



**TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
PULCHOWK CAMPUS**

**THESIS NO: 076/M.Arch/010**

**Transformation over time in Kochila/Saptariya Tharu Architecture:  
A case of Baswalpur village, Saptari, Nepal**

**by**

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**A THESIS**

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I hereby declare that the thesis entitled “**Transformation over time in Kochila/Saptariya Tharu Architecture: A case of Baswalpur village, Saptari, Nepal**” which is being submitted to the Department of Architecture, Pulchowk Campus, Institute of engineering, Tribhuvan University, in partial fulfillment of the requirements for the degree of Masters in Architecture (M.Arch.) is a research work carried out by me, under the supervision of Prof. Dr. Sudha Shrestha between Chaitra 2078 to Bhadra 2079. I declare that the work is my own and has not been submitted for a degree of another University.

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## ABSTRACT

Urban growth and speculative housing construction in rural areas, especially on the outskirts of the city, are leading to changes in property relations and the deterioration of traditional lifestyles and landscape characteristics. Rapid population growth in cities requires new housing demand, which is met in the surrounding rural areas. This process of urban development occurs with urban sprawl at the expense of rural areas. Tharus are one of Nepal's major ethnic groups, and Tharu architecture is an excellent example of ethnic architecture with an ecologically responsive design. However, as a result of urbanization, many Tharu settlements are shifting to fit modern demands, and traditional houses have been modified, with contemporary appliances, new spaces, and domestic life added that bear little resemblance to the original. In this study, changes in architectural forms in the Kochila Tharu community are observed. In attempt to extract an urban pattern or a rationale from what may appear to be haphazard disorder, a survey of traditional villages in the southeast of Nepal, specifically Baswalpur village of Saptari district, is undertaken. The objectives of this research are to investigate the paradoxical phenomenon of the house transformation in this village; to learn what the actual design of the traditional vernacular house is; to determine the extent of the impact of the transformation; to identify the factors that contributed to it; to examine the new roles and values that make up the new configuration; and to discuss how these new values affect the meaning and values of the original configuration. To investigate the effects of changing the physical configuration on the values and meanings of traditional homes, field observations were made at a few houses chosen using the purposive sampling technique, and interviews were conducted. The conclusion is drawn on the housing form in relation to people's way of living and will shed light on socio-culturally sustainable development and regeneration towards contemporary settlement of Baswalpur. This paper will also contribute to the argument for an impact of typological processes of physical environment on the local culture. With the identification of these factors, it is anticipated that this study will serve as a reference on house transformation and offer a reasonable perspective for community, government, and development measures on the transformation of traditional homes in Baswalpur village.

**Keywords:** Urbanization, Modernization, Housing Transformation, Traditional Kochila Tharu settlement, Urban influence

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# CHAPTER 1. INTRODUCTION

## 1.1 Background

The boom and speculative housing of rural areas, mainly suburban cities, has caused changes in ownership, and deterioration of traditional styles and panorama functions. The fast population boom of cities creates new housing needs, which are met via the encircling rural areas. This city improvement technique happens as the metropolis expands into rural regions. (Koca, 2006). The rapid increase of populace in cities necessitates new housing demands and this need is met by peripheral rural lands. This urban improvement manner occurs as city sprawl through rural regions (Koca). In a period of luxurious development and technological development that dominates every factor of our lives, it is able to be retro, to regress in time and area and attend ourselves to the cause of vernacular constructing practices (Kazimee, 2008).

Ozturk (2012) explains that technology exists by building constructed forms and plays an important role in human life to maintain its existence. Ozturk also believes that humanity, considered as an individual, has acquired the ability to coexist, entering the process of participation, becoming part of society, and leading humanity to become part of the cycle of change and transformation. The worldwide expression of changes due to sustainability, globalization, and technology in architecture has led to the transformation process. Likewise, Ozturk describes the transformation as a change "coming into a different from its own, occupying another position, changing form" (p. 25). Transformation is basically a change or shift in function from village to city. The influence of urban growth is a change process that happens in the urban periphery zone. Notions like "globalization, sustainability, ecological approaches, and technology diversify the change-transformation circle and the content of architecture" and "it can be argued regarding the term globalization that tradition is interchangeable with global values" all have a close relationship to change and transformation (Ozturk, 2012). The concepts of change and transformation are also a result of the consumption-based society, and as consumption rises, so do individual efforts, and as a result, these concepts are no longer regarded as concepts that can be individually perceived. Additionally, as various types and forms of building works appear, the consumption culture shaped by the economic structure can gain more attention and be more readily accessible to consumers (Ozturk).

To develop every settlement, a number of ecological, socioeconomic, and cultural regulators are at action. When these regulators and controllers are not present together, a settlement cannot be reached at that moment; rather, it is resolved through the constructive interaction of several controllers under new conditions. These settlement controllers are produced from two different backgrounds. Some of them are created using natural background knowledge, such as the location of water, the location of agricultural land, the location of barren land, the topographic features, the angle of the sun, the climate, and the availability of construction supplies. Others arise from socioeconomic factors, such as a safe and secure location, technology, common religious and philosophical ideas, individual preferences, and financial stability. These controllers act as a settlement's background forces and aid in the settlement's gradual transformation. This change in the settlement begins at the hamlet level. (Rashid, 2017). Building function, changes in spatial space, and building density are all examples of spatial transformations (Muladica, Murtini, & Suprapti, 2018). Additionally, the needs and economic development of these settlements have an impact on the expansion of the communities that establish the pattern of settlement change. Many indigenous beliefs are now obsolete due to well-known architectural representations. Despite their extensive history of usage and the valuable lessons they teach, conventional construction methods, accompanying forms, and materials are viewed as inferior. Some of the patterns that underlie transformation can also be considered as reasonable responses to societal and cultural changes. For instance, to address the housing scarcity, some alterations in the typical settlement were required. Similar to the last shift, others demonstrate a wish to live a more comfortable existence (Saleh, 2014)..

In most developing countries, contemporary buildings are unlikely to meet local conditions because transferred technology and imported designs fail to meet physical and psychological needs; Furthermore, blindly copying new concepts without any alteration has negative consequences for the old social, environmental, and cultural values of the area (Gopinath, 2014). In many cases, planning policies that combine old loyalty with individual self-interest have facilitated the process of cultural decline (Saleh, 2014). What's more unexpected is that, despite significant use of new building materials, processes, and equipment, new projects have failed to respond appropriately in climatological or environmental terms (Saleh).

Nepal is one of the multi-cultural countries with different indigenous groups living together in harmony sharing their cultures, traditions, rituals along with their way of living. Tharus are believed to be one of the largest and oldest ethnic groups of people, living in villages near dense infested regions that were isolated over the millennia, allowing them to develop unique “diverse cultures and languages” (BULLETIN, 2013, p. 1) inhabiting in Nepal (Rajaure, 1981). Tharus can be seen in the southernmost part of Nepal and Nepal’s southeast border India where the Tharu used to work usually as farmers or peddlers. “The Tharu, however, recognize many different subgroups distinguished by clan, region, cultural differences, and language” (Eichentopf & Mitchell, 2013) and endogamous sub-groups of Tharus are Rana, Katharia, Dangaura, Kochila, and Mech (Rajaure, 1981). Kochila tharu is one of a subgroup of tharu where Kochila Tharu people live in the districts “are Bara, Rautahat, Sarlahi, Mahottari, Dhanusa, Siraha, Udayapur, Saptari, Sunsari, Morang and Jhapa” (Eichentopf & Mitchell, 2013, p. 1). According to Boehm (2018), the Kochila/Morangia Tharu, found mostly in Morang and Sunsari, are distinguished from other Tharu who call themselves Kochila in Siraha, Udayapur, and Saptari districts by dress, customs, and language. But generally, Kochila tharu is also known as Saptariya tharu, since dominant Kochila Tharu people live in the saptari district.

Traditional Tharu architecture, like most other similar examples around the world, evolved in response to the needs of its users and the region's living environment. Geographic, climatic, sociological, and historical elements all have an impact on a region's architectural style. Many developing countries have seen a major change in architectural design systems that were previously used, with no way of adapting to the new style. As a result, local architectural forms, which have been reacting to people's physical and cultural requirements for thousands of years, appear to be overlooked. The majority of old residences are being turned into contemporary amenities from a similar archetype. Even though many characteristics of traditional homes were finest in their context, it is challenging to integrate modern living habits into a traditional setting. In addition, the new generation is drawn to the quick accessibility of all of the modern hi-tech age's conveniences

## **1.2 Rationale of the Research**

### **1.2.1 Need of research**

In light of the changing built environment in traditional settlements, it's important to first investigate and see what individuals in traditional communities have done to adjust their dwellings to meet their changing demands. It's also important to figure out what kinds of factors are impacting their decisions concerning new dwellings and how these elements interact with or are influenced by, the wider forces that they face as a community. We can only hope to discover acceptable solutions for the provision of adequate shelter if we comprehend the local and global factors at work in the transformation of traditional communities.

Traditional settlement studies tend to be either exclusively focused on the recording of vernacular architecture and building, or they are sociological studies that primarily deal with the socioeconomic and cultural milieu in traditional environments. Only recently have studies on traditional living settings begun to explore connections between the two, the physical built environment, and the intricacies of the populations they host. This research aims to contribute to the area of traditional environment studies by delving deeper into the whys and hows of changes in these extremely indigenous constructed environments and tying these changes to the complex regional and global dynamics at work all over the world. Further, a detailed study, seeks configuration compatibility and spatial organization of the houses and their transformations resulting from the lifestyle and behavioral system of the inhabitants within different historical periods.

### **1.2.2 Importance of research**

The study aims to analyze the history of the development and emergence of the Kochila and Saptariya Tharu architecture. It also aims to provide a deeper understanding of the multiple factors that affect the housing transformation process in rural areas. This research is regarded as a contribution to research because it focuses on the spatial characteristics of the houses and the perceptions of the people living in these regions about the housing modernization. The objective of this study is to provide a comprehensive analysis of the various house types in rural areas, which will contribute to the knowledge of housing in these regions. It also aims to provide relevant information to the professionals who are involved in the design and construction of

houses in these areas. The research also aims to provide valuable information about the design strategies utilized by the Tharu community. It will also help develop new strategies that will improve the sustainability of the houses.

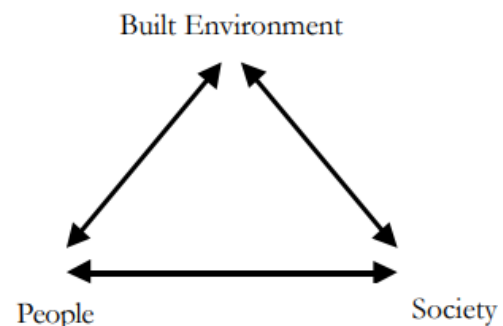
It is assumed that the individuals involved are experiencing a change in lifestyle. Their changing way of living also has an impact on the process of transformation. This study gains additional relevance by looking at how the dynamic characteristics of homes in traditional rural communities could serve as a foundation for housing development and improvement. It is anticipated that the study's findings would shed light on how dwellings have changed in rural communities and how they have utilized available space. Furthermore, this study makes an effort to examine housing transformation procedures in order to learn about their advantages and disadvantages and how the former may benefit other traditional rural settlements. Lastly, the findings of this study will be used by policymakers and the design experts to come up with new strategies and designs that will improve the living conditions of the Tharu community. These new designs should be based on the principles known as ecological responsive design.

### 1.3 Relevance of this study within the field of Built Environment Analysis

Built Environment Analysis, a field that developed from Building Function Analysis and was founded in the faculty of architecture at the Royal Institute of Technology in Stockholm, has oversight over this study (Nguluma, 2003).

The present housing transformation study is covered by built environment analysis since it examines how people alter the dwellings, they

live in. When seen, particularly in their early stages of expansion, traditional communities may appear disorganized, chaotic, and unplanned. The actuality, nevertheless, follows a specific order. These settlements are the outcome of choices and actions influenced by culturally derived conceptions of what dwellings are or may be. Both Built Environment Analysis and this study on housing transformation must take the user's perspective into consideration (Nguluma, 2003).



**Figure 1: The Built Environment Analysis triangle; (Source: Nguluma, 2003)**

The purpose of the study is to shed light on how the transition is taking place, the desire of individuals to own modern homes, and the effects of change. The study focuses on the process of transformation and the reasons behind house modifications. Designers can gain insight on basic units from the past by looking into how people interact with their environment. Studying the built environment will advance the fields of building, design, and planning and help experts better understand how individuals interact with it.

When houses are built, the goal is to address the immediate demand of sheltering the residents. However, the structure of a home may become restrictive and incapable of meeting the growing demands of the residents, necessitating the need for the owner or occupier to alter the property. By studying the built environment, one may learn more about how people interact with their homes and surrounds. Understanding the transformation process is essential because it increases knowledge of how the home functions, how household members interact with one another, and how the built environment functions as a whole. By examining the processes involved in housing transformation, different types of dwellings, and spatial uses, it is feasible to integrate research knowledge, practice, and design—all of which are crucial in the study of built environments. Building environment analysis study is essential since it provides knowledge that can be utilized to improve living conditions (Nguluma, 2003).

#### **1.4 Statement of the Problem**

In terms of the materials utilized, the construction methods, and the spatial design, the housing typology in Tharu communal settlements is evolving dramatically. The simple mud homes with thatched roofs built around a courtyard that formerly clearly identified the Tharu village's unique countryside atmosphere have mostly disappeared. Traditional architectural characteristics from the Tharu villages are rapidly being displaced by more contemporary dwelling construction methods that seldom ever match vernacular framework knowledge.

According to studies, Nepal is both the most rural and the most urbanized country in South Asia (Meier, 2018). Because of the shrinking distance between society and cultures, the influence of the quickly changing process is increasingly visible on a local scale (Ozturk, 2012). Similarly, the study indicated that traditional Tharu houses built of mud and wood are on the edge of extinction and that this is occurring to individuals

who opt for contemporary concrete dwellings (Setopati Nepal's digital newspaper, 2075). Likewise, the study also found that factories producing traditional mud tiles and other items have closed down and shortages of wooden tiles, khariya grass, and alluvial mud ponds are another reason people are switching to brick-and-mortar houses. The traditional built forms of traditional architecture are a direct outcome of the influence of culture and the climate of the region (Gopinath, 2014). Today, many tharu villages are undergoing a lot of changes due to several factors like social, economic, cultural, etc.

The Tharu people currently struggle with choosing between maintaining their traditions and adjusting to modern life. Old buildings have changed as a consequence, adding modern conveniences, new spaces, and a new way of life that has little to do with the original (Hanan, 2012). The traditional settlements of many Tharu villages are gradually striving towards the standard of living of the city, and as the basic family living system changes, traditional building practices are disappearing. Traditional housing is subject to change as it is increasingly affected by the modernization effects of the capital economy.



**Figure 2: Transformation of houses in traditional settlement of Saptari**

Many Tharu people are moving to the outskirts of cities as their economic status improves, while in rural areas they are also starting to choose modern buildings forgoing traditional houses, in some places, members of the Tharu community have started homestay tourism and have preserved their traditional houses (Setopati Nepal's digital newspaper). The previous study has shown that these modern building forms do not respect the environment to a considerable extent by generating areas that are not truly pleasant and are afterward conditioned by artificial techniques (Gopinath, 2014). Studies revealed that socio-economic factor is the main reason for the transformation of any traditional settlement. It is all known that Tharu architecture is very important in the evolution of Nepalese architecture and the transformation which has been brought

by urbanization and modernization along with the change in lifestyle of local people with modern needs and demand has led to the changes in a traditional settlement. The changes which we have experienced is the transformation of traditional settlement in Tharu village of Saptari district is in the tangible part only however the intangible part is still strong to survive and continue to survive with no or minimum alteration. For this study, I have organized problems seen in the transformation of the traditional settlement of Tharu village in the following points:

### Layout

The compact settlement Pattern, courtyard planning, and street layout of Saptariya tharu village have been transformed after the improvement in the infrastructures.

### Skyline

The industrial revolution has given us technology with new materials like steel and glass which is great for humankind. Including this, the improvement in the economic status of people and urban influence has led the way in constructing a building from traditional to modern type. The rapid urbanization of rural settlements has led to an uneven skyline in traditional settlements.

### Built heritage

The term "built heritage" refers to structures like cathedrals and cemeteries, fences and industries, homes and hotels, marketplaces and museums. It consists of places, districts, and street scenes. It is the outward expression of the evolution of our culture.

From the study (Setopati Nepal's digital newspaper, 2075), the way of constructing kochila tharu house has been changing or nearly in the verge of extinction especially in the residential sector due to the difficulty in availability of local materials that were used traditionally for construction. Nowadays, bricks, cement, and iron are more easily available than bamboo or thatch. So, people are moving to concrete buildings that are strong and durable in comparison to mud houses. From my observation and experiences, I can say that the design and planning of some modern buildings lack functionality due to which many rituals are not being able to conduct as they should be.

Other important things that are affected due to modernization/globalization are:

- Extinction of traditional ornaments
- murals and wall paintings

- Use of traditional dresses
- Traditional songs and dance
- Use of folk musical instruments
- Traditional handmade products

## 1.5 Research Questions

The major objective is to explore how housing is changing, how space is used, and the spatial characteristics of interior and outdoor space in traditional rural villages. Understanding what is being transformed, how transformations occur, the reasons driving the transformation, and the outcome. The research questions are listed below:

- How Kochila/Saptariya tharu architecture has emerged in the overall period in history?
- What are the aspects of the area in which the Kochila/Saptariya tharu architecture has been changed?
- How does the socio-economic factor affect the use of spaces and the spatial configuration in the house forms and material culture of the village?
- How can house types in the village be classified and analyzed?
- What are the people's attitudes and responses towards housing modernization?

## 1.6 Validity of the research

Based on the level of change in many different regions of the world, similar sorts of studies on traditional settlement transitions have offered many insights and numerous ideas. One of the primary causes of the threat to indigenous architecture is the acceptance of modernism by our culture, both internationally and domestically. Baswalpur Village, one of the traditional Tharu villages, is a significant study area that has lost its identity as a result of transition. It has its own character and a traditional environment of eco-friendly design. Lack of knowledge arises on the utilization of spaces, why alteration affects spatial aspects, and how individuals see housing modification. Although traditional/rural towns offer a wide variety of homes, there is a lack of knowledge of current and emerging home styles as a result of transformation, which may be further studied by specialists like architects and planners. It is also uncertain if the modified dwelling styles are efficient in terms of density, improved spatial qualities facilitating cross ventilation, and appropriate light. Given this knowledge gap, addressing current housing and planning issues in traditional rural

villages is very difficult. The livelihood, culture, and language of the tharu architecture have been the subject of numerous articles, journal papers, books, and peer-reviewed papers, many of which are based on the mid-western and far-western tharu community; however, the documentation regarding the change and transformation related to the eastern Kochila Tharu architecture is lacking, which is the primary reason that interested me to do research on this topic. And in my view, this justification supports my research idea.

### **1.7 Scope and Limitations**

**Scope:** To approach the importance of continuity of traditional systems for adaptation in contemporary design practice.

**Limitation:**

- The study is limited to stand-alone residential buildings
- The choice of buildings is done on the degree of level of transformation (i.e., from traditional to contemporary type)
- The study is entirely architectural, based on on-the-spot field observations and discussions with locals.

### **1.8 Thesis Outline**

The first chapter of this thesis outlines the introduction of the study. It deals with background, statement of the problem, objectives of the study, Need and importance of the study, the conceptual framework of the study, scope, and limitation of the study, and expected to output from the study. The second chapter presents the theoretical framework regarding modernization, urbanization, and the transformation of house forms. The third chapter outlines the ecological responsive design, and tharu architecture. The fourth chapter presents case study of different traditional settlement to draw out inferences. The fifth chapter presents a research methodology that deals with the research design, research strategy, nature and source of data, population and sample size, method of data collection, and method of data analysis. The sixth chapter includes study area of Baswalpur village. The seventh chapter presents site observation and data analysis and interpretation of the transformation of the architecture of the Tharu village. The eighth chapter includes the classification and analysis of house types. The ninth chapter includes finding and discussion of the research study and finally, the tenth chapter presents the conclusion, and recommendations

## **CHAPTER 2. THEORITICAL FRAMEWORK**

Theories and ideas pertinent to the topic are reviewed and discussed in this chapter. In order to analyze the process of housing transformation in connection to concepts of modernism and modernization, home types, usage of spaces, and spatial characteristics, a theoretical framework containing pertinent variables must be found. The fundamental presumption is that the current housing transition should be seen in light of the developmental elements ingrained in modernism and modernization. There is also discussion of certain ideas.

### **2.1 What is a theory?**

A theory is a structure in which various ideas and statements have been logically integrated (Nguluma, 2003). Lundequist (as cited in Nguluma, 2003) asserts that concepts are how people see the world. He argues that how we understand the world depends on how we perceive it. Concepts evolve when societal transformations take place. Additionally, concepts alter as relationships with one another and our perspective of the world alter. These are the building blocks of communication. It is challenging for scientists to describe their discoveries without established notions (Nguluma). This framework guides the analysis and discussion of modernization theories, a theoretical framework for classifying and analyzing different types of houses, housing adjustment theories, and ideas influencing the design of houses.

### **2.2 Traditional versus modern houses and building materials in the transformation process**

Local building materials, which can be conveniently gathered in the village, are typically used to construct traditional homes. Typically, craftsmen and household members build houses, frequently with the aid of friends and neighbors. The technology and techniques utilized are straightforward. "Specialization in the traditional households increases the technological resources as each artisan passes on what he learns and adds to the store of know-how," claims Oliver (as cited in Nguluma, 2003). Because buildings are constructed using industrially manufactured construction materials like concrete blocks, corrugated iron sheets, and concrete tiles that cost money to acquire, the transition from traditional to contemporary building materials is a sign of modernity and the cash economy. While some may initially build homes using

traditional building materials, they eventually change to "modern" building materials, locals from traditional rural villages sometimes relocate their residences to big metropolitan areas in order to accommodate themselves to urban ways of life. One can wonder if the homes people live in, like their economies, represent their lifestyles. Why are individuals replacing traditional construction materials in their homes with those made by factories? Could this be connected to the shift to an urban lifestyle, given the utilization of "modern" building materials and the desire for "modern" homes? These issues will be covered in more detail in the next chapters. However, it is acknowledged that traditional housing knowledge is not a single phenomenon and cannot be researched broadly.

Traditional home builders are addressing the issues while taking into consideration their extensive knowledge. For instance, concrete structures that are anticipated to fulfill the same purpose as timber structures are designed using expertise with timber structures. The modernization of homes is included in the study of housing transformation, although it does not explicitly track this development from a conventional point of view. But in the context of this study, it is thought crucial to comprehend the idea of a conventional dwelling. According to Norton (as cited in Nguluma, 2003), some aspects of traditional approaches may still be effective, but others may have become ineffective, impossible, or generally unsustainable due to a lack of local resources, the sheer number of people requiring housing, the need for more buildings more quickly, or a change in or inadequacy of funding sources.

The settlement of Baswalpur uses traditional building methods, although they take a lot of time and need several steps. The requirement for builders to frequently generate their own construction materials and components, as well as to put up with rigorous exercise labor, occasionally in really unfavorable weather, is a factor that significantly hinders the effective creation of buildings.

### **2.3 Theory of determinants of house form**

Research of vernacular architecture's variables for defining home shape highlighted the fact that there is no one determinant. It's interesting to note that a wide variety of socio-cultural elements, viewed in their broadest sense, have contributed to the development of the dwelling shape rather than being the sole cause of it. Furthermore, the research notes that there is always some "freedom of choice" with regard to housing shape, even

in the face of severe climatic, economic, material, and technological limitations. Basic requirements, the status of women, families, privacy, and social interactions are other socio-cultural variables that influence the home design. The variables that determine the form of the house also take into account how people see the ideal life. The notion that peoples have of an ideal existence ultimately determines the form of a house, shapes the space, and shapes their connection, given a certain climate, the availability of a particular material, and the limitations and capabilities of a particular degree of technology (Nguluma, 2003).

The way that individuals perceive these factors, as well as their level of existence and significance in society, affect how houses are built in different ways. As a result, both consistency and change are present in the character of man and his institutions, which has an impact on the architectural form. The research study claims that the home shape is still viable and useful even after the culture in which it was created has changed. Additionally, certain aspects of behavior and way of life are stable or change gradually. It is frequently noticed that older structures are rebuilt just for the sake of newness, not because they are less habitable, worthless, or suitable for the way of life of the time (Nguluma, 2003).

According to material variables, there are different degrees of freedom for socio-cultural influences to determine house shape. According to the study, building materials give socio-cultural elements a framework in which to operate, suggesting that people typically make the most use of the available building materials by taking the local environment into consideration and making the home as pleasant as possible. In order to relate the importance of elements to their degree of change, there are built environment aspects that change quickly and others that last for a very long time and change very slowly. Some components that are kept are occasionally changed to comply with economic, political, technological, and other values.

Numerous social, economic, and political issues also have an impact on house shape in addition to socio-cultural ones. Given the socioeconomic benefits of a new building form, for example, space utilization may come into play when deciding whether to keep an existing building form even if it is still habitable and meets many of the users' perceptual criteria. Similar to this, political considerations may prevail over socio-cultural or economic considerations in determining whether to keep a building. Socio-

cultural variables are the most compelling of the many aspects that affect how houses are built. This is due to the fact that individuals alter their homes to meet demands from growing families and functional separation to improve privacy within particular cultural contexts.

## **2.4 What constitutes a house type?**

This research aims to examine the changes in housing in traditional rural communities, where most houses were not created by architects. The topic of house types should be discussed in order to evaluate how newly emerging house types connect to the factors driving transformation. The architect, builder, or craftsman might generalize from the type or alter its application according to the ongoing transformation process (Nguluma, 2003).

A new type can be created by combining other kinds. Both time and place are where type is placed, although there is a case to be made that place location is relative because things found in many locations can be grouped together into a single typological class. It is possible to say that every type derives from one or more others because of the many transformations that types are capable of undergoing. Typological transformation is the process of converting an existing type into a new type. Transformation can take many different forms, such as blending more than two kinds by transferring characteristics from one to the other, extending or exaggerating a particular characteristic, or changing the scale. Typological transformation is a process that is not just seen while evaluating the past; it is also a powerful resource for conceptualizing the future (Nguluma, 2003).

## **2.5 Theoretical framework for classification and analysis of house types**

It is important to determine how to categorize different types of houses in traditional villages for the sake of this study. The classification of various home types is being examined. There are several methods to categorize different types of houses. According to Lawrence (as cited in Nguluma, 2003), dwelling types may be categorized by an examination of architectural blueprints and site visits. Lawrence offers additional characteristics that might be used to categorize different types of houses. These criteria consist of:

- Stylistic rules governing how building facades are constructed
- Socioeconomic factors relating to the inhabitants' work status and income (e.g., working class or middle class)

- The number, size, and configuration of housing units on each floor level of residential buildings (for example, whether there are two or three rooms, a floor plan, or only one façade with fenestration);
- The design and construction of the structures (such as timber-framed, brick- or stone-walled), which is utilized by both experts and laymen to understand the nature of physical boundaries (such as walls, fenestrations, and door openings) to residential buildings.

## **2.6 Urbanization, Globalization and Modernization**

The rate of urbanization has increased year after year due to the fast expansion of the urban economy and social transformation. Despite the necessity for urban expansion owing to the need for additional homes and rapid population increase, rapid urban growth and urban expansion have occurred. Cities and villages have expanded into the surrounding countryside, and new homes are being constructed among the fields, transforming farms and communities into new housing projects (Koca, 2006).

Some of the towns on the outskirts of cities evolved into a transition zone between urban and rural life. Although these rural regions have served as a buffer zone for urban sprawl, they also have the potential to become new urban development zones. By generating a landscape of dispersed development, villages and farms are linked to cities and towns. According to Maestas (as cited in Koca, 2006), scattered urban expansion has had an impact on the land use character of rural regions, particularly agricultural and protected lands. This speculative urban expansion has altered the socio-spatial aspects of rural communities.

According to Altman and Wohlwill (as cited in Koca, 2006), the terrain's character has the characteristic of landscape, which needs the preservation of distinctive cultural or ecological resources and structures. Similarly, the type of sprawl style of urban growth via rural regions can vary based on the historical settlement pattern and varies from region to region. In this regard, identifying the distinctive characteristics of the rural village based on location and historical process is critical in order to ensure the area's survival (Koca, 2006). Local cultural identity is becoming increasingly essential in this age of globalization.

As researchers have pointed out, the concept of modernity is characterized as the historical challenge of moving from received orders to produced orders (Baper, Hassan,

& Mustafa, 2010). Similarly, modernity is a quest without an established formula. It is not a translation of the pseudo-truth that emerged from other realities as a source of all obstruction, but a transforming power to accept and use those occasional benefits (Baper, Hassan, & Mustafa). Similarly, many researchers contend that urbanization reflects changes throughout whole cultures and is a multifaceted representation of physical, geographical, institutional, economic, demographic, and social aspects (Shrestha, 2021). Furthermore, the phenomena of urbanization are inextricably tied to modernity, industry, and the sociological process of rationalization, with urbanization causing massive social, economic, and environmental changes (Shrestha).

Yonda (2016) stated that modernity has three meanings. First, because the overall meaning is comparable to all forms of social-progressive development, if individuals go ahead to recognize improved scale. A move from living in the cave to staying in the structure is unquestionably an example of modernity. The second connotation is more historical in nature, and it refers to the alteration of social, political, economic, cultural, and mental factors.

### 2.6.1 Migration and social change

Oxford defines change as "an act or process through which something changes" (Ozturk, 2012). Change is

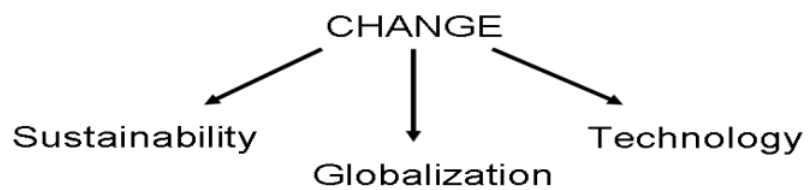


Figure 3: Change and the relationship between concepts

essentially a state that arises from the essence of existence and so constitutes transformation. Globalization, sustainability, ecological methods, and technology all contribute to the diversification of the change-transformation circle and the subject matter of architecture. It might be claimed that when it comes to the phrase globalization, tradition and global ideals are interchangeable. The diminishing distance between societies and cultures, as well as their participation in the fast-changing process, may be sensed more locally (Ozturk). There is little evidence of social change inside the Baswalpur village since no new social differences have emerged.

The research (Yonda, 2016), defines social change as a significant change in social structures, behavior patterns, and the social international system that includes norm

change, value change, and cultural phenomena at a certain time. Similar to this, the research asserts that probable changes include changes in composition, structures, functions, sub-system relationships, and environments. The language of social change determines the essence of social change, such as indications of displacement, migration and the blending of core traditions to new ones, or the fusion of two distinct cultures that may ultimately be recognized by society as the social norm. The observe additionally states that the manner of social alternate may be interpreted in numerous ways, along with: 1) gradual change, also referred to as evolution, and fast exchange, also called revolution; 2) small-effect exchange and massive-effect exchange; and 3) anticipated exchange and sudden change. Social change cannot be consciously recognized; it's miles as much as society to interpret the trade and pick whether or not it's far the alternate they choice. As a substitute, change does now not necessarily have a beneficial impact; it can additionally have the alternative effect.

Migration is more common in areas where individuals have easy access to opportunities and amenities. The majority of individuals are drawn to areas with higher living standards and more opportunity. And, unlike in the past, these services are mostly provided in metropolitan areas rather than in rural areas. Many residents of Baswalpur village relocated (permanently or temporarily) to the metropolitan area in quest of a brighter future, leaving the settlement in a poorer state. However, since the village development committee was converted to a municipality, significant changes have occurred in the village region.

## **2.7 Modernity and modernization**

The first is modernism, which is defined as "the present, or current, or using as its opposite the idea of earlier, of what is the past." "New as opposed to the old" is the second meaning. Thirdly, modernism is also defined as breaking with tradition and symbolizing anything that does not accept the past's inheritance. Modernity also refers to the characteristics of contemporary life as well as how a person perceives these characteristics. Modernity refers to a way of looking at life that is connected to an ongoing process of change and transformation, with an eye toward a possible future that differs from both the past and the present. Interestingly, the strengthening of ties between the local and the global is a significant feature of the modern world. People

are viewed as active agents who have the power to alter their own fates, the natural world, and society (Nguluma, 2003).

Modernity is a compelling concept in emerging nations, filled with images that are both terrifying and thrilling. Conventionally, the transition from traditional to contemporary housing can be perceived as a progression, or it can be understood as a linear change where traditional housing elements are gradually replaced by modern ones. Such transition is aligned using a modernization paradigm, one of the major currents in theory of development within the social sciences. The transition from traditional to modern housing involves a number of aspects, such as space usage, home design, building materials, and construction techniques.

Modernization of housing include upgrades to housing. Modernizing homes mostly involves switching from conventional to contemporary building materials and altering how space is used. Other causes identified for the modification of homes include the shift from a subsistence to a cash economy and the desire to lead a contemporary life. It is also noted that, in contrast to ancient societies, modern societies view homes as a way to generate revenue through the rental of homes or individual rooms. The modernization covered in this study takes into account the kind of houses that individuals were residing in prior to moving into traditional rural settlements. The starting point for this investigation is the attempts made by individuals to better the situation by constructing new structures or expanding or altering existing ones.

## **2.8 Modernization and housing transformation**

It may be interesting to explore modernization of housing in traditional rural villages where buildings are of poor quality and the majority of residents are low-income workers. The debates about modernization and modernity must be conducted with caution. The theories must be used in a certain context. For example, especially in the context of change, the process of housing transformation taking place in traditional settlements in Baswalpur village might be associated to modernity. However, it might be related to other variables.

The strong demand for quality housing has recently been made worse by the rapid pace of social and economic growth. Urban residents, particularly those who have attained a certain level of social prestige in terms of good education, successful enterprises, and public employment, opt to live in "modern" residences that satisfy specified

specifications as a result of the transition to a modern economy. It is believed that people who desire to be modern would change their homes in a variety of ways. A crucial aspect of third country modernization is how modernity affects native traditions. Material conditions are incompatible with the growth of contemporary consciousness since non-industrialized nations' socioeconomic foundations and formations, comprising culture and educational backgrounds, are significantly different from those of industrialized countries Nepal (Nguluma, 2003).

### 2.8.1 Transformation process

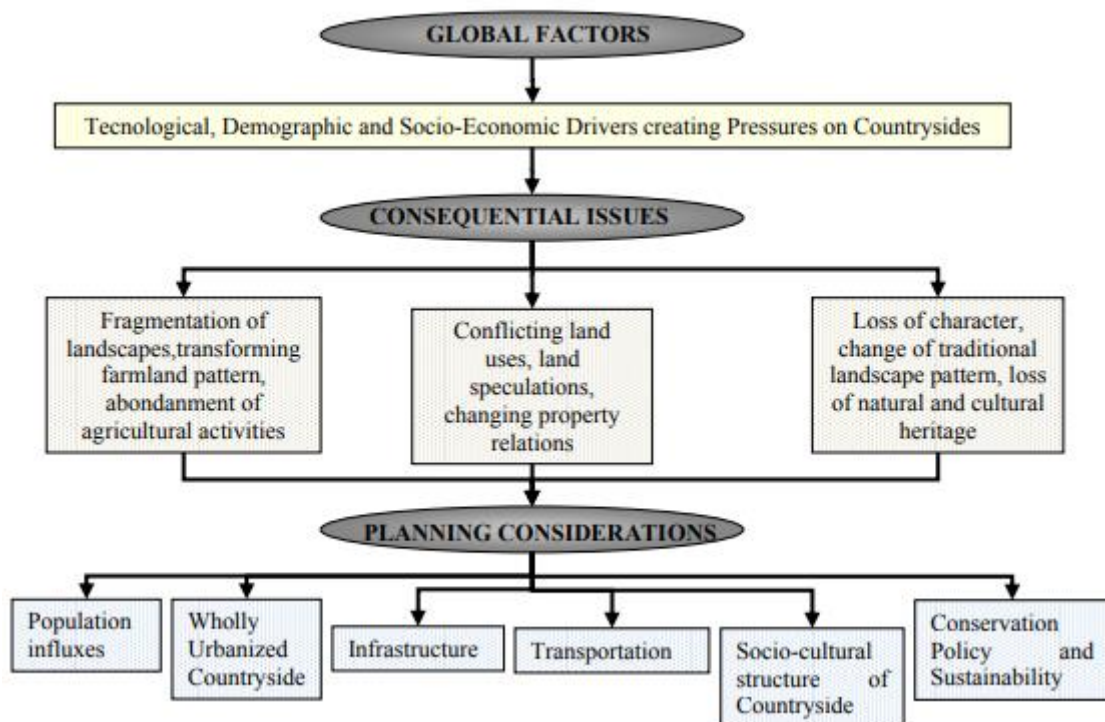


Figure 4: The conceptual diagram of the causes and consequences of transforming countryside (Koca, 2012)

### 2.8.2 Factors influencing transformation (Shiferaw, 1998)

- Tenure form
- Financial sources
- Original dwelling function
- Employed labor
- Infrastructure and support services
- Building material and building orientation

### 2.8.3 Transformation motives (Shiferaw, 1998)

The following succinctly summarizes the common reasons for extensions:

- Aspirations that are sociocultural dictated
- The expansion of families
- The desire to earn money (via subletting, kiosks, local bars, handicrafts, etc.)
- Adaptation to adverse climatic circumstances
- The desire to imitate common dwelling types

## 2.9 Modernism theory and the evolution of house design

Modernism theory is one of the ideas that has the most aspects of a developmental viewpoint. The external shape of buildings has received the majority of attention when discussing modernism in architecture and urban planning. However, how architectural design and spatial organization may alter human behaviors was an essential component of the original classical modernist thinking. Furthermore, it contributes to the formation of a new human being in conformity with a modernizing society. Modernism, which took inspiration from functionalism, stressed design for quantifiable features such as fundamental light and air needs, function separation inside the house, and standard equipment for practical living. According to Vestbro other aspects of modernism include:

- The practical division of space into sections for activities including sleeping, cleaning, working from home, and connecting with family and friends.
- Workforces that are more effective due to health-promoting norms and designs.
- It is believed that creating houses for nuclear families and individuals will discourage thoughts and affinities that are restricted by tradition.
- Supporting communal facilities that serve a leisure and educational function, such as children's parks, play areas, and clubrooms for political discussions and adult education.

Functionalism encompassed medical knowledge developed between the 1800s and the first decade of the 1900s, according to Gehl (as cited in Nguluma, 2003). In the 1930s, this led to healthier designs. Homes were expected to have access to open space, natural light, air, ventilation, and other amenities. Buildings were consequently made to face the sun. Separation of functions, design for health and comfort, support of a modern lifestyle, and design to increase productivity are further key elements that foster the growth of house design.

- **Distinction between functions and health**

It is asserted that one tactic to encourage growth is to separate activities in order to accomplish everyday functioning in a home. One instance is in kitchens where the fuels include wood, paraffin, and charcoal. To reduce health risks connected with carbon monoxide from fuel combustion, these spaces should be segregated from sleeping and living areas. To minimize pollution, pit latrines should be positioned a fair distance from other functions of the home.

- **Comfort**

A good house design is intended to take climatic comfort into account. Cross ventilation, plants for cooling and enjoyment, and views of greenery regions are all comfort features. The fundamental purpose of these design factors is supposed to be achieving comfort living in modernized dwellings.

- **Design for promotion of modern lifestyles**

As urbanization rises, individuals have a propensity to alter their lifestyles in order to adapt to the circumstances in metropolitan areas, where people from various socio-cultural backgrounds coexist. Separation of responsibilities such as having different sleeping quarters for parents, children, and teenagers, for instance, tends to enhance privacy and has been seen as a feature of modern life.

Contemporary architecture is neither just or even largely a justification for new construction technology, according to Holston (as cited in Nguluma, 2003). New architectural typologies and development conventions have been created as an instrument for social change. In order to understand if traditional settlements have undergone social change due to home builders, the research looks at the emergence of new dwelling forms. Whether the altered homes reflect the locals' altered socioeconomic status is the crucial question.

- **Design for promotion of productivity**

It has been argued that facilitating health, safety, and decent sleep may enhance productivity. Modernists also believe that separating functions, providing privacy, and abolishing the street as a social area will develop a more rational human being.

## CHAPTER 3. LITERATURE REVIEW

A literature review assists in thoroughly studying the many elements and qualities of project books, journals, design papers, and documentation. We discovered via study that we need to learn more about the requirements of our cases and initiatives.

### 3.1 Ethnic architecture

Ethnic architecture includes a variety of traditional and vernacular building styles that may be found across the nation's numerous ethnos - linguistic subgroups. These forms include permanent and temporary houses, granaries, fortresses, places of worship, and other transitory constructions. The various ethnolinguistic communities develop ethnic architecture. Ethnic architecture is primarily inspired by its surroundings, notably the climate, geography, vegetation, and biodiversity. It also addresses communal and social goals, such as the desire to be protected from hostile and roaming tribes and to socialize with other humans (Marasigan, n.d.).

Ethnic architecture is informal and intuitive, typically produced by the owner and constructed using materials from their family and the local community. Tradition typically has an impact on the design first, followed by chance, audio, or improvisation. Tradition establishes the fundamental shape or form and structural principles, whereas chance allows the builder, designer, and craftsman to improvise and make changes along the way, relying on instinct and aesthetic awareness to meet design and execution issues (Marasigan, n.d.).

The majority of ethnic homes follow a similar design: they have steep thatched roofs to aid in drainage; they are elevated on posts or stilts to protect from the dampness and humidity of the earth; they have slatted flooring to let in cool air from below; and in the lowlands, they use bamboo while in the uplands, they use nice and tight-fitting solid planks to help retain heat. The typical ethnic home is a multifunctional one-room building that is airy, bright, and comfortable while still being sturdy and structurally sound (Marasigan, n.d.).

The knowledge of the vernacular building tradition of a long line of expert craftspeople who successfully combine beauty and usefulness into a single harmonious whole is reflected in ethnic homes as a whole. The ethnic home expresses the native style of allocating space both internally and outside. The ethnic home is small in size since it

serves primarily as a shelter from the weather as well as a place to sleep, cook, and eat. Its residents spend the most of their time outside, either in the fields or working under the house's extended eaves. The home also serves as a gathering place for people's cultures at other times. Weddings, funerals, death anniversaries, religious ceremonies, and other life-cycle celebrations are held there. On such occasions, ceremonial platforms may be built beside or near the house, or on specific elements of the home, such as the porch. The entire home may be utilized by simply rearranging parts to provide additional space and a more fitting setting for the ceremonies (Marasigan, n.d.). Ethnic architecture can be classified using four different considerations (Marasigan, n.d.):

1. According to structural methods used: - cave-dwellings, elevated one-room huts over land or water, multilevel houses, longhouses for the community, tree houses, land houses.
2. According to use or function: - places of worship,
3. According to historical period: - the ancient, modern, and contemporary
4. According to cultural groups or people: - Tharu, Newar, Gurung, etc.

Architecture, like other kinds of art, is a historical product. Ethnic architecture has evolved in reaction to changes in time and history, such that, while it is a store of traditional skills and stories and maintains an essential link to the past, it has also allowed for change and innovation over time. Similarly, ethnic architecture is heavily impacted by the lifestyles, environments, and social structures of many cultural groupings (Marasigan, n.d.).

### **3.2 Ecologically responsive design of Vernacular architecture**

A formal expression that has been established in response to a variety of geographic, climatic, and economic characteristics that define the local area or region is what distinguishes ecologically responsive design (Fernandesa, Mateusa, Bragança, & Silva, 2014). Vernacular architecture is a form of ecologically responsive architecture. The consequence



**Figure 5: Hill house in Dolakha with shaded terrace and balcony**

of hundreds of years of experience, vernacular architecture employs materials that are

readily accessible in the area, regulates climate using resources from nature, and organizes spaces in accordance with social and cultural requirements. According to some studies, vernacular architecture is defined as the design of buildings that directly responds to the local climate, geology, availability of materials, traditions, and customs. These buildings are then constructed using local materials and inherited construction techniques that have been passed down from generation to generation with occasional or continuous adaptation in response to social and environmental issues and constraints (Anderson, 2019).

Vernacular design also addresses the issue of affordability in terms of building construction because it makes use of regional resources, local know-how, and local labor, it integrates cost-effective construction techniques. Likewise, in a time when technical advancements and opulent improvements rule every area of our life, it might be out of style to go back in time and place and pay attention to regional architectural traditions (Kazimee, 2008). However, vernacular architecture is more than just a sentimental yearning for things and techniques that are now basically archaic; rather, it



**Figure 6: Façade of Newar house with big wood carved window and large roof overhang**

is a strategy for addressing contemporary issues like global warming, the housing crisis, and economic inequality (Kazimee).

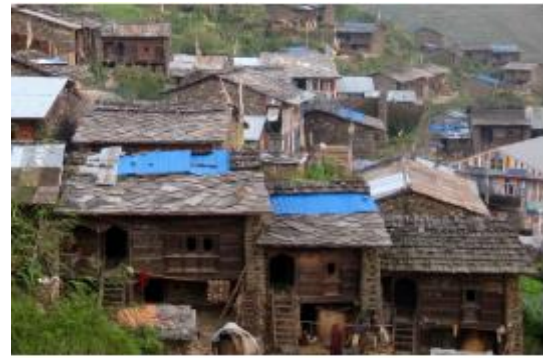
Similar conclusions were drawn by Kenneth Frampton, who highlighted that the importance of vernacular architecture should not be limited to emotive regionalism but rather, when rigorously analyzed, should result in answers that are both fair and current. Paul Oliver goes further in his affirmation of the vernacular as more than a nostalgic nod to the past, asserting that approximately 90% of the world's housing problems will be resolved by self-help techniques, employing locally accessible resources and technology rather than highly specialized, high-tech approaches (Kazimee, 2008).

In the past, structures and places that accommodate time and location were created by indigenous cultures. People developed thoughtful methods to balance their wants and goals while coping with the forces of nature and the local environment. Instead of rejecting and battling the natural processes, they became a part of the equation and fully

considered them. (Kazimee, 2008). Likewise, in comparison to the dispersed type of settlements typical of modern cities, vernacular communities are distinguished by their compactness of form and effective use of land and building ecology, which has numerous advantages in terms of the environment, the economy, and society. Solving the environmental issues of the twenty-first century and meeting the need for housing from the expanding urban population appears more important than ever (Kazimee).



**Figure 7: Typical Small windows in building façade in Upper Mustang**



**Figure 8: Typical attached Tamang house with elevated ground floor**

Vernacular architecture is transforming or evolve in over time and space, through trial and error (Sadhu, 2020). The traditions of a particular people and place are dynamic as they transform or evolve in time and space, resulting from the ever-changing circumstances, where the built forms also adapt to and reflect the newer needs. Deniz Erg NselÖnder (as cited in Sadhu, 2020, p. 38) states that Home reflects a person's view, and his or her place and status in the society and collectively contains a different meaning than shelter.

### **3.3 Climate-responsive design in vernacular houses of different climate regions**

The research study by Bodach, Land, and Hamhaber (2014) discloses the examination of Nepal's regional vernacular architecture in the subtropical, warm temperate, cold temperate, and alpine climate zones. The parameters for analysis of climatic responsive design in vernacular houses are done on the following manner:

- Settlement pattern
- Building form and orientation
- Building stories and internal space arrangement
- Walls and openings
- Roof; Foundation, floor and ceiling

### 3.4 Climate-responsive design strategies in vernacular architecture of different climatic zones in Nepal

Climate-responsive design strategy	Climate zones			
	Subtropical	Warm temperate	Cool temperate	Alpine
Solar passive heating	-	+	±	-
Protection from the cold		±	+	+
High thermal mass of walls and floors		+	+	+
High thermal mass with night ventilation	-			
Building orientation north-south	±	±		
Compact settlement and building layout			+	+
Low thermal mass of walls and floors	+			
Light well insulated roof	+	±	±	
Heavy roof				+
Reduction of direct solar heat gain in summer	+	+		
Enhancement of air movement in summer	+	+	±	
Protection from heavy rain	+	+	+	
Outdoor sleeping space for summer	+			
Small openings to reduce heat losses				+
Medium sized openings	±	+	+	
Shading of openings in summer	+	+		

Legend: + applied - not applied ± partly applied

Figure 9: Vernacular design strategies

(Bodach, Land, & Hamhaber, 2014)

### 3.5 Vernacular architecture and four pillars of sustainability

- Environmental Responsibility and Protection
- Economic Prosperity and Vitality
- Social Justice and Equity
- Cultural Vibrancy and Continuity, (Anderson, 2019)

An important lesson for the future is to learn from vernacular architecture, construction processes, and associated trades and skills. As much as its language, music, art, literature, or food, architecture developed and as a result of building methods is a distinctive aspect of a location's culture. Architecture conveys a certain image and is the most visually appealing of those cultural elements. This is referred to as the "genius loci," or "spirit of a place" (Anderson, 2019).

### 3.6 Important principles of vernacular architecture

The following idiomatic ideas might provide inspiration and direction for addressing housing issues in a specific area while also preserving and improving the environment. Where it is practicable, design experts must continue to take the lead in incorporating these ideas into designs.

### **3.6.1 Participatory paradigm**

The majority of city inhabitants will continue to define shelter most practically in squatter and slum areas. Squatters build their dwellings in traditional and local ways utilizing cooperative and self-help techniques that are most economical and affordable for them. The environmental and energy resources are less stressed by structures that can be used for a variety of purposes and are easily adaptable to be changed to many additional applications during the course of their lifetime. (Kazimee, 2008).

### **3.6.2 Diversity and sense of place**

Vernacular towns are characterized by tightly packed, coherent townscapes with structures and land uses that exhibit a high level of intricacy and coherence. The outcome is a vibrant townscape that is rich in visual appeal and notable cultural history. The structure was envisioned in traditional vernacular architecture as a living architectural organism that was molded to meet the specific needs of social and cultural requirements. (Kazimee, 2008).

### **3.6.3 Local materials and regional flare**

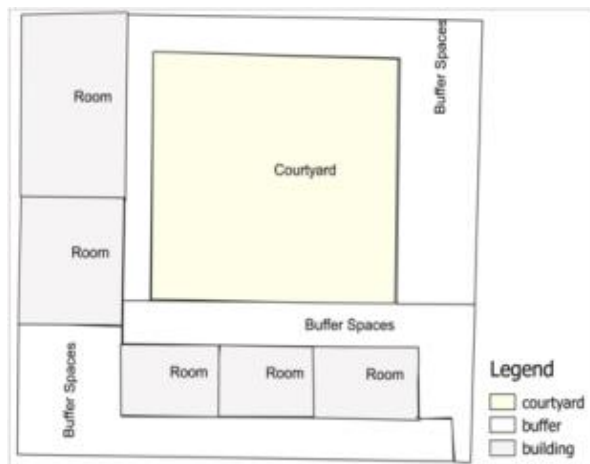
The logic of construction in a particular area is represented by vernacular architecture, which is a literal depiction of the building materials and techniques utilized by skilled and knowledgeable users. Comparatively speaking, indigenous resources are more affordable and accessible than industrial goods that are imported. For the majority of people who can self-help build their homes, they are easily accessible. In many places of the world, rammed earth and adobe brick are used by local contractors to construct homes. In a hot, dry region, adobe material proven to have excellent insulation qualities, protecting inside living areas from the sun's glaring rays and outside heat. In order to keep housing inexpensive, local materials and straightforward construction methods are acceptable for a wide spectrum of individuals. Local materials take less energy to fabricate and, in certain situations, less transportation. They are simple to modify for the location (Kazimee, 2008). Vernacular architecture offers illustrations of previous methods of building design that should be researched. It is defined by persistent efforts to develop through several generations, making the most of the little resources at hand. (Fernandesa, Mateusa, Bragança, & Silva, 2014).

### 3.6.4 Energy conservation and ecology

A particular microclimate is produced by the direction of a building and its location with respect to wind, sun exposure, and the impact of vegetation. The sustainable energy patterns of a site and buildings are substantially influenced by the optimal design of open spaces, roadways, gardens, and courtyards. The building's orientation, material composition, surface texture, and colors on its exposed surfaces all contribute to the energy pattern. Learning from and making improvements to the traditional construction practices that for many years gave people sustainable answers to their energy problems. (Kazimee, 2008). The topic of cultural identity and the viability of reviving a type of building that is inextricably linked to the local area or region in an era of globalization revolve around vernacular architecture. By utilizing passive solar design, conventional methods, and local materials, vernacular architecture may help cut down on waste and energy use (Fernandesa et al 2014).

### 3.7 Vernacular architecture resulting in the creation of climate responsive and socially interactive spaces

The easiest way to characterize the traditional homes in the study region is as a collection of solitary, rectangular huts arranged around a courtyard. The main courtyard, which is utilized for celebrations and other social events, is crucial to preserving family ties. The home is divided into two zones: the inner casual zone, which contains the sleeping quarters,



**Figure 10: Traditional houses with buffer spaces**

restrooms, and kitchen, and the outer or formal zone, which includes the main living room or "Baithak Ghar" for visitors. Sometimes one enters the informal zone directly, but more frequently one enters through the outside Baithak. All of the rooms have covered verandahs that face the courtyard, with the exception of the Baithak Ghar or outer house. There is a main entrance and an exterior verandah that is sheltered on the Baithak. The many types of roofing materials include CGI sheets, thatches, and bamboo poles. supplementary bamboo poles.s

### 3.8 Origin of Tharus in Nepal

The Tharu people are an indigenous ethnic group who has lived in the lowlands of Nepal for centuries (Backward Society Education (BASE), n.d.). Tharus live across the whole terai belt of Nepal with diversity in culture, art, architecture, lifestyles, languages, social organizations and political aims (United Nations Resident and Humanitarian Coordinator's Office (UN RCHCO), 2013). They are believed to be the original inhabitants of this region. However, the origin of Tharus is controversial. According to a legend they migrated from the Thar Desert of Rajputana in northwest India, "when Mohammedan invaders captured Rajputana and murdered the men, the royal woman fled away to the forest of the Terai taking their servants as new husbands. Thus, the offspring of the Rajput women and their low caste servants became Tharus." (Risley, H.R. (1892), *The Tribes and castes of Bengal*, Vol. II, P.313).

In this regard, S.K. Shrivastav describes that Tharus are mongoloid people predominantly so, who have successfully assimilated non-mongoloid physical features as well as (from a study of culture dynamics-S. K Shrivastav). But the new researchers have very different opinion. Kurt W. Meyer and Pamela Deuel describe that the Tharus not one tribe but several tribes who have been brought together by a common fate over a period of a thousand years or more. (Meyer, Kurt W. and Deuel, Pamela (1999), *who are Tharu? Nepal: Tharus and Terai Neighbors*, EMR Kathmandu, P. 149). Through different opinions of various scholars about the origin of Tharus are different, the latest version is more reasonable because Tharus are found throughout the Terai in various groups with diversity of language, culture and architecture.

There are at least 26 different Tharu groups, many of which have their own languages and traditions. According to some Tharu activists, there are at least 60 numerous groups that identify as Tharu. Almost all Tharu communities currently hold this belief, which is supported by the Nepali State, that they are native to the Terai. Since neither the Madheshi community nor Pahadi immigrants to the Terai claim to be original to the regions where the Tharus inhabit, this indigenoussness is also an element of the Tharu identity (UN RCHCO, 2013).

The Tharu are the largest and oldest ethnic group in the Terai region. They have a distinctive culture since they have lived for millennia in remote areas among malaria-infested forests and densely populated settlements. The Mulki Ain, a codification of

Nepal's native legal system that created a caste structure for society, was created in 1854 by Jung Bahadur, the country's first prime minister of the Rana dynasty. In terms of social standing, the Tharus were at the bottom. The removal of their land caused chaos in the neighborhood and forced the eviction of the residents. The WHO assisted the Nepalese government in the 1950s in eradicating malaria in the Terai area. In order to claim the bountiful land, this led to the influx of people from other regions, who forced the Tharus people into servitude under the new.

### **3.8.1 Origin of Kochila Tharus**

According to research (Eichentopf & Mitchell, 2013), the Kosila Tharus of the eastern Terai were historically discovered under the influence of the Brahminical and Vaisnava culture of the Mithila kingdom. Krauskopff (The Anthropology of the Tharus: An Annotated Bibliography, 1995) claimed that the ethnonym Koshila or Kochila could be related to the name of the river Koshi on whose bank they used to live. Rivers appear to have served as a cultural or social border as well as a focal point of tharu settlement, as we have already seen. Despite the Koshila Tharus' prominence, their ethnographic is far less established than that of the tharu communities in the western Terai.

From Morang to Rautahat, a number of districts, including Udayapur Inner Terai Valley, are home to the eastern tharus, also known as the Koshi, Koshila, or Kochila tharus (in Jhapa District, the Rajbansis, sometimes known as the "Bengali Tharus," predominate) (Krauskopff, 1995). The Koshila tharu, who appear to have primarily moved westward, are becoming less and less prevalent in Siraha's areas. Their primary residences are the Saptari and Siraha districts, but many also reside in the Sunsari area across the Koshi River. It's interesting to note that the Koshila Tharus may also have distinct views of some subgroups or endogamous tribes, such as the Lamputchwa tharu of the Morang area. According to Boehm (2018), the Kochila/Morangia tharu, found mostly Morang and Sunsari, are distinguished with other Tharu who call themselves Kochila in Siraha, Udayapur, and Saptari districts by dress, customs, and language. But generally, Kochila tharu is also known as Saptariya tharu, since dominant Kochila tharu people live in Saptari district.

### 3.8.2 Distribution of Kochila Tharu in Nepal

The Tharu are the second-largest Adibasi Janajati group after the Magars, accounting for around 6.7% of the total population in Nepal and self-identifying as such in the 2011 Census. There are considerable Tharu populations in all of the Terai districts as well as inner Terai districts like Surkhet and Udaypur, although the highest concentrations of Tharus are in the districts from Dang to Kanchanpur.

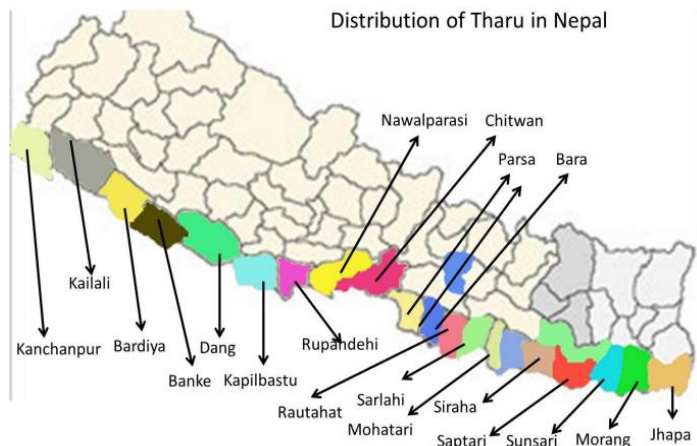


Figure 11: Distribution of Tharus in Nepal

- Rana Tharu in the Kailali and Kanchanpur districts of the far western Nepal Terai
- Dangaura Tharu in western Terai: Dang-Deukhuri, Banke, Bardia, Kailali and Kanchanpur districts
- Paschuan (Western) Tharu Rupandehi, Nawalparasi
- **Kochila Tharu in Eastern Terai: Morang, Sunsari, Siraha, Saptari, Sarlahi, Bara, Parsa, Rautahat, Mohatari, Udayapur**
- Lampuchwa Tharu in Morang District



Figure 12: Distribution of Kochila tharu in Nepal

### 3.8.3 Evolution of kochila tharu architecture

The present state of Kochila Tharu architecture is a long study of typical architecture that emerged in the Morang, Sunsari, Siraha, Saptari, Sarlahi, Bara, Parsa, Rautahat, Mohatari, Udayapur of Terai region of Nepal, more than 2000 years ago. The Kochila tharu architecture began from the settlement on the bank of koshi river. A study of the native Kochila Tharu architecture of the tharu village reveals their living patterns, house shapes and orientations almost in similar manner to that of housing typological characteristics of western tharu. Materials and technologies are marked according to climatic and geographical conditions of terai region and social, religious and cultural standards. Tharu's architecture is considered as excellent mud architecture, but housing construction has its limits due to the shortage of timber tiles, khariya grass, alluvial mud and unsuccessful attempt to correlate the modern needs and demand of modern people of tharu community. There are no other modern buildings that follow basic characteristics like the Newar in Kathmandu valley. Due to lack of architecture and knowledge, there is a tendency for modernization. Disadvantageous conditions created locally and nationally and as a result traditional Architecture is disappearing day by day.

Since, there are varieties of potatoes even in a single sack, in similar way we can also find varieties inside the tharu community. As we head from east to west region of Nepal, gradually we can find difference in the language, the dresses and even with the jewelries in Tharu community. The traditional cuisines also differ from place to place. The way of celebrating some festivals and rituals also differ as we move on eastern to western region of tharu community. Study says although physically the Tharu are similar to other peoples in the area, they speak their own language is now recognized officially (Rajaure, 1981). Additionally, according to the study, the Tharu people are known by a variety of regional names, including Morangia Tharu, Saptariya/ Kochila Tharu, Mahotari Tharu, Chitwania Tharu, Danguara Tharu, Kathoriya Tharu, and Rana tharu. The language that they speak is also known by the name Tharu (Chaudhary, 2013).

### 3.9 Tharu community, building planning and form in history

#### 3.9.1 Tharu settlement pattern

The Tharus live in tiny, sparsely inhabited communities that are frequently out of reach for miners. The Tharus are always looking for a suitable location to establish their communities. They believe that an ideal location must be high ground near a river or other source of water that is protected from flooding and water logging during the rainy season. The Tharus built their homes far



**Figure 13: Cluster planning of typical traditional Tharu settlement in Bardiya, a western Terai district**

enough apart to provide for a higher quality of life. The settlement lacks specific granaries for shared usage and distribution, bachelor's dormitories, communal cottages, menstrual huts, and guest houses. A vital part of the community is the House of Pradhan (Chief of Village). When visiting a Tharu Village, even a passing visitor is struck by how neatly the dwellings are arranged and how tidy they are in comparison to other Indian villages' crowded conditions. As a result, a Tharu village symbolizes a well-knit society that has grown closer together through shared responsibilities and partnerships.

According to Tharu mythology the orientation of village and the houses are north south oriented because the almighty god guru baba resides in “Harikabilas”, to the north up in the mountain. The Villages are made up of houses built in two lines running north-south, on either side of a central village lane. Apart from the village and household the most important unit



**Figure 14: Tharu village**

in the structure of Tharu society is the clan. The society is divided into an indefinite number of exogamous patrilines. Like clans of

- Dahit Tharu
- Baidh Tharu
- Ratgaiya Tharu
- Bhagoriya Tharu
- Sukhoriya Tharu
- Gammuwa Tharu etc.

### 3.9.2 Typical Tharu house and its layout

The Tharus are renowned for having spotless homes. Typically, the Tharus construct their homes out of mud, wood, and grass. Tharu homes are known for being consistently cool in the summer and warm in the winter. Each house is a standalone home with a field and a vegetable garden. It is separated from the other homes by a thin or wide lane. The other orientations of the home do not guarantee wealth; hence the house must face the east. The size of the home depends on the number of family members. There must be a Than (place of worship) in every home. The wealthy Tharus built a Bangla on the side of the main home (the Rest House).

The internal layout of the house does not vary except in the size and number of rooms. The location of the kitchen and the deity room does not vary, so in addition to the north-south axis we find a constant distribution of features on the east and west of house.

From North to South the house is divided into three sections

- The southernmost area is "Ghari" (place to keep cattle's cow, buffalo, goat, etc.)
- The next middle section "Bahari" is a semi-public area.
- The northern section called "Bhitar" contains the "Konti" sleeping room, "Bhansa" the kitchen and "Deurar" the deity room.

The "Bhitar" is entered via a doorway situated at the middle of the north wall of 'Bahari' which gives into the central corridor of silos "Dehari" on either side. To the north most part of the house is "Bhansa" on north-west side and "Deurar" on north-east side, where the deities face east. In the hierarchy basis the highest-level north will always be dominating, so in case of extension of house, the house is always extended towards south.



storied houses are also constructed to meet the modern requirements and escape from the danger. Normally, a village comprises just a single row of houses on either side of road, but some villages consist of several rows of houses too. The houses for living purposes are oriented towards the street and rest of the land behind the house is left for agricultural spaces as we can see on the picture.

- Scattered pattern village at 1-2km distance
- Longitudinal plan
- north south oriented
- Courtyard plan
- Cluster design
- Narrow alleys
- Detached unit

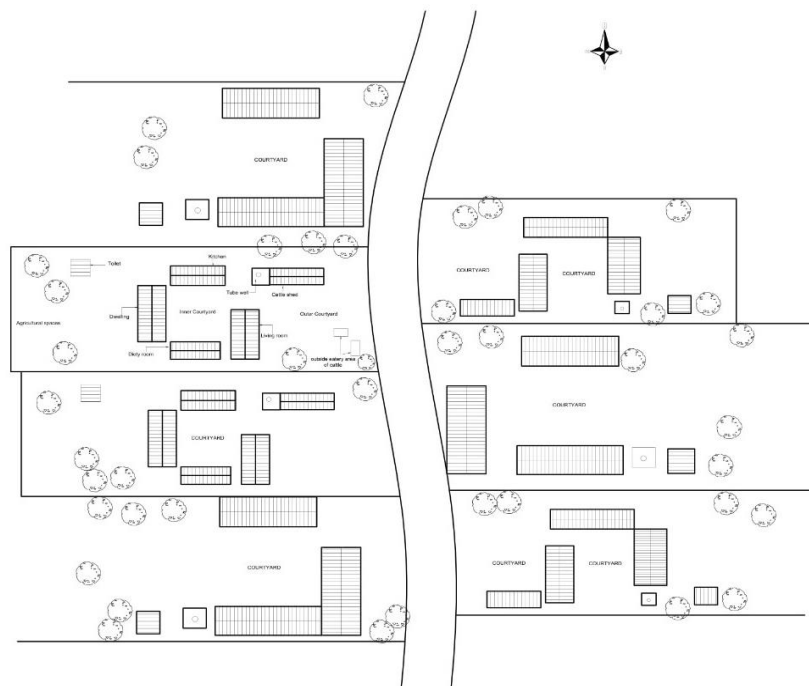


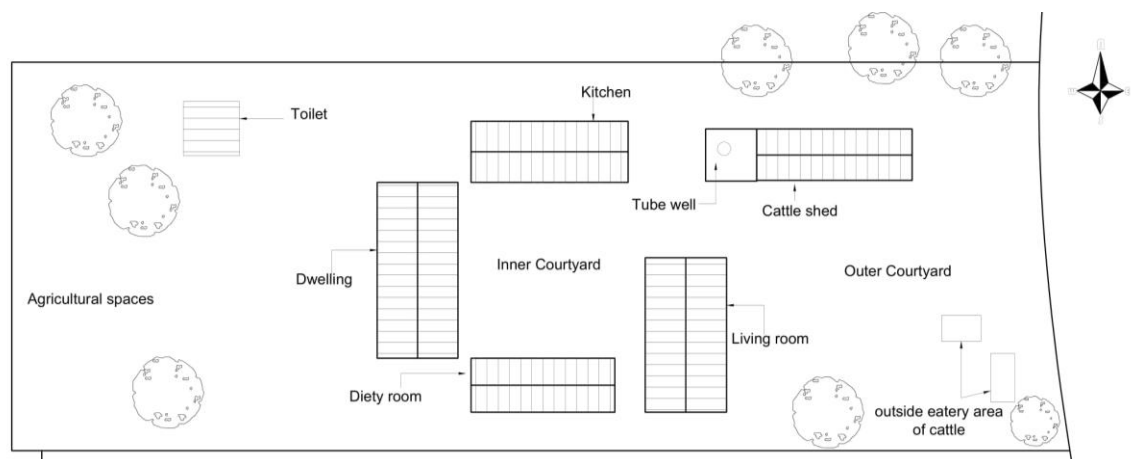
Figure 17: layout of dwelling units in Saptariya tharu village

### 3.9.4 Kochila Tharu house

Historically, Kochila tharu house used the local materials that were easily available in the terai belt of Nepal i.e., mud, wood, bamboo and grass. The Tharus have their own social system. Tharu house are low raised, identical, mostly single storied with slope roof and are elongated. They have small no windows in their houses They usually settle in a group of their own community members, forming a dense settlement in one area. Each house is a standalone home with a field and a vegetable garden. It is separated from the other homes by a thin or wide lane. The size of the home depends on the number of family members.

Traditional Tharu houses are identical in design and the pattern of construction is also same though the building size can vary according to the number of inhabitant or following the scheme i.e., panchabala or satebala plan. The houses are constructed parallel to the village road, towards north-south direction and thus they are facing either east or west. The house is single storied rectangular in plan with two side slope roofs. The width satbala (seven post), naubala (nine post) and the length varies according to the number of kotha (bay), normally 4, 6, 8 bays. Although, the Tharus follow the joint family system, there is a trend to break away the joint family. In such cases, the original house is not divided but another building is constructed. But nowadays some buildings are also divided as required. The houses of Kochila Tharus are single storied with mezzanine floor. Usually, ground floor is used for sleeping or storing grains on Kothi but most of the time the mezzanine in Saptariya village is used for sleeping purpose with the clear height of about 5-6 feet. Cattel shed and storage of cattle fodder is usually placed on the front face of the site. No cattle are led to the rear part of the house. The back of the site is left for agricultural spaces as shown in the figure below.

The typical dwelling units of Kochila Tharu house in Saptariya village mainly comprises of outer courtyard, entrance hall or guest hall, cattle shed, kitchen, dwelling spaces, deity room and toilet. Toilet was not the major unit of Tharu houses in the history but with the higher knowledge and awareness of the sanitation programme now almost all the houses have toilet in the planning layout.



**Figure 18: Example of dwelling composition of Tharu house in Saptariya village**

### 3.9.5 Allocation of spaces: On the basis of functions

#### A. Ghari (Cattle shed)

Cattle shed are generally located in the southern part of the house. It may either separate or attached to the resident. Nowadays cattle shed is separately built little distance from the house.



Figure 19: Cattle shed attached to the house in south

#### B. Bahari (Entrance Hall)

Bahari covers a single bay of building, which serves as an entrance hall and is situated between the cattle shed and dwelling area. This section is mainly used for family gathering and also used for work place for making basket nets mats, straw cushions, ropes, chattri etc. The ghari and bahari are separated from semi open wooden partition. The upper part of the bahari, below the roof looks like an exhibition of tharu art and artifacts.

#### C. Dwelling Area

The dwelling area is separated from the bahari either by half partition wall or by Dehries (grain soil). It has central corridor (north-south) with room on two sides. The room is accessed from the corridor and all partition does not exceed 6 feet to 10 feet leaving a lot of space beneath the roof. This allows good ventilation and keeps the place cool during the hot summer. There is kitchen at the north west and deuraha at north-east of all tharu house except the house of ulthawa. In the kitchen and the divinity room, there are no windows and only small holes let some light pass into these two dark rooms. The kitchen has generally 2- 3 horse shoe type of chulha at the centre facing south. At the foot of the western wall of the kitchen there is a pit hole of draining out a wastewater after washing the small utensils. The outer rooms are generally used for sleeping purposes by the other family members. Each couple is given room of its own and its privacy is respected by all. All tharu houses has courtyard (aangan) in the front of the house and this links the building to the road. A portion of the space reserved for the cattle & the area is delimited with the help of wooden post. The area is also used for drying of grains and vegetable products and various other activities. The aangan also plays vital role in social gathering and also have cultural and religious importance.



Figure 20: Kitchen view of Tharu house

### 3.9.6 Allocation of spaces: On the basis of privacy level

#### A. Public space: Courtyard:

Courtyard or Aangan is the important space of the Tharu settlement. It has social, cultural and religious importance. All the activities of the Tharus are governed by the courtyard. It acts as gathering space for the social cultural functions. Courtyard let the air flow in each dwelling. It acts as a



Figure 21: Drying grains on courtyard

resting place for member during the summer. All the feast and functions are carried out in the courtyard so it has cultural significance. It acts as a recreational area for the children and the youth. Courtyard is more related to their agricultural purpose as it provides the space for the storage of the agricultural products drying of crops. It is also used for washing, bathing and sun drying of the clothes.

**B. Semi-private space: Cattle shed and veranda:** It is a space attached to the dwelling. It has its own significance in Tharu architecture. It defines the life style of the Tharu people. It also acts as a buffer zone to protect from the direct sun light. Mostly semi private spaces face the south. It is used as sleeping purposes, storing of agricultural products and other household goods. The grinding machine (Jato) and rice husking machine (Dhiki) are placed in the veranda. The cattle shed is used for the storage of animal fodder. Veranda acts as a family lounge used for welcoming the visitor and also acts as living room. In some cases, it is also used for dining purpose and cycle parking.



**Figure 22: Verandah (Osara in tharu language)**

### **C. Private space: Dwelling:**

It includes the sleeping room, puja room, mezzanine floor. Sleeping rooms are open partition room. The kitchen is allocated on the northern face of the house. The lighting is provided by the small opening. Opposite to the kitchen is a deity room. The mezzanine floor is used for the storage of agricultural products and also acts as buffer zone for the living and sleeping area, so it maintains the comfort in the sleeping.

### 3.9.7 Material and Construction technology of tharu house

The materials used in construction are procured from the natural environment: wood, bamboo, soil, rice husk, cow dung etc. The wood of young trees, section varying from 12 to 14 cm is used to make posts and beams, which form the frame work of the ceiling and the false ceiling for the drying of maize. Bamboo is cut with in the village. Bamboo stems are used to make the fences while bamboo lathes are used in the framework and the roofing. The grass (straw) used in the roofing is cut to a length of about 1 meter and tied into bundle. The yellow ochre clayey soil mixed with the rice husk forms

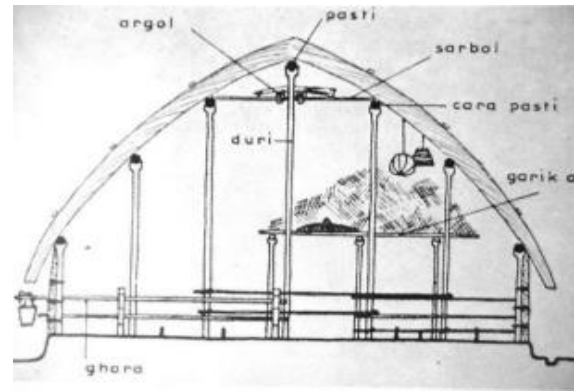
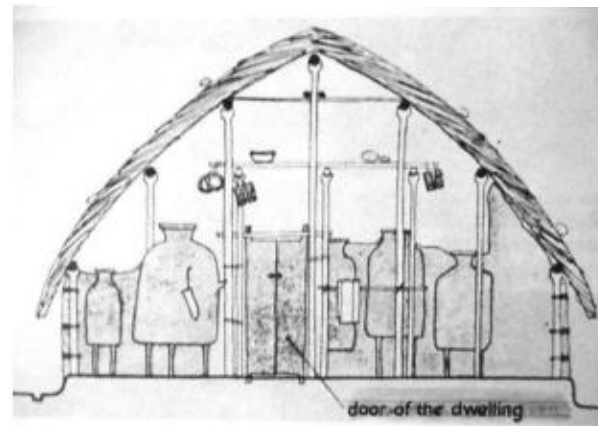


Figure 23: Interior space construction technique



cohesive cement. A coating of clayey soil and dried cow dung is applied on the cob walls, the floors and the household equipment: silos, fire stoves etc.

The dwelling building is covered by a large thatched roof supporting entirely by several rows of wooden poles. The frame work, driven 2 cubits into the ground, is arranged according to a fixed order formed by 7 rows of equidistance pole running across the length of the building and divides the building into 6 bays. Each row consists of 7 poles “Duri” placed at a distance of one meter from each other. On the either side of the longitudinal axis, the heights of the poles keep decreasing from the ridge pole to the extremities.

The frame work is constituted by the ensemble of poles which supports the purlin. The 7 purlins rest on the fork head of the pole to which they are firmly fixed. The purlin is made up of 2 or 3 pieces of wood joined together so as to cover the entire length of the building.

The roof is made of rafters “Keri” which extends from the ridge to the roof. The rafter is tied to the purlin with the help of plant strap and are placed at the interval of 60 -80 cm. The Bamboo laths “Bati” is placed on the purlins at a distance of 30 cm parallel to the ridge.

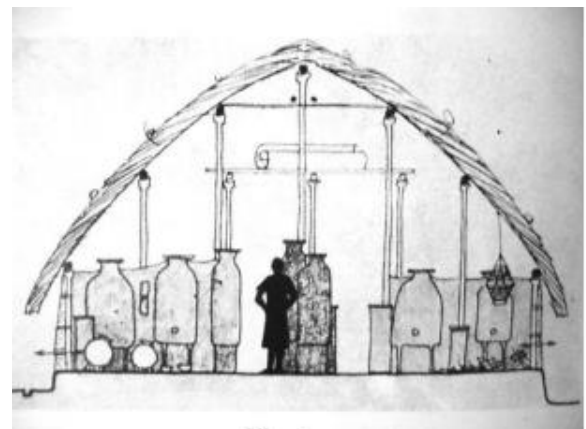
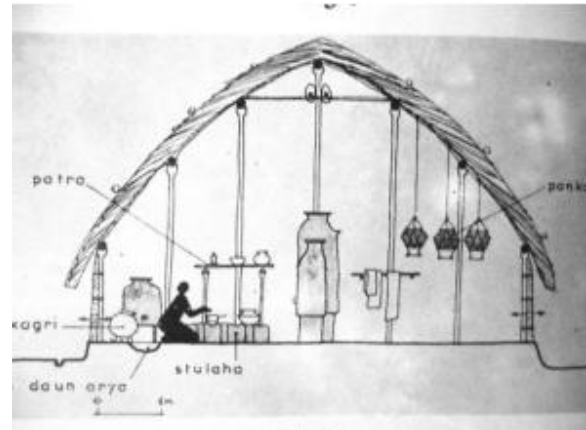
Together with the purlin they form a light frame on which the straw is placed. The straw, tied into bales, is arranged in successive layer held in position by bamboo lath.

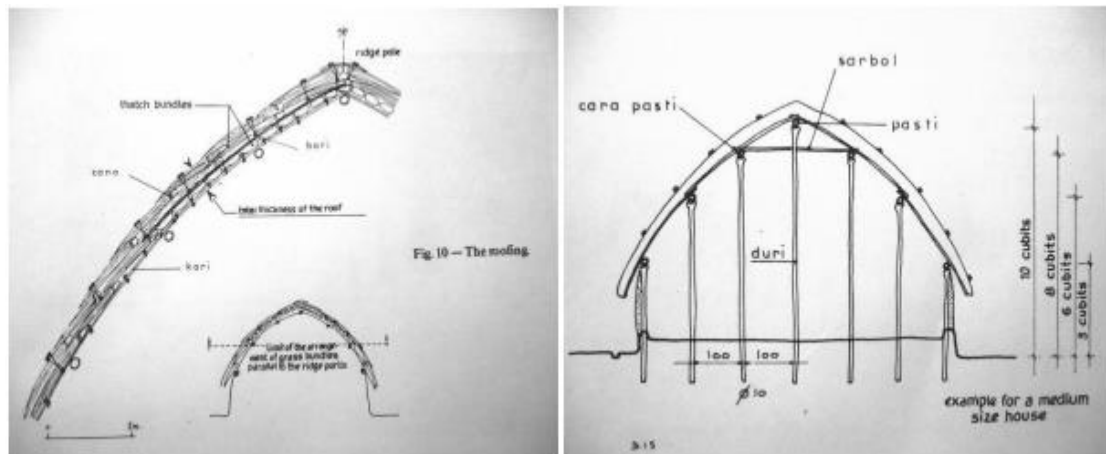
The cob walls of the façade below the roof and the two gable ends are constructed separately. the two underhung façade wall 3 cubit high and

about 10 cm thick are plastered on the outside over made of crisscrossed bamboo sticks, taken between horizontal laths, this enables “Jakra “is maintained vertically by 2 intermediate poles “Doasa”. The gables of the building are made by ensemble “Jakra” taken between poles of the frame work to the other pole “Biata” which can be seen from outside.

Door openings, small window and “Moaka” are provided on external walls below the roof for light and ventilation for the inhabitant area. The door consists of wooden framework and two pivoting leaves, allow the passage of 63 cm wide and 150 cm high. The thatched roof is cut for the easier access.

(Source: Man and his House in Himalayas: A Tharu Houses in The Dang Valley: Camille Milliet-Mondon; Edited by Gerard Toffin)





**Figure 24: Roof section and structure member of tharu house**

Construction materials are temporary in type which is procured from the nearby forest and from the agricultural products. Tharu people have strong interconnection with the environment. They see the village and the forest as one entity. It is a specialty of Tharu house that it always remains cool during summer and hot during winter. Wooden beam and posts are used to construct the framework of the house whereas the bamboo is used for framework of wall and roofing. Thatch straw, clay tiles and grass are used for the roofing material. The clay soil mixed with rice husk and dung is used for plastering the wall and floors and also used to prepare the household equipments.

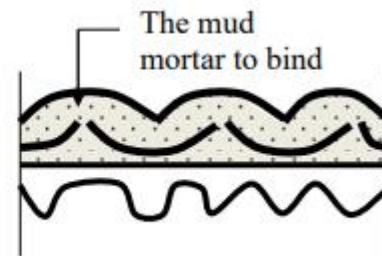


**Figure 25: Tharu women and girls plastering the house**

For the construction of a Tharu house, first of all we need Y-shaped posts. Depending upon the choice, Panchabala or Satbala, required no. of wooden posts are erected. The post in the central row is called Dhuri khanbas which are higher, while the lateral rows are progressively shorter on each side. Naturally the height of the posts is less at the sides since all the posts have to support to the beams and rafters on which the sloping roof rests. The number of posts in each row depends on the number of the bays required and this determines the length of the building. Traditionally Hat (hand) system is used

for measurement and this is about 1'6". The posts are placed at a distance of 6-8 Hat in each bay and 2-3 Hat from each other in each row.

On the top of these posts just in the Y-frok, long beams (Pasti) are fitted thus linking the pillars of each row with each other. The intermediate posts (Kun khamba) are also tied by a wooden beam (Sarbal) transversly. Above the beams rafters (Korai) are fitted from the higher beam to the lower beam making roughly 40 degrees slope of the roof. The rafters are tied to the purlins with the help of plant straps and bamboo lathes are placed on these purlins. Together with the purlins, they form light frame on which thick layer of thatch is placed as roof covering and these layers are held in position by bamboo lathes. The total thickness of the roofing is about 1 ft.



**Figure 26: Detailing of clay tiles (khapda) at roof**

The surrounding walls of the house are constructed with bamboo and reeds and these are plastered with clayey soil mixed with rice husk and cow dung both outside and inside. While plastering the wall, some Tharus also make various figures of birds and animals on the surface of front wall. The empty space between the Dehries



**Figure 27: Joint detail of beam and post**

in the house is also filled by same kind of wall. Doors opening and small windows are provided only in the façade walls below the roof. The doors consist of a wooden frame with two solid pivoted leaves, whereas the windows don't have any shutter. Generally, the openings made in the façade walls at the dwelling level enable the light and ventilation in the inhabited area. The roof is projected 3-4 ft. outside to protect from rain and acts as a shading device during the hot summer.

Although, Tharu houses are single storied, there is usually considerable space between the ground level and the summit of roof. Above some of the rooms, there may be a platform supported on a few wooden posts, about 7-9 ft. high. This platform is used for storing firewood, maize cobs, leave cups and other various household goods. Technologies used in the Tharu



Figure 28: Building and shaning a wall: first.

house are sustainable and can be used during long run. Some buildings are raised up to 3-6 ft. to prevent from damp, snake and water logging during rainy season.

### 3.9.8 Different size and variation in dimension

The size of the house is proportional to the number of inhabitants, the dwelling building being capable of sheltering 4-25 people. However, the three-dimension height, width, length vary. The height of the building above the platform is determined by the height of the frame work poles placed on the axis.

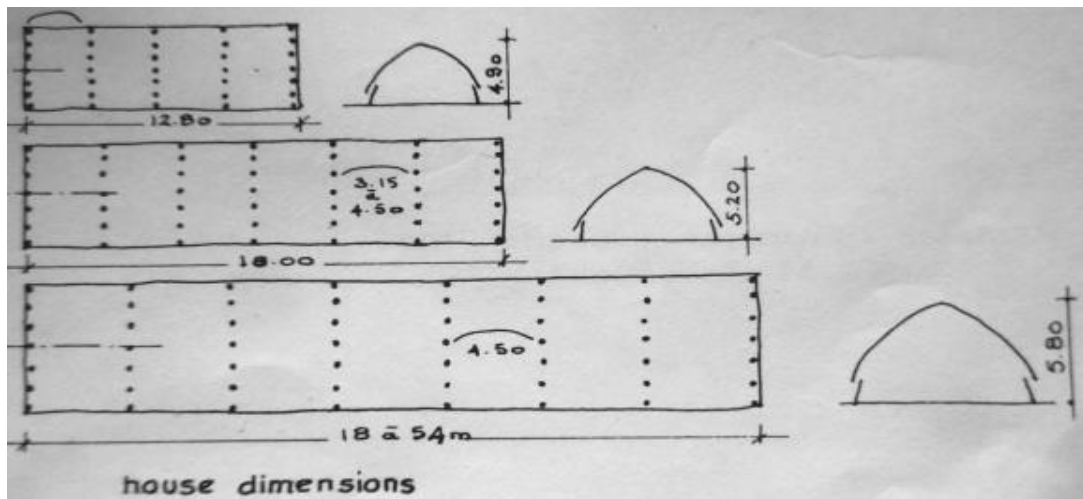


Figure 29: House Sizes and Dimensions

The medium size houses are 10-cubit height i.e., 5.20 m in the case of small house, the pole is 9 cubits high i.e., 4.90 m. The width varies according to the spacing of the poles in a single row. Even though the number of the poles is fixed at 7, the space in between can vary from 2 to 3 cubits. Consequently, the width can vary from 5.4 m to about 7.8 m depending upon pole spacing. Of the three dimensions the length varies the most. It

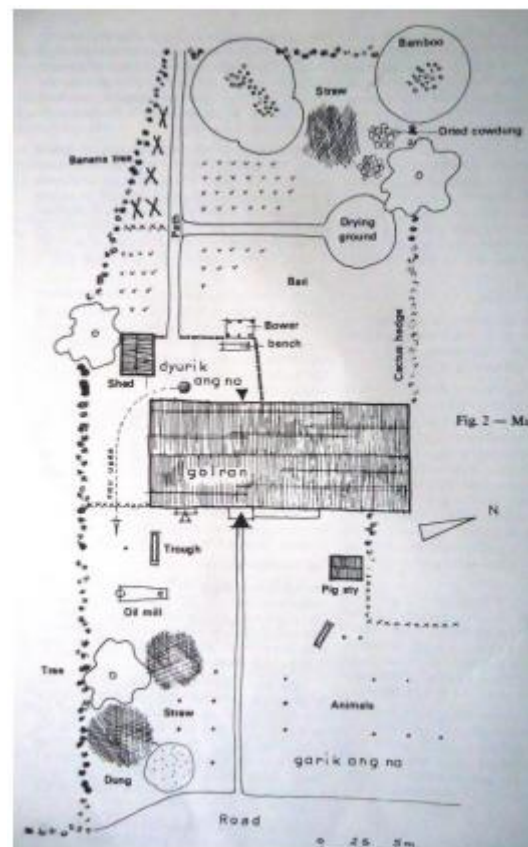
is determined by the number or constructive rows of the pole. The width of the bay – space left between two rows is more or less constant at 3.15 m.

The smallest house has 4 bays, the largest 12. The total length of the building thus varies from 12.8m to 54 m. The 4 bays house is inhabited by 4 to 6 people, 6 bay houses by 6 to 10 people and the largest house can in exceptional case shelter up to 32 members of the same family. Whatever the size of the building, the hall occupies only a single space left between 2 rows of poles where the cattle shade can cover one, two or three bays and the dwelling area can occupy 2 to 8 bays.

### 3.10 Built environment of a Tharu house

In the case of all the dwelling units of Tharu consist of three district zones, a building which includes the cattle shade and inhabitation area, separate activities are assigned to each zone.

The main construction is preceded by an open space separated partially on all side by a cactus hedge. The “Gharik-ang-na” covers an area of 3.20 sqm and a rectangular passage running across it links the building to the road. A portion of the space is reserved for the animals and the area is delimited with the help of wooden posts. It also includes a pigsty as pig is not allowed to stay under the family roof. Straws and dung are stocked in the “Gharik-ang-na”, a part of the area is used for the drying of grains and vegetable products. The oil crusher “Kad” is placed near the space reserved for the animals.



The second space outside the dwelling unit is situated at the back of the main building. It forms a small courtyard enclosed by a partition made of branches. Access to the kitchen garden is possible by the means of a narrow passage allowed for in the barrier. The courtyard is used to perform domestic tasks requiring an abundant supply of water such as washing of large vessels, cleaning

with ash, personal washing (for this purpose a basin is dug in the earthen floor to collect the rain water) and for the preparation and shorting of vegetable picked from the kitchen garden; also, for temporary activities such as a basketwork, weaving, manufacture of ropes, fishing nets and alcohol. Next to the courtyard is a store “Chapra” where wood, agricultural and fishing implements and vessel for distillation are stored.

The kitchen garden “Bari” is enclosed by hedge. A path running through it connects the house to the fields. The family garden is used for growing vegetables for daily consumption: peas, yellow lentils, radish, gourd, onions, and chilies. Banana and guava trees are also planted. A rice husk grinder, “Paira” is placed close to the bamboo. The dried dung cakes “Gugi-tak” are also piled up nearby. A circular earthen surface is used for the drying of pottery wear and vegetables products.

The dwelling building is located in the center of the settlement on the right- and left-hand side of the main road coming from the north. Running parallel to the road, its longitudinal axis is oriented north-south as in the case of all the village construction. Traditionally, one of the façades under the roof should face the east or west looking at the main road (Camille, n.d.).

### **3.11 Evolution of Kochila tharu house form from past to the present**

The traditional vernacular architecture of tharu settlements has evolved over time in response to user needs and is distinguished by characteristics like as climate, culture, and resources. However, the current rural landscape environment is dictating a wave of change in the age-old conventional vernacular architectural practice. Historically, tharu dwellings were not permanent structures because they were nomads travelling in search of a safe and better place. Previously, dwellings were made with light weight, easily available materials such as forest timber, bamboo, leaves, straw, and grasses, which degraded over time and had to be relocated carrying just utensils and clothes. Because they were a nomadic tribe, they did not consider building a more permanent structure. However, as time passed, the necessity of having a permanent home for their future grew, which not only contributed to their economic stability but also help to grow their cultural characteristics.

The tharu dwellings in Saptari district were not as ornate as those in Morangiya or Dang, and there were only one storey houses in the Saptari district's tharu village. One of the causes is that Saptari experiences a lot of dry seasons, which leads to this style

of basic house construction. But the similarity is that the dwelling units were constructed around the courtyard. And till the date the Tharu houses are built in courtyard planning. The evolution of the Tharu house's housing shape is examined below in terms of its component.

### **3.11.1 Foundation**

In the past, foundations were frequently nonexistent from mud buildings in Tharu dwellings, and walls were instead constructed directly on the ground or on very thin footings or slabs. This was brought about by an apparent robustness of earth walls that was absent from more traditional materials, which diminished the significance of foundations. With the advancement in technology and innovation in materials, the earth was dug out little swallow to uplift the timber post or bamboo post in earlier phases. After time passed the adobe bricks with mud was used in the foundation. But after the easy in available of cement and baked brick people started to make foundation out of its combination. Load bearing structure with 4"x4" pillar was upright with a single rod in center to give strength. But nowadays most of the houses use frame structure for constructing houses.

### **3.11.2 Outer wall**

The outer walls of Tharu homes were composed of grass or light woods and bamboo during their nomadic phase. As time passed, they moved to building the wall using a sugarcane-like plant material known as "Khariya ghas" or "Kharhi" in local language, which was widely used by the Tharu people in the past. The wall was built with a mixture of Kharhi, nigalo bamboo, and mud, as well as cowdung and rice husk. Due to the scarcity of Kharhi, locals opted to using Nigalo bamboo and bamboo leaves combined with mud to build buildings, with bamboo serving as the principal load bearing elements of the structure. People later switched to using bamboo strips with mud on the wall. Surprisingly, in many Tharu houses these days, the bamboo strips are also plastered with cement to shorten the maintenance time of the mud and bamboo wall. Houses continued to evolve with the use of adobe bricks and mud mortar with mud plaster, which was eventually replaced by baked bricks with mud and, later, red brick with cement. Nowadays, the majority of residences have an outer wall made of brick and cement. Likewise, wall murals can also be seen in old Tharu houses which is being lost these days due to loss in interest by the recent generations.



**Figure 31: Use of Kharhi with mud on wall**



**Figure 32: Use of nigalo bamboo, bamboo leaves, straw and mud as outer wall**



**Figure 33: Use of bamboo strips and mud in wall**



**Figure 34: Brick and mud mortar in outer wall**



**Figure 35: Combination of bamboo strips in one wall and straws, bamboo leaves and nigalo bamboo with mud on another wall**



**Figure 31: Combination of brick with cement; bamboo with mud as outer wall**

### 3.11.3 Window

Because of the fear of theft in the terai region, windows were usually avoided in tharu dwellings in earlier phases. However, to ensure air circulation, small round, oval, or square openings were cut into the walls. The openings were not cut in the wall, but rather left plastered to function as windows. The size of the windows grew larger over time in order to accommodate day light within residences with ventilation. The windows were built with the installation of window shutters. Nowadays, medium to large-sized windows with glazing are often utilized to combine daylight, air circulation, and to make a house look proportionate and appealing.



Figure 33: Brick pattern for ventilation



Figure 33: Criss-cross pattern of window opening without frame and shutter

### 3.11.4 Roof

In earlier days, the tharu houses were categorized on the basis of roof types. The slope roof was used in earlier days. Three types of houses were categorized on the basis of roof design, they were: चार पाखे (चौखटाहा); दोपाखे घर (मुनही घर); and पोखरापटन घर. The roofs of char pakhe used to be seen in great extent along with do pakhe ghar. The roof of pokharapatan ghar was seen in wealthier residents.

Earlier phases of construction used paddy straws for the roofs. The roofing material was shifted to Khapada, and mud tiles were used. Cement tiles were also utilized on the roofs among some tharu houses. However, due to damage caused by hailstorms during the monsoon, the usage of tiles and khapada was replaced with the use of corrugated galvanized iron sheets. The majority of traditional home roofs are now replaced with CGI sheets. Furthermore, many people are moving to contemporary buildings to

decrease the maintenance and repairs of mud houses, where we can see the usage of cement on roofing replacing slope roofs with flat roofs.



**Figure 39: Thatch roof using rice straws**



**Figure 34: Khapada roof house**



**Figure 41: Different types of cement tiles used on roof**



**Figure 42: Use of CGI sheet**

## **3.12 Passive Technology in Tharu House**

### **3.12.1 Solar Orientation:**

Exposure to the sun can efficiently warm or cool a space or create troublesome heat and cooling load problems. The Tharu houses are elongated with width facing N-S direction to boycott the hot summer sun rays. The entry of the house faces the east or west direction. Since the house are arranged in the courtyard system all the houses get the morning sun whereas the west and south sun is blocked by planting the vegetation. To block the sunlight of the south cattle shed is placed in the south. The kitchen is placed in the north so that they can get rid from the heat. Medium size opening 20-40% in north and south wall at body height at wind ward direction is provided. Mostly the vegetations are deciduous.

### **3.12.2 Water level/Microclimate/drainage:**

There is a heavy precipitation in the Terai region so there is a problem of the water logging system. The most Tharu village have wide pond like drain which is used by the duck and also acts as a water body to cool the hot breeze in the summer season. The settlements are mostly linked with water sources so it is easy to connect the drain with the river. So, the water table of the Terai is also high so it is easy to get water from the hand pump. The agricultural land is just near by the village as well as the villages have a plenty of the trees and the water bodies which create separate climate form the regional climate. This type of the micro climate helps make the climate of the built environment more comfortable. In the summer the people also rest on the shade of the tree and cold air breezes in the hot climate due to the micro climate.

### **3.12.3 Planning/Technology**

Houses are mostly planned with the courtyard planning; the house are separated from each other so that the air can be flown in the courtyard form every direction. The separated houses also have an Aangan in the front to allow the flow of air into the building. This type of cross ventilation in the courtyard helps in the flow of the cool air in the internal environment.

In some cases, there is a resting space in the center of the courtyard which is open from all side so that air can flow from all direction. The internal partitions wall is open type with the double height used the mezzanine floor which is used as store acts as a buffer zone creating the cool environment in the living area. Veranda or semi open space acts

as sleeping space and also acts as a buffer space. Kitchen is placed at the north. Passage is created in the middle for the circulation of the air. The wall is made of reed plastered with the clayed mud internally or externally so that it prevents heat to transmit inside. This heavy internal and external wall have time lag over 8 hours.

#### **3.12.4 Material used:**

Use of a material also plays a vital role in adopting the passive building design. The Tharu houses are constructed with the vernacular material. The materials used by them are more suitable in the hot climate of Terai. Light weight insulated roof are provided with the clay tiles which have minimum thermal storage capacity. Earth beaming is used to reduce the heat loss. Hollow tile roof reduces the roof heating. The most of the Tharu house have thick thatch roofs which prevent the heat to penetrate inside.

#### **3.12.5 Natural ventilation in Tharu house:**

Given that it simply relies on natural air flow and may significantly reduce the demand for artificial ventilation and air conditioning, natural ventilation is unquestionably a useful instrument for sustainable development. Reducing the amount of electricity required for cooling helps the energy source's electrical producing plant emit less greenhouse gases.

Tharu home is equipped with an appropriate cooling system in the summer. There is enough wind pressure outside to cause air movement inside the structure, especially through the inhabited areas. In Tharu homes, natural ventilation is used to improve indoor thermal comfort by minimizing the impact of relative humidity levels exceeding 60%. The stack effect of the ventilation system is employed to pull in colder, heavier air from outside by lifting warm air up to be expelled through high level outlets.

The Tharu settlements are more located in the river bank and the lower Terai belt. So, the water table is high as well as they have small ditches and cannel nearby their settlements having enough water bodies in surrounding. A structure with a water element within or nearby may provide a relaxing atmosphere. By "sensible chilling," this psychological effect can be strengthened.

### **3.13 Climate-responsive design in Tharu houses of Sub-tropical climate regions of Nepal**

According to Bodach, Land, and Hamhaber's (2014) research, the following homes are mentioned in their examination of vernacular architecture in Nepal's subtropical climate: Tharu houses in Chitwan (field study), Traditional Terai homes, Rana Tharu homes in the far-western district of Kanchanpur, Dangaura Tharu homes in the mid-western district of Dang, and Eastern Kochila Tharu homes in the eastern districts of Morang and Sunsari. Homes must provide protection from the heat and heavy rain because of the prevalent tropical monsoon environment. Cane, wood, and thatch are the principal locally available materials utilized. They result in the creation of a cozy "breathing" house, whose construction envelope is somewhat porous and improves natural ventilation.

#### **3.13.1 Settlement pattern**

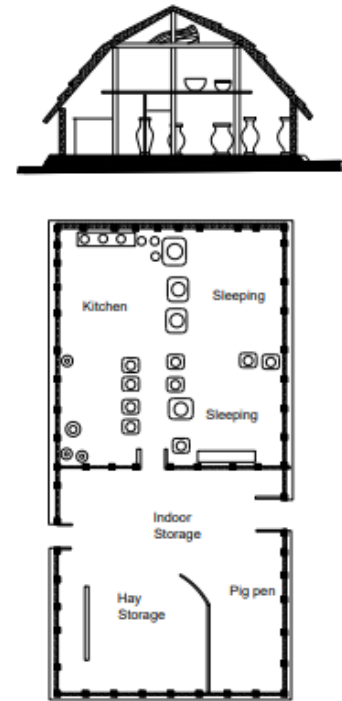
In Nepal's subtropical climate, the traditional settlement pattern is less dense and more flexible. Tharu homes are either haphazardly positioned along the road or they form groups of partially enclosed complexes. The Rana Tharu village is built around a courtyard that is open on at least one side to allow cool breezes to move through it. The long homes in the Dangaura Tharu settlement are set out in a single row along the road, each having a spacious yard in front of them. This enables simple air penetration into the homes.

#### **3.13.2 Building form and orientation**

The structures feature rectangular floor layouts and are encased by thin walls that occasionally do not rise above 75 cm. Traditional longhouses are present in Dangaura and Eastern Kochila Tharu homes, but Rana Tharu homes feature a smaller floor design. More than twice as long as its shorter counterpart, the Dangaura Tharu homes' longer axis. In order to minimize exposure to the sun, the lengthier facade is often oriented north-south.

### 3.13.3 Building stories and internal space arrangement

The majority of Terai's traditional homes are one story or like the Rana Tharu homes feature a ground floor with a mezzanine used for storage. They feature high ceilings to improve the ongoing ventilation which is crucial in this hot and muggy atmosphere. However, one of the Tharu investigated homes in Eastern Nepal was discovered to be two stories due to growing urbanization and rising settlement densities. The dwellings under study have more horizontally oriented space planning. The interior area is nearly unbroken, which facilitates a constant natural circulation of cold air from the shaded region beneath the eaves. Only one division of the Longhouses under study does not extend to the roof, allowing for unrestricted airflow. Large grain storage jars are employed in Rana Tharu homes to create room division. Verandas which are semi-open areas take up a substantial portion of the floor design in all Tharu homes. The verandas offer additional pleasant space for daily activities and are sheltered by the roof overhang. The second level of the Eastern Kochila Tharus' two-story homes is mostly used for sleeping quarters and storage. The veranda which makes up one-third of the second floor layout offers a cool semi-open sleeping area during the hot and muggy summer months.



**Figure 35: Floor plan and section of Dangaura Tharu House**

### 3.13.4 Walls

Traditional Terai homes have relatively thin walls built primarily of wattle and daub. There are bamboo strips loosely woven into an open mesh at the top of the outer wall, which allows for continuous day illumination and ventilation. Wood or reed walls without plaster contain sporadic gaps. External walls can also be



**Figure 36: Tharu home in Chitwan with a large roof overhang and a covered veranda**

constructed from thin, woven cane mats fastened to a wooden frame, then white-washed and rendered with mud plaster.

### 3.13.5 Roof

In Nepal's subtropical climate, thatch is typically used to create pitched roofs (Bodach, Land, & Hamhaber, 2014). Temperatures inside are often substantially lower than outside thanks to the low windows and triangle openings at either end, which guarantee a constant influx of air from the shaded region beneath the eaves (in given figure). Houses in Dangaura and



**Figure 37: Gable opening for air circulation in Tharu House, Chitwan**

Kochila Tharu also feature thatch roofs, which are light and excellent insulating. The length of the roof overhang shields the walls from direct sunlight. Verandas, which are created by extending the roofs, offer a cozy space for working and even sleeping at night.

### 3.13.6 Foundation, floor and ceiling

To prevent the inside from flooding during the rainy season, Tharu dwellings are often placed atop a plinth composed of stone or soil. For the same reason, some homes are constructed atop 90–300 cm-tall wooden pilings. High ceilings and piling height from the ground improve air flow throughout the structure. Compacted earth, clay tiles, or naturally occurring stones are used for floors; they may also be plastered with cement.

### 3.13.7 Openings

In order to improve air circulation and give comfort during the hot and muggy summer months, buildings feature a small number of low windows and an opening in the roof. By placing trees around the buildings and having roof overhangs, windows can be shaded.

### 3.14 Characteristics of Tharu houses in Subtropical climate of Nepal

Table 1 shows the characteristics of tharu house in subtropical climate.

	<b>Tharu house in Chitwan</b>	<b>Traditional Terai houses</b>	<b>Rana Tharu house</b>	<b>Dangaura Tharu house</b>	<b>Kochila Tharu house</b>
<b>Settlement pattern</b>	Scattered clusters	Loose clusters of semi- enclosed compounds	Loose pattern around open courtyard	Loose, along the road side	Loose building clusters along road
<b>Building form</b>	Rectangular	Rectangular floor plan	Compact layout	Elongated	Elongated
<b>Building orientation</b>	n.s.	n.s.	Longer façade north-south wards	Longer side east-west oriented	Long facades east-west
<b>Building stories</b>	1	1	1.5	1	2
<b>Internal space arrangement</b>	Horizontal, few divisions	Horizontal manner, almost undivided open space	Horizontal, mezzanine used as storage	Horizontal, few division	Mainly horizontal, 2nd floor includes open veranda
<b>Semi-open spaces</b>	Veranda	Veranda	Open courtyard, veranda	Veranda	Open courtyard, veranda in second floor
<b>Wall material</b>	Wattle and daub, straw and mud, timber, bamboo	Mud plastered woven cane mat tied on timber frame	Mud plastered timber/bamboo walls	Low walls of wood and bamboo covered by mud layer	Lumber on timber structure

	<b>Tharu house in Chitwan</b>	<b>Traditional Terai houses</b>	<b>Rana Tharu house</b>	<b>Dangaura Tharu house</b>	<b>Kochila Tharu house</b>
<b>Wall thickness</b>	Very thin	Thin, permeable to air	Thin	Thin	Thin, permeable to air
<b>Roof material</b>	Thatch	Thatch or tiles	Thatch	Bamboo lathes with thatch covering	Thatch
<b>Roof type</b>	Pitched roof	Hipped roof	Pitched roof	Hipped roof	Pitched roof
<b>Roof overhang</b>	Wide	Wide	Wide	Large	Large
<b>Foundation</b>	Plinth of stone and mud	stone plinth or wooden piling	Earth/stone plinth	Slightly raised platform	Earth/stone plinth
<b>Floor</b>	Compacted earth with fine mud layer	compacted earth or clay tiles	n.s.	Covered by mud layer made	n.s.
<b>Ceiling</b>	High ceilings	High ceilings	High ceilings	High ceilings	n.s.
<b>Openings</b>	Very small	Upper part of exterior wall is made of loose bamboo strips	n.s.	Few and small openings	Few and very small, doors are largest openings

n.s.= Not specified, Source: (Bodach, Land, & Hamhaber, 2014)

### 3.15 Socio-Cultural aspects of Tharu

According to history, Tharus are small-scale farmers. However, some of them are wealthy and some of them in the eastern Terai have become successful entrepreneurs. But a large percentage of them are really diligent tenant farmers. Most of the Tharus in

Dang-Deukhuri have been very greatly explicated by retrieves, Jamindars, landlords and revenue agents. They are virtually slaves in the hands of Jamindars, sold and bought at will since most of them are landless share-cropping peasants, they have to rely entirely on the mercy of the Jamindars.

Chaudhary, (1998), has said that agriculture was only one alternative but it was a subsistence level due to joint family system they could not manage their economy and every year they started selling their parental land. Now they have hardly a hectare or less in a family. Most of them turn to Kamaiyas or bonded labour due to social culture e.g., in marriage, death and birth and other social functions they could spend a lot more than their capacity by selling their land or mortgaging or taking loans (Saunki).

Tharus have social functions at least once in a month and right from seeding to harvesting of the crops they undergo several social functions keeping their fields off and pay heavy expense on social functions. Their social function is not lesser than the functions of Jyapu (Newar) of Kathmandu valley. But Jyapu sustains their economy, because they are not Kamaiyas or bonded labour and not exploited by big landlord or clever people. But the Tharus have every fear from all sides to be exploited and is like a "fresh cucumber". Even a grass needle puncture inside it all damage a lot. In marriage, birth, and all other functions alcohol is a must. No works finish without alcohol. Alcohol is like water. They cannot work and go out without alcohol. 'Alcohol is their life.' They are born on alcohol, breathe on alcohol and die on alcohol as Kamaya or bonded labourers are born as bonded and die as bonded laborer.

Festivals of Tharu are a part of Tharu culture. Due to the contact with other outside people as well as Hindu emigrants from hill, Tharu culture has been highly influenced by Hindu Culture. Their festivals have socio-cultural importance and have undergone some significant changes. For e.g., food habit, dress pattern, way of observing various festivals and say of living.

### **3.15.1 Socio-Cultural aspects of Kochila tharu**

According to a study (KC, 2019), Tharu ethnic minorities, like many other indigenous ethnic people in Nepal, believe in a supernatural world made up of a variety of practices designed to forge a close bond with deities and spirits that are thought to have a bearing on the future of their way of life. And since they have long held the notion that these beliefs have an impact on their way of life, stability, and prosperity, they have carried

them over from their forefathers. According to research, for the Tharus, the earth is a vast holy theatre in which individuals, spirits, and impersonal forces are intricately intertwined, and this influences the way in which individuals spend their lives. Curiously, the research reveals that the Tharus participate in a variety of religious rituals and hold a strong belief in the relationship between what they practice and the way they live their life.



**Figure 38: Socio-cultural dimension of Tharu people**

The Kochila Tharu culture, according to Eichentopf and Mitchell, is distinct from those of their other Tharu neighbors (A Sociolinguistic Study of Kochila Tharu in Southeast Nepal, 2013). Interestingly, their differences in attire, traditions, and language are also apparent. According to Krauskopff (as cited in Eichentopf & Mitchell, 2013), published and unpublished studies demonstrate a striking diversity between groups in terms of social organization, rituals and religious practices, village and domestic organization, mythology, and festivals. We also observed some variations in terms of housing and clothing types in the Kochila Tharu areas. The supernatural is a topic that the Tharu faith is interested in. They have a number of gods connected to the house, the forest, and many material civilizations. Baramthan, which is beyond the hamlet, is one of the main tenets of their faith.

### **3.16 Socio-economic aspect of Tharu community**

#### **1. Family Composition:**

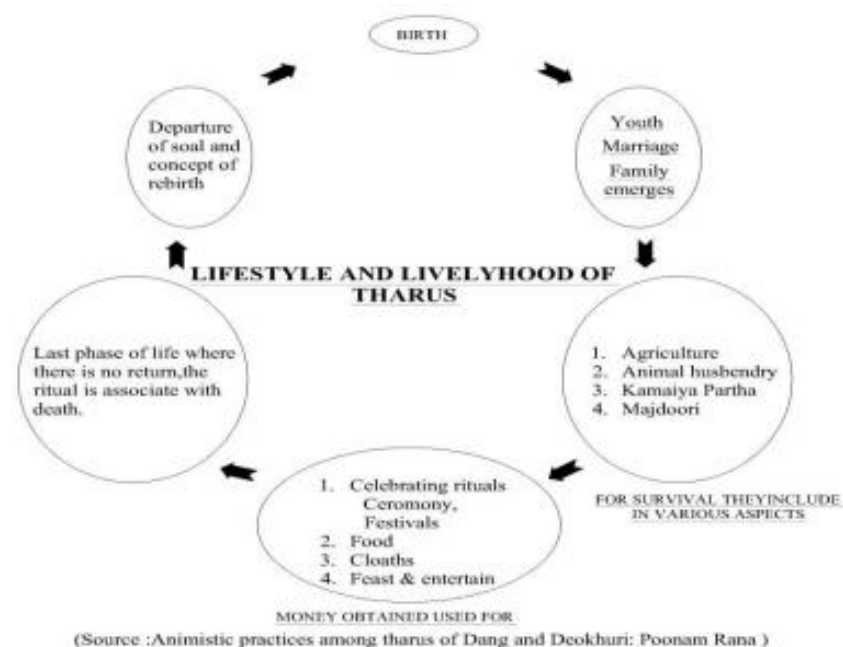
There is evidence of patrilineal families in the Tharu society. Unlike other matrilineal communities, their descendants may only be traced through the father's line, that is, to sons. The family's practical leader who engages in extracurricular activities is a male

Tharu. The family patriarch dies, and his wife or eldest son assumes control of the household.

## 2. Family activities

All the family members take part in performing of daily work. The tasks are allocated according to sex, age and following hierarchy. The young men (son) do most of the agricultural work: ploughing, getting the rice field ready, sowing, and looking after the field. The father is responsible for the animals, chancing of litter, milking the cow, etc. he cultivates the kitchen garden, makes the mats, nets and ropes, and repairs the implements.

The mother, who is in charge of food stocks, takes out an adequate quantity of grains from silos for the day. She feeds the pigs and hens in the “Gharik Angna”, plucks the vegetable from the kitchen garden and looks after the baby. During her spare time in the afternoon, she is engaged in basket work or weaving. The daughter in law crushes the grain, presses the oil, carries the fuel, lights the fire and prepares the meals. She washes the dishes and look after the upkeep of the dwelling. The daughter draws and carry the water from the well, help in cleaning of the grain, do the washing and short out the vegetables. At the time of harvest, they are all out in the field or in communal threshing ground “Khryan”.



**Figure 39: Life style and livelihood of tharus**

The house is not occupied for the entire day. The dwelling area, in particular, can be closed for several hours as meals are taken only in the morning and the evening and if the women are not in the field they work in the courtyard.

### **3. Religious Composition:**

The practice of religion is cultural. Every village in the globe has its own unique religious history. All ethnic group's religious practices are entwined with their respective religions. It is categorically stated that the Tharu community in the research is Hindu. Hindu deities like Laxmi, Sita, Ram, Krishna, Vishnu, Durga, Kali, etc. are worshipped by them. Additionally, they admire their own Kul Devata (Deities). The deities are Dina Bhadri, Laksare Sardar, Lalu Sardar, Lanksare, Sales, SurSaire, Musan Sardar etc.

### **4. Housing, Clothing, Food and Ornaments**

Contrary to popular belief, only a small percentage of Tharu homes actually consist of a joint family, as shown by the current survey. It might be because of the cultural contact with individuals from other communities, especially those who relocated from the highlands. The combined family members' status, role performance, and task distribution seem to be pretty fascinating. The primary grains consumed by Tharus are corn, wheat, and paddy. They also get food from the forest and the river. People in Tharu enjoy fishing, collecting snails, and foraging for wild fruits and vegetables. However, they are now learning how to cultivate vegetables on their own property. A diverse society is developing in the Chitwan district. The traditional attire of older generations is worn. Shirt, lagauti, and headgear for men are all pagari. Their shoes are made of wood. Women wear a white dhoti and a shirt. The majority of them have godana (tattoo) on their legs and arms in addition to wearing silver jewelry such the mantika (on the forehead), rings, nathiya, phophi, and bulaki (on the nose), matha (on the hand), and hasuli and chakati (a necklace of silver coins) on the neck. The trend of young people is, however, drastically evolving. Shirt, tee, pants, and shoes are virtually always seen on boys. The typical female attire includes a sari, top, kurtha salwar, and pants. Gold jewelry are worn by certain girls.

## 5. Dance

In Sauraha, dance plays a significant role in Tharu culture. They execute several dances, such as the harvest dance, the Jhiri dance, the holy dance (Damju dance), the Thekada dance, and the peacock dance, among others.



Figure 41: Peacock dance



Figure 41: Jhiri dance

### 3.16.1 Household goods and furniture

Previously Tharu people used to prepare their household goods and furniture by themselves but now they purchase from the market. Tharus are well known in the manufacture of basket articles used for agricultural purposes, food preparation, storing of clothes and personal objects etc. colourful basket work is made at the



Figure 42: Kothi

time of marriage. The shape and size of baskets vary according to usage. The material used are vary bamboo, seeds and grass. Basketwork is carried out by the women whereas bamboo sheets, rain hats, nets ropes are made by the male. The earthenware silos are prepared by the women themselves which is used for storing corns. Various furniture such as Machya, Khatya etc. are prepared by themselves. Household goods and furniture used by Tharus are given below.

1. **Bhauka** – it is a special kind of basket used by Tharus to store their clothes, ornaments and personal objects. It is hung from the roof and prepared by ewaving a special material called Bhagra. It is 1“8” in height with 6” dia. At base, 1“8” at middle and 1“0” at top opening. Generally, Topana is used to cover the opening and Pendi is used as base of Bhauka

2. **Bhauki** - It is small kind of Bhauka and it is 10" in height with 4" dia at base, 10" at middle and 7" at top
3. **Topna** – it is used as cover or lid of basket
4. **Khar** – it is ash of mustard plant which is used for washing clothes
5. **Thakra** – a set of small pieces of bamboo sticks that is used like a comb
6. **Matika** – a wooden vessel that is used to keep liquid items like ghee, oil, curd etc
7. **Dehri** – it is a special kind of earthenware silo that is not only used for storing the grains, but also used as partitions in the building. It is made in various sizes as required. Generally, it is made 2'0"-3'6" in length, 1'0"- 1'6" in width and 6'0"- 7'6" in height and 1.5" to 2" thick. It is placed on an earthen base called Guara which is 1'0"-2'0" in height and closed with earthen disk called Barkan placed on the top of the neck. The grains are removed by the means of a circular hole made at the base of the silo and plugged with an earthen stopper
8. **Kuthli** – it is cylindrical type of small earthenware silo used for storing grains
9. **Dhakan** – a kind of earthenware lid



Figure 44: Jatho or Chakiya

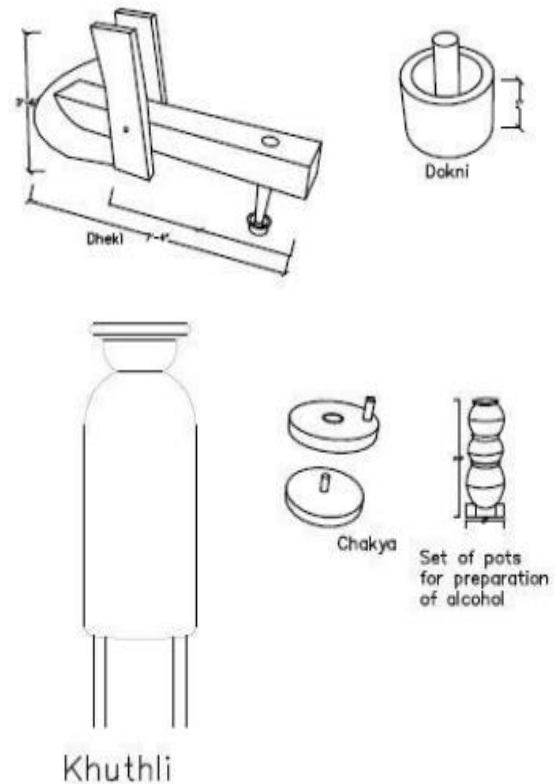


Figure 43: Traditional tharu household items

10. **Khatya** – it is like a bedstead made from weaving San fixed to the wooden frame, which is 5'9" in length, 3'6" in width and 1'4" in height
11. **Tukki** – a traditional type of lamp in which kerosene is used
12. **Khapri**- a kind of earthenware pot, which is used for frying grains
13. **Hanri** – it is a kind of earthen cooking pot

14. **Gilas** – a kind of glass used for drinking water
15. **Guentha** – cow udng used for firing in kitchen
16. **Chulha** – earthenware stove used in kitchen
17. **Barhani** – a kind of broom
18. **Lotya** – a small vessel used as jug or sometimes as mug for water

### 3.16.1.1 Festivals and ceremonies

Tharus have also their own kind of festival which is celebrated by their own way. They have feast, festivals and ceremony. Eating, Drinking, Singing and Dancing are the main activities that are done during festivals. Some of the important Tharu festivals are given below:

1. **Maghi** – it is one of the main festivals of Tharus, also known as a New Year of Tharus. The main day of Maghi falls on the first day of Magh. Before the main day of the festival, families go for fishing and also prepare Dhekri. This is the festival of drinking, singing and not doing any work.



Figure 45: Tharus celebrating Maghi

2. **Hori or Phaguwa** – according to Hindus, Hori (Holi or Phaguwa purnima) falls on the full moon of Phalgun.
3. **Jitiya** - One of the most important festivals celebrated by Tharu women, Jitiya is celebrated by keeping fast by the mothers for their sons. On this day, the brothers visit their sisters' home to invite them and take them to their maternal home where they will be celebrating this festival and also Saamaa Chakewa. The married women keep waterless fast and worship Lord Jitmahan on this occasion.
4. **Chauthichan** - Chauthichan, celebrated on the day of Ganesh Chaturthi festival, is celebrated by worshipping the moon.
5. **Akharhi Pawain** - Celebrated by offering rice pudding to the home deity, Akharhi Pawain falls on the month of June-July.
6. **Joorshital/Siruwa** - Celebrated on the first day of the Nepali year, the festival of Joorshital is celebrated by sprinkling water on each other.

### 3.17 Symbolic Expression of the Tharu

#### 3.17.1 Mokha: Symbolic Expression of the Morangiya Tharu

The culture of the Tharus is quite rich. The arts and crafts of Morangiya Tharu are distinct from those of Dangoriya Tharu (in the western Terai plain). In the inner-madhesh and across the plain, different settlement regions have distinct names for the same arts and crafts. They have cultivated a custom of painting Laxmi, the Hindu goddess of prosperity and fertility, in vibrant shapes on the outside walls and verandas of their homes. These paintings are created in advance of Dipawali, the festival of lights (Suman). Many Tharus think that seeing a peacock when they first leave their house would bring them luck for the day. In order to beautify their homes, the ladies of Morangiya tharu create lovely paintings, relief mouldings, engravings, and other decorations. Houses have mud walls that are covered in water- and clay-mixed pond clay when they are dry (laththa maati). A well-known kind of indigenous Tharu art is mokhaa art. Along with covering the wall and windows, mokha is another fabric used. Clay is used to make Chakka, and women in particular are active in its creation. On the wall facing the street, different colors are used to create motifs like plants, flowers, animals like elephants and peacocks, trees, and birds' leaves, among others.



Figure 47: Traditional wall art of Eastern Tharu



Figure 47: Peacock design of Mokha art

### 3.18 Understanding relationship of socio-cultural aspects with architectural space formation in traditional settlement

Numerous experts contend that "culture" has a crucial role in societal sustainability and is the primary component in the creation of architectural spaces (Gurung, n.d.). Architecture is a reflection of culture in every civilization and interacts intimately with

its structural, historical, political, economic, and social characteristics. The most significant influence on architecture comes from changes in community cultural characteristics. Thus, understanding the architectural style of any environment requires an understanding of culture and how it affects architectural spaces. It takes resurrecting social sensibility, communication, and interaction with the natural world to create a sustainable culture. The usage of vernacular architecture appears to be an excellent option since it takes into account the local culture and environment (Gurung).

The architectural style of each age is a reflection of the culture and art, and it is proportionate to the changes that occur in the spheres of life and art since architecture is a mirror of human thought in connection to space, aesthetics, and culture of distinct cultures. A society's culture is portrayed through its architecture, which has a significant influence on all facets of human existence. Architecture demonstrates the historical and revolutionary role in fusing these elements together, and it has the power to influence people's way of life and how they communicate with one another. Homes that represent current lifestyles based on local, ethical, and cultural traditions alter in appearance as a result of incorporating contemporary modifications. Homes exhibit new styles anytime changes occur, therefore it can be claimed that they are a component of cultural contents (Ju, Omar, & Ko, 2009). Since the days when construction and trimming were common, architecture has developed, endured until the present, and its variety has been established (Gurung, n.d.). The model of the relationship between culture and architecture can be expressed based on four different definitions as shown in Table.

**Table 2 shows the relationship between architecture and culture.**

<b>Architecture and culture</b>	<b>Architecture</b>	<b>Scope of culture</b>
Functional	Due to the interplay of social components	Sociology
Conceptual	As a work of art with an eventual goal of mental elevation	Aesthetics
Functional Conceptual	Regarding the quality of human existence, which includes deeds	Anthropology

Architecture and culture	Architecture	Scope of culture
Perceptual	Because of one's perspective on the area's-built environment	Psychology

### 3.18.1 Some factors affecting the formation of architecture spaces

There are a few things that can affect how architectural spaces are created:

- Climate, the natural environment, and man-made environments are environmental elements.
- Material considerations include materials, construction science and technology, and the economics.
- Behavioral patterns and spatial characteristics of activities, technology, and biological instruments are functional elements.
- Cultural aspects include sustainable patterns, beauty, fashion, and taste as well as innovation and creativity.

Study (Gurung, n.d.) says, among the mentioned topics, historical, temporal, environmental, and cultural ones are crucial. It is necessary to research cultural factors and how they relate to issues with architecture.

### 3.18.2 Elements of open spaces and their functions in heritage settlement

In context of Nepal, study was found in relation with functions of the social spaces.

Table 3 shows the relationship between architecture and spaces of the house.

Types of open spaces	Functions
Small chowks (courtyards) surrounded by dwellings	<ul style="list-style-type: none"> <li>• Playgrounds for children</li> <li>• Drying clothes, grains</li> <li>• Fetching water</li> </ul>
Bahal (Buddhist courtyards with shrines)	<ul style="list-style-type: none"> <li>• Social interaction, worshipping, safe play area for children</li> </ul>
Nani (Buddhist courtyards without shrines)	<ul style="list-style-type: none"> <li>• Social interaction, safe play area for children</li> </ul>
Main chowk (large square mostly near palace or in front of palace)	<ul style="list-style-type: none"> <li>• Events</li> <li>• Announcements</li> <li>• Important functions: City Hall, law court, police station, post office</li> </ul>

Types of open spaces	Functions
Streets	<ul style="list-style-type: none"> <li>• Also, for daily activities, bathing kids, drying grains (during harvesting season)</li> <li>• Also used for commercial activities (in recent years)</li> <li>• Procession routes for chariots during festivals</li> <li>• Connectivity</li> </ul>
Khet (Agricultural field)	<ul style="list-style-type: none"> <li>• Agriculture, farming</li> </ul>
Ghats (River bank)	<ul style="list-style-type: none"> <li>• Cremation areas for Hindus</li> <li>• Worshipping Gods</li> </ul>

### 3.18.3 Open spaces and their historical function in heritage settlement

Table 4 shows the relationship between open spaces with their historical setting

Elements of open spaces	In which open space	Functions
Patis (covered area)	Along the street, along the houses	Communal building/ public shelter for games, music, gossip Instruction and business Resting space
Hiti (public fountain sunk in the ground)	Along the street	For fetching water
Garden wall, pond or tank for water supply	Along the street, in smaller squares	Relaxation and beauty Fetching water
Dabali (elevated platform)	In the large squares	Cultural programs
Sattal (rest houses)		For resting, chatting
Stone spout, water well	In the courtyards, large squares	For fetching water
Lachhi (squares)		Artistic work- pottery, carpet weaving painting

### 3.18.4 Relationship of socio- cultural aspect with built space in Tharu settlement

Types of spaces	Functions
<b>Courtyard</b>	<ul style="list-style-type: none"> <li>• Major space for social interaction</li> <li>• Festivals and social functions</li> <li>• Utility area: washing, bathing, sun drying grains, clothes</li> </ul>
<b>Verandah</b>	<ul style="list-style-type: none"> <li>• Buffer zone between private (dwelling) and public space(courtyard)</li> <li>• Used as dining space in daily use as well as in occasion and ceremonies</li> <li>• Sleeping purposes, storing of agricultural products and other household goods; dhiki, jato</li> </ul>
<b>Guest/entrance hall</b>	<ul style="list-style-type: none"> <li>• Semi-public Space for entertaining guests and social interaction</li> </ul>
<b>Khet (agricultural filed)</b>	<ul style="list-style-type: none"> <li>• Important economic lifestyle</li> <li>• Design of house; agriculture based</li> </ul>
<b>Walls</b>	<ul style="list-style-type: none"> <li>• Display of traditional wall art like mokha art</li> <li>• Depicting Laxmi, the Hindu goddess of prosperity and fertility</li> <li>• Peacock design: human happiness, passion and bliss</li> </ul>

### 3.19 Comparative study of traditional Kochila tharu house and modern contemporary buildings

Table 5 shows the comparative study between traditional mud house with contemporary house

Parameters	Traditional kochila tharu house	Contemporary house
<b>Planning</b>	Courtyard planning with single row detached dwelling unit	Often compact planning
<b>Building form</b>	Elongated	Often rectangular
<b>Building materials</b>	Mud, Bamboo, Timber, Thatch, Tiles- low embodied energy	Cement, Iron, brick, glass- comparatively high embodied energy
<b>Building height</b>	Single storey, sometime with mezzanine space	Residential, generally 2-3 storey in terai region
<b>Internal space configuration</b>	Mainly horizontal	rectangular, multiple function under single roof
<b>Openings</b>	Few and very small, doors are largest openings	Medium to large window
<b>Semi-open spaces</b>	Open courtyard, veranda	Verandah
<b>Wall</b>	- Thick mud made of combination of burnt and sundried bricks; Lumber on timber structure - 50-600mm thick wall-insulator	- 9” thick at exterior; 5” thick at inner partition - Red brick and cement mortar - Cement plaster both side of wall
<b>Roof type</b>	Slope with long projection up to verandah, avoiding heat to the inner rooms	Generally flat, modern design with less projection and overhangs
<b>Roofing material</b>	Thatch or tiles	RCC
<b>Foundation</b>	Earth/stone/brick plinth	RCC with pillar

<b>Floor</b>	Compacted mud flooring	Cement concrete flooring, tiles
<b>Thermal comfort</b>	Comparatively cooler than concrete house	Concrete Absorbs heat during day in summer, uncomfortable interior
<b>Ventilation</b>	Courtyard design to break the house into smaller with more walls opening onto the outdoors, much easier to encourage a gentle breeze into the home	Rely on mechanical air conditioning
<b>Natural lights</b>	Equal dispersion of natural light in all room in courtyard house	Not enough in Inner core of big house

### 3.20 Inferences from literature study

- Urbanization and modernization are influential to the traditional settlement
- The lifestyle and social priorities have been changing
- The speculative urban growth has changed the characteristics of the rural settlements in terms of socio-spatial components
- Traditional homes are challenging to integrate modern living habits into a traditional setting and often new generation are drawn towards modern hi-tech conveniences
- New building materials, processes, and equipment, new projects have failed to respond appropriately in climatological or environmental terms
- Identification of the unique characteristic of the rural settlement according to location and historical process is prominent in order to maintain the sustainability of the area
- Utilize the local knowledge of construction and planning for the future sustainable design strategies

## CHAPTER 4. CASE STUDIES

In this context, the transformation of indigenous/village house architecture was studied. A brief introduction and scenario for the transformation of each of these locations is provided. People's geography, geology, culture, climate and beliefs are, of course, integral parts of indigenous architecture, so the focus of this study is on the physical aspects of architectural forms and their internal transformations. The causes of transformation might differ from location to location and from case to instance more in response to the shifting needs of the local population.

### 4.1 Transformation of vernacular architecture of India

The scenario and causes of transformation of vernacular houses of different regions of India is discussed below in following case studies.

#### 4.1.1 Case 1 - Himachal Pradesh (H.P.): the case of Kinnaur

The villages in this district have vernacular landscapes intact – yet very traditional with many houses which bear typical character of Kinnaur with roofs made of slate stone and carvings of wood.



**Figure 49: Kath and Kunal construction**



**Figure 48: Steep Pitched roof**

#### 4.1.1.1 Scenario of transformation of vernacular houses in Kinnaur district, H.P.; (Sadhu, 2020)

Table 6: Transformation of house in Kinnaur district

S. No.	Transformation		
	Component	Effect	Cause
1.	<b>Construction technique</b>	Difference in material for Kath Kuni	<ul style="list-style-type: none"> <li>✓ Shortage of timber and stone</li> <li>✓ Changing market with availability of new types of building materials</li> <li>✓ Government policies and afforestation measures</li> </ul>
2.	<b>Spatial organization</b>	Absence of projecting Verandah	<ul style="list-style-type: none"> <li>✓ Gradual shift from agriculture and other occupations and change in dwelling unit spatial configuration</li> <li>✓ Change in climate over a period of time</li> </ul>
3.	<b>Building Materials</b>	<b>Wall:</b> Use of concrete blocks and bricks	<ul style="list-style-type: none"> <li>✓ Shortage of timber and stone</li> <li>✓ Changing market with availability of new types of building materials</li> <li>✓ Government policies and afforestation measures</li> </ul>
		<b>Windows:</b> Glazing	<ul style="list-style-type: none"> <li>✓ Scarcity of timber</li> <li>✓ Change in climate over a period of time</li> <li>✓ Preference for bright interiors</li> </ul>
		<b>Roof:</b> Use of Corrugated tin sheets	<ul style="list-style-type: none"> <li>✓ Economical and free of maintenance</li> <li>✓ Changing market with availability of new types of building materials</li> <li>✓ Light weight material leading to reduction of the dead load of the building</li> </ul>
4.	<b>Decoration</b>	Carving in Timber: Simpler design	<ul style="list-style-type: none"> <li>✓ Prolonged duration of construction</li> <li>✓ Shortage of skilled work force</li> <li>✓ Expensive and uneconomical</li> </ul>
		Jallar: Use of metal Jallars	<ul style="list-style-type: none"> <li>✓ Shortage of timber</li> <li>✓ Speedy installation</li> <li>✓ Shortage of skilled work force</li> <li>✓ Expensive and uneconomical</li> </ul>
5.	<b>Colour / Texture</b>	Painting on outer façade	<ul style="list-style-type: none"> <li>✓ Symbol of status</li> </ul>

S. No.	Transformation		
	Component	Effect	Cause
			<ul style="list-style-type: none"> <li>✓ Protection of timber from external environment</li> <li>✓ Improved aesthetic appeal</li> </ul>



Figure 51: Absence of Kath Kuni style with use of concrete blocks



Figure 50: Transformed verandah with use of glass

#### 4.1.2 Case 2 – Andhra Pradesh (a.p): a case study of Ghantasala village, Krishna district

Ghantasala is a village in Krishna district, A.P, India. It is situated at a distance of 60 km from Vijayawada city and 11 km from Machilipatnam town. It was one of the flourishing places of Indo Roman trade in the yesteryears, besides being a centre of religious worship, along River Krishna and the Bay of Bengal.

##### 4.1.2.1 Scenario of transformation in vernacular houses of Ghantasala village, A.P.; (Sadhu, 2020)

Table 7: Transformation of house in Ghantasala village

S. No.	Transformation		
	Component	Effect	Cause
1.	<b>Construction technique</b>	Use of wire cut bricks, concrete blocks etc.	<ul style="list-style-type: none"> <li>✓ Availability of light weight and new materials</li> <li>✓ Change in soil quality of the place</li> </ul>
2.	<b>Spatial organization</b>	Absence of Granary in the front porch or relocation of Granary	<ul style="list-style-type: none"> <li>✓ Change of primary occupation from Agriculture to business or the like</li> <li>✓ Influence of Vaastu, resulting in shifting to a different part of the plot in case its actually located in the north east portion</li> </ul>

S. No.	Transformation		
	Component	Effect	Cause
		Attached Kitchen, toilets	<ul style="list-style-type: none"> <li>✓ Change in the cooking equipment gadgets leading to smoke-free kitchen</li> <li>✓ Change in comfort standards of the present users with Toilets</li> <li>✓ Safety and ease of access at any time accessibility in case of attached toilets</li> <li>✓ Ease of access for the elderly</li> </ul>
3.	<b>Building Materials</b>	<b>Wall:</b> Use of concrete blocks and bricks	<ul style="list-style-type: none"> <li>✓ Scarcity of timber and expensive nature of vernacular materials</li> <li>✓ Changing market with availability of new types of building materials</li> <li>✓ Urge for contemporary aesthetic appeal</li> <li>✓ Ease of erection of temporary or permanent structures for additional built-up area, parking for vehicles etc.</li> </ul>
		<b>Windows:</b> Glazing	
		<b>Roof:</b> Use of Corrugated tin sheets	
4.	<b>Ornamentation</b>	Carvings in timber: Contemporary or modular type of carving	<ul style="list-style-type: none"> <li>✓ Longer time required to reproduce or emulate vernacular style carvings</li> <li>✓ Shortage of skilled work force</li> <li>✓ Expensive nature of vernacular style carvings</li> </ul>
		Use of Oil bound distemper and water-proof paints for exterior and interior	<ul style="list-style-type: none"> <li>✓ Shortage of timber</li> <li>✓ Speedy installation</li> <li>✓ Shortage of skilled work force</li> <li>✓ Expensive and uneconomical</li> </ul>
5.	<b>Chrome/Texture</b>	Use of Oil bound distemper and water-proof paints for exterior and interior	<ul style="list-style-type: none"> <li>✓ Symbol of status</li> <li>✓ Protection of timber from external environment</li> <li>✓ Improved aesthetic appeal</li> </ul>



**Figure 53: New materials and style for the extended house beside the vernacular style**

**Figure 52: Manduva transformed from open cut-out to piped concealed through**

### 4.1.3 Findings from the case study

As per the two cases studied above, economic constraints like income inconsistency, maintenance cost; geological / geographical constraints like non-availability of traditional materials like wood etc., social constraints like peer pressure, disinterest of present generation to continue the old tradition amidst their present routine, human resource constraints like non-availability of skilled labor, emotional constraints like compliance of local Vaastu regulations, other family situations, Subdivision etc. are understood to be the causes of transformation in combination or in isolation, for the changing scenario of vernacular architecture of a place. In a nutshell, despite the constraints observed in the said two cases, people try and retain the visual form as far as possible even with the new materials in place of vernacular materials.

## 4.2 Transformation of Rural Settlements in Bangladesh (Rashid, 2017)

Bangladesh's rural housing has historically been impacted by a variety of natural and socioeconomic factors. Twelve carefully chosen homesteads have been taken for the research in order to look at the background and process of the transition of communities.

### 4.2.1 Traditional rural homesteads

In Bangladesh's rural areas, traditional rural homesteads are made up of a group of functionally distinct cottages arranged around a central courtyard, or "uthan." The formal zone (masculine, exterior section of the home), and the family zone, are the two main zones of a typical Bengali house (female, inner part of the house). The "Bengali" society is represented by these zones, which were set up based on social, cultural, religious, and climatic factors.

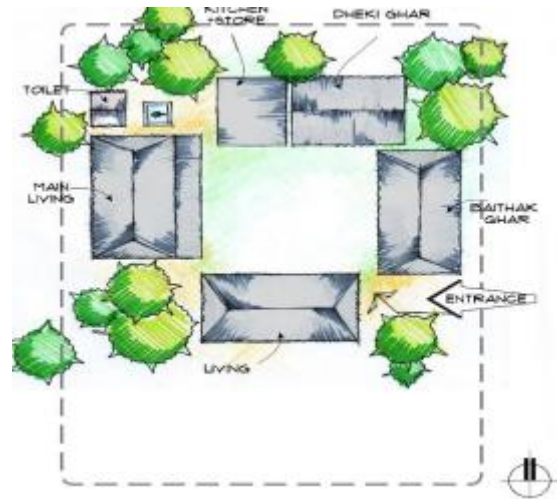


Figure 54: Common spatial form of rural settlement

In its most basic form, a traditional home is a collection of modest "huts" or "shelters" arranged around a "Uthan," or center courtyard. The outside home (Baithak Ghar), the inner house (Dwelling unit or Ghar), the kitchen, and the cow shed are among the several huts built for various purposes. Two additional huts—the storehouse (for storing food, fuel, etc.) and the "Dheki Ghar," or shed for rice husking—appear for bigger homes. Toilets are often set up for the living room and the non-family visitors at the exterior of the outer courtyard. Ekchala, Dochala, or Chauchala are the typical names of the dwellings. Ponds are another crucial component that are typically employed as water

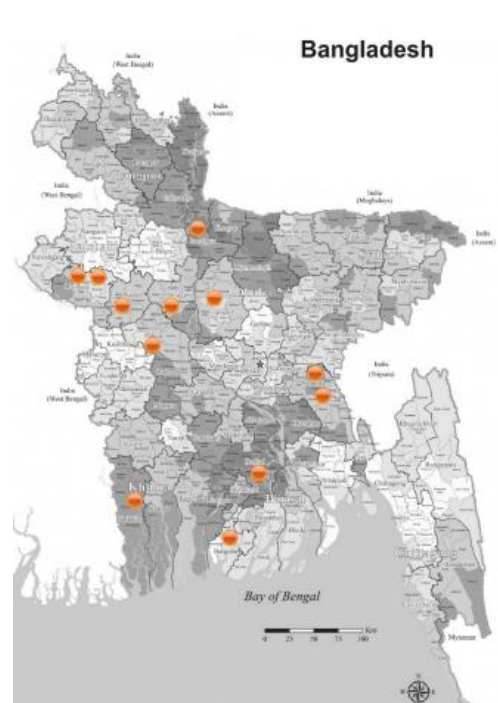


Figure 55: Location of selected homesteads

sources. Gender segregation is seen in Muslim families, in addition to the diverse usage of the ponds. Many wealthy households set up separate ponds for men and ladies.

#### 4.2.2 Selected homesteads

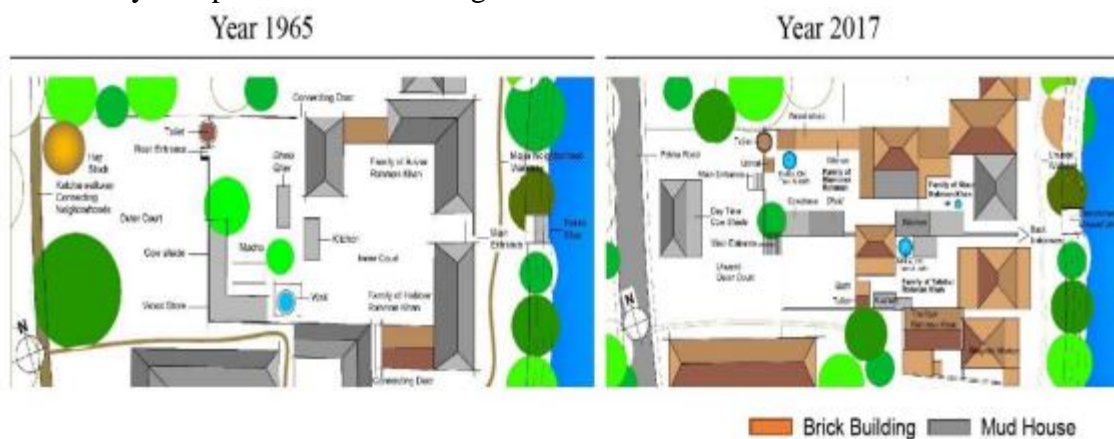
Out of Bangladesh's 10 administrative districts, a total of twelve homesteads were chosen.

#### 4.2.3 Comparative analysis

The information gathered from the field survey reveals that there are several organizational structures used for the transformation of homesteads. In the majority of villages, new homes have been built in the last 20–25 years. The amount of open space has diminished, and the way building materials are used has undergone drastic change. In other instances, the distribution of the entire homestead is even changed.

##### 4.2.3.1 Construction of New House Forms

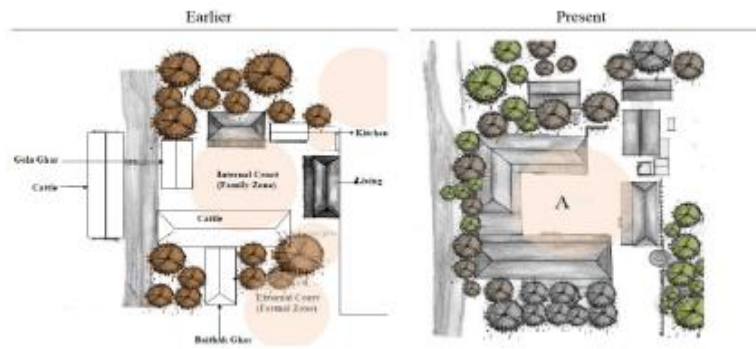
Using the Khan-Para town in the Rajshahi district as an example, it can be shown that this community was built around a pond and that, over the period of 50 years, the quantity of open space and courtyards (uthan) has significantly decreased. New homes have been built all around the pond as a result of the family's growth. New cow barns were constructed as a result of the population growth and the popularity of animal husbandry as a product to sell during Eid-ul-Azha.



**Figure 56: Layout of the selected homestead of Khan-para in the year 1965 and 2017**

The previous and current spatial arrangement of the chosen homestead in the Taltola hamlet in the Natore area shows both the construction of new residences and the relocation of old ones.

The settlement of Nikaril in the Tangail district's chosen homestead was created with a number of cottages surrounded by a courtyard (uthan). According to the information we have, a new home and a new bathroom were constructed around the yard in the twenty-fifth year.



**Figure 57: The earlier and present spatial arrangement of the of Taltala village**

The chosen homestead in Govindapur village, Comilla district, has undergone



**Figure 58: Multiple houses surrounded by a courtyard in the homestead of the village Nikaril**

continuous evolution for about forty years, and this evolution has been studied. It is discovered that while the homestead was first constructed with just one house, a kitchen, a bathroom, and a courtyard, several other residences have since been built.



**Figure 59: Continuous changes of the selected homestead of the Gobindapur village**

#### 4.2.3.2 Re-distribution of Land

The transformation process has been changed along with the re-distribution of homestead premise in some cases. From the case study of Tilahari village of Rajshahi, it is found that Conversion of the family into single structure from joint structure is responsible for such transformation.



Figure 61: Spatial settings of the settlement of Tilahari village in the year 1997 and 2017

Some of the pond in the Jamalpur district village of Boistompara has been filled in order to provide a larger area for the renovation of the ancient home.

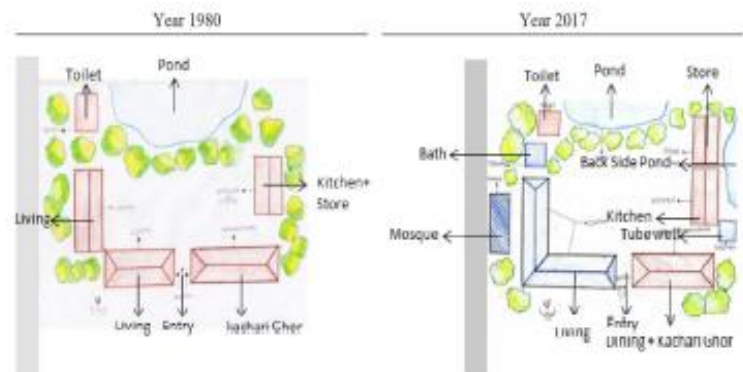


Figure 60: Spatial settings of the selected homestead of Boistompara village at past and at present

Situation at 2017	Situation at 1980
The room for living has been divided internally. The main reason of increasing the number of family members.	multirThere was two living room on 1980s and there was no partition wall.
The mosque is the new construction	At that time there was no mosque.
Both ponds are now used for fishing, washing, and bathing.	Only the front pond was there and it was used only for washing and bathing.
Now there is two tube well one is for internal use and other is for external use.	There was only external tube well.
The store is also a new construction. At present it is used as paddy store. Kachari ghor is now used as dinning and boithok khana.	Previously the kitchen was used to cook, store and serve food.

Figure 62: Comparative features of the selected homestead of Boistompara in two different eras

### 4.2.3.3 Changes in Materials

The materials used in rural settlement development have undergone substantial modification. Every occurrence in our investigation that involved changes to the building components was discovered. In recent decades, brick has replaced traditional building materials including bamboo, fence, and CI sheet as the primary material for new home construction.



**Figure 63: The brick and cement wall are being used as the construction material for wall**

	Location	Wall materials	Roofing materials	False ceiling	Floor materials
Homestead Year: 1997	Baithak Ghor	Mud	Mud made tiles	Wood/Bamboo	Mud
	Main Living	Mud	CI sheet and mud made tiles	Bamboo	Mud
	Dining Space	Mud	CI sheet	Bamboo	Mud
	Kitchen	Mud	Mud made tiles	Bamboo	Mud
	Gola Ghor	Mud	Mud made tiles	No	Mud
	Varenda	Mud	Mud made tiles	Bamboo	Mud
	Toilet	Bamboo	CI sheet	No	Net cement finish
	Dhaki Ghor	Mud	Mud made tiles	No	Mud
Homestead Year: 2017	Baithak Ghor	Brick	CI sheet	Wood	Net cement finish
	Main Living	Brick	CI sheet	Wood	Net cement finish
	Dining Space	Brick	CI sheet	Bamboo	Mud
	Kitchen	Brick	Mud made tiles	No	Mud
	Gola Ghor	N/A	N/A	N/A	N/A
	Varenda	Brick	CI sheet	No	Net cement finish
	Toilet	Brick&Tiles	CI sheet	Wood	Floor tiles
	Dhaki Ghor	Brick	CI sheet	No	Mud

**Figure 64: Comparative use of construction materials at specific homestead of Tilahari village**

### 4.2.3.4 Transformation in Courtyard

Since the courtyard, or "uthan," is a crucial component of Bengali rural living, it goes through a variety of changes. The divided internal courtyard may be seen at Tilahari's particular farmhouse in the Rajshahi area. Due to changes in the family structure, both the previous homestead and new families had to be split apart. Internal courtyard might thus be separated.



**Figure 65: Spatial settings of the homestead of Tilahari village in the year 1997 and 2017**

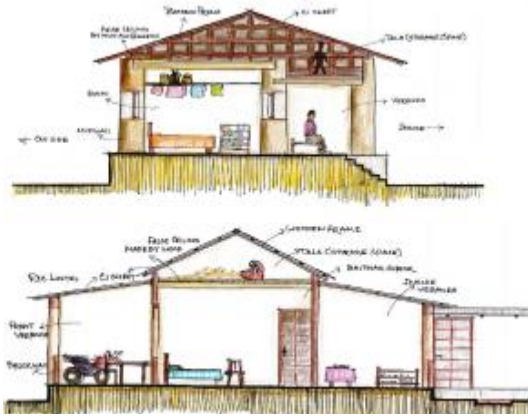


Figure 67: Sections of the past and present homestead

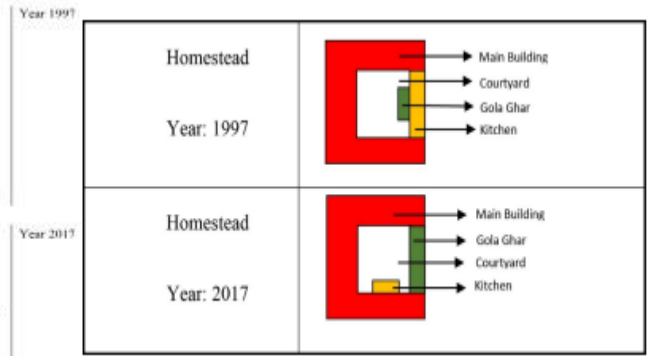


Figure 66: Existing and present basic layouts of selected homestead in Tilahari village

The internal architecture and design of the farmhouse have seen changes in use as well. To keep the courtyard free of clay during rain and to make upkeep simple, the courtyard may occasionally also be coated with cement-plaster. The courtyard serves as the primary focal point of the home's makeover in the Sirajganj district's Hatikumrul hamlet.



Figure 69: The inner courtyard is covered by cement-plaster to make it clay free during rain

The courtyard (uthan) has nearly completely vanished with the construction of a new home on the exterior grounds of the property.

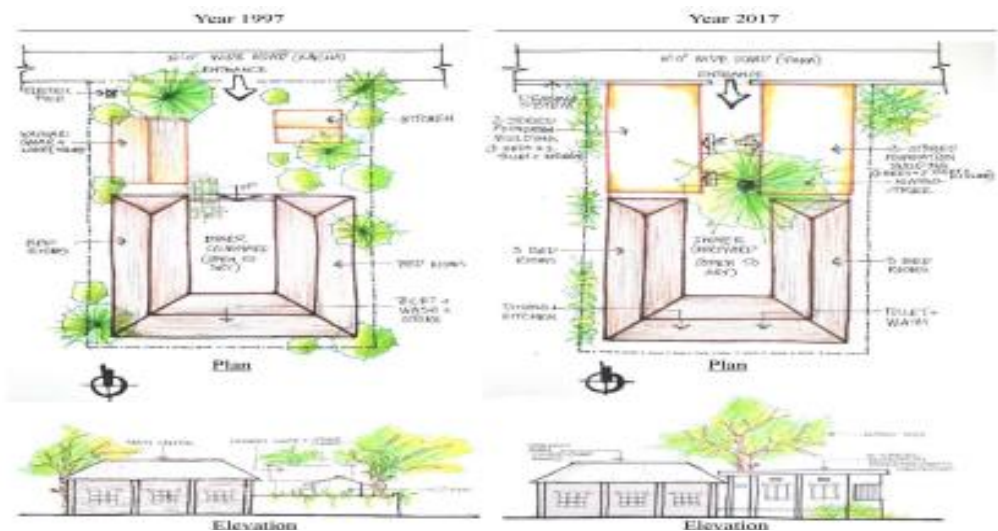
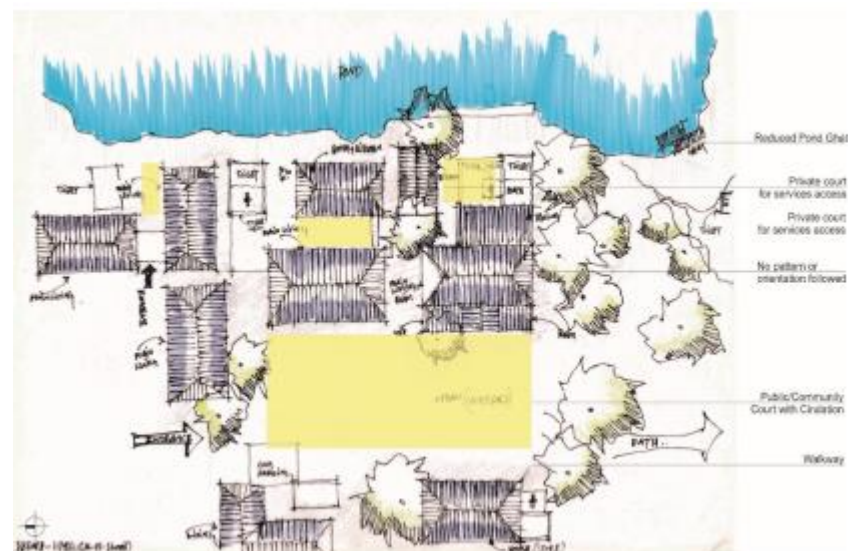


Figure 68: Spatial settings of the selected homestead in Hatikumrul village 20 years ago and at present

The demands of the court yard (uthan) were lessened as a result of rising land prices and a decline in direct participation with agriculture. In the chosen homestead in Shaktola village, Comilla district, another sort of change in the courtyard was noticed. The interior courtyard has been limited due to the requirement to construct new homes. Therefore, a large number of residents elect to maintain an exterior courtyard. To expand the size of the exterior courtyard, they also demolished a few modest dwellings.



**Figure 70: Spatial settings of the selected homestead at 20 years ago**



**Figure 71: Spatial settings of the selected homestead at present**

#### 4.2.3.5 Reflection of Urban Influence

The whole settlement of the Hatikumrul village in the Sirajganj district has nearly been turned into a town as a result of the ongoing urbanization and economic success of rural dwellers. The availability of urban-style amenities in the village has altered the level of living. The homestead is directly impacted by all of these amenities.



**Figure 72: Influence of urban lifestyle on the homestead by compact living and sanitation system**

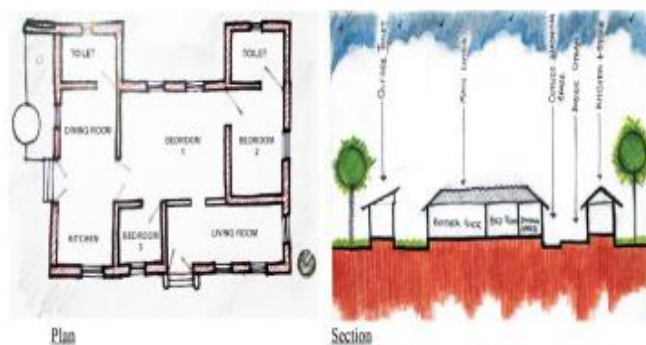


**Figure 73: Compact functional arrangement in the selected homestead of Shaktola village**

Instead of building separate residences for each family member in the chosen farmhouse in the Shaktola hamlet of the Comilla area, the house has been enlarged to accommodate everyone. Under one roof, many uses have been grouped together.

In metropolitan living environments, this kind of arrangement is present.

The main house of the chosen homestead in Govindapur village, Comilla district, has bedrooms, a living room, a dining room, a kitchen, and restrooms.



**Figure 74: Plan of the main house and section shows the compact functional zoning**

#### 4.2.4 Purposes of the transformation

Investigating the reasons for the changes in settlement of the chosen instances led the researchers to some intriguing conclusions. The following is a list of them:

- i. One of the causes of the change in homestead patterns is land redistribution among relatives.
- ii. People today demand all of a homestead's amenities in a single area. Separate house designs are becoming less effective as a result, becoming broader than before and incorporating all of the amenities under one roof.
- iii. Building a brick concrete (Pucca) house instead of an earthen (Cucha) house is made better by a growing brick field nearby the community.
- iv. The capacity to access power makes it possible to operate the machinery that mobilizes construction in a village.
- v. The development of roads and transportation is a crucial factor in changing the overall situation and the structural development of a village.

Transformations are visible throughout the town, not just on the homestead, and they are brought on by a number of circumstances. For instance, the following factors may be seen influencing the development of Khan-para in the Rajshahi district: Families are growing from generation to generation due to factors such as increased education, which has improved economic conditions; migration to urban areas; changes in people's interests and attitudes; and the death of rivers due to improved roads and the use of motorized vehicles; reliance on the power and telecommunications systems, as well as the promotion of entertainment and other amenities.

### 4.3 Spatial Transformation of Dutch period Town Houses in Galle Fort, Sri Lanka

#### 4.3.1 Galle - A History (Kishore, 2010)

The city of Galle situated on the South Western tip of Sri Lanka is the administrative capital of the southern province of the Island. Its historic quarter, the Fort, is said to be the largest surviving Fortified Dutch Colonial Town outside Europe and one of the best examples of a fortified city built by the Europeans in South and South East Asia. This was declared a UNESCO world heritage site in 1984.



Figure 75: Location of Galle fort

The morphology of Galle Fort represents a primary response of the buildings to the street. Residential plots which are about 50% of the built fabric are narrow on the street frontage and run deep and perpendicular to the street. The commercial value of the street frontage in urban spaces was a major consideration for the frontage to be narrow. Houses in row on either side of the street with colonnaded open verandahs contributed immensely to the character of the streetscape by defining its street edge. This characteristic remained intact during Dutch and British Periods, where Galle continued to function as an Administrative Centre of Southern Sri Lanka.



Figure 76: Streetscape of Galle fort



Figure 77: Aerial Views of Galle Fort (photos Ashley DeVos)

### 4.3.2 Architecture of the “Town House” of Galle Fort

The "Dutch Houses" in the Galle Fort exhibit typical features of the marine Sri Lankan vernacular architecture of the 18th and 19th centuries. In terms of culture, this has included fusing Asian and European ideas, designs, technology, and lifestyles, as well as adapting them to the new societal demands in tropical Asian settings. As a result, it is not thought to be truly Dutch but rather a fusion of western and eastern architecture. It represents a distinct type of building known as Dual Parentage and was created by local artisans using expertise from migratory Dutch people.

The courtyard has been a key component that not only has given the townhouse light and ventilation, but also defined and defined the other important functional rooms around it. When the layout and relationships between the rooms of the town homes in Galle Fort are examined, it becomes clear that there is a very clear pattern. Although they vary in size, proportion, and interior design (depending on the social and economic standing of the residents), the *Stoep* (front verandah), *Klein Zaal* (lobby), *Zaal* (great hall), and *Halvedak* (back verandah) have mostly remained constant as separate types of semi-private areas in the front half of the home. The more private areas were arranged around or around a courtyard at the back of the site. The family's domestic activities were centered on this peaceful indoor courtyard.

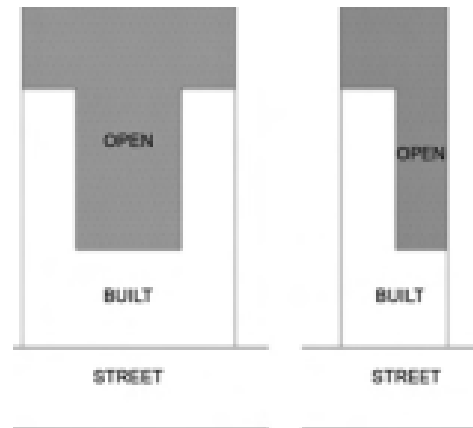


Figure 79: Two typical configurations of town houses

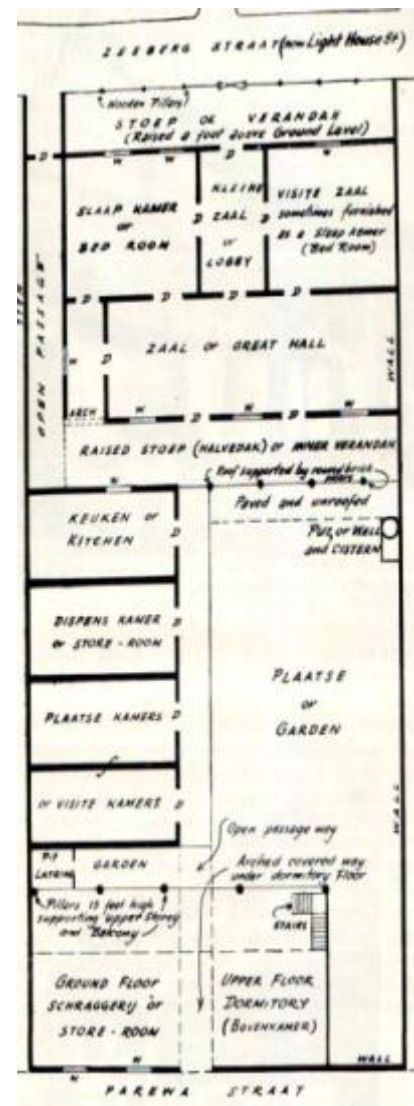


Figure 78: Typical plan of a Dutch House in Galle fort

### **4.3.3 Some distinct elements can be identified in a typical Dutch Town House abutting a street frontage.**

- Stoep (front verandah)
- Klein Zaal (lobby) which could consist of one or two rooms on either side
- Zaal (Great Hall)
- Zolder (attic - above the Zaal)
- Halve dak (back verandah) so called because only half the paved is covered by roof
- Plaatsse (Courtyard – paved compound)
- Slaap Kamer (Bed rooms)
- Visite Kamers (Visitors' rooms)
- Plaatsse Kamer (handy room used for different purposes)
- Keuken (Kitchen)
- Dispens Kamers (Store room)
- Well – usually in the Plaatsse

### **4.3.4 Transformation of form of the Town House**

The unique architecture of domestic buildings and streetscape generated by these buildings gradually began to disappear during the latter part of the British and post-Independence periods. Particularly during the last few decades, the town dwellings' internal layout and construction envelope both seem to have lost some of their uniqueness. Main reasons for this occurrence could be due to expansions and fragmentation to accommodate additional functions due to growth of family units, legal ownership related factors and a general deterioration of spaces owing to the poor economic status of most of the occupants.

### **4.3.5 Conservation efforts related to Galle Fort**

During the late 1970's with worldwide trends on preservation of heritage, conservation efforts on Galle Fort too got under way. However, privately owned domestic buildings, which are an integral part of the Fort Heritage, were not governed by rules or regulations with regard to restoration and preservation. This resulted in rapid changes and deterioration, causing severe changes to historic streetscapes.

Building Regulations of the Urban Development Authority, conservation regulations imposed by the Galle Heritage Foundation and legal jurisdictions of the Antiquities Ordinance have been used as tools for these proposed preservation attempts. Method of preservation was adoptive conservation related to social conservation aiming at preserving the outer envelope of the building to harmonize with the surrounding streetscape while allowing occupants to alter the interiors of their houses to fulfill their modern-day requirements. Proposals were prepared to bring back houses to its townhouse character.

55 Private houses had been selected. The main intention of the programme was to reduce the negative impacts of environmental and climatic aspects through a policy of minimum intervention. Reintroducing the front verandah, one of the most crucial components of the town house design of the Fort of Galle, was one of the main objectives.

#### 4.3.6 The study

This study is an attempt to investigate the present context of the ‘Town houses’ within the Dutch fort, specifically the interior spaces and layout, how they have been transformed by the occupants.

Six examples on the basis of the variation in the spatial layout, unique social circumstances and accessibility are selected from the 55 houses that were preserved/conserved by the GHF to analyze the following;

1. The physical characteristics of the Town houses at present and what the original might have been
2. The Social context
3. The Environmental/climatic responses and material usage

#### 4.3.7 Analysis of the selected Houses

1. No 52, Leyn Baan street



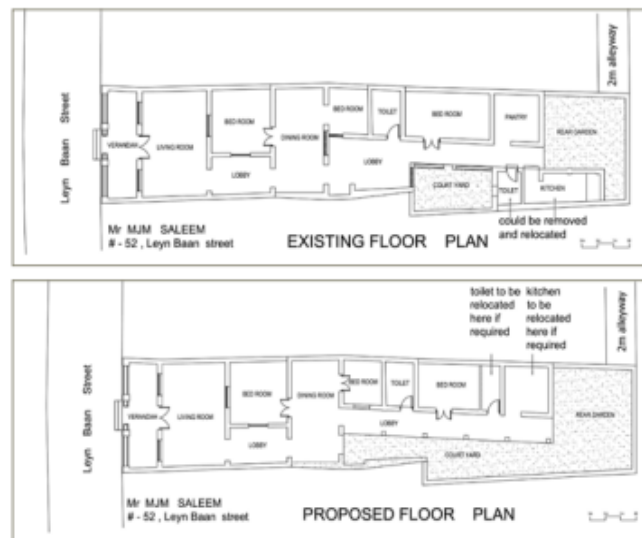
Figure 80: Location of selected houses

#### 4.3.8 General observations through analysis of the case studies

##### A. Physical dimension

- Most urban houses in the Galle Fort have retained the first four layers of space (verandah to street edge, living space/lobby, inner living space/great hall, verandah to courtyard).
- What have changed are the more private areas beyond these spaces. Reasons could be;
  - a. need for more space due to larger families – additions and fragmentation
  - b. need for modern day requirements - internal bathrooms, kitchens
  - transfer of ownership – due to economic reasons
  - social habits of occupants in relation to space usage
  - Galle acquiring World Heritage status too has contributed to this
- The original courtyard compromised to gain more private spaces. Therefore light, ventilation and proper circulation which are essential for a healthy living environment have been compromised.

The study revealed that preservation of the street façade and envelope is inadequate to sustain this historic city. Giving the occupants the total freedom to alter the interiors without any guidelines has made most of the spaces almost unlivable in terms spatial quality. Thus, for the present and future internal physical changes to be compatible to the aspect of ‘livability’ that



**Figure 81: NO 52, Leyn Baan Street house**

existed in the original town, careful consideration of the present community along with their social needs is vital in conservation efforts to preserve the overall sustainability of the historic Fort of Galle.

## **B. Social dimension**

- With passage of time, the ethnicity of communities that occupied these houses changed. Along with the change in lifestyle, the need for functional spaces as physical demarcations of their social beliefs and norms changed
- For example, a greater majority of the people occupying the town houses are Muslims by ethnicity, the issue of gender segregation especially where women are preferred to be away from the public imposes specific restrictions on their space usage. This was a prime restriction in reintroducing the open verandah to the front façade of the building which exposes women to the public.
- The open verandah was reintroduced in place of an enclosed space, this verandah was not utilized by the occupants since during the day, only women occupy these houses and they keep the front doors and windows closed in order to prevent the interior of the house being exposed to the street. Therefore, the verandah has become a mere ‘artifact’ or ‘ornament’ to the street.
- The private spaces zoned towards the rear areas of the site, clustered together with minimum exposure to light and ventilation
- In some houses that were studied, the existing method of expansion of spaces where circulation is from one room to another due to narrow width of plot indicates the limitation of privacy within the family which appears acceptable, representing the strong social links within the extended family.

## **C. Environmental dimension**

The environmental response of the town houses cannot be considered in isolation although it should be a prime consideration for habitation. The present usage of the town house is strongly linked to the social composition of the occupants; the functional and spatial needs. Physical conservation guidelines devoid of an understanding of the social context will not ensure that individuals, families and communities will make environmentally sustainable choices in organizing their interior spaces.

The Dutch adopted simple design features in the town houses that created a very comfortable temperature within the house. High roofs with wide overhanging eaves, verandahs on either side of the main functional spaces that created a buffer zone preventing heat transmission, thick walls that reduce heat transmission, and design features that allow for cross ventilation etc. Educating the community on the possibility

of adopting such simple methods in their houses and the long-term environmental benefits of such decisions could convince them to consider environmentally sustainable design options in future expansions

#### **4.3.9 Findings from the case study**

The architectural fabric reveals different phases of its development bringing variety to its social and physical attributes. The houses have survived, and have been occupied for centuries due to the fact that they were designed in a way that the main aspects for healthy living which are adequate natural light and natural ventilation was obtained into the buildings and adequate privacy by locating them around or along a courtyard. The interesting observation is that major changes have happened in houses only in the past half a century. And some of these changes have made the houses not conducive for healthy living.

## **CHAPTER 5. RESEARCH METHODOLOGY**

The methods utilized to carry out the research are described in this chapter. A selection of tools for choosing and evaluating renovated homes is also provided in this chapter. It offers techniques for documenting transformational processes, people's perspectives on modernization, and observations of how indoor and outdoor space is used. The chapter also goes through how to recognize the different types of houses in the study region. It also tries to explain why the research methodologies chosen were chosen and why they are thought to be appropriate in this particular situation.

### **5.1 Conceptual framework of the study**

The term "human behavior" refers to the variety of actions taken by people that are impacted by their environment, upbringing, attitudes, feelings, morals, values, ethics, power, rapport, hypnosis, persuasion, coercion, and/or heredity (Definition, n.d) so, this study is based on non-exact science or social science. The research paradigm is based upon the Transformative paradigm because in this research knowledge is not neutral and it reflect the power and social relationship within society, and thus the purpose of knowledge construction is to aid people to improve society. The ontological claim for this research is that modernization and urbanization has caused transformation of traditional architecture and settlement. Further, this research intends to produce knowledge by looking into the changes in the lifestyles and its relationship with the space configuration; the forces (Occupational shift, educational shift, changes in family structure, etc.) behind the transformation; and relationship with their changed social life, cultural life with the spaces, both interior and exterior spaces. And finally, Epistemological assumptions is made based on people's choices for opting modern designs over traditional design.

### **5.2 The research designs**

The case study research strategy was used to conduct this research. According to Yin (2009), a case study is "an empirical inquiry that aims to explain a contemporary phenomenon in its real-life setting, particularly when the borders between phenomenon and context are not well defined and numerous sources of data are utilized." Bell (2014) adds to Yin's assertion by categorizing case studies as explanatory, descriptive, or exploratory. While an exploratory case study seeks fresh ideas or insights into the

phenomena being researched, a descriptive case study focuses on situations or events that have occurred or are currently occurring. Explanatory case studies, on the other hand, strive to explore or reveal the cause-effect relationship of the examined phenomenon.

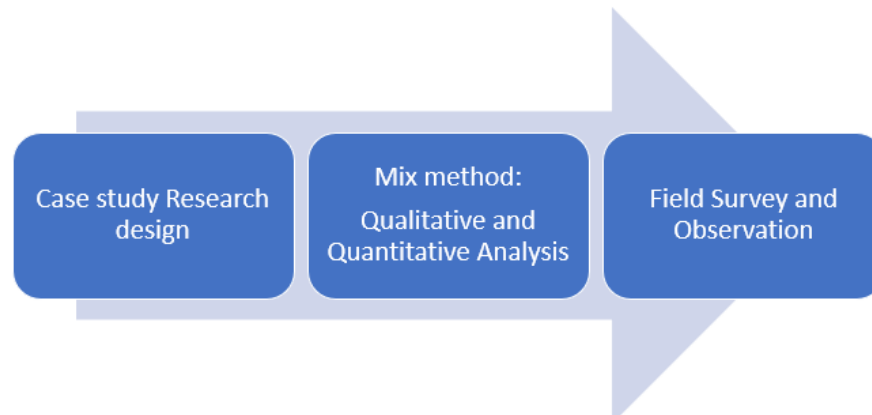
The primary goal of this research is to discover how housing transformation occurs in traditional villages. The study investigates the causes affecting transformation as well as the consequences of transformation activities resulting in spatial characteristics. This research seeks to learn about people's views on housing modernization, how they use space, and what dwelling types are observed in the research area as a result of housing transformation.

This was accomplished by examining one example of a traditional settlement known as Baswalpur village. Housing distribution in Baswalpur village is organized by the villagers without any government participation. The same people carry out the activities of changing their houses.

This study's main topics are housing, people, indoor and outdoor space, and their interactions. This emphasis requires a face-to-face conversation between the researcher and the residents. An in-depth study is required in this type of research to understand people's values, interests, and goals in the process of housing transformation. Research of this nature involves both a qualitative and quantitative approach. According to Gilham (Gillham, 2000), qualitative research is concerned with what individuals say and do. Quantitative research focuses on measurements and is distinguished by more controlled and standardized data collecting. Instead of focusing on single factors, qualitative research examines the individual or organization as a whole. The quantitative method was confined to the gathering of socioeconomic data, a demographic survey, and a perception question survey. The quantitative data provided this study with important statistics, while the qualitative data supplemented the research debate, creating a better framework for evaluating the statistical data's conclusions.

Their perspectives on housing transformation, modernization, and the utilization of space are being studied for a detailed study of housing transformation. A single case study technique is utilized to examine spatial attributes as well as identify dwelling categories. A pilot study was conducted prior to the start of the investigation. The pilot

research results were utilized to enhance the selection of residences for in-depth investigations and to improve questions presented to occupants.



**Figure 82: Process of research methodology**

### 5.2.1 Choice and justification of research strategy

According to Nguluma (2003), a properly chosen research plan provides real-world practical relevance. As a result, the selection of a technique is influenced by a variety of criteria, including the objective of the research, the type of the information required, and the availability of resources. Understanding the transformation process involves an exploratory descriptive explanation of the phenomena. The primary goal of this research is to first examine the notion of housing transformation and then apply the definition in a real-life scenario. To comprehend the transformation process, a systematic methodology is required to observe what kind of modifications are occurring, hence recognizing the potentials and potential risks of the transformation process.

The nature of the research topic, objectives, and research questions justifies the use of a case study strategy. The emphasis of is on housing change, method, and outcomes. The relevant questions are 'how' and 'what' is happening in terms of housing change. As a result, the emphasis is on a combination of descriptive and exploratory accounts in order to comprehend the process, problems, and outcomes of housing transformation. The shift and subsequent changes in the use of space and spatial attributes must be analyzed in their actual context. Answering the "how" issue requires an analytical account of people's values, interests, and judgments. The dwellings are observed and evaluated as study objects, and judgments and interpretations are generated.

The case study research technique is applicable in this study since housing change occurs in a 'real world' environment. According to Yin (2009), "case studies allow a study to keep the holistic and meaningful qualities of real-life occurrences." The case study has the distinct advantage of allowing the researcher to work with a wide range of information, records, observations, and interviews.

The main issue with case studies is that "they give no basis for generalization... they take too long and result in large papers" (Yin, 2009, p. 10). Yin, on the other hand, points out that case studies, like experiments, are "generalizable to theoretical propositions rather than populations or universes." This means that the case study does not represent a sample, and the main goal is an analytical generalization rather than a statistical generalization. A clear knowledge of housing transformation aids in the identification of difficulties that can serve as a foundation for understanding housing evolution in other traditional settlements. The phenomenon found in this study might be connected to other settlements with characteristics comparable to the research site.

### **5.2.2 Selection of a case: Why Baswalpur village?**

Baswalpur village is chosen as the case study area to illustrate the dramatic change of housing transformation of Kochila tharu settlement.

### **5.2.3 Quantitative and qualitative methods**

Social science studies distinguish two primary research methodologies: qualitative and quantitative approaches. Quantitative research is distinguished by the systematic and standardized collecting of data through experiments and surveys. Quantitative approaches employ criteria that place varied points of view and experiences into predefined response groups. The quantitative technique has the benefit of measuring the responses of a large number of people to a small set of questions, allowing for comparisons and statistical aggregation of the data.

Individuals or organizations are seen holistically in qualitative research, rather than as discrete variables and hypotheses. Qualitative data give depth and specifics through direct citation and detailed description of the program, settings, events, individuals, interactions, and observable behaviors. The detailed descriptions, direct quotations, and case documents of qualitative methods are collected as an open-ended narrative, without attempting to fit program activities or people's experiences into pre-determined,

standardized categories, such as the response choices that constitute typical questionnaires or tests (Patton, 1987: 9-10).

In this study, data is gathered using both quantitative and qualitative methods. The qualitative method addresses open-ended questions. The documented samples give an account of the area's housing growth and transformation in particular. Face-to-face interviews have taken place. It was critical to guarantee that locals responded freely and honestly. This is accomplished by ensuring that questions are asked in a plain and straightforward way, and that residents are given appropriate opportunity to share their experiences. Observations and discussions were also conducted. Structured questions are addressed in the quantitative method.

As a result, this work incorporated both the qualitative and quantitative methodologies. It has been noted that higher confidence may be shown in research findings if the findings are generated from more than one type of examination.

### **5.3 How the research was conducted?**

#### **5.3.1 Nature and sources of data**

The study will include primary and secondary data collection. Primary data will be collected from the study area. During the fieldwork, primary data on key information will be collected from the sample respondents. The secondary data will be extracted from published and unpublished books, journals, articles, and other different sources.

#### **5.3.2 Sample framing, sample size, and sampling procedure**

A sample is a group of a very small number of persons chosen from a population for research purposes. Participants or responders are the members of the sample. A sample is a limited subset of a statistical population whose attributes are analyzed to learn more about the entire population. The source material or device from which a sample is obtained is referred to as the sampling frame. The process of extracting a sample from a population is known as sampling.

The research comes under purposive sampling in which individuals are selected in which researches reply on their own judgement when choosing members of the population to participate in their surveys. Purposive sampling, also known as judgmental, selective, or subjective sampling, is a form of non-probability sampling in which researchers rely on their judgment when choosing members of the population to participate in their surveys (Alchemer, 2021). As per the central line theorem (CLT)

states that regardless of the population distribution, the distribution of sample means approaches a normal distribution as sample size increases. Sample sizes of more over 30 are frequently deemed adequate for the CLT to hold (Ganti, 2022). Purposive sampling will be used to select 30 respondents for unstructured interviews. A group interview will be conducted for in-depth interviews. The sample size for quantitative analysis is calculated using the formulae below. Random sampling can be used for the structured questionnaire survey, with a sample of 132 residents' units taken after calculating the total population of 202 Tharu residents per household.

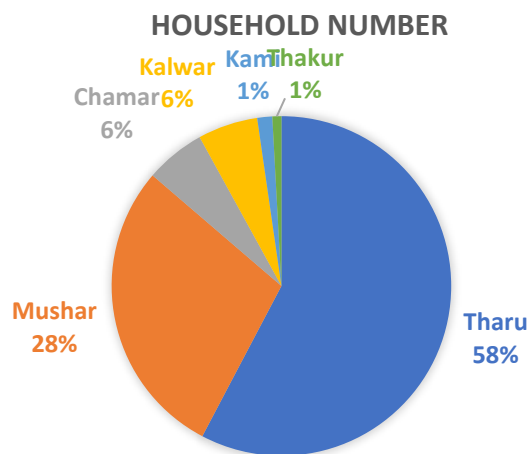
$$\frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N}\right)}$$

Confidence level = 95%

Z-score (for 95%) = 1.96

Margin of error (e) = 5%

P = 0.5



### 5.3.3 Research Variables and Indicators

The study will investigate the implication of occupancy and funding as salient socio-economic factors of housing transformation. The research variables and indicators related to the collection of socio-economic data of the residents will include Household size; Household income; Material living conditions; Education and work; Economic risks; Health; Social relations; Participation and trust; Safety; and Environment. For the observation of house forms, traditional housing form will be taken as a baseline reference for the study of degree of transformation.

### 5.3.4 Categorization of House typology

The transformation of traditional houses in Baswalpur village is identified by comparing the research objects with traditional houses that still maintain their original layout and design. The houses were categorized to show the degree of change of the houses that undergo transformation on the basis of literature review (Dwijendra et al., 2017). The level of transformation is categorized in following way shown below:

1. **Category A:** Houses which undergo a slight or no transformation. This category can be seen from the absence of change in the materials used and the house shape, as well as functions, and the absence of new space in one compound.
2. **Category B:** Houses which undergo some transformation. This category can be seen from the existence of change in the materials used and the house shape, while the space function remains the same, and there is no new space in one compound.
3. **Category C:** Houses which undergo significant transformation. This includes transformations in terms of the materials used and the house shape. Some houses may undergo a transformation of space function and some may not, and there is a new space in one compound.
4. **Category D:** Houses which undergo a huge transformation. This includes transformations in terms of the material used, the house shape, functions; and there is a new space with a new function.

#### **5.4 Techniques and tools of data collection**

To obtain necessary and reliable data for this study, the researcher was used traditional methods such as direct participation, observation, structured questionnaire, focus group, and oral histories.

##### **5.4.1 Observation**

Observational research is a research technique where you observe participants and phenomena in their most natural settings (Delve, 2020). This enables researchers to see their subjects make choices and react to situations in their natural setting, as opposed to structured settings like research labs or focus groups (Delve). The observation method is used to collect observable information such as changes in materials and housing layout of the village, and residents' participation in using spaces in day-to-day household activities. The data collected through observations will be used to support the structured data in the relevant place in the text.

In terms of housing form, alterations to the façade, and adjustments made in connection to housing location, activities of continual transformation over the research period have been noticed. The researcher also noted whether the alteration occurred on the inside, outside, vertically, or horizontally. Domestic chores including cooking, eating, cleaning dishes and clothing, taking a shower, socializing, and running a small company were the main domestic activities seen in both indoor and outdoor settings. These factors are

taken into consideration while talking about concerns relating to the improvement of housing and the separation of roles, as well as issues relating to the development of an indoor pleasant living in connection to health design and privacy.

In order to prevent influencing people's behavior, the goal was to conduct observation anonymously without informing the subjects beforehand. But it was impossible to conduct this experiment without the occupiers' knowledge. This was due to the fact that it took a day to monitor everything that was going on in one house. The task was to observe the chosen homes for one day as part of the exercise. Only twelve homes were examined because it takes a lot of effort and is challenging to handle a big sample. The reason it's relevant is because it supports the validity of testimony from interviews and other forms of evidence. It was difficult to conduct the observation exercise constantly throughout the day since the goal was to conduct physical observation rather than participant observation.

#### **5.4.2 Questionnaire Construction**

The questionnaire is designed to accomplish certain goals. First of all, literature review will be done to find out the variables for the questionnaire which comprises research questions. Secondly, demographic information, building information, courtyard information, information related to transformation of village and recommendation is constructed.

The demographic questions will include respondents name, age, gender, occupation, family type, household size, major sources of income and family household income. Building details questions include the house typology, building use, time of construction, no. of story, category of building, construction material, interior configuration, etc. The courtyard related questions include behavioral and environmental aspects of information. The question related to transformation of village include the reason of transformation, opinion on village and city lifestyle and what are the thoughts behind the transformation, etc.

#### **5.4.3 In-depth interviews**

Interviews with the observed houses resident is conducted and both semi-structured and unstructured, is used to collect primary data. The interview is also used to double-check the information obtained from the questionnaire. The unstructured open-ended questions are developed for field operationalization, covering the utilization of spaces

in the tharu home and its value in present day in the village, as well as people's perceptions of urban impact in the interior arrangement. Pre-testing was done on the first place prior to the field investigation. These structured and unstructured questionnaires was converted to the KOBO toolbox for field implementation, and then distributed and gathered using KOBO collect, a free open-source mobile data collecting tool.

The principal aim of this study concerns the views of people on the issue of transformation, modernization and how they use space. This interview method has been preferred rather than the distant administration of questionnaires. In-depth interviews were conducted in 12 houses in order to understand:

- How the transformation is taking place?
- What do residents think about housing modernity and modernization?
- How are the outdoor and indoor space used and what are their spatial qualities?

#### **5.4.4 Interview with key informants**

Interviews with key informants helped in finding out the historical development of Baswalpur village which included informants' residents who have been living in the settlement since the early settlement days. They spoke of changes in land use in the settlement and housing development. In the research area, interviews with 5 key informants are taken. The key informants were old knowledgeable person, retired engineer, ward chairperson, social activist and a knowledgeable home maker. Key informants were thought to be knowledgeable about revealing information that prompted more investigation and questioning of the claimed research work.

#### **5.4.5 Data collection**

The information will be gathered in order to bring the study to a conclusion. The data will be collected through secondary sources such as journal papers, articles, published or unpublished thesis reports, and the field, which is largely a raw version of the data report. Observations, surveys, interviews, and focus groups are examples of primary data sources that the researcher collects and processes directly. The following sources of information will be used to compile the data:

- Direct observation of the house structure
- Questionnaire with a family member in the community
- Case study and literature review

#### **5.4.6 Filed operationalization**

Unstructured open-ended questions and structured questions will be created for filed operationalization. Pre-testing will be performed prior to the filed investigation. To gather data on the field, Kobo collect (a mobile data collection system) will be employed. Interviews for unstructured questionnaires will be performed both individually and in groups.

#### **5.4.7 Data Analysis**

All the raw data will be collected in the Kobo toolbox software after the questionnaire survey is conducted. Further, the statistical analysis will be done using the SPSS statistical tool such that direct graphical comparisons can be made with the obtained results.

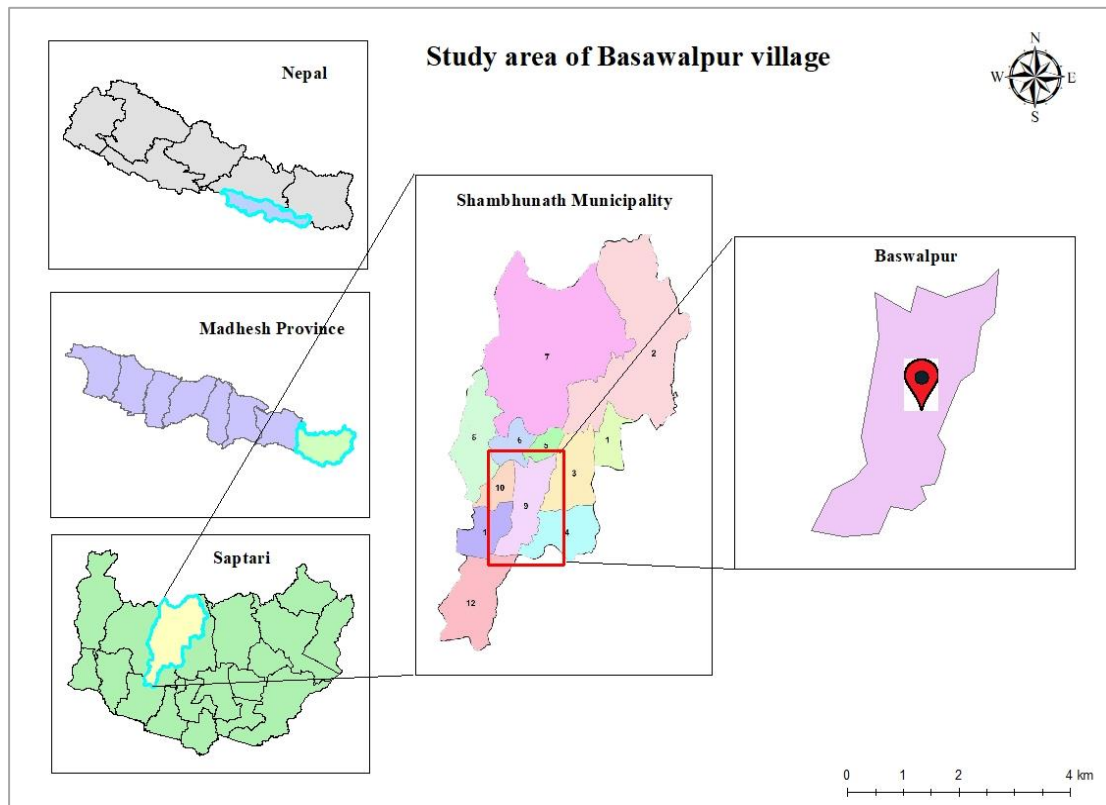
#### **5.4.8 Case study**

Case studies have shown to be a highly helpful tool in the advancement of research. As a result, relevant international cases have been selected and thoroughly researched. Inductive reasoning logic was used to the conclusions obtained from the case studies, resulting in the validation of the research output. The findings will be evaluated and modified based on the input, and a complete research report will be generated.

## CHAPTER 6. STUDY AREA: BASWALPUR VILLAGE

### 6.1 Physical geographic settings

Baswalpur, also known as Basbalpur, is a growing market town in the Sagarmatha zone of southeastern Nepal's Sambhunath Municipality's Ward No. 9 in the Saptari district of the Madhesh Province. On May 18, 2014, a new municipality was created by merging the previous VDC with Khoksar Parbaha, Sambhunath, Mohanpur, Bhangha, and Rampur Jamuwa village development committees. In 615 different families, there were 3151 individuals living in Nepal as per the 2011 census. It lies in the coordinates of 26.60°N latitude and 86.67°E longitude. The village is bordered on all sides by farmland and other communities within around a 2-3 km radius.



**Figure 83: Location map of Baswalpur**

The study area for the thesis involved the observation of traditional as well as transformed residences of the Tharus group, as Tharus constitute the majority of the population. In addition, since there are not enough traditional buildings in the tharu community area, Mushar basti was used to observe other traditional houses in Baswalpur village. The observation is focused on the transformation and change taking place in Baswalpur village, as well as its influence on the health and well-being of its

residents and the surrounding environment. A total of 12 houses were chosen based on the degree of transformation respond to changes in plan and space usage, as well as changes in materials. Along with this transformation in socio-economic condition and transformation in cultural practices is also observed.

## 6.2 Population and Ethnic groups of Baswalpur village

According to the preliminary report of census 2078 B.S., the total population of Baswalpur is 1300 with 350 household numbers where 202 household belong to Tharu, 100 household of Mushar, 20 household of Chamar, 20 household of Kalwar, 5 household of Kami and 3 household of Thakur.

Thus, the majority ethnic inhabitants in Baswalpur village are Tharu (58%) with a few Thakur, Chamar, Kalwar, and Kami. Mushar basti, with a population of 28 percent, has been found residing in the village's rear for several decades.

## 6.3 Architecture of Baswalpur village

### 6.3.1 Village layout and settlement

The settlement pattern of Baswalpur village is in linear settlement pattern with main street in the north-south axis with some branches of the galleys. The houses lie on the either side of the village lane, oriented north-east and running across the entire length of the settlement. As they fix the north direction with respect to the location of hill. The construction pattern is identical i.e., long and single storied with an adjoining kitchen garden. But, now two storied houses are also constructed to meet the modern requirements. Normally, a village comprises just a single row of houses on either side of road, but some villages consist of several rows of houses too.

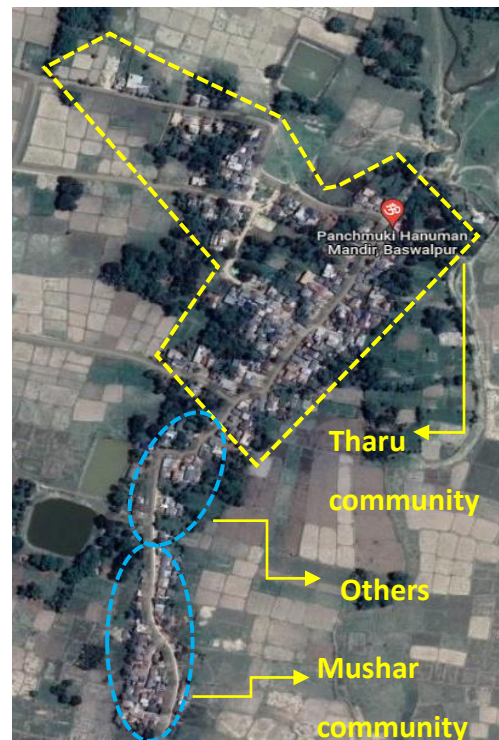
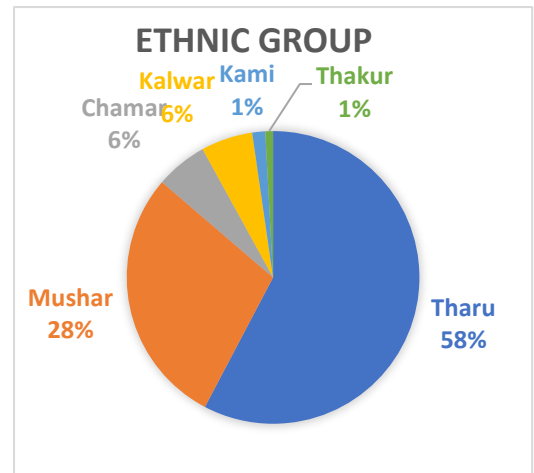
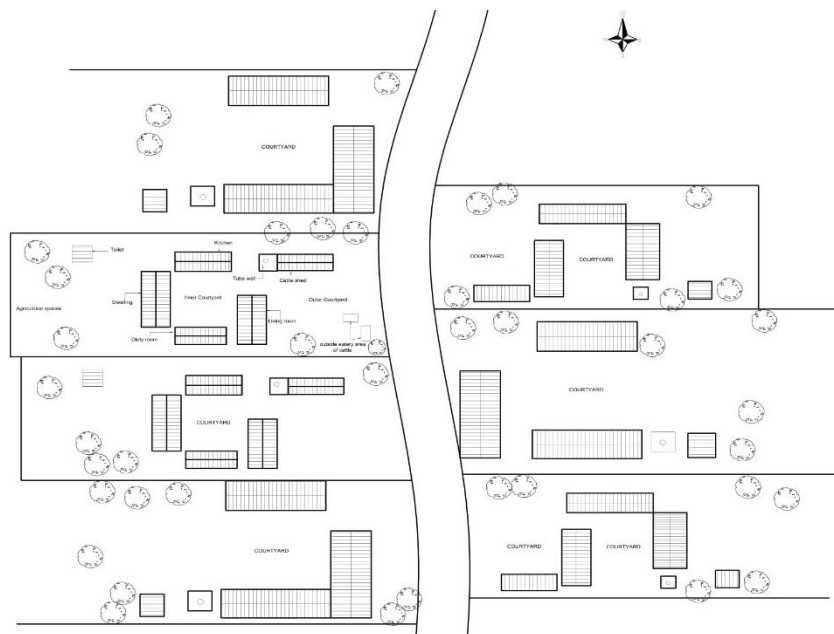


Figure 84: Settlement pattern of Baswalpur village

The houses for living purposes are oriented towards the street and rest of the land behind the house is left for agricultural spaces as we can see on the picture below.



**Figure 85: Wide view of streets of Baswalpur**



**Figure 86: Schematic plan of settlement pattern of Baswalpur village, Saptari**

- Scattered pattern village at 1-2km distance
- Longitudinal plan
- north south oriented
- Courtyard plan
- Cluster design
- Narrow alleys
- Detached unit

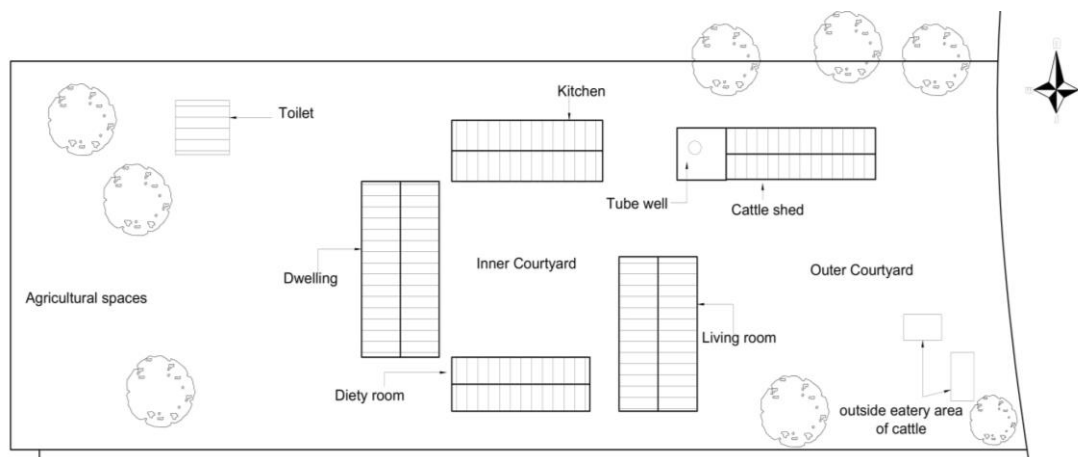
### 6.3.2 Traditional houses characteristics

Historically, house of Baswalpur village used the local materials that were easily available in the terai belt of Nepal i.e., mud, wood, bamboo and grass. Generally, houses are low raised, identical, mostly single storied with slope roof and are elongated. They have small no windows in their houses, especially from the street side. They usually settle in



**Figure 89: Traditional house with cement tile roof of Baswalpur village**

a group of their own community members, forming a dense settlement in one area. Each house is a standalone home with a field and a vegetable garden. It is separated from the other homes by a thin or wide lane. The Size of the house is depending on size of family.



**Figure 87: Schematic plan of dwelling composition of tharu house in Baswalpur village**



**Figure 88: Traditional houses from street view with no windows**

The typical dwelling units of tharu house in Baswalpur village mainly comprises of outer courtyard, entrance hall or guest hall, cattle shed, kitchen, dwelling spaces, deity room and toilet. Toilet was not the major unit of tharu houses in the history but with the higher knowledge and awareness of the sanitation programme now almost all the houses have toilet in the planning layout.

### 6.3.3 Allocation of spaces

The spaces inside typical tharu house in Baswalpur village constitute of Darbajja, Basghara, Osara, Angnaa, Gosai ghar, Bhatninha ghar as main traditional spaces. However, some of the spaces may be missing according to the social status of the household in the community.

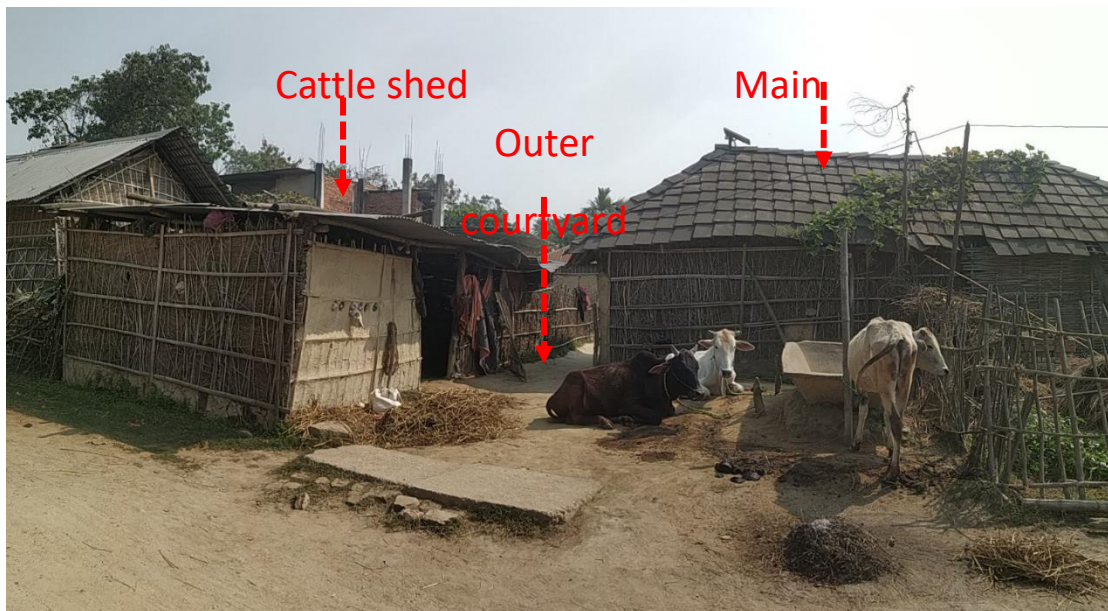


Figure 91: View showing different spaces of tharu house

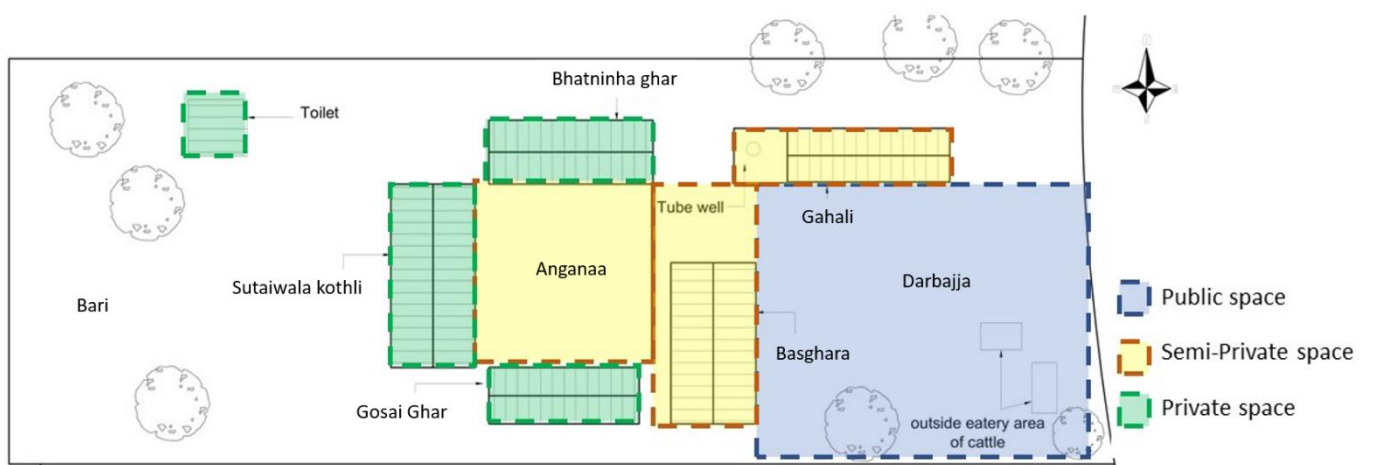


Figure 90: Zoning of Tharu house on the basis of privacy level

### A. Public space: Outer Courtyard (Darbajja)

In the Baswalpur village, most of the tharu houses comprises of two types of courtyards: outer and inner courtyard. The outer courtyard, called “Darbajja” in tharu language of Saptari district, serves the space for public activity. This courtyard is the main frontal space of the site that houses many daily activities of the



tharu community. In usual days, the space is used for the cattle herding and cattle eatery area. In some occasion like marriages, the space is used for the gathering space for guest/ Janti. the outer courtyard is directly linked to the guest hall and cattle shed. Sometime, Bhakari (big vessel for storing grains made up of bamboo and mud) is placed near outer courtyard.



**Figure 92: Social gathering for marriage ritual on Darbajja (Outer courtyard)**



**Figure 94: Prepping for Swayamber, ritual of marriage, in Darbajja (Outer courtyard)**

### **A. Semi-private space: Cattle shed, Entrance Hall/Guest Hall, inner courtyard and verandah**

#### **i. Guest hall (Basghara)**

Basghara in Saptariya tharu language is the main guest hall usually detached or semi-detached of single row house structure. It is located on the frontal face of the site and usually visible from the street. This section is mainly used for welcoming of guest and other family gathering. Guest is entertained firstly on this section and after sometime guest is taken to the inner courtyard and verandah spaces. Basghara and main sleeping spaces are separated in most of the house. In present context the concept of Basghara space is found to be lost due to the fact that the people of this community are more sociable these days while in earlier history stranger or guest were not supposed to be directly enter into the inner courtyard or main sleeping rooms.



**Figure 95: View of Guest Hall from outer courtyard**

## **ii. Cattle shed (Gahali)**

Cattle shed or Gahali in local tharu language is usually detached or semi-detached from the main dwelling units. The cattle shed is used for housing cattle like cows, buffaloes and goats also sometime used as the storage of animal fodder. Interestingly, one of the final funeral rituals is also performed by the sons of the demised person along with priest inside the cattle shed.



**Figure 96: Performing funeral ritual in Gahali (Cattle shed)**

### iii. Inner courtyard (Angnaa)



**Figure 97: Using Inner courtyard to dry grain**

Inner Courtyard or Angnaa in Saptariya tharu language is the important space of the Kochila Tharu settlement. It has social, cultural and religious importance. All the activities of the Tharus are governed by the inner courtyard. It acts as gathering space for the social and cultural functions. Courtyard let the air flow in each dwelling. It acts as a resting place for member during the summer. All the major feast and functions are carried out in the courtyard so it has cultural significance. It acts as a recreational area for the children and the youth. Courtyard is more related to their agricultural purpose as it provides the space for the storage of the agricultural products drying of crops. It is



**Figure 98: Marriage feast preparation going on in Angnaa (Inner courtyard)**

also used for washing, bathing and sun drying of the clothes. Also, tulashi moth can be seen on the inner courtyard as most of the people are following Hindu religion.



**Figure 99: Maruwa (Temporary structure to perform marriage ritual)**

#### **iv. Verandah (Oshra or Osara)**



**Figure 100: View of Verandah (Osara)**

Oshra in Saptariya tharu language is the verandah or pidhi in nepali language, attached to the dwelling spaces. It has its own significance in Kochila Tharu architecture. It also acts as a buffer zone to protect from the direct sun light. The width of the verandah is usually 3-4 ft and it is used for sleeping purposes, storing of agricultural products and other household goods. In most of the tharu house, Oshra is used as dining space is usually day as well as in occasional days. Sometime, the grinding machine (Jato or Jatta in tharu language), rice husking machine (Dhiki or Dheki) and chulo are placed in the veranda/ Oshra. Veranda acts as a family lounge used for welcoming the visitor and also acts as living room.



Figure 101: 7' Oshra (Verandah) on the modern house

### **B. Private space (Dwelling space): Sleeping spaces, Kitchen (Bhatninha ghar) and deity room (Gonsai ghar)**

Dwelling space mainly comprises of sleeping, kitchen and pooja room. Dwelling space is separated from guest hall and cattle shed. Usually, this section is not directly visible from the street.

#### **i. Dwelling spaces (Sleeping spaces)**

There is no as such local name in Saptariya tharu language of dwelling spaces. The main sleeping spaces are separated from the Basgarha and is located in the rear part of the plan layout of tharu house. The rooms single bay structure is accessible from the verandah and sometime partitions are made in case of increment in family structure. All the partitions do not exceed 6'0"-7'0". Each couple is given room of its own and its privacy



Figure 102: Dwelling unit with mezzanine

is respected by all. Due to the slope roof of a house structure, a lot of space beneath the room is left. This allows a good air movement during the summer and keeps the room cool. For the lighting of these rooms small windows or holes are made on the walls. Width in all house almost remains constant while length may vary no of room(bay) and member i.e., 4,6,8 bays. Usually, sleeping spaces and not provided mezzanine floor, except sometime mezzanine space is provided in the form of “**Machha**” (bamboo sheets) for storing onions, potatoes and garlics. The reason of providing mezzanine space is keep grains and foods safe from rats.

## ii. Kitchen (**Bhatninha ghar**)

Kitchen is called Bhatninha ghar (meaning Bhat pakaune ghar) in Saptariya tharu language. Kitchen is detached or semi-detached portion of the dwelling area. The kitchen has mainly 1 or 2 horseshoe type of Chulha (1- Ekasiya) and (2- Duwasiya). The Chulha faces east or west direction. North facing Chulha is not good for various reasons. At the foot of the western wall and sometimes on southern wall depending upon the face of Chulha, a small pit-hole is created for the drainage of the waste water after washing the small utensils and vegetables. Sometime the grain storage vessel made from mud and cowdung called ‘**Kothi or Koith**’ in saptariya language is placed in the kitchen for storing rice, paddy and wheat.



**Figure 104: Placement of chulo on inner courtyard; inner courtyard as a place for**



**Figure 104: Kitchen with horizontal window for proper ventilation**

### iii. Deity room (Gonsai ghar)

**Deity room or Gonsai ghar** in Saptariya tharu language is the most private space of the tharu house. This section is used only by the main members of the house. No outsider is allowed to enter to the Gonsai ghar. This space is separated or partitioned within the same sleeping spaces and usually no big windows are kept. Only small holes are kept for ventilation purposes. The Deity of Kochila Tharu people is called “Gonsai” in local language.

## 6.4 Construction technology and building materials

Construction materials are temporary in type which are procured from the nearby forest and from the agricultural products. The material is environmentally friendly and resists the hot climate of Terai.

- Wooden beams and posts are used to construct the framework of the building, whereas bamboo is used for the framework of the wall and roofing.
- Thatch, straw, clay tiles and grass are used for the roofing material.
- The clayey soil mixed with rice husk and cow dung is used for plastering the wall and floors and also used to prepare household equipment like Dehri, chulha etc.



**Figure 106: Bamboo strips with paddy straw and mud plastered wall**



**Figure 106: Weaved pattern bamboo strips wall (Thakuwa tat in local language)**

## 6.5 Socio-economic scenario of people in Baswalpur village

Baswalpur is a developing village with a fundamental unit that upholds a social structure with all of its inherited traditions, customs, and institutions from long ago. The structure of the old Tharu settlement was closely related to the social, economic,

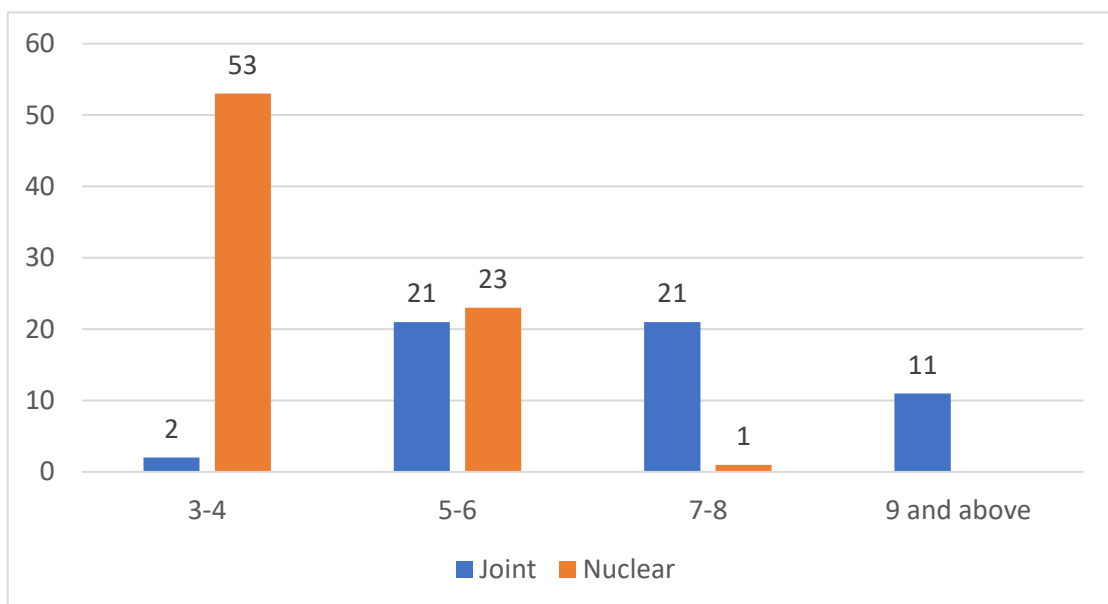
and political context. The Baswalpur village's existence and socio-cultural interactions have always been centered on the agricultural field rather than the home. In the earlier days, the local village headmen known as “Patwari” was elected to look ad take major decision of the village and to solve the dispute among the village people.

Most of the people of Baswalpur village are involved in agriculture sector and few on animal husbandry. However, influence of urban life style is found in newer generation. Economic growth is the primary driver of this area's massive development.

### 6.5.1 Family size and household number

Earlier maximum local residents were living in joint family as the family was majorly involved in agricultural activities only that required manpower and labor which was accomplished by the family members. The household number of maximum families used to be in greater number. In the present context, many family members have moved out of joint family to nuclear family in search of maintain more private life.

From the survey, majority of respondent lived in nuclear family with the household numbers of 3-4 people while there are still other families that live in joint family.



**Figure 107: Family type and household number from the surveyed data**

### 6.5.2 Family economic activities

The people around the Baswalpur village were involved in agricultural activities in the past days but in the present context diverse economic activities can be seen involved by the family members. From the survey, it is found that still maximum number of families are involved into agriculture/farming sector along with a job that help in improving economic status of the family while other family members are involved in daily wage worker, skilled worker like carpenter and painter and some are involved in business.

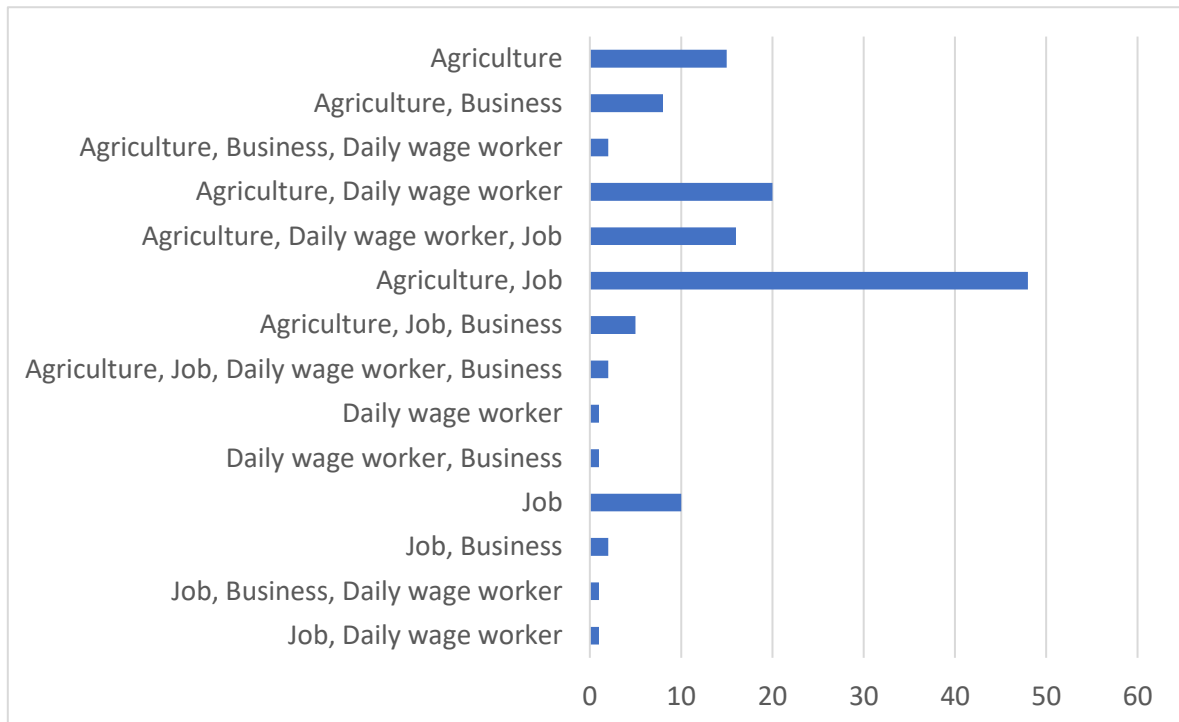
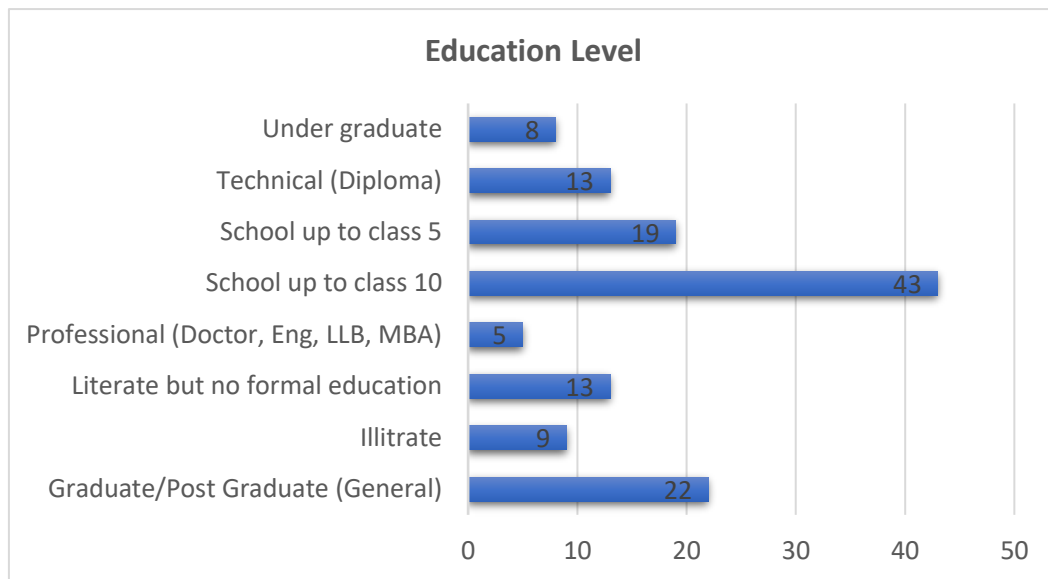


Figure 108: Economic activities involved by family members

### 6.5.3 Education

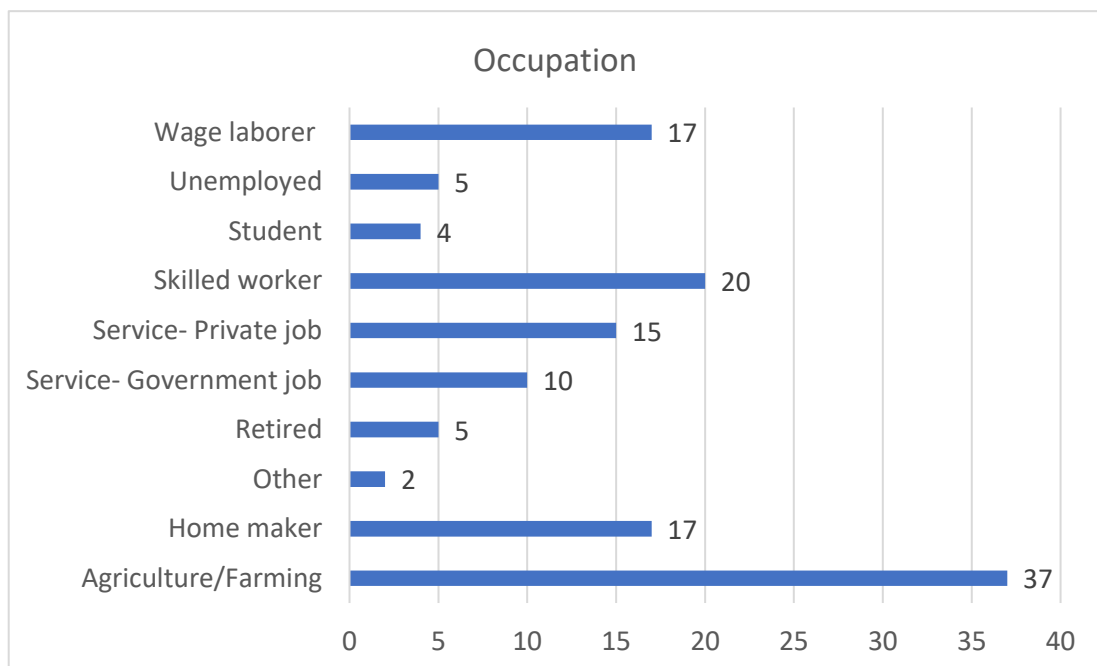
Earlier in the history, most of the people were deprived of the education as they had no easy access to education system and many of those were involved in agricultural activities. Only the family from higher status were given education but now the scenario is very different from the past as the government of Nepal is focused into improving the literacy rate of each household. In present context, the municipality of Baswalpur comprises people of different education level. From the survey it is found that majority of the respondents have the education level up to class 10 followed by graduate/post graduate respondents



**Figure 109: Education level of respondent of Baswalpur**

#### 6.5.4 Occupation

People from Baswalpur village used to be involved in animal husbandry and agriculture but in present context according to the survey, majority of respondent are still involved in agriculture but some of the members from the family are involved in other occupation like skilled worker (Carpenter, painter) followed by daily wage workers and some people are also involved in hourly job in private and government sector.



**Figure 110: Occupation of respondent of Baswalpur**

### 6.5.5 Economy

Majority of the respondent have the combined family income of rupees between 25k to 50k and few family members with the higher income.

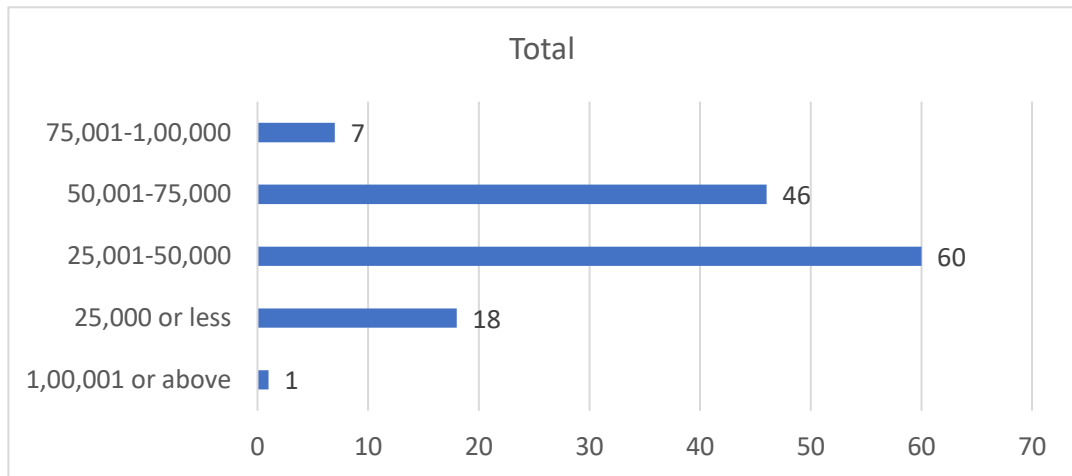


Figure 111: Combined monthly income of the family members

## 6.6 Socio-cultural practices in Baswalpur village

### 6.6.1 Festivals

**i. Maghi:** - Maghi, which is regarded as new year in tharu community, is widely celebrated by the people of Baswalpur where most of the female member of the family take part in the celebration. Locals celebrate it by huge function, eatery feast and many entertainment performances.



Figure 112: Glimpse of Maghi Mahotsav celebrated in Baswalpur

**ii Jitiya :-** Jitiya is one of the cultural practice similar to “Teej” where the married female member of the family take fast for the long life of their husband and children and to maintain prosperity inside their home. Jitiya is widely celebrated by the locals by organizing entertainment functions on the open field of the village are called ‘Khariyaan’



**Figure 113: Married ladies prepping for Jitiya ritual;**

(Source: Music Nepal Ethnic)

### **6.7 Transformation of form of the traditional tharu house in Baswalpur**

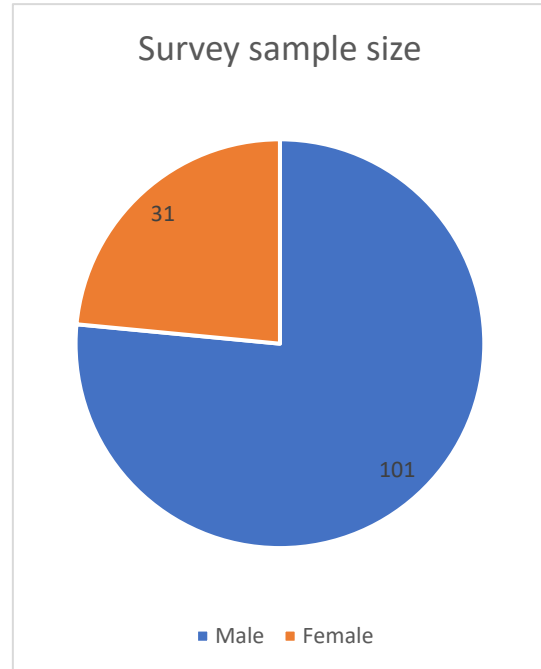
Rural communities are moving toward this transition as a result of the quick changes in the social and economic circumstances. Rural housing has been negatively influenced by urbanization, economic progress, and technological improvement and the unique architecture of traditional buildings and streetscape generated by these buildings gradually began to disappear. The transformation of place took place after the influence of urban lifestyle and expansions and fragmentation to accommodate additional functions due to growth of family units. A whole village is transformed as a result of the modification of the homes. The development of settlements is influenced by the alteration of traditional homes as well as changes to all natural and socioeconomic factors.

Furthermore, in 2046-47 B.S., huge fire hazard took place in Baswalpur which cause heavy hazard to the whole settlement and the man kind. This fire casualty was also one of the major reasons behind the transformation of the settlement.

Twelve carefully chosen residences have been taken for the research in order to look at the history and process of the change of communities. Based on the kind, scope, and motivations of the renovations, a selection of residences has been examined.

## CHAPTER 7. SITE OBSERVATION AND DATA ANALYSIS

Finding the answers to the specified study questions will need analysis based on the three factors. The focus of the first study, which is based on field observations, is physical change. The second one was based on a questionnaire survey that sought to identify the socioeconomic context around physical changes, and the third one was based on easily accessible secondary data. The observational study and questionnaire survey helped to discover changes in construction and land use patterns as well as changing trends. Natural processes or human activity both contribute to the change. According to the



**Figure 114: Pie chart shows the sample distribution for questionnaire survey**

purposive sampling technique's predicted sample size, 132 respondents in total were questioned during the field observation for the structured questionnaire. The pie chart displays the sample distribution for the socio-economic and demographic survey, as well as includes the perception survey, as the total number of Tharu households is 202 according to the preliminary data of the 2021 census report.

### 7.1 Transformation in practice of house forms

The general introduction to this thesis, the study setting, the theoretical framework, the research design, and the methodology have all been covered in the preceding four chapters. Findings about the transformation of housing are discussed in this chapter. How and why change is undertaken are the themes discussed. Both the results of the housing transition and the opportunities and issues they provide are clarified. Owners' perspectives serve as a foundation for understanding people's wants and wishes as they strive to change older homes into contemporary ones.

### **7.1.1 Different types of housing transformation**

According to this study, inhabitants of Baswalpur village sometimes alter their homes in a variety of ways under quite a variety of conditions. Most often, owners are the ones who take the initiative to convert a space by adding on to the existing structure, altering room dimensions, raising ceilings, relocating doors and windows, and so on. While some locals destroyed the mud and pole buildings and installed concrete blocks in their replacement. The following modifications have been introduced to housing in Baswalpur village:

- A horizontal transformation that involves adding rooms to the old home.
- Demolition of old homes and construction of brand-new ones.
- Replacement of mud and pole structures in phases.
- Constructing new concrete block structures next to outdated pole and mud structures.
- Interior modifications
- Vertical extensions whereby rooms are added vertically to accommodate additional functions.

#### **7.1.1.1 Horizontal extensions**

This sort of change occurs when an owner constructs a single-story house with one or more rooms and then adds more rooms by extending the existing house horizontally. Typically, this sort of transformation is planned for from the start when a house is built. Extension projects range from expanding an existing room or rooms to building a fully new living unit to an existing one. Horizontal extensions provide space to the extended family members a new shelter to live in.

Out of the 12 observed houses, the house from category C, extended horizontally in order to utilize the space of their plot along with to house additional family member.

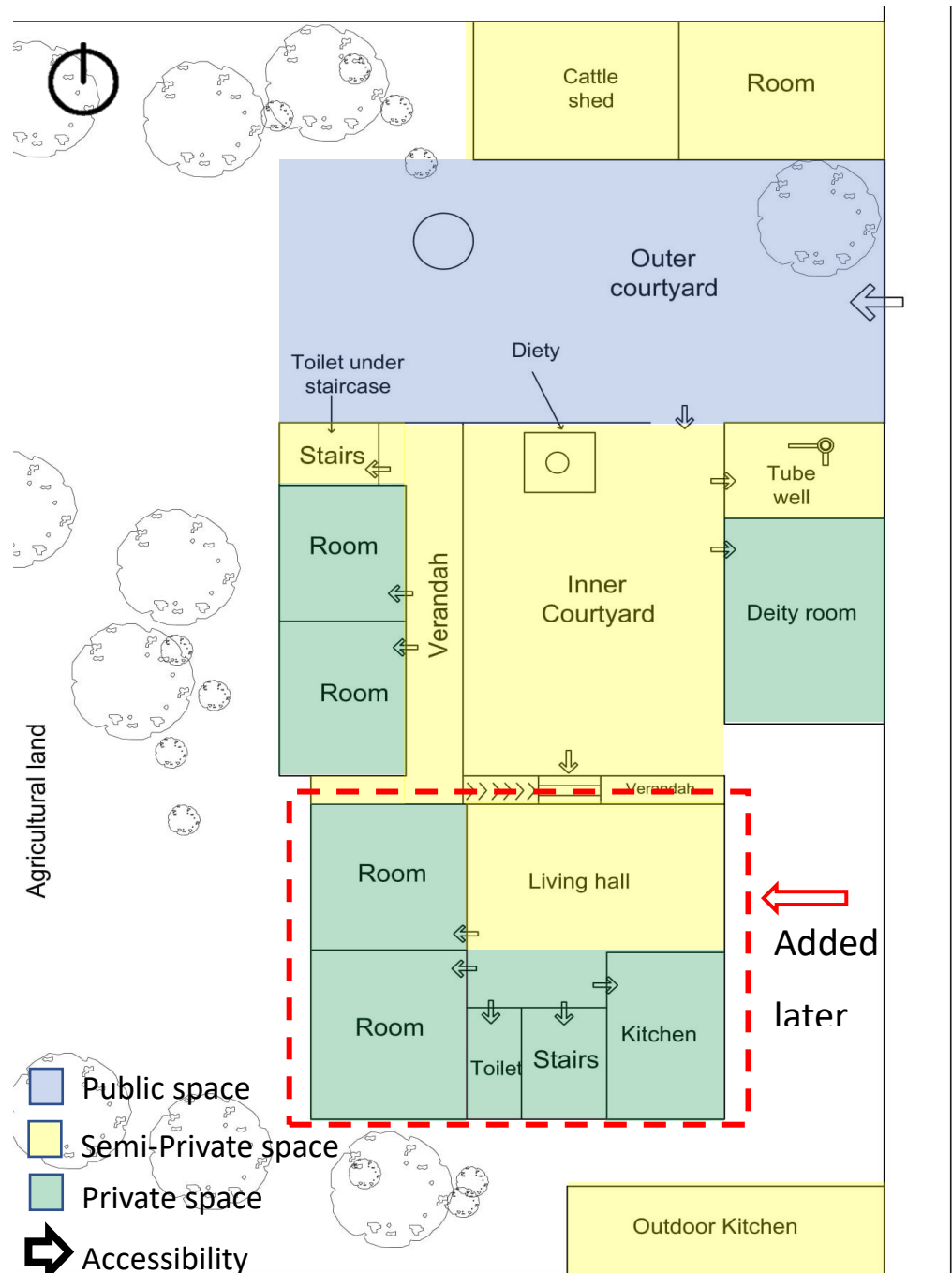
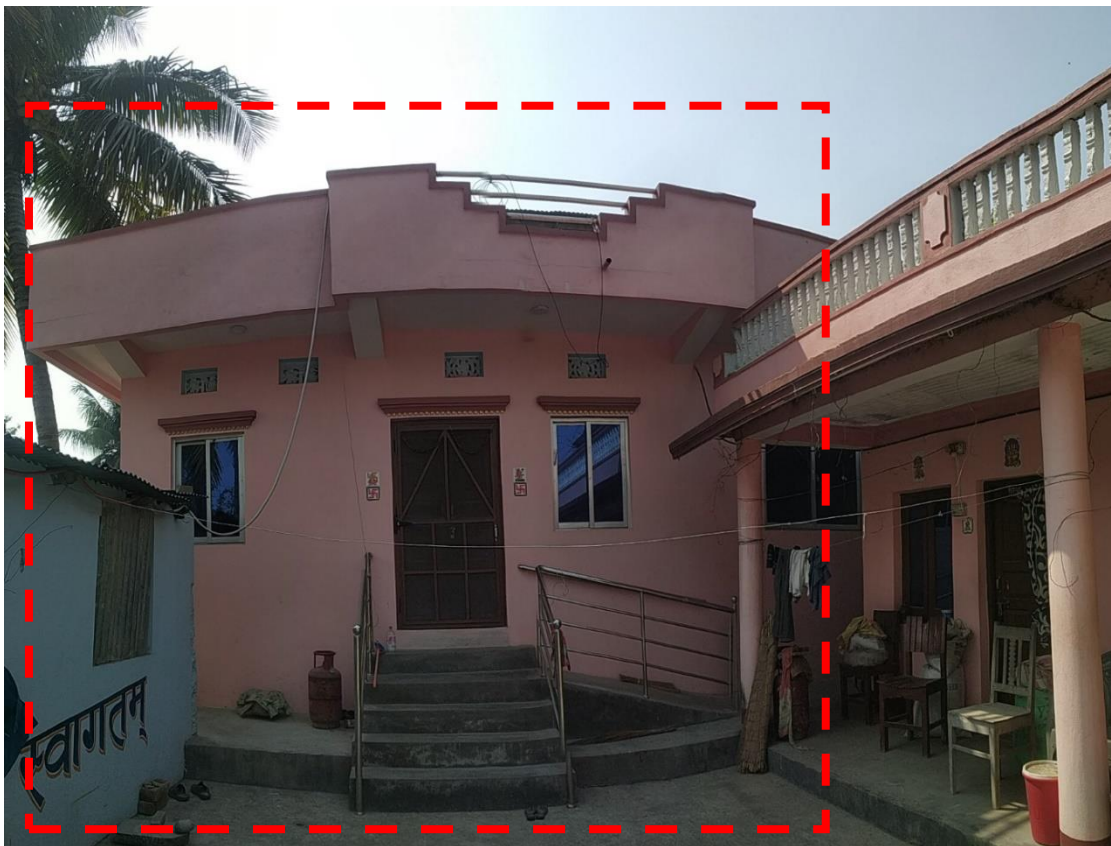


Figure 115: Plan of Residence of Ram Piyari Chaudhary

Narrating the process of horizontal transformer, the respondents said that this house forms has been added in phase wise:

*“I discovered that my family was expanding, therefore I needed additional space. In addition, I was getting ready for retirement, so I thought it would be wise to build a few more rooms for future generations. My elder son is an engineer and my younger son is a pharmacist and their family lives in city area thus I had to build my new home in modern way accommodating all the facilities under one room so that it would be easier for my daughter-in-law. Under the suggestion of my elder son, I built my home in bricks and cement that is stronger than my previous mud house. After the fire casualty in 2046-47 B.S., I re-built my homes in phases, the first building was built in load bearing structure and this is another reason to extended my home horizontally rather than going vertically.” (Interview with Mrs. Ram Piyari Chaudhary)*



**Figure 116: Compact planning type of house was horizontally extended (Residence of Ram Piyari Chaudhary)**

#### **7.1.1.2 Demolition of old homes and construction of brand-new ones**

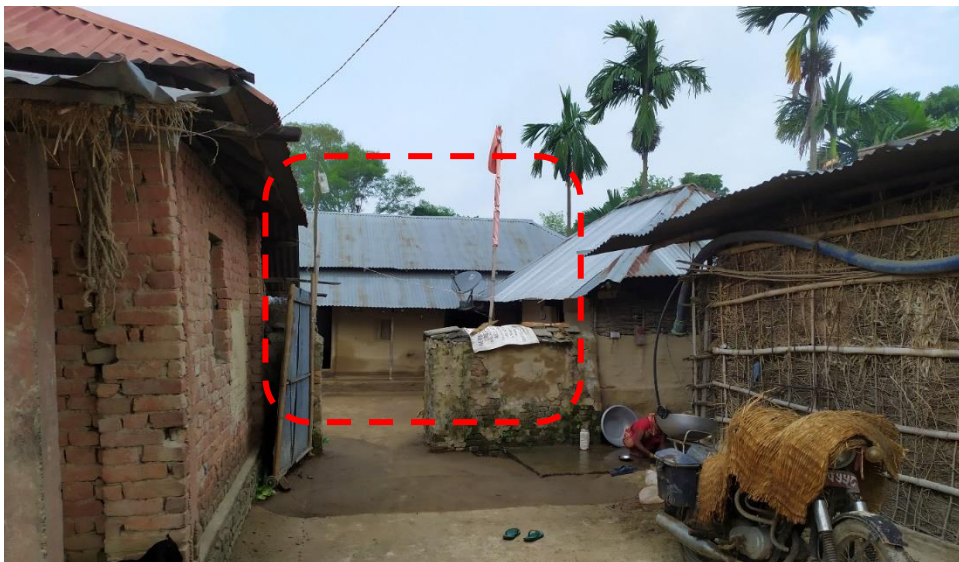
Demolish old buildings and build new ones is another sort of renovation project that has been seen in Baswalpur. The majority of the houses being destroyed are constructed of mud timber pole. Building new walls of bricks or concrete blocks around an old mud and pole building is one way this change occurs. To enable the destruction of the old building, residents migrate into the built-up area.

One of the observed houses of Mr. Ram Subaran Chaudhary, has been seen with this kind of transformation process.

Narrating the demolition of old home and construction of new home, respondent said:

*“My old house has been built over more than 20 years that was constantly maintained and repaired by my family members and with the help of some labor. The construction material of the house was degraded with the course of time and needs serious repairing or replacement. Along with this, rats have caused disturbances by making holes under the floor that cause difficulty for us to step in. So, I decided to completely replace it with the modern building but in the same internal configuration as my old building.”*

(Interview with Mr. Ram Subaran Chaudhary)



**Figure 118: Demolition of mud house into RCC house shown in picture below; Residence of Ram Subaran Chaudhary before transformation**



**Figure 117: Replacement of mud house into RCC house; Residence of Ram Subaran Chaudhary after transformation**

### 7.1.1.3 Replacement of mud and pole structures in phases

The demolition of a chamber made of mud and wood and the replacement of its walls with concrete blocks constitutes another sort of alteration.

One of the transformers had the following to say:

*“This is our second structure out of two. The first old building we have already demolished and constructed new RCC house. The structure you are seeing is used mostly for storing grains and other household stuffs. The top floor is used for sleeping purposes. The reason for replacing the mud wall and timber post is that the process for maintaining and repairing is very hardworking and time consuming for us. The labors are also not easily available nowadays and thus we also opted for one-time investment on the construction materials that is strong and durable.”* (Interview with Mr. Raj Kumar Chaudhary)



**Figure 119: Addition of pillar and concrete block in old mud structure; Residence of Mr. Ram Kumar Chaudhary (School Teacher)**

#### 7.1.1.4 Constructing new concrete block structures next to outdated pole and mud structures

In this instance, people who had big lots built extra rooms out of concrete blocks before demolishing their existing mud and timber pole construction. The owner's proposed bigger house is subsequently added to the newly constructed building.

One of the transformers had the following to say:

*“We lived in this house until 2073 B.S. and still the old mud structure is still in use for cooking and storing things, we began demolishing one room at a time to enable for the replacement of mud construction rooms with bricks. The reason for replacing the mud and timber pole construction with concrete structure was degradation, which caused leaking. Sleeping rooms were tiny, and toilets were placed outside the main home. We also required a contemporary home with adequate space to accommodate all of the family members.” (Interview with Mr. Ramakant Chaudhary)*



**Figure 120: Contemporary 2 storey house was built beside traditional house; Residence of Mr. Ramakant Chaudhary**

This type of transformation usually takes place in a larger plot, where it is possible to erect a new structure adjacent to the old one as shown in above figure, which is normally extended step by step until the whole house is completed. From the observed houses, maximum was following this type of transformation process. Unlike the two types of transformation previously mentioned, the new structure is built apart from the old one.

### 7.1.1.5 Interior modifications

House transformation does not stop with structural changes to the outside of the structures. There have been some alterations within the house. Given that in some other circumstances, modifications are made gradually over time, the use of interior space involves occupants moving from one room to another. In certain cases, interior walls are removed in order to increase the size of rooms.

One of the interviewees commented that:

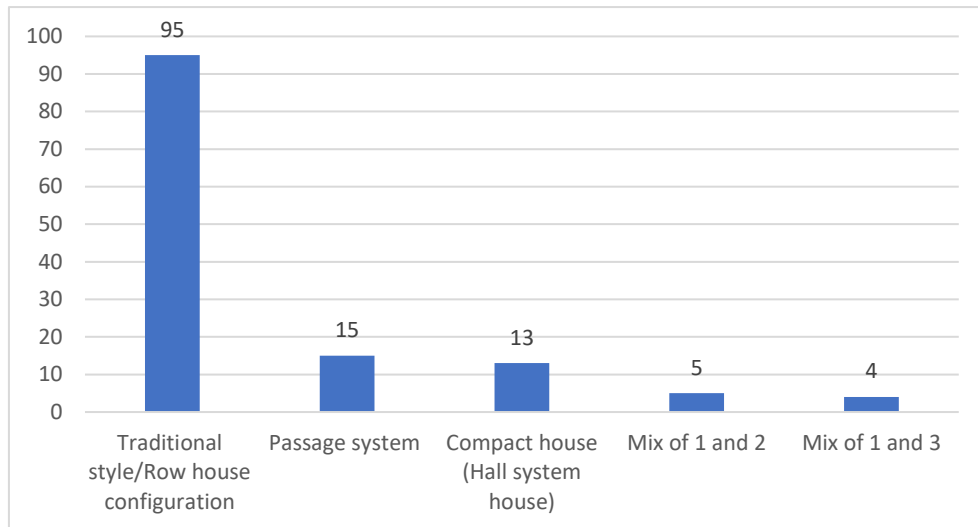
*“I have always been living in traditional layout house but with the time and change in the lifestyle I built this house with city style interior planning so that my son and daughter in law can have all the facilities under single roof and should have to go out to fetch water for cooking or bathing purposes. This kind of layout also helped me to maintain privacy for my daily activities”* (Interview with Mrs. Ram Piyari Chaudhary)



**Figure 121: Interior modification according to city lifestyle**

Interior alteration may also include wall extension to obtain higher ceiling levels, replacing of tiny windows with larger ones, or elimination of partition walls to create larger rooms. Other renovations include shutting doors that expose into the corridor and allowing more convenient access.

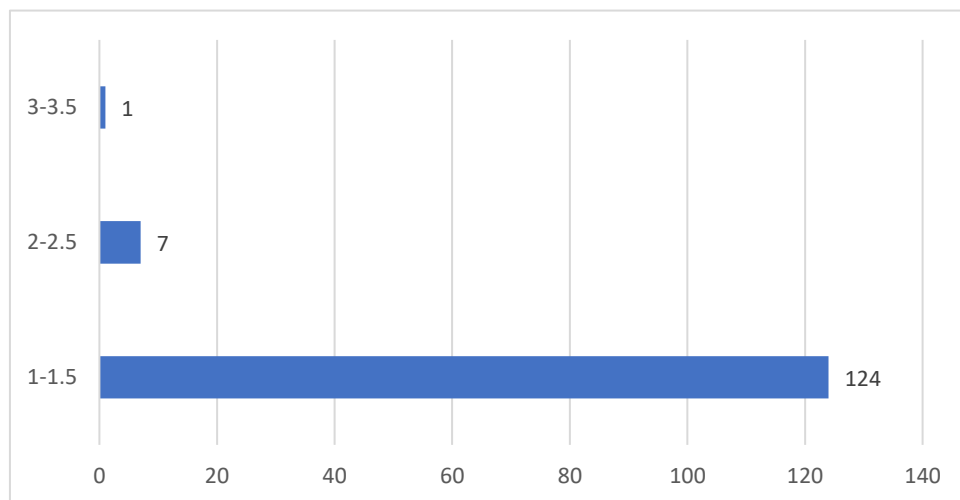
However, from the survey it is found that maximum of the houses still follows the traditional row house configuration and few with passage system house and compact houses.



**Figure 122: Interior configuration of surveyed data**

#### 7.1.1.6 Vertical extensions whereby rooms are added vertically to accommodate additional functions

In Baswalpur settlement, there are very few two-storey and three-storey houses. From the survey, it is observed that out of 132 houses, 124 houses were of 1-1.5 storey, 7 were of 2-2.5 storey and only 1 house was of 3-3.5 storey.



**Figure 123: Number of storeys of according to survey**

Vertical extension is another form of transformation started to be observed in the Baswalpur village where there is no space left for horizontal extensions. In order to understand how vertical extensions, take place, one of the inhabitants who had made an extension to his house explained:

*“My family members and I have been living in this house for more than 7 years. Earlier we used to live in joint family with my in-laws but as my family started to grow, I need separate space to live my further life. After my husband returned from foreign country, we decided to build our own house but due to limited space after re-distribution of land among in-laws, we were left with limited space and thus we decide to extend our house vertically in order to house all the spaces we needed at that time.”*



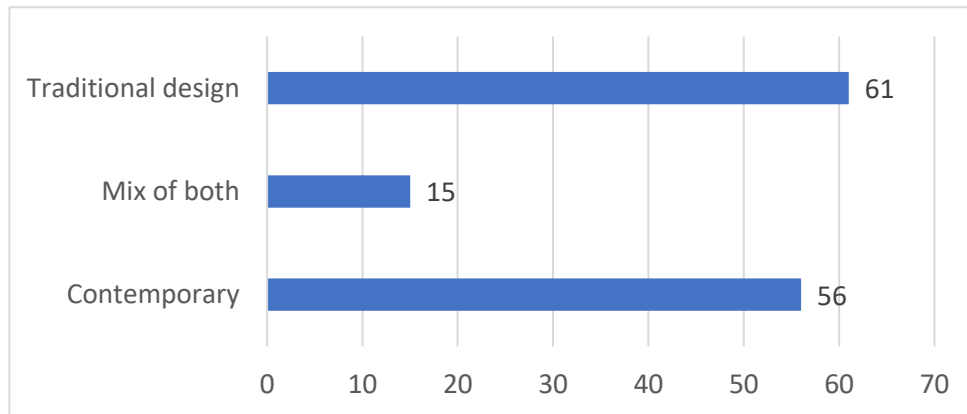
**Figure 124: Vertical expansion of house due to limited plotland;  
Residence of Mukhilal Chaudhary**

In Baswalpur, many houses were transformed over the past ten years, since many people aspire to own houses to live in.

## 7.1.2 Building information from survey

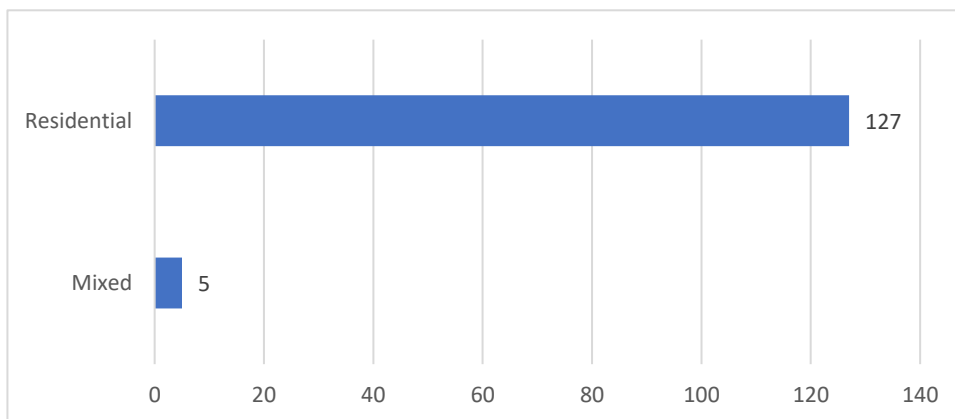
### 7.1.2.1 House typology

Out of 132 survey houses, 56 were contemporary, 61 were traditional and 15 were mix of both.



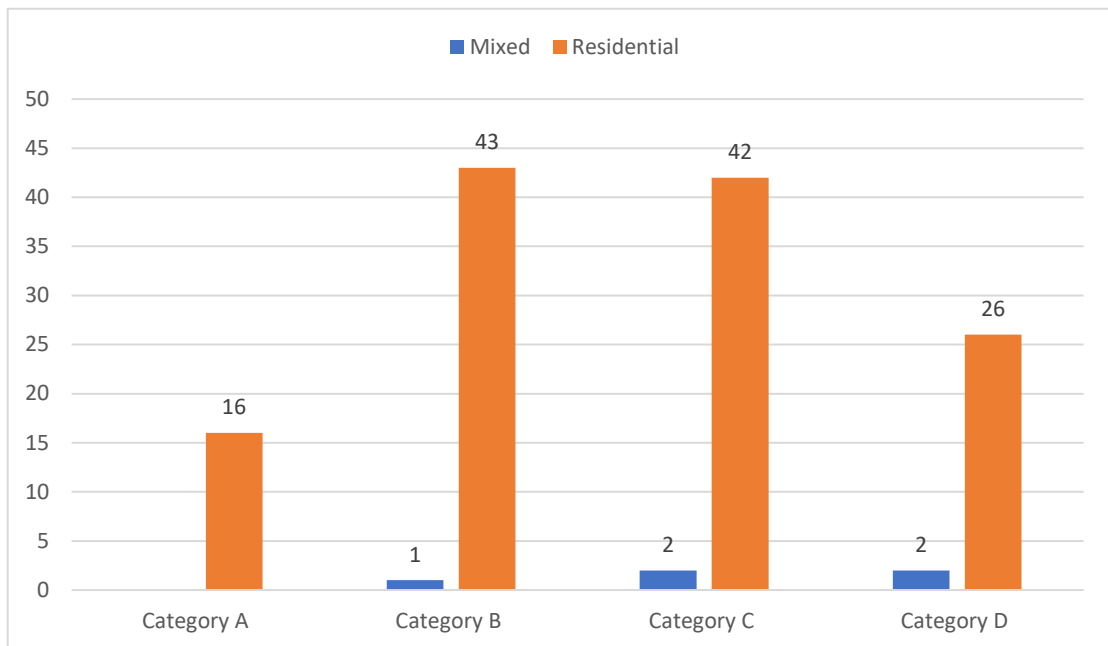
### 7.1.2.2 Building use

Majority of observed houses i.e., 127 no. houses were residential and rest 5 no. of houses with mixed used.



### 7.1.2.3 Building category and building use

From the survey, it is found that 43 houses belong in category B and 42 houses belong to category C, 26 houses in category D and 16 houses in Category A



## 7.2 Transformation for housing modernization

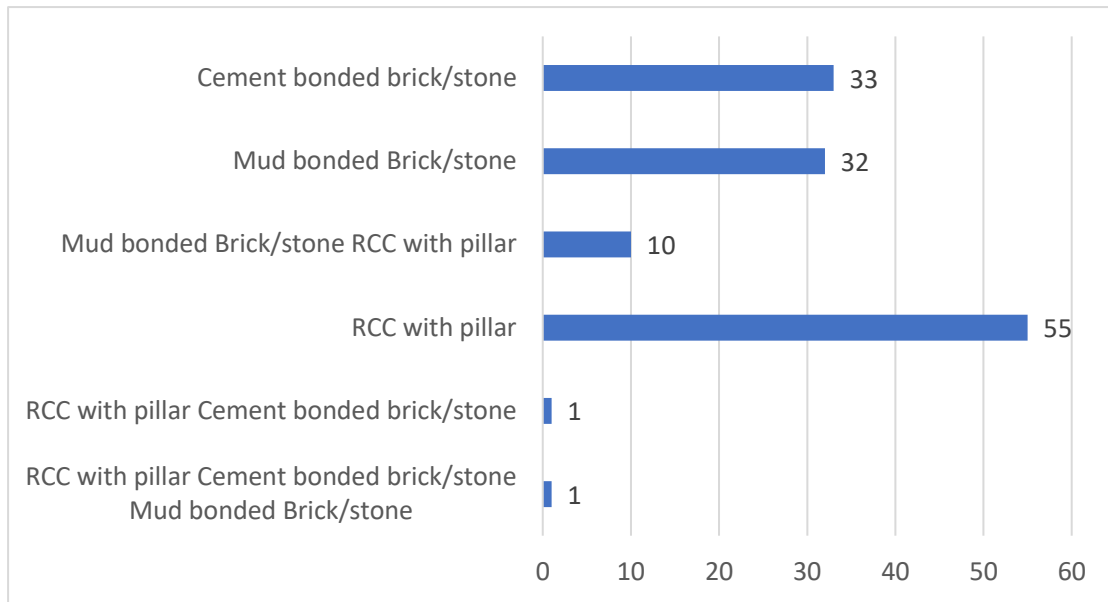
This section discusses how individuals perceive modernity and how housing alteration is related to modernization. Housing modernization in the Baswalpur village is characterized by changes in terms of extension, the appearance of new dwelling types, spatial linkages, and the use of space. Density is increasing, and traditional architectural standards are being rejected. Building materials, function separation, comfort qualities, renting rooms, and toilet facilities are the five primary components considered in terms of modernization.

### 7.2.1 Building materials

The ongoing change in construction materials is one of the factors included in the analysis of house modernization within the framework of housing transformation in Baswalpur village. Residents modernize their homes by converting them from traditional to "modern" building materials. This is simple to verify physically in the research region and is supported by interviews with Baswalpur village inhabitants.

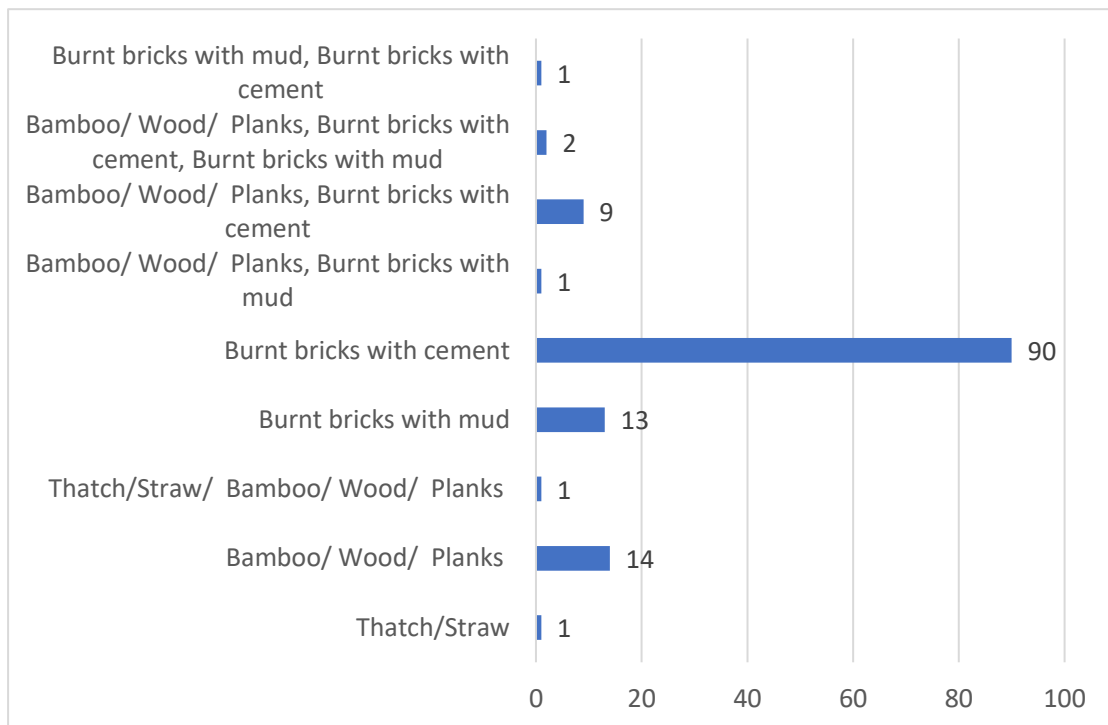
#### Foundation

Majority of 55 houses used RCC with pillar, 33 houses used cement bonded brick/stone and 32 houses used mud bonded brick/stone



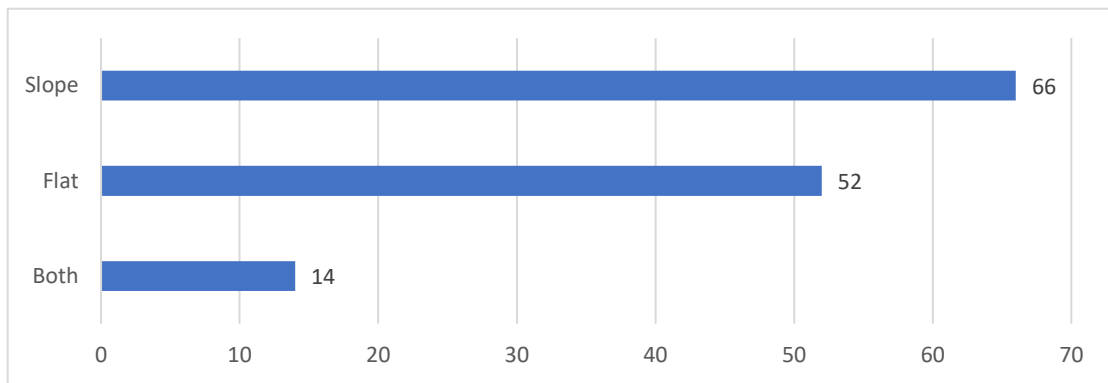
### Outer wall

Majority (**90 no.**) of observed houses used **burnt brick with cement** as outer wall in their houses.



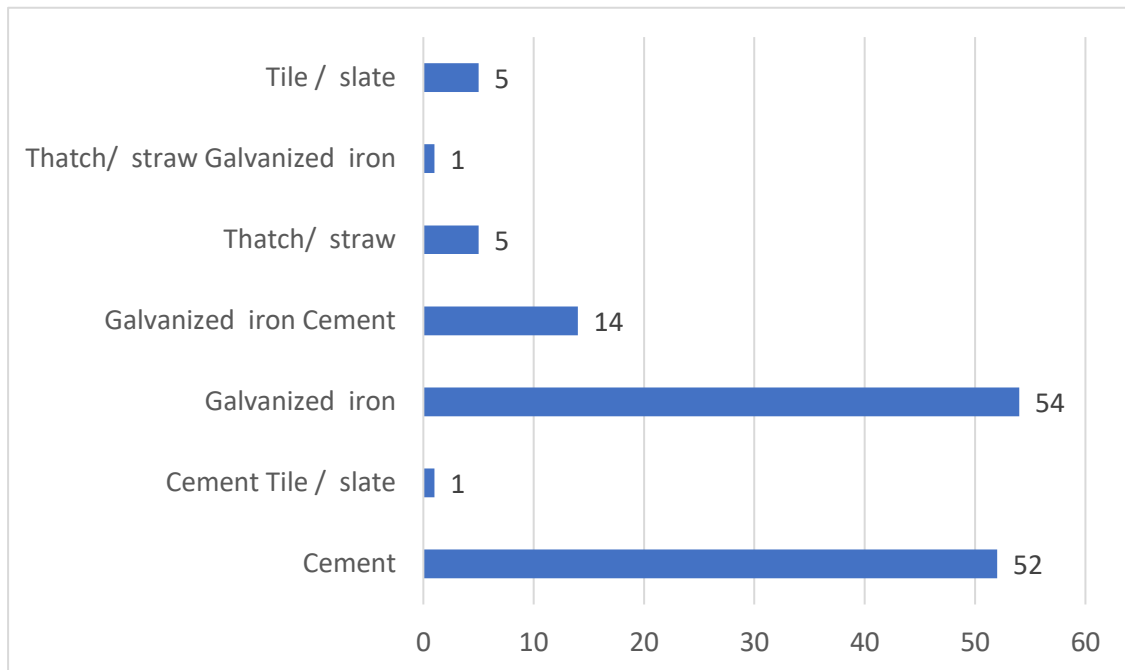
### Roof type

Both Flat and slope roof were found to be used in observed buildings where 66 of the survey houses used slope roof while 52 houses used flat roof and rest 14 houses used mix of both roof type.



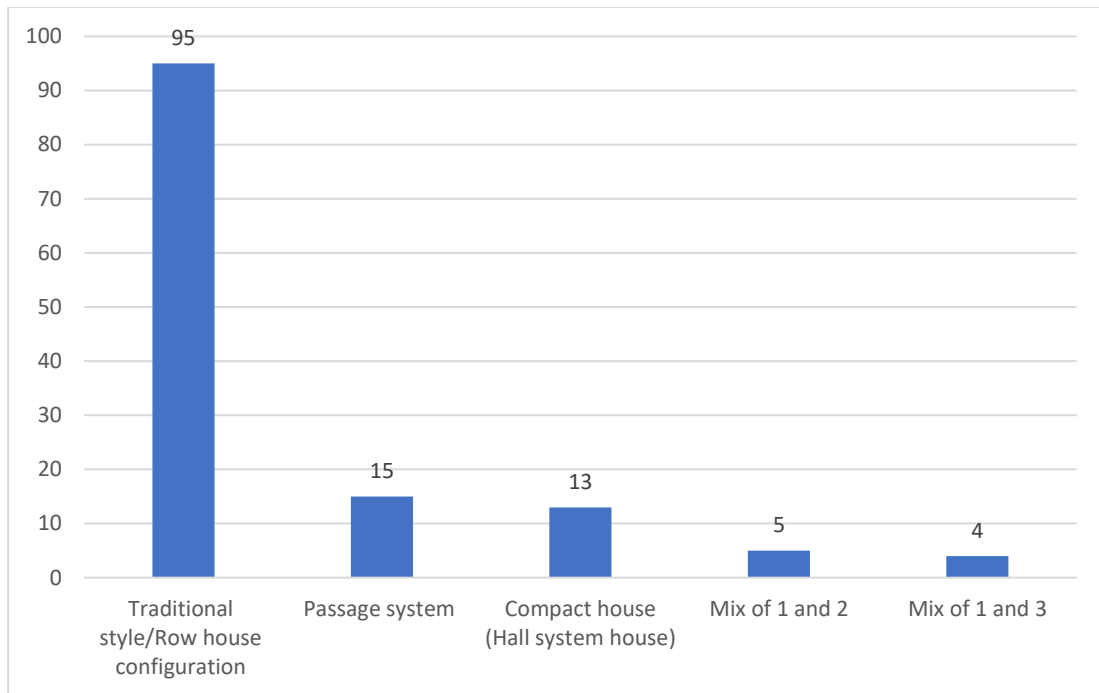
### **Roofing material**

Majority of 54 survey houses has galvanized iron roofing, 52 houses have cement roofing. Few were observed with tile/slate and thatch/straw roof.



### **7.2.2 Separation of functions/ Interior configuration**

The flawless execution of tasks is made possible by the separation of functions in a home. Separation of activities is sometimes seen as a reflection of an improved level of life, which includes an inherent rise in the number of housing options. It is found that, majority of the houses still has traditional row house configuration.



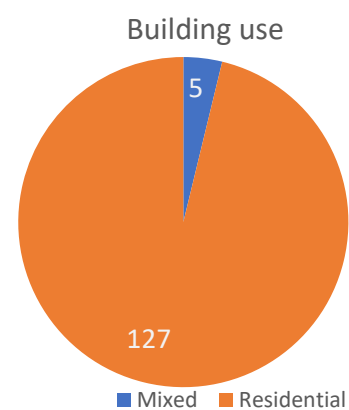
### 7.2.3 Climatic comfort

Climate comfort is seen as a key component of home design development. The residents of Baswalpur also view climate comfort as a crucial component of a contemporary home. Large windows are regarded as components of a contemporary home since they provide the space with appropriate ventilation and lighting.

Nine of the twelve dwellings in-depth interviews were conducted—had windows that were sufficiently large to allow for cross ventilation and sufficient illumination. Large windows may let in more light, but it does not always mean the home will be cooler. This is a result of homes being built too closely together, which prevents cross-ventilation. In the circumstances people are forced to use fans to bring down the room temperature. The scenario would worsen if homes had little windows, though.

### 7.2.4 Rooms for economic activities

Majority of the survey houses was used as residential purpose but few of the 5 survey houses has mixed building use of residential with commercial space as per the need of the people of Baswalpur village. The people are found to involve in business by opening shops in their home.



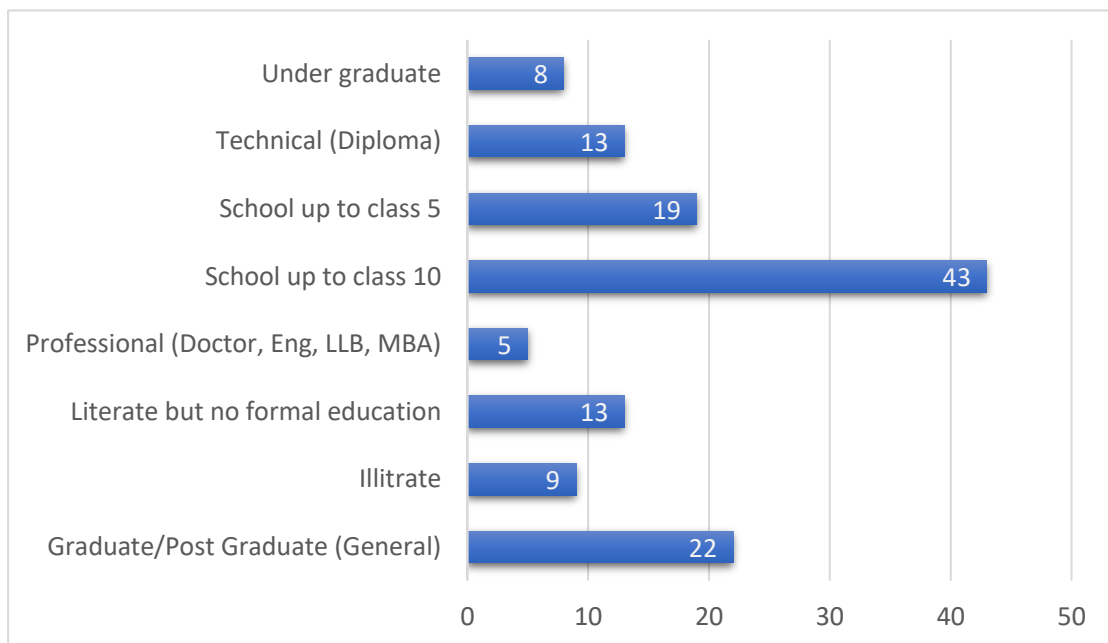
### 7.2.5 Toilet facilities

Classical modernism considers health and hygienic standards to be significant, particularly in the developing elements of house design. Improved toilet facilities are also linked to a more contemporary style of life in Baswalpur village, depending on the sort of toilet one has. It is found that all of 132 respondents house has the provision of toilet in their homes with septic tank.

## 7.3 Transformation in socio-economic condition

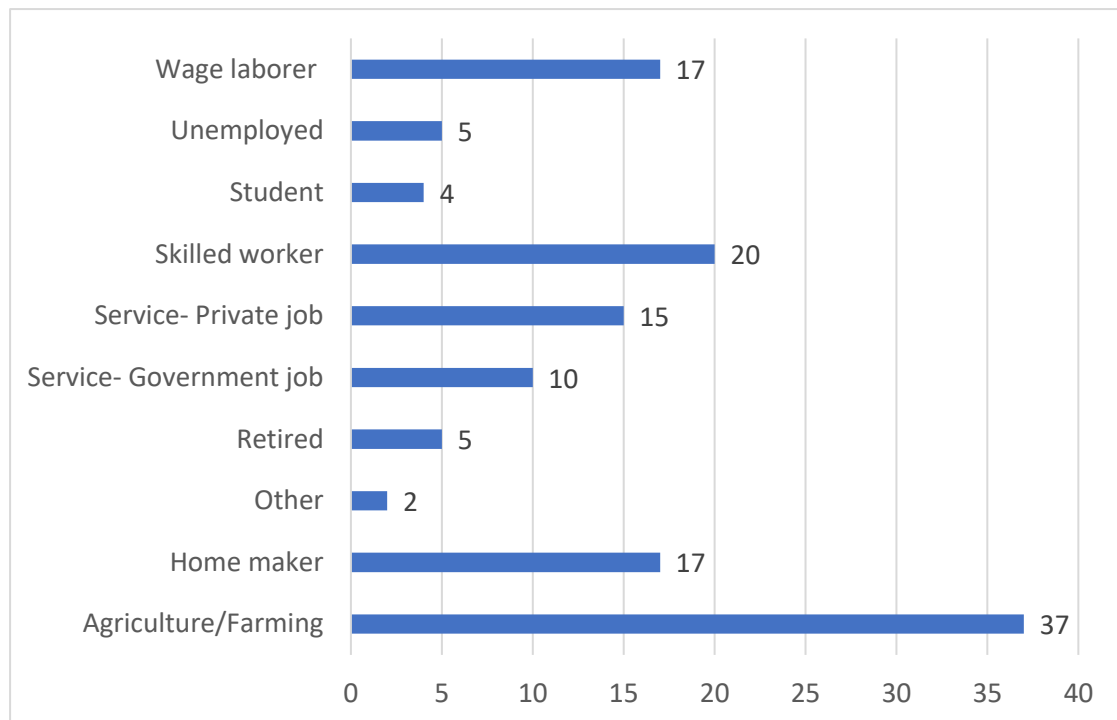
### 7.3.1 Education level

Majority of the respondent has perused the education level up to class 10 while others has completed education level like class 5, undergraduate, graduate, etc. as shown in the graph below.



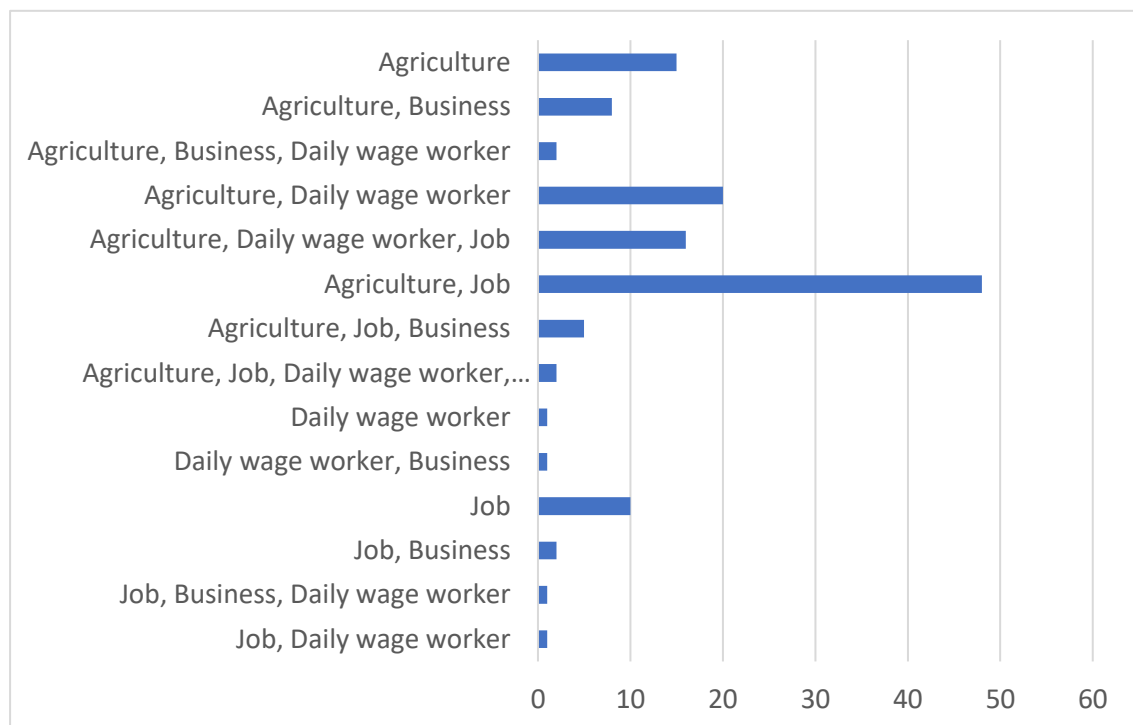
### 7.3.2 Occupation

Most of the respondents are still involved in agriculture activities followed by skilled worker like carpenter and painter along with daily wage worker. Remaining others are involved in teaching, government job, private job, business, etc.



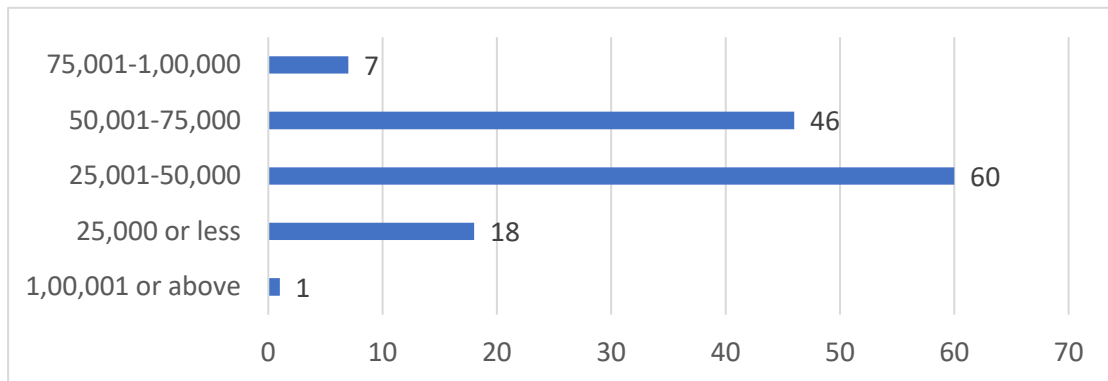
### 7.3.3 Main sources of income

From the observation, it is found that respondent's majority of family members are involved into agriculture and job as economic activities, few with agriculture and daily wage worker and few with solely agriculture as economic activity.



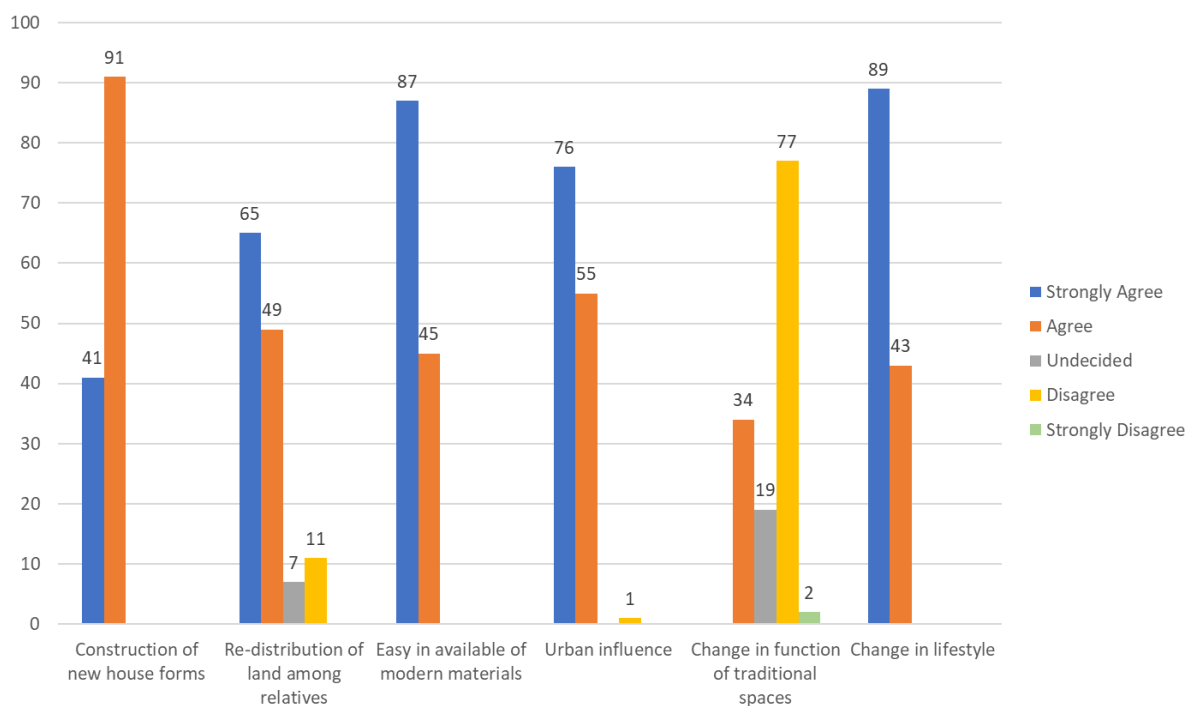
### 7.3.4 Monthly income of the family

60 number of respondents are having monthly combined income of 25,000 to 50,000, 46 respondents with 50,000.



### 7.4 Underlying factors for transformation

There are several forces driving housing transformation. The locals have revealed causes such as economic, social-cultural, and a strong demand for modernization. 89 respondents strongly agree that change in lifestyle has led to the transformation of village followed by 87 respondents confirming that easy in available of modern construction materials has led to construction modern houses in this settlement. 76 respondents strongly agreed for the urban influence as a major reason. The other reasons are construction of new house forms, re-distribution of land among family members, and change in function of traditional spaces.



### 7.4.1 Socio-cultural reasons

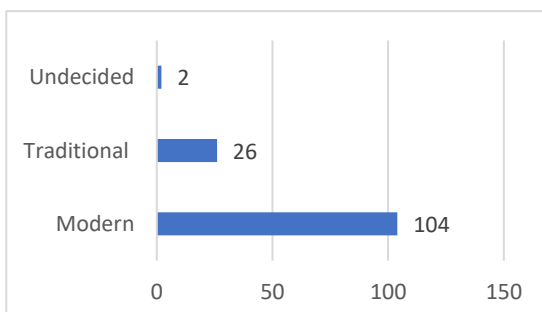
Housing transformation is influenced by social variables such as a growth in the number of family members. Others are for extended family members looking for seclusion, safety, and security.

- Increase in household members
- Space for an extended family
- In search for privacy
- Protection
- Security

### 7.4.2 Aspiration to live in a “modern” house

The majority of the 104 respondents preferred modern house over tradition ones and prefer not to live in mud house. According to the survey respondents, these dwellings are made of traditional materials and are connected with poverty and, as a result, a low social position. As a result, the majority of individuals seek to convert their homes to concrete block buildings. One house owner observed:

*“After more than 25 years of residing in the mud house, we made the decision to demolish the building and construct a new home using concrete blocks. What you see right now is this new structure. The original timber and mud construction was degrading, which is why it was demolished and a brand-new one was constructed. The bathrooms were outside the home, and the bedrooms were modestly sized. We felt the urge to build a contemporary home that would fit our urban lifestyle. We planned for a living room, dining room, kitchen, bedroom, and bathroom in the new home. In order to give enough light and cross ventilation, we also included big windows. We like having a contemporary home now.”* (Interview with Hari Dev Chaudhary)



**Figure 125: House type preference by respondents**



**Figure 126: Modern house of Hari Chaudhary**

A "modern house" is one that was constructed using construction materials that were produced industrially. It has built-in toilets and divisions for spaces like the living room, dining room, kitchen, and toilets. Cross ventilation was mentioned as a functional aspect.

Although Baswalpur village people believe contemporary homes to be superior than traditional homes, it is important to define what "better" homes actually include. Durability is a quality that, in the opinion of our survey respondents, defines a better dwelling. The belief that industrially manufactured construction materials are more durable than conventional building materials is widespread among villagers.

## CHAPTER 8. CLASSIFICATION AND ANALYSIS OF HOUSE TYPES

Finding and analyzing changes in Baswalpur with a view to identifying and categorizing existing and new housing types is one of the goals of the current study. Therefore, this chapter offers a categorization of the various housing types present in the research area. This settlement has constantly changed built environments made up of various buildings and the space between them. The renovated homes could stand in for certain ideals that truly unite peoples' history and present way of life.

### 8.1 Observation of the selected Houses

The houses are selected for the study of transformation on the degree of changes in the architectural form and layout of the spaces along with change in materials compare to traditional and local architecture. According to the information acquired from the field study, house transformation is arranged in various ways. The amount of open space has diminished, and construction materials have undergone drastic modifications. All the observed houses are analyzed on the basis of three dimension i.e., physical, socio-economic and environmental as these dimensions play major role in transformation of any settlement. Four categories of degree of transformation is made on the following basis:

1. Category A (No/Minimum transformation)
2. Category B (Transformation in material only)
3. Category C (Transformation in material, house shape and space function only)
4. Category D (Transformation in material, house shape, space function and addition of new space with new function)

#### 8.1.1 Category A

Houses which undergo a slight or no transformation. This category can be seen from the absence of change in the materials used and the house shape, as well as functions, and the absence of new space in one compound. Indigenous houses were observed few in numbers and mostly intact in Mushar basti rather than in tharu basti.

### 8.1.1.1 House No. 1

The house no. 1 belongs to Category A since this house has a traditional and indigenous character of terai architecture or tharu architecture. In present situation in Baswalpur village, typical tharu house architecture is seen less on tharu community area and mostly seen on Mushar basti. The House no. 1 is one of the houses from Mushar basti.



Figure 127: View of house no. 1 from inner courtyard

Table 8: Description of House no. 1, Category A

Description of House no. 1			
<b>House no.</b>		1	
<b>Name of house owner</b>		Ram Sila Sada	
<b>Time of construction</b>		More than 10 years	
<b>House category</b>		Category A	
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey	
	<b>Construction technique</b>	Traditional construction techniques using wooden beam and post	
	<b>Spatial organization</b>	<b>Darbajja:</b>	Absent
		<b>Basghara:</b>	Absent
		<b>Gahali:</b>	Absent
<b>Angnaa:</b>		Present	
	<b>Verandah:</b>	3 feet wide with small deity space on one corner; verandah acts as a buffer zone and the slope	

		roof projection in verandah help to protect from direct sunlight
		<b>Internal layout:</b> L-shape house of single row structure with two rooms
	<b>Building materials</b>	<b>Foundation:</b> Mud bonded brick
		<b>Wall:</b> Thick mud brick wall with rammed earth plaster
		<b>Window:</b> Small openings
	<b>Roof:</b> Slope roof with use of thatch	
	<b>Decoration/ Carving</b>	No decoration
<b>Socio-economic status of occupants</b>		The occupants are involved in agricultural activities and daily wage work
<b>Environmental response</b>		Use of environmentally friendly local construction materials like mud, bamboo and timber with courtyard planning insuring proper circulation of air during summer

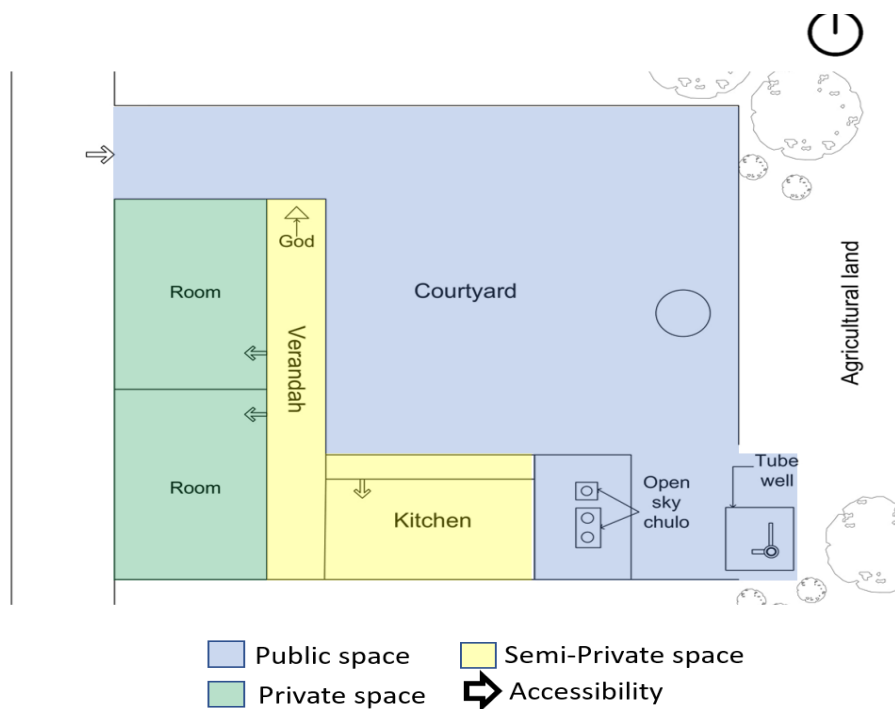


Figure 128: Schematic plan of category A house no. 1



**Figure 131: Kitchen with horizontal window**



**Figure 131: Courtyard used for drying grains**



**Figure 131: Outdoor chulo for drying grains**

### 8.1.2 Category B

Houses which undergo some transformation. This category can be seen from the existence of change in the materials used and the house shape, while the space function remains the same, and there is no new space in one compound.

#### 8.1.2.1 House no. 2

This house no. 2 is categorized in Category B for the reason that the internal layout of the house is in typical style of Tharu architecture with same functional activities and also the shape of the house is in traditional form of Tharu architectures. The transformation is only observed in the change of construction material like cement, brick, glass, CGI sheet, etc. and in the construction technique. However, few temporary structures can be seen with traditional structure. As seen in the schematic plan, the house is L-shape single row structure having one room and kitchen from the southern side and two rooms from eastern side. Two courtyards; Outer and inner courtyard, according to their functions, are provided. The front yard or outer courtyard is huge accommodating cattle shed in the front. The verandah is used as a family lounge and sometime used for welcoming the visitor.

**Table 9: Description of House no. 2, Category B**

<b>Description of House no. 2</b>	
<b>House no.</b>	2
<b>Name of house owner</b>	Samat Lal Chaudhary
<b>Time of construction</b>	4-5 years

<b>House category</b>		Category B
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey
	<b>Construction technique</b>	Load bearing structure
	<b>Spatial organization</b>	<b>Darbajja:</b> Present
		<b>Basghara:</b> Absent
		<b>Gahali:</b> Present
		<b>Angnaa:</b> Present
		<b>Verandah:</b> 5 feet wide on southern side and 2 feet wide on eastern side; verandah acts as a buffer zone and the slope roof projection in verandah help to protect from direct sunlight
		<b>Internal layout:</b> L-shape house of single row structure with four rooms; Kitchen space with kitchen sink inside
	<b>Building materials</b>	<b>Foundation:</b> Cement bonded brick with 9"x9" pillar
		<b>Wall:</b> 10" brick wall with cement-sand plaster
		<b>Window:</b> Medium size openings with glazing
<b>Roof:</b> Use of corrugated iron sheets with slope roof		
<b>Decoration/ Carving</b>	No decoration	
<b>Socio-economic status of occupants</b>	The occupants are involved in agricultural activities, animal husbandry; government service in health sector and social worker	
<b>Environmental response</b>	Courtyard planning insuring proper circulation of air during summer	

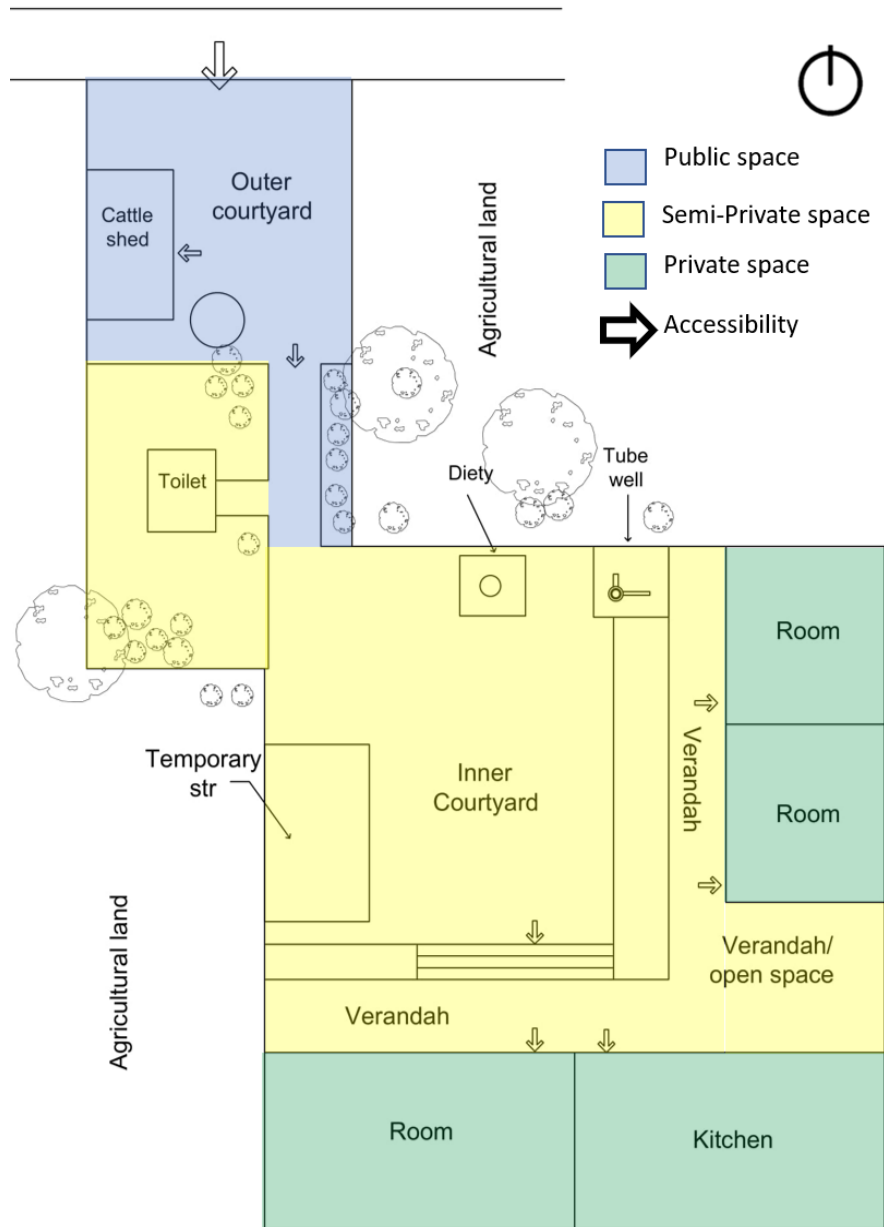


Figure 134: Schematic plan of Category B house 2



Figure 133: View of house no. 2, Category B



Figure 133: View of Darbajja and Gahali House no. 2

### 8.1.3 Category C

Houses which undergo significant transformation. This includes transformations in terms of the materials used and the house shape. Some houses may undergo a transformation of space function and some may not, and there is a new space in one compound.

#### 8.1.3.1 House No. 3

The home no. 3 falls under Category C since the material and shape of the house have changed, and a new dwelling unit has been built with a new form, but the purpose has remained the same as in traditional tharu architecture. This home is designed around a courtyard, featuring an outside and inner courtyard. A blend of



Figure 135: House no. 3, View of traditional structure

contemporary and classic architectural structures makes up the composition. Although the site's easternmost building is made of contemporary materials, the arrangement of the building still follows a single row structural scheme with three rooms. In addition, a staircase is attached from the north to meet the needs of the members and to encroach on the flat terrace, reflecting changes brought about by new societal expectations. Rest of the houses are used as per the functions shown in schematic plan.

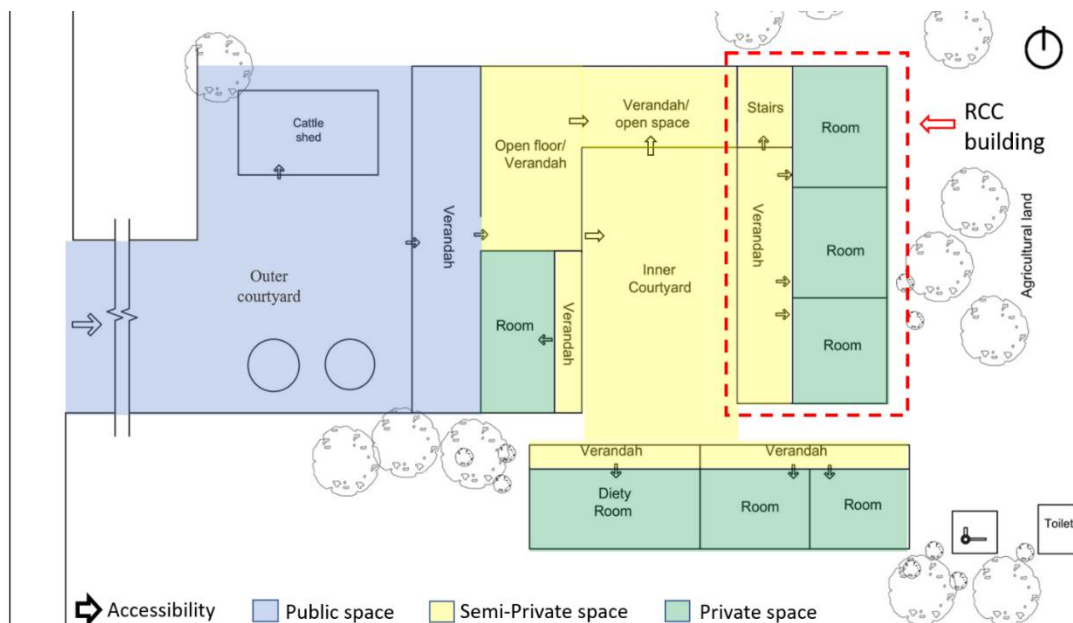


Figure 136: Schematic plan of house no. 3, Category C

**Table 10: Description of House no. 3, Category C**

<b>Description of House no. 3</b>		
<b>House no.</b>	3	
<b>Name of house owner</b>	Man Bharan Chaudhary	
<b>Time of construction</b>	More than 10 years- Classical style block and traditional block Approx 5 years for southern contemporary block	
<b>House category</b>	Category C	
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey
	<b>Construction technique</b>	Load bearing structure- southern block Frame structure- eastern block Traditional row house – traditional blocks
	<b>Spatial organization</b>	<b>Darbajja:</b> Present
		<b>Basghara:</b> Present
		<b>Gahali:</b> Present
		<b>Angnaa:</b> Present
		<b>Verandah:</b> 3 feet wide on western side and 4-5 feet wide on eastern side; verandah acts as a buffer zone and the slope roof projection in verandah help to protect from direct sunlight
<b>Internal layout:</b> L-shape house of single row structure with four rooms; Kitchen space with kitchen sink inside		
<b>Building materials</b>	<b>Foundation:</b> Cement bonded brick in load bearing southern block; RCC with pillar in eastern block; Mud bonded with brick in rest old traditional blocks	

		<b>Wall:</b> 10” brick wall with cement-sand plaster in contemporary blocks; bamboo and mud wall in old traditional block
		<b>Window:</b> Medium size openings with glazing in contemporary building; small openings on old traditional block
		<b>Roof:</b> Use of corrugated iron sheets with slope roof on traditional building and contemporary building of southern side; Flat roof with cement as materials on eastern building
	<b>Decoration/ Carving</b>	Traditional mud decoration in western dwelling unit
<b>Socio-economic status of occupants</b>		The occupants are involved in agricultural activities, animal husbandry; private service
<b>Environmental response</b>		Courtyard planning insuring proper circulation of air during summer; Few structures are left using traditional materials and local building techniques that are environmentally friendly, but new additions to houses are built with contemporary materials such as cement, brick, and CGI sheet, which are not climatic and environmentally friendly



**Figure 145: House no. 3, View of Modern structure**



**Figure 146: Kothi used by locals to store grains**



**Figure 147: Wall carving on eastern block of house no. 3**



**Figure 137: Parewa khop on house no. 3**

#### 8.1.3.2 House No. 4

The house no. 4 falls into Category C since the material and shape of the house have changed but the space configuration still follows the traditional tharu house style. This house comprises all the important traditional tharu house spaces like Darbajja, Basghara and so on. One of the blocks from western side undergoes into transformation shifting from traditional to contemporary because the traditional house was degraded over the period of time and the repair process was time taking and labor induced which was causing problem to the house occupants. The detail description of house no. 3 is shown in table below.

**Table 11: Description of House no. 4, Category C**

<b>Description of House no. 4</b>		
<b>House no.</b>	4	
<b>Name of house owner</b>	Ram Subaran Chaudhary	
<b>Time of construction</b>	2-3 years (Only RCC structure) More than 10 years (Other traditional structure)	
<b>House category</b>	Category C	
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey
	<b>Construction technique</b>	Frame structure- western block Traditional row house – remaining traditional blocks
	<b>Spatial organization</b>	<b>Darbajja:</b> Present
		<b>Basghara:</b> Present
		<b>Gahali:</b> Present
		<b>Angnaa:</b> Present
		<b>Verandah:</b> 7 feet wide on western block; 2 feet wide on eastern block and northern kitchen block; 8 feet wide
	<b>Building materials</b>	<b>Internal layout:</b> Each block possessed single row house planning of traditional tharu house
		<b>Foundation:</b> RCC with pillar in western block; Mud bonded with brick in rest of the traditional blocks
		<b>Wall:</b> 10” brick wall with cement-sand plaster in contemporary blocks; bamboo and mud wall in northern kitchen block; mud bonded brick wall in eastern block
	<b>Window:</b> Medium size openings with glazing in contemporary building; small openings on old traditional buildings	

		<b>Roof:</b> Use of corrugated iron sheets with slope roof on traditional building; Flat roof with cement as materials on contemporary building
	<b>Decoration/ Carving</b>	Flora and fauna paintings on walls is observed
<b>Socio-economic status of occupants</b>		The family members of this house are found to be engaged in farming operations, teaching, and government work, indicating economic stability in the house design.
<b>Environmental response</b>		Courtyard planning insuring proper circulation of air during summer; Few structures are left using traditional materials and local building techniques that are environmentally friendly, but new additions to houses are built with contemporary materials such as cement, brick, and CGI sheet, which are not climatic responsive and environmentally friendly



Figure 139: Top view of house showing activities in courtyard



Figure 139: Painting done on mud wall during wedding function



Figure 142: View of Basghara from main street



Figure 142: View of gahali with mezzanine space



Figure 142: Wider verandah to accommodate different function

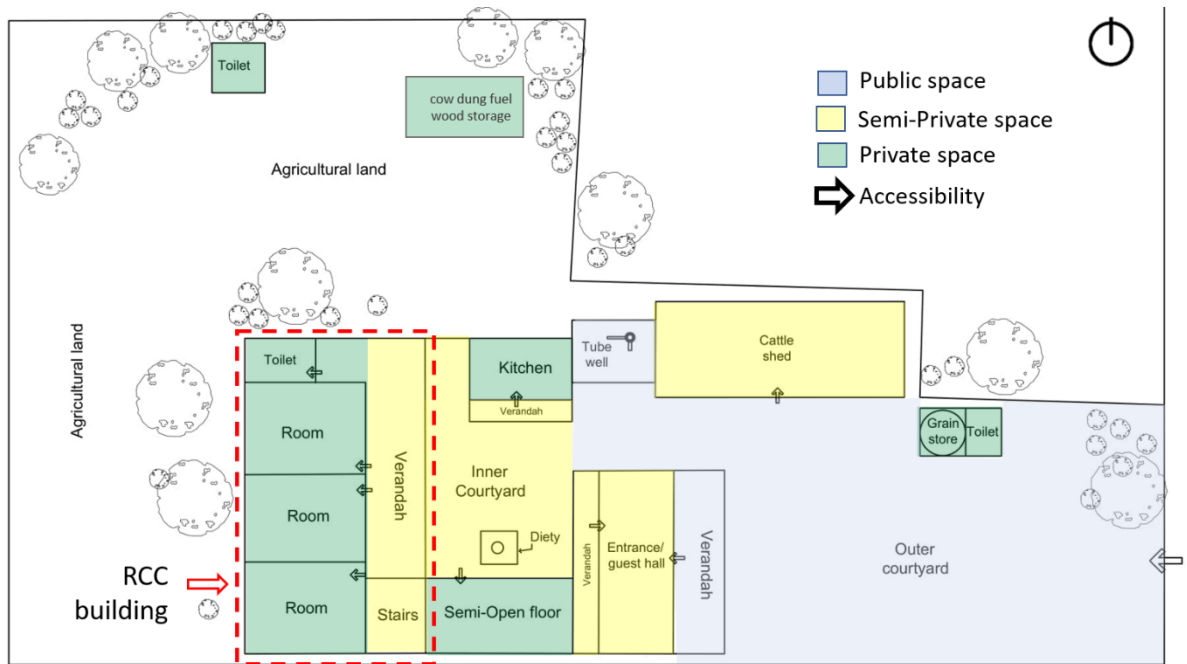


Figure 144: Schematic plan of Category C, house 4



Figure 143: Inner Courtyard view, House no. 4

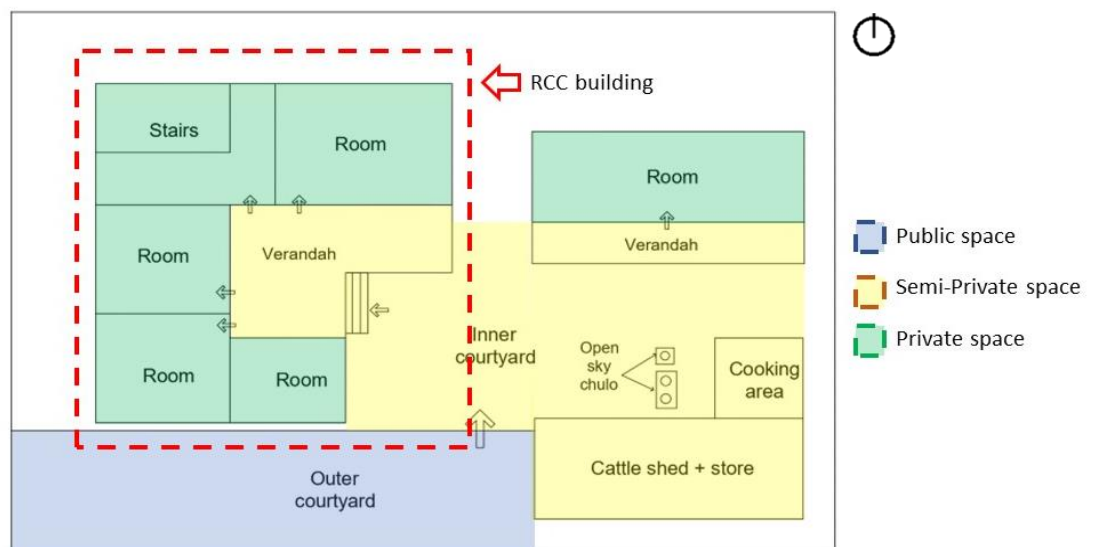
### 8.1.3.3 House No. 5

The house no. 5 falls into Category C since the transformation is observed on the basis of material and shape of the house. The overall layout of the house is same to that of traditional tharu house planning but the addition of new house form with the addition of new function is observed. The new house form is built around the aagan beside the traditional house as a need to expand the sleeping spaces for new family members. The detail description is given below.

**Table 12: Description of House no. 5, Category C**

<b>Description of House no. 5</b>		
<b>House no.</b>	5	
<b>Name of house owner</b>	Saroj Chaudhary	
<b>Time of construction</b>	2-3 years (Only RCC structure) More than 10 years (Other traditional structure)	
<b>House category</b>	Category C	
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey
	<b>Construction technique</b>	Frame structure- western block Traditional row house – remaining traditional blocks
	<b>Spatial organization</b>	<b>Darbajja:</b> Present
		<b>Basghara:</b> Absent
		<b>Gahali:</b> Present
		<b>Angnaa:</b> Present
		<b>Verandah:</b> 2 feet wide on traditional block; contemporary block has indoor-outdoor open space used as veranda for seating and hanging out for multiple activities
		<b>Internal layout:</b> Northern block comprised of single row house planning with mezzanine space and contemporary is the mix of compact planning and passage system
<b>Building materials</b>	<b>Foundation:</b> RCC with pillar in contemporary block; Mud bonded with brick in rest of the traditional blocks	
	<b>Wall:</b> 10” brick wall with cement-sand plaster in contemporary blocks; bamboo and mud wall in traditional block	

		<p><b>Window:</b> Medium size openings with glazing in contemporary building; small openings on old traditional buildings</p> <p><b>Roof:</b> Use of corrugated iron sheets with slope roof on traditional building; Flat roof with cement as materials on contemporary building</p>
	<b>Decoration/ Carving</b>	No decoration or carving on wall
<b>Socio-economic status of occupants</b>		The family members of this house are found to be engaged in agricultural activities and in private service employment
<b>Environmental response</b>		Courtyard planning insuring proper circulation of air during summer; Few structures are left using traditional materials and local building techniques that are environmentally friendly



**Figure 145: Schematic plan of house no. 5, Category C**



**Figure 148: View of aagan and traditional house**



**Figure 148: View from street**



**Figure 148: View of contemporary block from**

#### 8.1.3.4 House no. 6

The house no. 6 falls into Category C since the transformation is observed on the basis of material and shape of the house. The overall layout of the house is same to that of traditional tharu house planning but the addition of new house form with the addition of new function is observed. The detail description is given below.

**Table 13: Description of House no. 6, Category C**

<b>Description of House no. 6</b>		
<b>House no.</b>	6	
<b>Name of house owner</b>	Tulshi Chaudhary	
<b>Time of construction</b>	2-3 years (Only RCC structure) More than 10 years (Other traditional structure)	
<b>House category</b>	Category C	
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey
	<b>Construction technique</b>	Frame structure- eastern block Traditional row house – remaining traditional blocks
	<b>Spatial organization</b>	<b>Darbajja:</b> Present
		<b>Basghara:</b> Absent
		<b>Gahali:</b> Present
<b>Angnaa:</b> Present		
	<b>Verandah:</b> No verandah	

		<b>Internal layout:</b> Compact planning house is observed
	<b>Building materials</b>	<b>Foundation:</b> RCC with pillar in contemporary block; temporary post for traditional structures
		<b>Wall:</b> 10” brick wall with cement-sand plaster in contemporary blocks; bamboo and mud wall in traditional block
		<b>Window:</b> Medium size openings with glazing in contemporary building; No openings on old traditional buildings
		<b>Roof:</b> Use of corrugated iron sheets with slope roof on traditional building; Flat roof with cement as materials on contemporary building
	<b>Decoration/ Carving</b>	No decoration or carving on wall
<b>Socio-economic status of occupants</b>		The family members of this house are found to be engaged in agricultural activities and in private service employment
<b>Environmental response</b>		No proper and big courtyard for proper air circulation

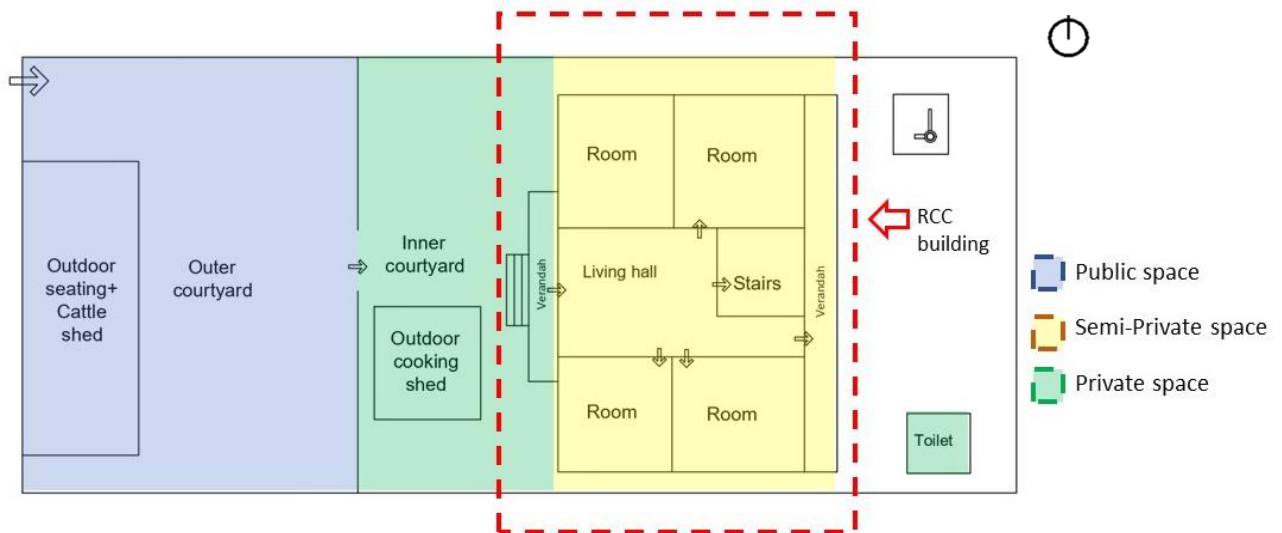


Figure 149: Schematic plan of house no.6, Category C



Figure 150: View from darbajja of house no. 6, Category C

#### 8.1.3.5 House no. 7

The house no. 7 falls into Category C since the material and shape of the house have changed. The overall layout of the house is same to that of traditional tharu house planning but the transformation in the house form with the addition of new structure with new function depicting the lifestyle of city is observed. This home is designed around a courtyard, featuring an outside and inner courtyard. As shown in the picture above, three type of built structure is seen built in different time frame according to the need of the resident. The eastern building is single row with single room with no verandah, this house serves as deity room. The western most building is single row with two rooms with addition of staircase giving extra space to the terrace area for fictional

activities. The southernmost building is the latest addition that full reflect the compact planning layout indicating the urban influence in the house form. The remaining dwellings are utilized in accordance with the purposes depicted in the schematic plan. The detail description is given below.

**Table 14: Description of House no. 7, Category C**

<b>Description of House no. 7</b>		
<b>House no.</b>	7	
<b>Name of house owner</b>	Ram Piyari Chaudhary	
<b>Time of construction</b>	2-3 years (Only RCC structure) More than 10 years (Other structure)	
<b>House category</b>	Category C	
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey
	<b>Construction technique</b>	Frame structure- western block Load bearing- Other structure Traditional row house – remaining traditional blocks
	<b>Spatial organization</b>	<b>Darbajja:</b> Present
		<b>Basghara:</b> Absent
		<b>Gahali:</b> Present
		<b>Angnaa:</b> Present
		<b>Verandah:</b> 3 feet wide on western block
<b>Internal layout:</b> Each block possessed single row house planning of traditional tharu house except the southern building with compact planning house serving multiple function under single roof. The access to roof is achieved by the stairs in this house.		
<b>Building materials</b>	<b>Foundation:</b> RCC with pillar in western and southern blocks; cement bonded brick in eastern	

		<p>block; traditional mud bonded brick in traditional block</p> <p><b>Wall:</b> 10” brick wall with cement-sand plaster in contemporary blocks; bamboo and mud wall in northern block</p> <p><b>Window:</b> Medium size openings with glazing in contemporary building; small openings on old traditional buildings</p> <p><b>Roof:</b> Use of corrugated iron sheets with slope roof on eastern building; Flat roof with cement as materials on contemporary building</p>
	<b>Decoration/ Carving</b>	Paintings on walls is observed
<b>Socio-economic status of occupants</b>		The family members are involved in teaching, engineering and in medical sector indicating the economic stability and the choice more towards the city lifestyle. Urban influence- new addition of building >> Hall system house for Compact functional arrangement under single roofs
<b>Environmental response</b>		Courtyard planning insuring proper circulation of air during summer; Few structures are left using traditional materials and local building techniques that are environmentally friendly, but new additions to houses are built with contemporary materials such as cement, brick, and CGI sheet, which are not climatic responsive and environmentally friendly

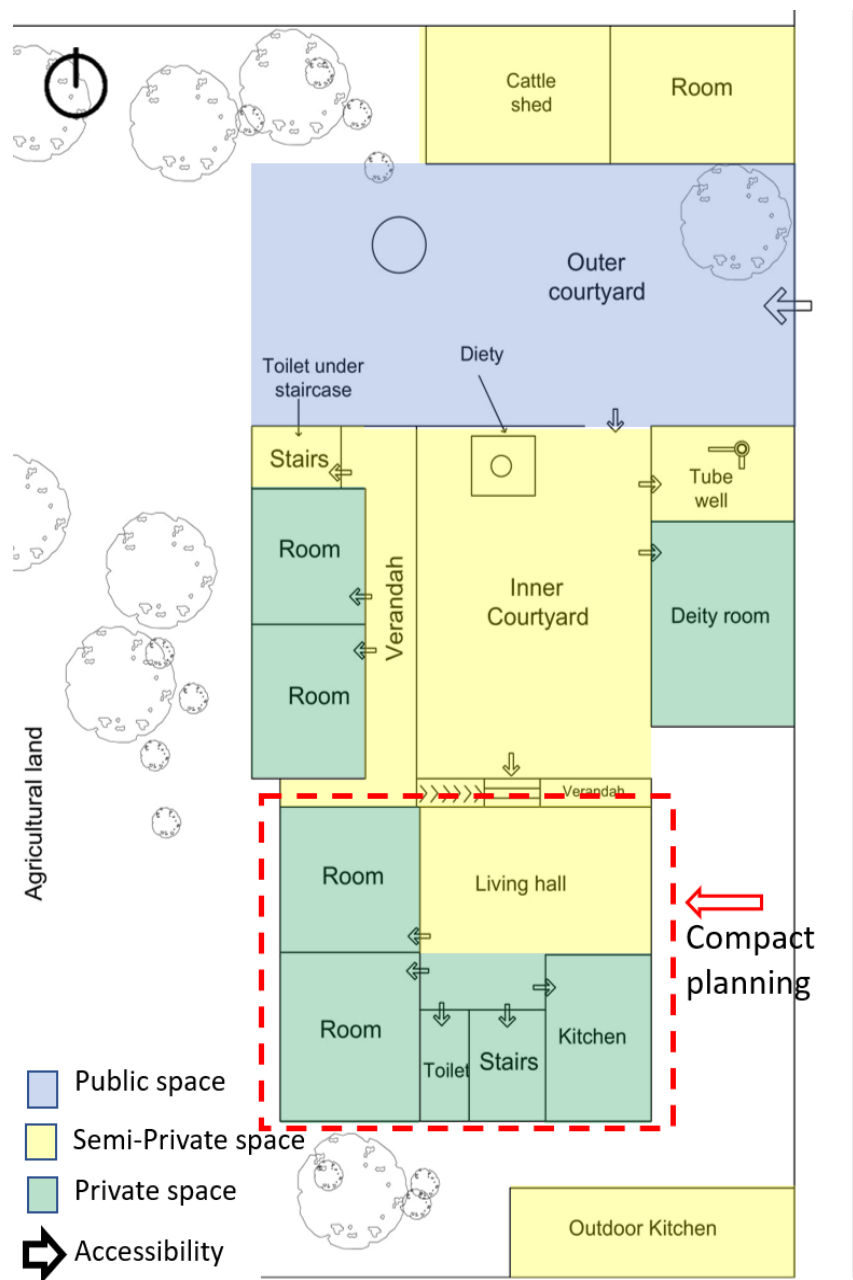


Figure 151: Schematic plan of house 7, Category D

Single row structure without  
verandah

Hall system house

Single row structure with



Figure 163: Different housing form of house no. 7



Figure 164: View from street of house on. 7



Figure 152: The interior of the house no. 7

### 8.1.3.6 House no. 8

The house no. 8 falls into Category C since the transformation is observed on the basis of material and shape of the house. The overall layout of the house is same to that of traditional tharu house planning but the addition of new house form with the addition of new function is observed reflecting the urban house form and urban lifestyle of the occupants. The detail description is given below.

**Table 15: Description of House no. 8, Category C**

<b>Description of House no. 8</b>		
<b>House no.</b>	8	
<b>Name of house owner</b>	Ramakant Chaudhary	
<b>Time of construction</b>	7 years (Only RCC structure) More than 10 years (Other traditional structure)	
<b>House category</b>	Category C	
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey (Traditional structure) Two storeys (Contemporary structure)
	<b>Construction technique</b>	Frame structure- Contemporary block Traditional row house – remaining traditional blocks
	<b>Spatial organization</b>	<b>Darbajja:</b> Present
		<b>Basghara:</b> Absent
		<b>Gahali:</b> Present
		<b>Angnaa:</b> Present
		<b>Verandah:</b> 5 feet wide on contemporary block; 3 feet wide on traditional block
<b>Internal layout:</b> Northern block comprised of two storeys compact planning house and single row planning for traditional house		
<b>Building materials</b>	<b>Foundation:</b> RCC with pillar in contemporary block; Mud bonded with brick in rest of the traditional blocks	

		<p><b>Wall:</b> 10” brick wall with cement-sand plaster in contemporary blocks; bamboo and mud wall in traditional structure</p>
		<p><b>Window:</b> Medium size openings with glazing in contemporary building; small openings on old traditional buildings</p>
		<p><b>Roof:</b> Use of corrugated iron sheets and cement tiles with slope roof on traditional building; Flat roof with cement as materials on contemporary building</p>
	<b>Decoration/ Carving</b>	No decoration and carving are observed
<b>Socio-economic status of occupants</b>		The occupants are primarily engaged in agricultural activities and skilled worker like carpentry
<b>Environmental response</b>		Courtyard planning insuring proper circulation of air during summer; Few structures are left using traditional materials and local building techniques that are environmentally friendly, but new additions to houses are built with contemporary materials such as cement, brick, and CGI sheet, which are not climatic responsive and environmentally friendly

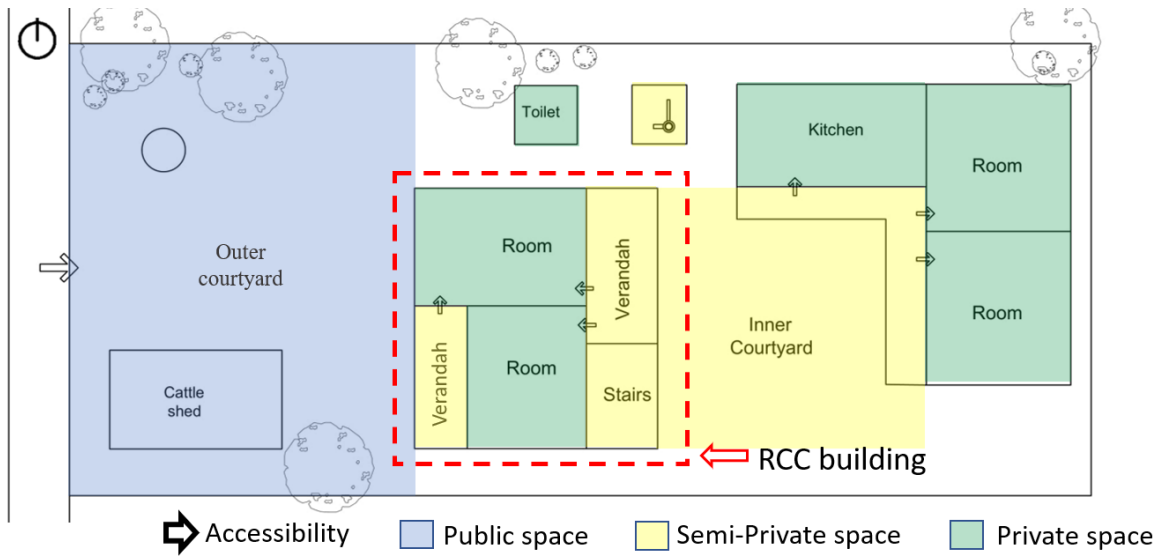


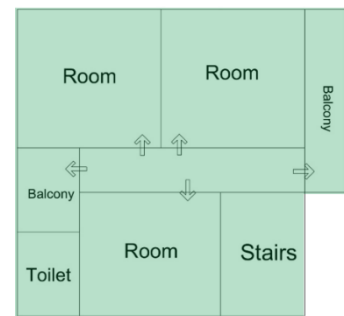
Figure 166: Schematic plan of house no. 8, Category C



Figure 154: Use of broken tiles on ground for rain water drainage



Figure 168: Traditional shelf in kitchen



First floor



Figure 153: Contemporary and traditional building form of house no. 7, Category C

### 8.1.3.7 House no. 9

The house no. 9 falls into Category C since the transformation is observed on the basis of material and shape of the house. The overall layout of the house is same to that of traditional tharu house planning but the addition of new house form with the addition of new function is observed reflecting the urban house form and urban lifestyle of the occupants. The detail description is given below.

**Table 16: Description of House no. 9, Category C**

<b>Description of House no. 9</b>		
<b>House no.</b>	9	
<b>Name of house owner</b>	Manoj Chaudhary	
<b>Time of construction</b>	6-7 years (Only RCC structure) More than 10 years (Other traditional structure)	
<b>House category</b>	Category C	
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey (Traditional structure) Two storeys (Contemporary structure)
	<b>Construction technique</b>	Frame structure- Contemporary block Traditional row house – remaining traditional blocks
	<b>Spatial organization</b>	<b>Darbajja:</b> Present
		<b>Basghara:</b> Absent
		<b>Gahali:</b> Present
		<b>Angnaa:</b> Present
		<b>Verandah:</b> 5 feet wide on contemporary block; 3 feet wide on traditional block
<b>Internal layout:</b> Southern block comprised of two storeys passage system house and single row planning for traditional house from northern side		
<b>Building materials</b>	<b>Foundation:</b> RCC with pillar in contemporary block; Mud bonded with brick in rest of the traditional blocks	

		<p><b>Wall:</b> 10” brick wall with cement-sand plaster in contemporary blocks; bamboo and mud wall in traditional structure</p> <p><b>Window:</b> Medium size openings with glazing in contemporary building; small openings on old traditional buildings</p> <p><b>Roof:</b> Use of corrugated iron sheets and cement tiles with slope roof on traditional building; Flat roof with cement as materials on contemporary building</p>
	<b>Decoration/ Carving</b>	No decoration and carving are observed
<b>Socio-economic status of occupants</b>		The occupants are primarily engaged in agricultural activities and private job
<b>Environmental response</b>		Courtyard planning insuring proper circulation of air during summer; Few structures are left using traditional materials and local building techniques that are environmentally friendly, but new additions to houses are built with contemporary materials such as cement, brick, and CGI sheet, which are not climatic responsive and environmentally friendly



**Figure 170: Paintings on wall during marriage in house no. 9**



**Figure 171: Maruwa (temporary structure) on the aagan for marriage rituals**

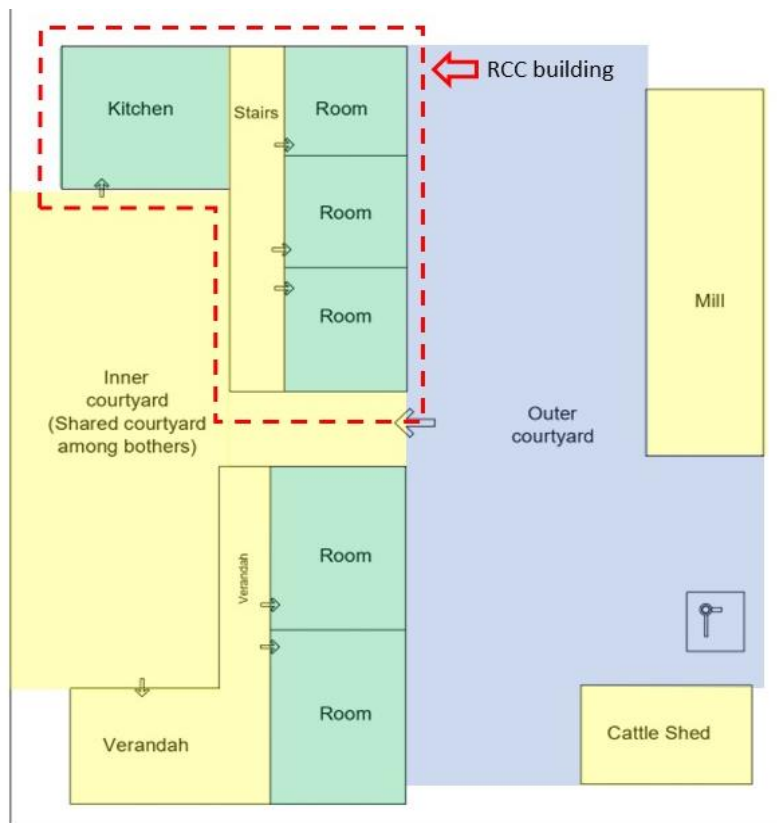


Figure 173: Schematic plan of house no. 9, Category C



Figure 172: View of contemporary house no. 9



#### 8.1.4 Category D

Houses which undergo a huge transformation. This includes transformations in terms of the material used, the house shape, functions; with the addition of new space with a new function.

##### 8.1.4.1 House no: 10

The house no. 10 falls into Category D since there is huge transformation observed on the basis of material, shape of the house and building function. However, the overall layout of the house is not changed completely in relation to that of traditional tharu house planning and the transformed space configuration reflects the urban lifestyle. The detail description is given below.

Table 17: Description of House no. 10, Category D

Description of House no. 10	
House no.	10
Name of house owner	Bipin Chaudhary
Time of construction	2-3 years

<b>House category</b>		Category D
<b>Physical dimension</b>	<b>No. of Building storey</b>	One and half storey
	<b>Construction technique</b>	Frame structure- Contemporary block
	<b>Spatial organization</b>	<b>Darbajja:</b> Present
		<b>Basghara:</b> Absent
		<b>Gahali:</b> Present
		<b>Angnaa:</b> Absent
		<b>Verandah:</b> No verandah
		<b>Internal layout:</b> Passage system house planning
	<b>Building materials</b>	<b>Foundation:</b> RCC with pillar
		<b>Wall:</b> 10” brick wall with cement-sand plaster in contemporary blocks; bamboo and mud wall in temporary structure
		<b>Window:</b> Medium size openings with glazing in contemporary building
		<b>Roof:</b> Flat roof with cement as materials on contemporary building
<b>Decoration/ Carving</b>	Paintings on traditional building is observed	
<b>Socio-economic status of occupants</b>	The occupants are primarily engaged in agricultural activities and private job like engineering	
<b>Environmental response</b>	Transformed houses is built with modern materials such as cement, brick, glass, which are not climatic responsive and environmentally friendly	

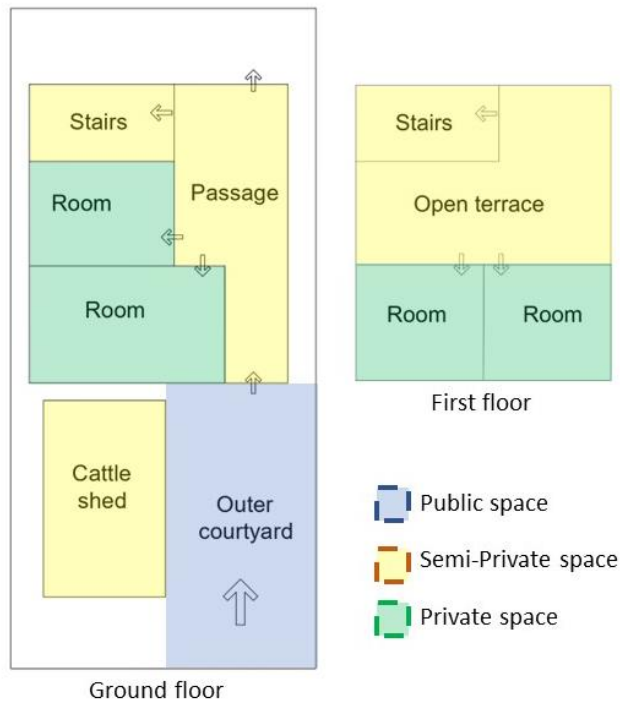


Figure 174: Schematic plan of house no. 10, Category D



Figure 155: Exterior view of house no. 10, Category D

#### 8.1.4.2 House no. 11

The house no. 11 falls into Category D since there is huge transformation observed on the basis of material, shape of the house and building function. The overall layout of the house completely transformed in relation to that of traditional tharu house planning and the transformed space configuration reflects the urban lifestyle. The detail description is given below.

Table 18: Description of House no. 11, Category D

Description of House no. 11		
<b>House no.</b>	11	
<b>Name of house owner</b>	Hari Dev Chaudhary	
<b>Time of construction</b>	4-5 years	
<b>House category</b>	Category D	
<b>Physical dimension</b>	<b>No. of Building storey</b>	One storey
	<b>Construction technique</b>	Frame structure- Contemporary block

	<b>Spatial organization</b>	<b>Darbajja:</b> Absent
		<b>Basghara:</b> Absent
		<b>Gahali:</b> Absent
		<b>Angnaa:</b> Absent
		<b>Verandah:</b> No verandah
		<b>Internal layout:</b> Compact house planning
	<b>Building materials</b>	<b>Foundation:</b> RCC with pillar
		<b>Wall:</b> 10” brick wall with cement-sand plaster
		<b>Window:</b> Medium size openings with glazing
		<b>Roof:</b> Flat roof with cement as materials
<b>Decoration/ Carving</b>	No decoration or carving	
<b>Socio-economic status of occupants</b>	The occupants are primarily in private service sector	
<b>Environmental response</b>	Transformed houses is built with modern materials such as cement, brick, glass, which are not climatic responsive and environmentally friendly	

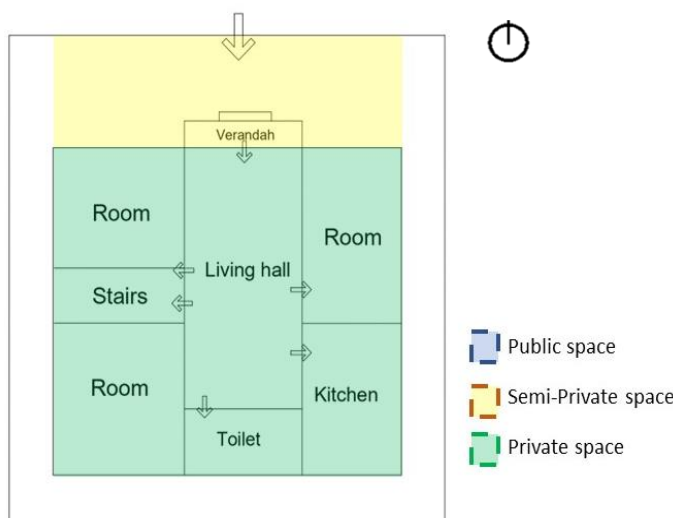


Figure 176: Schematic plan of house no. 11, Category D



Figure 156: Exterior view of house no. 11, Category D

### 8.1.4.3 House No. 12

The house no. 12 falls into Category D since there is huge transformation observed on the basis of material, shape of the house and building function. The overall layout of the house completely transformed in relation to that of traditional tharu house planning and the transformed space configuration reflects the urban lifestyle. The reason for transformation is due to limited land plot so the vertical planning is seen. The detail description is given below.

**Table 19: Description of House no. 12, Category D**

<b>Description of House no. 12</b>		
<b>House no.</b>	12	
<b>Name of house owner</b>	Mukhilal Chaudhary	
<b>Time of construction</b>	7 years	
<b>House category</b>	Category D	
<b>Physical dimension</b>	<b>No. of Building storey</b>	Two and half storey
	<b>Construction technique</b>	Frame structure- Contemporary block
	<b>Spatial organization</b>	<b>Darbajja:</b> Absent
		<b>Basghara:</b> Absent
		<b>Gahali:</b> Absent
		<b>Angnaa:</b> Absent
		<b>Verandah:</b> 2 feet wide in front of the house
	<b>Internal layout:</b> Passage system house planning	
	<b>Building materials</b>	<b>Foundation:</b> RCC with pillar
		<b>Wall:</b> 10” brick wall with cement-sand plaster
<b>Window:</b> Medium size openings with glazing		
<b>Roof:</b> Flat roof with cement as materials		

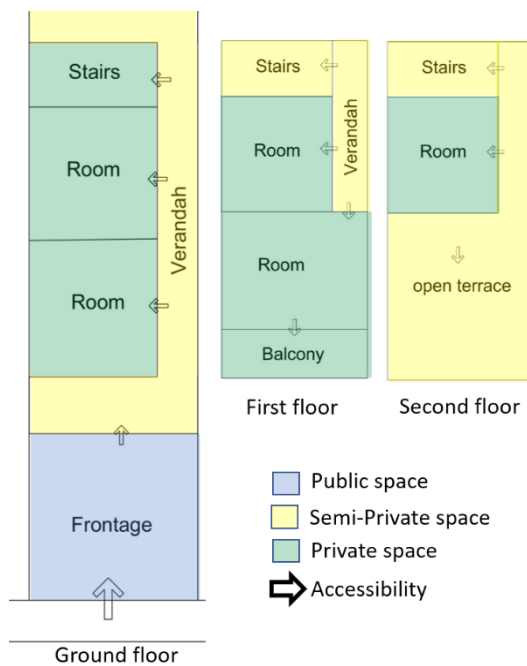
	<b>Decoration/ Carving</b>	No decoration or carving
	<b>Socio-economic status of occupants</b>	The occupants are primarily involved in agriculture activities and animal husbandry. Some of the occupants are also involved in private service sector and labor induced works
	<b>Environmental response</b>	Transformed houses is built with modern materials such as cement, brick, glass, which are not climatic responsive and environmentally friendly



**Figure 178: Exterior view of house no. 12, Category D**



**Figure 157: Small frontage**



**Figure 180: Schematic plan of Category D,**



**Figure 158: View of verandah, row house character**



<b>Style of houses analyzed (Transformation)</b>				
				under single roof
<b>Construction technique</b>  <b><u>Effect</u></b>	<ul style="list-style-type: none"> <li>Traditional construction technique</li> </ul>	<ul style="list-style-type: none"> <li>Old house-Traditional construction techniques</li> <li>New house-frame structure (modern construction technique)</li> </ul>	<ul style="list-style-type: none"> <li>Fully modern construction technique (load bearing and frame structure)</li> </ul>	<ul style="list-style-type: none"> <li>Fully modern construction technique (Frame structure)</li> </ul>
	<b><u>Cause</u></b>	<ul style="list-style-type: none"> <li>Limited approach to availability to local materials</li> <li>Less economic stability</li> </ul>	<ul style="list-style-type: none"> <li>Shortage of timber and bamboo</li> <li>Changing market with availability of new types of building materials</li> </ul>	<ul style="list-style-type: none"> <li>Availability of light weight and new materials</li> <li>Government policies and afforestation measures</li> </ul>
<b>Building Materials</b>  <b><u>Effect</u></b>	<ul style="list-style-type: none"> <li>Mud and bamboo wall</li> <li>Small openings for ventilation</li> <li>Thatch roof</li> </ul>	<ul style="list-style-type: none"> <li>Old structure-local materials</li> <li>New structure-Use of concrete and bricks, glazing, use of CGI sheets on roof, flat terrace</li> </ul>	<ul style="list-style-type: none"> <li>Use of concrete and bricks on wall</li> <li>Glazed windows</li> <li>Flat terrace</li> </ul>	<ul style="list-style-type: none"> <li>Use of concrete and bricks on wall</li> <li>Glazed windows</li> <li>Flat terrace</li> </ul>
	<b><u>Cause</u></b>	<ul style="list-style-type: none"> <li>Unstable socio-</li> </ul>	<ul style="list-style-type: none"> <li>Scarcity of timber and</li> </ul>	<ul style="list-style-type: none"> <li>Changing market with</li> </ul>

<b>Style of houses analyzed (Transformation)</b>				
	economic status of occupant	expensive nature of vernacular materials <ul style="list-style-type: none"> <li>• Changing market with availability of new types of building materials</li> </ul>	availability of new types of building materials <ul style="list-style-type: none"> <li>• Urge for contemporary aesthetic appeal</li> </ul>	availability of new types of building materials <ul style="list-style-type: none"> <li>• Ease of erection of temporary or permanent structures for additional built-up area</li> </ul>
<b>Thermal comfort</b> <b><u>Effect</u></b>	<ul style="list-style-type: none"> <li>• Courtyard planning and traditional housing form</li> <li>• Also, approach to artificial air conditioning</li> </ul>	<ul style="list-style-type: none"> <li>• Courtyard planning</li> <li>• Service of air conditioning, mechanical, electrical equipments</li> </ul>	<ul style="list-style-type: none"> <li>• Courtyard planning</li> <li>• Dependency on artificial air conditioning</li> </ul>	<ul style="list-style-type: none"> <li>• Fully dependent on artificial air conditioning</li> </ul>
<b><u>Cause</u></b>	<ul style="list-style-type: none"> <li>• Easy approach to basic infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Improvement of economic conditions</li> <li>• Easy approach to basic infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Improvement of economic conditions</li> <li>• Easy approach to basic infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Improvement of economic conditions</li> <li>• Easy approach to basic infrastructure</li> </ul>

## CHAPTER 9. FINDINGS AND DISCUSSION

This chapter offers a discussion of issues arising from the research as well as a summary of the key findings. The following topics are covered in this chapter: Physical transformation; Occupational transformation; whether transformation results in suitable house design; the paradox between modern and conventional building materials; and the issue of modernization. The results of the above studies highlight the fact that social structure is one of the main factors in housing transformation that leads to the transformation of rural settlements as a whole. Socio-economic factors of society and households influence the transformation of rural settlements. Transformation also depends heavily on the strength of political influence in this society. As you can see from observing traditional villages, we can see more of the changes after the VDC was transformed into a local government. For more information, the results are shown below:

### 9.1 Physical transformation

#### i. Construction of new house form

Most of the houses in the village have retained the courtyard planning. What have changed are the more private areas beyond these spaces. Reasons could be: need for more space due to larger families – additions and fragmentation; need for modern day requirements - internal bathrooms, kitchens; social habits of occupants in relation to space usage. Nowadays, people require all facilities of a homes in a single zone; separate house concepts are losing its form.

#### ii. Re-distribution of land

Conversion of the family into single structure is another reason for land distribution including expansion of families from generation to generation, land distribution among relatives.

#### iii. Change in materials and construction techniques

People are getting more interest towards modern material; they think it's more durable and stronger. People are shifting to modern construction techniques so as to lessen the hard work and regular maintenance required in local construction technique which also includes easy in availability of modern materials.

iv. **Reflection of urban influence**

Direct involvement with the city and city dependency are affecting the taste of the residents which often influence conventional beliefs. People find more convenient in compact planning houses.

## 9.2 Occupational transformation

The findings from this study reveals that there is gradual change from primary activities to secondary and tertiary activities. Now a days people of Baswalpur village are more engaged in private and government jobs.

Cause	Effect
<ul style="list-style-type: none"> <li>Earning from agriculture is not sufficient in the present socio-cultural and economic milieu</li> <li>Lack of infrastructure and policy to promote agricultural activities</li> </ul>	<ul style="list-style-type: none"> <li>Traditional social segregation has decreased but economic segregation has increased</li> <li>Decrease in interest in hard working agricultural activities</li> </ul>

Change in livelihood i.e., transition from farming as major occupation to secondary occupation is observed as a result of expanding urbanization, many communities are shifting from primary to secondary activities. People's ambitions and expectations increase in tandem with their social status and financial status. The invention of modern comforts resulted in an internal change in outer activities. As a result, the requirement for open space in a building is addressed by changing and altering classic buildings including the alteration in conventional urban fabric, increasing the settlement's physical vulnerability. Likewise, increased affluence, economic security, and technological proficiency inspire individuals to create sustainable and secure homes. Also, socioeconomic variables impact the evolution of conventional housing types.

Likewise, direct interaction with the city and city reliance are influencing people' tastes, which frequently impact traditional thinking. Because urbanization has caused a significant increase in the value of land, many individuals believe that constructing is more profitable than an open courtyard. Village residents frequently adhere to the city's functional organization and building style. According to observations, rural people are taking a position for urban growth in order to better their living conditions, and the majority of them are emulating the significance of regional circumstances.

### **9.3 The contradiction between modern and traditional building materials**

The majority of those surveyed show admiration for what they regard as "contemporary" materials. They now have a bad opinion of the conventional building materials. Modern building materials are frequently preferred over ancient ones because they are thought to be more "durable" in comparison. The majority of those who participated in the interviews believed that the local building materials were of low quality and susceptible to airborne and other illnesses. The respondents said that occupants invest a significant amount of their priceless resources in maintaining or rebuilding homes made of conventional materials. According to this study, the majority of Baswalpur residents favor concrete blocks over earthen or soil blocks when it comes to contemporary construction materials.

### **9.4 Transformation for modernization**

The following discussion is based on aspects considered as modernization by the Baswalpur village residents as revealed during the course of carrying out this study.

#### **9.4.1 Separation of functions**

The spatial design of few homes was noted to comprise amenities such a kitchen, bedroom, sitting area, store, restroom, and toilet. These homes are a reflection of the owner's social position because, in the majority of situations, those who live in them are wealthier than those who, in the present context, reside in simple, few-room homes, making them socially superior. For instance, extensions were made to add spaces for bathrooms, toilets, dining, cooking, sitting, and resting. Unlike the previous constructions, which were often compact and had just a few rooms and were distinguished by the diverse uses of space, these homes showed spatial order with a separation of activities taking place in separate regions of a house. Separating functions resulted in better space functionality and is therefore regarded as one of the advancements in home design.

Residents of Baswalpur interpret an increase in space as modernization because it allows for the installation of modern equipment. It was noted that some occupants had modern furnishings, including TVs, freezers, sofas, dining tables, and chairs. Modernization is linked to all of this equipment. They believe that because they reside in modern homes, they are "modern." They also believe that owning modern homes has enabled them to achieve their goals and desires.

### **9.4.2 Potential for multi-storey houses**

One of the results of horizontal transformation is the single storey houses that dominate the Baswalpur settlement. This type of house leads to increased density resulting in problems of spatial quality especially the reduction of outdoor space. As the family started to expand, more and more urge for additional spaces will increase and instead of extending horizontally, maybe 2-3 storey building should work out in order to reduce the carbon foot print and to maximize outdoor spaces. Furthermore, there is a shortage of professional advice on how Baswalpur village residents might best use their plots to increase both interior and outdoor space. Vertical change, or at the very least, the construction of two-story homes, may be the answer to this issue. This means that while increasing inside space, it will be possible to create larger streets, more green spaces, and greater outdoor features in backyards. The upstairs, where there is probably more air circulation, could house amenities like bedrooms. The downstairs could house amenities like kitchens and living areas. By taking this decision, one may also stop the community from spreading out and save money by not having to build as much infrastructure.

According to the case study in Baswalpur village, people are expanding their homes vertically. There are several reasons for this expansion. The first is a lack of land to develop horizontally, and the second is the urban living impact to live in modern dwellings like cities. Most of the houses in Baswalpur village will most likely be 2-3 stories in the near future.

## CHAPTER 10. CONCLUSION AND RECOMMENDATIONS

### 10.1 Conclusion

The tradition of housing construction in the village of Baswalpur is influenced by the modernization process in which the universal values of the living environment have replaced the lifestyles practiced locally. The previous social framework for the use of traditional home space has changed to personal preferences in managing the activities and functional needs of residents. Today, each home has its own way of respecting the original home and evolving its structure. As a result of individuals exploring new motives and possibilities, the living environment today is very different from the past. Various natural factors, such as landscape nature, climatic conditions, availability of arable land, or easy availability of building materials, influence the type of transformation of rural settlements.

In the above review, it is proved that, there has been significant changes in the construction materials and minimum changes in the form and layout of the houses of rural settlements in Baswalpur village. The traditional materials and local construction techniques is observed to be vanishing rapidly in the Tharu community area replacing mud and timber architecture with brick and cement structure. However, there are still some traditional houses left in Mushar basti, the reason may be that the people from Mushar community could not afford to build RCC houses. The internal layout of the houses can also be seen influenced by urban lifestyle as most of the young generations is found to be living in city areas for study or for job and hence the replications can be seen on the housing style. One of the examples from Category D can be stated as the compact planning style of cities and towns where multiple functions are found to be under single roof which was opposite from the past. The thermal comfort is maintained with the means of artificial mechanical equipments like air conditioning and fans where in the past the houses play major role in maintaining thermal comfort. Likewise, the study also revealed that the majority of the transformation of the house type fallen on category C which implies that the houses don't seem to be completely transformed rather they shows medium scale of transformation where old traditional houses are still

in use (although it is in bad state) and instead repairing or reconstructing traditional building they are going for contemporary house form.

Therefore, as a result of observation, it can be said that socioeconomic factors of society have the greatest influence on the transformation of traditional houses in Baswalpur village. According to the general rules of dwelling, the stability of a settlement increases over time, and with increasing durability, deformation also occurs simultaneously. As the number of family members increases or new families are created in the home, the need to build a new home also arises. Growing wealth, economic confidence and technological excellence encourage people to build new, modern and safe homes. Our direct connection with and dependence on a city influences the tastes of its residents, which often influence their shared beliefs. Observations have shown that rural people adhere to their stand regarding urban development to improve living standards, and imitation is often unpopular. Our millennial traditional settlements are indigenous and environmentally friendly. In urban imitation we can think of how logical it is to turn away from the settlement of our own vernacular ways.

So, this kind of settlement are not preservation oriented rather they are continuity-oriented and they seek to create continuities of such expressions as traditions, beliefs and intangible values into the future through the acts of value to the present. So, allowing sufficient time (may be generations long) to change and letting the society make the change through its own mechanism would be in the best interest of cultural and social diversity of mankind.

## **10.2 Recommendations**

This study restores the essence of integrating traditional shapes, ideas, expressions and materials into modern / current design and technology, by designing architectural environment designers, architects and other related professionals brings benefits to. The recommendations are highlighted in the points below:

### **10.2.1 The role of the Government**

Traditional rural settlements have seen unplanned housing transformations as a result of insufficient resources, particularly financial resources, incorrect policies, and a lack of institutional capacity. In order to facilitate housing transformation and the formalization of traditional settlements, policy review is required in order to direct and enhance strategic deployment of the limited public resources available, such as

financial, technical, and people resources. For housing and development, the government should establish a proper division of labor among the major players in the public, private, and unorganized sectors of society, including established local committees and non-governmental organizations (NGOs). Developers appear to enjoy the freedom to carry out renovating tasks without even taking surrounding homes into account in terms of spatial features like air movement, privacy, and traffic flow. In order to ensure that house renovation operations are carried out within justifiable, affordable, and acceptable standards and norms, it is crucial for the government to oversee advancements as they occur.

Likewise, the urban and architectural preservation of Baswalpur village and conservation decision-making in general should be a collaboration between the central government and the local government; and conservation decision-making in general should be a collaboration between the central government. An unfocused transformation can lead to a total change that can eliminate the cultural identity of the rural settlement so the possibility of developing as a tourist destination should be searched on. For this, the art and craft museum or cultural center is one of the examples to promote the craftsmanship of tharu people of Baswalpur.

### **10.2.2 The private sector**

Private builders have constructed the majority of the homes. In the process of building a house, there are two different actors: the client (owner), who mobilizes resources (materials and money), and the contractor, who completes the construction job. The owners plan and oversee the construction process. In light of this, the owner should share responsibility for the intentional development of the community's local identity and should be committed to fostering a sustainable and healthy environment.

### **10.2.3 Community Based Organizations**

Community based organizations like Tharu Kalyankarini Sabha, Tharu mahila Samaj and Tharu bidhyarthi sabha should work together in creating and promoting opportunities regarding the traditional house of tharu people in way like they are promoting other festivals like maghi and jitiya. Similarly, educating locals on the significance of maintaining their towns' cultural and architectural history. Locals must understand that conservation does not conflict with economic growth. Instead, active sustainable development strategies like safeguarding cultural and architectural assets

promote the long-term resurgence of urban life and the economy of historic city centers. Similar to this, including the community in the conservation process is essential to maintaining historical structures and sites. This should motivate residents in historic city centers to engage in the historical sites' current and future potential.

#### **10.2.4 Building materials and construction technology**

As was said previously, "new" building materials are chosen over ancient ones, even if the latter have several advantages over the former, such as being easier to maintain and climate-appropriate. Raising awareness of the possibilities of local construction materials is necessary, as is promoting their usage and production. Although it is believed that conventional materials have a short lifespan, there are alternatives to increase their quality. Most individuals have a propensity to construct homes employing contemporary materials that are readily available on the market. This promotes the importing of pricey materials. The growth of a local/traditional building materials sector is hampered by this trend.

To effectively promote the use of local construction materials, training institutions, local governments, and private sector businesses including contractors and building material manufacturers must take the lead. Continuous experimentation and performance assessment might help to accomplish this. In order to assist the accomplishment of desired objectives through training and research, the government must provide an enabling environment. In order to use local materials and identify areas for development for improved performance, it is also necessary to evaluate the building methods already in use. This could make it easier to get higher-quality local building supplies.

A clear policy on the promotion of locally accessible and naturally occurring materials should be created in order to secure the promotion of local construction materials. Similar to this, locally produced products have to be standardized, especially those produced by small businesses that make use of regional natural resources. Additionally, they should be able to inform and raise awareness among the Tharus about the value of using traditional construction materials rather than so-called "modern" ones. Lastly, the local bye laws and guidelines should be made in such a way that the new building should incorporate the essence of tharu culture and layout of tharu houses and the development activities should be in perspective of sustainability by using sustainable

and indigenous materials and construction techniques like CSEB block construction, rammed earth construction since, it is all known that traditional tharu houses were sustainable and environment friendly.

### **10.2.5 House types for terai climate**

For the house design in terai climate, courtyard planning is best that ensures proper air circulation inside the houses.

### **10.2.6 What can professionals learn from the study?**

This paper recommends that the architect's interest should focus on traditional design rather than modern concepts and expertise. This will improve the use of cheap building materials such as soil, wood, stone and thatched, and improve the design principles of privacy, space and comfort rooted in the traditional architecture of the Tharu community. Experts are advised not to abandon our traditional heritage know-how related to the development and execution of designs. When our traditional architectural styles and methods disappear from the continent, it becomes a great tragedy and a huge loss. The benefits of our native methods and materials were enormous and needed to be disseminated while fixing shortcomings associated with traditional approaches.

### **10.2.7 Recommendations for further research**

This study has indicated a number of issues that could not be investigated due to limited time frame of the research. Because Baswalpur village is a tharu settlement, and the housing layout follows a courtyard design, even though the housing transformation is underway, residents continue to follow courtyard planning unless there is a land limitation. So, future research should focus on the identification and study of different types of courtyard houses as a typical urban dwelling of past eras in order to investigate its potential in guiding future housing designs, and research might also be done on courtyard design variants and microclimate performance.

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## ANNEX 1: Questionnaire form for Thesis

### 10.3 Questionnaires form for structured questionnaire survey

#### A. Respondent details

1. What is your name? (Enter your name)
2. What is your age? (In years)
  - 20-29
  - 30-39
  - 40-49
  - 50-59
  - 60 or above
3. What is your gender?
  - Male
  - Female
  - OthersIf other, please specify:
4. What is your ethnic group?
  - Tharu
  - Thakur
  - Chamar
  - Kami
  - Mushar
  - OtherIf other, please specify:
5. What is your religion?
  - Hindu
  - Buddhist
  - Christian
  - Muslim
  - OtherIf other, please specify:
6. What is the primary language spoken at your home?
  - Tharu
  - Maithili
  - Nepali
  - OtherIf other, please specify:

7. What is your household size?
  - 1-2
  - 3-4
  - 5-6
  - 7-8
  - 9 and above
8. What family type do you live in?
  - Nuclear
  - Joint
9. What is your education level?
  - Illiterate
  - Literate but no formal education
  - School up to class 5
  - School up to class 10
  - Under graduate
  - Graduate/Post Graduate (General)
  - Professional (Doctor, Eng, LLB, MBA)
  - Technical (Diploma)
10. What is your Occupation?
  - Agriculture/Farming
  - Wage laborer Skilled worker
  - Service- Government job
  - Service- Private job
  - Home maker
  - Student
  - Retired
  - Unemployed
  - Other

If other, please specify:
11. How many members of the family are involved in economic activity?
  - 1-2
  - 3-4
  - 4 and above
12. What is the combined monthly income of your family?
  - 25,000 or less
  - 25,001-50,000
  - 50,001-75,000
  - 75,001-1,00,000
  - 1,00,001 or above

13. What activities do other members of your family do that financially contribute to the household's income?

- Agriculture/Farming
- Business/Trade
- Job Daily wage worker
- Other

If other, please specify:

## **B. Building details**

14. What is the house typology?

- Traditional design
- Contemporary
- Mix of both

15. What is the type of building used?

- Residential
- Commercial
- Mixed

16. How many years have been to the time of construction?

- 1-3
- 4-6
- 7-10
- Above 10

17. How many stories is the house?

- 1-1.5
- 2-2.5
- 3-3.5
- More than 3.5

18. Which category of house do you live in?

- Category A
- Category B
- Category C
- Category D

## **19. Construction material**

19.1. What is the foundation of house?

- Mud bonded Brick/stone
- Cement bonded brick/stone
- RCC with pillar
- Wooden pillar

19.2. What is the outer wall of house made of?

- Thatch/Straw/
- Bamboo/ Wood/ Planks

- Un-brunt bricks
- Burnt bricks with mud
- Burnt bricks with cement
- Cement blocks
- Stone
- Other

If other, please specify:

19.3. What is the roof type of your house?

- Slope
- Flat
- Both

19.4. What is the roofing material of your house?

- Thatch/ straw
- Galvanized iron
- Tile / slate
- Cement
- Other

If other, please specify:

19.5. What is the major material of the floor?

- Earth and cow dung
- Cement
- Mosaic or tiles
- Bricks
- Stone
- Wood
- Other

If other, please specify:

20. Interior space configuration

20.1. What type of interior space configuration does your house have?

- Traditional style/Row house configuration
- Passage system
- Compact house (Hall system house)
- Mix of 1 and 2
- Mix of 1 and 3
- Mix of 2 and 3
- Other

If other, please specify:

20.2. Which of the following traditional spaces do your house have?

- Darbajja (Outer courtyard)

- Basghara (Entrance/Guest Hall)
- Inner Courtyard (Aangan)
- Osara (Verandah)
- None

20.3. What type of rooms does your household occupy?

- Bedroom
- Kitchen
- Living room
- Toilet
- Other

If other, please specify:

20.4. Is your house suitable for your current lifestyle?

- Yes
- No
- Undecided

20.5. Availability of land for further building construction?

- Yes
- No

### C. Courtyard details

21. Does your house have a courtyard?

- Yes
- No

22. If there is a courtyard, then:

22.1. Behavioral aspects of the courtyard

22.1.1. Do you use the courtyard daily?

- Never
- Rarely
- Sometimes
- Often
- Always

22.1.2. How often do you use the courtyard for activities during the days? (Please rate

Time in a day	Never	Rarely	Sometime	Often	Always
Morning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Afternoon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22.1.3. Which season do you prefer the courtyard most?

<b>Season</b>	<b>Never</b>	<b>Rarely</b>	<b>Sometime</b>	<b>Often</b>	<b>Always</b>
Summer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monsoon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Winter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22.1.4. What kind of activities the courtyard used for?

<b>Activities</b>	<b>Never</b>	<b>Rarely</b>	<b>Sometime</b>	<b>Often</b>	<b>Always</b>
Social gatherings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooking space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dining space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Washing utensils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drying grains and clothes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sleeping space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22.1.5. Courtyard is one of the important social spaces of the house, do you agree?

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

22.1.6. How often are the ceremonies/functions organized in the courtyard in a year?

<b>Function types</b>	<b>Never</b>	<b>Rarely</b>	<b>Sometime</b>	<b>Often</b>	<b>Always</b>
Social functions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultural functions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Religious functions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other functions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22.1.7. Do you feel that the courtyard is providing privacy and security?

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Undecided</b>	<b>Agree</b>	<b>Strongly agree</b>
<b>Privacy</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Security</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 22.2. Environmental aspects of the courtyard

### 22.2.1. Ranking of Thermal Comfort: summer, monsoon and winter:

<b>Season</b>	<b>Very uncomfortable</b>	<b>Slight uncomfortable</b>	<b>Comfortable</b>	<b>Slight Comfortable</b>	<b>Very Comfortable</b>
Summer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monsoon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Winter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 22.2.2. Do you feel that the courtyard is providing ventilation in all rooms?

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

### 22.2.3. How do you avoid the heat during summer in a courtyard house?

	<b>Never</b>	<b>Rarely</b>	<b>Sometime</b>	<b>Often</b>	<b>Always</b>
Nothing is required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical air conditioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Covering of cloth/ Curtains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 22.2.4. Do you feel that the courtyard is providing natural light in all rooms?

	<b>Never</b>	<b>Rarely</b>	<b>Sometime</b>	<b>Often</b>	<b>Always</b>
Natural light in all rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 23. If there is no courtyard, then:

23.1. Did your house have a courtyard before?

- Yes  
 No  
 I don't remember

23.2. What are the reasons for not having courtyard in your house?

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Undecided</b>	<b>Agree</b>	<b>Strongly agree</b>
Lack of land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Didn't find the space useful anymore	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approach for modern design house	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Addition of new house	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### **D. Transformation of the village**

24. To what extent do you think the physical environment has changed over time?

- Not at all  
 Moderately  
 Extremely

25. Are these reasons for the transformation of the village?

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Undecided</b>	<b>Agree</b>	<b>Strongly agree</b>
Construction of new house forms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Re-distribution of land among relatives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy in available of	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

modern					
materials					
Urban influence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
function of					
traditional					
spaces					
Change in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
lifestyle					

26. Which lifestyle you prefer the most?

- Village lifestyle
- City life style
- Both

27. Which type of house do you prefer in future?

- Modern
- Traditional
- Undecided

### **E. Basic facilities**

28. What electrical equipment do your household occupy?

- Television
- Telephone
- Refrigerator
- Fan/ AC
- Light bulb/Tube light
- Iron
- Other

If other, please specify:

29. Present toilet types

- Connected to sewerage
- Pit latrine
- Septic tank

30. Drinking water source

- Well/Pond
- Tube well
- Tap
- Jar (Bottled water)

## 31. Sources of water for cleaning and washing

- Tube well
- Well/Pond
- Public tap
- Other

If other, please specify:

## 10.4 Questionnaires of a field study on transformation of houses

### In-depth interviews- 12 no.s

#### 1. Information on house occupants

House no:.....

Date:.....

Owner's name:

Age:

Gender:

Education:

No. of persons in the household living together:

#### General questions

- When was this house constructed? Who built it?

#### 2. Questions about alterations and extensions

- i. Have you changed walls, doors, windows, ceiling, roofing materials or number of rooms in this house since you occupied it? If yes, what did you change and when were the changes made?
- ii. What prompted you to make changes?
- iii. Did you create any extensions e.g., addition rooms?
- iv. Have you modified the use of space such as kitchens, sleeping rooms etc.?
- v. Have you modified interior walls so as to change room sizes? If yes give reasons
- vi. What other modifications have you done in your house?

#### 3. Questions about alterations and extensions at plot level

- i. Are you planning to construct more buildings/rooms on this plot?
- ii. If yes, what are they for (rent, own residential use, shop, others (specify)

#### 4. Questions about process of transformation at both house level and plot level

- i. What reasons prompted you to carry out transformation?
- ii. How did you carry out the changes?

- iii. Who were the actors in the whole process of transformation? (Architects, contractors, contractors, local leaders, etc.)
- iv. What are the advantages of transformations?
- v. What are the disadvantages of transformations?

#### **5. Questions about use of different spaces**

- i. Cooking and eating
- ii. Storage of Household goods
- iii. Sleeping arrangements
- iv. Hygiene

#### **6. Questions about use of space at plot level**

- i. How is the outdoor space defined and used over time?
- ii. Is there any agreement between neighbors in the use of private space?
- iii. How do you determine boundaries of private, semi-private and communal space?

#### **7. Use of space for income generating activities inside the house and outside the buildings**

- i. Do you have any small business done at home (inside the houses or within the plot)?
- ii. What kind of business is that?
- iii. Are you in any way having difficulties to work at home? Give reasons.
- iv. Do you grow vegetables near the house?
- v. Do you keep poultry and animals? If yes, where do you keep them?

#### **8. Visitors**

- i. Where do you usually receive visitors?
- ii. When visitors come to stay overnight, how do you arrange for their sleeping area?

#### **9. Ideas about urban life style**

Could you please tell me your daily schedule from the time you wake up to the time you go to bed.

#### **10. Ideas about modernity**

- i. If you think of a house considered modern, which features do you think of?
- ii. Do you think that by having a modern house one is improving ones living conditions? In which way?

- iii. What do you consider to be the difference between a traditional and a modern house?
- iv. Should houses provide for nuclear or extended family living? Which aspects are important for the two ways of living?
- v. Is nuclear family living more modern?
- vi. How important is the separation of activities in the house?
- vii. How do you see the issue of having toilets inside the house, (What we call self-contained houses)? What are the positive and negative aspects of this situation?
- viii. What should be separated? Kitchen from living room, toilet from kitchen and living, bedroom from living room, workplace from residential quarters?
- ix. How important is the separation of men and women, children and parents, boys and girls in the house? Which measures should be taken to achieve separation (if desired)?
- x. What changes do you see which are considered as modern but which you do not consider improvements?
- xi. What does it mean to be a modern person?
- xii. What are the most important aspects of house improvement?

#### **11. Building rules and regulations**

- i. Are you aware of existing rules or regulations guiding people during housing construction and transformation?
- ii. If yes, do you think these rules are taken into consideration by the transformers?
- iii. Do you think it is important to have such rules and regulations?
- iv. Do you have any local rules which guide development in this settlement?

<b>House number</b>	<b>Name of respondent</b>
House 1	Ram sila sada
House 2	Samat Lal Chaudhary
House 3	Man Bharan Chaudhary
House 4	Ram Subaran Chaudhary
House 5	Ram Piyari Chaudhary
House 6	Ramakant Chaudhary
House 7	Mukhilal Chaudhary
House 8	Tulshi Chaudhary
House 9	Hari Dev Chaudhary
House 10	Saroj Chaudhary
House 11	Bipin Chaudhary
House 12	Manoj Chaudhary

## 10.5 Key informants interview form

Interviewee:

Title/Designation:

Date:

1. What are the roles of planners and architects in housing development in traditional settlements?
2. Are there any local rules and regulations guiding development in traditional settlements? If any, please, give examples.
3. It seems that people in this settlement are transforming their houses through extensions and alterations. Do you see this as a potential or threat? Please, give reasons.
4. In your opinion, what are the reason for the transformation of the village? Are these threat to the local identity of village? Please give reasons.
5. Do you think the local culture can be saved to the future design?
6. In your opinion, what should be the future role of architects, planners and contractors in housing and general settlement development in traditional settlements?

### Key informant's interviewee list: 5 no.s

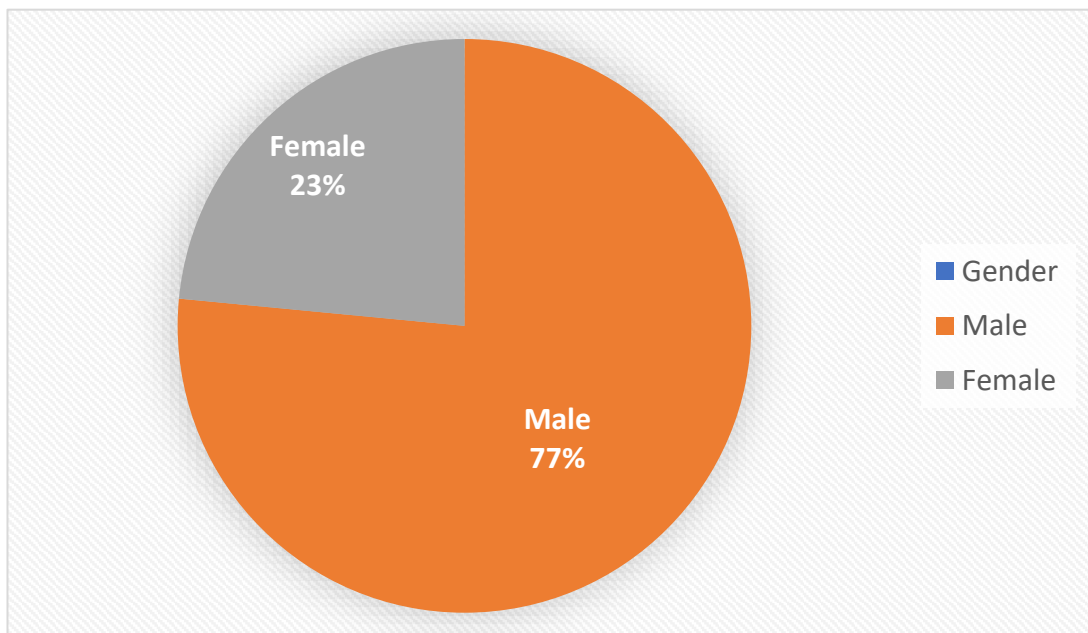
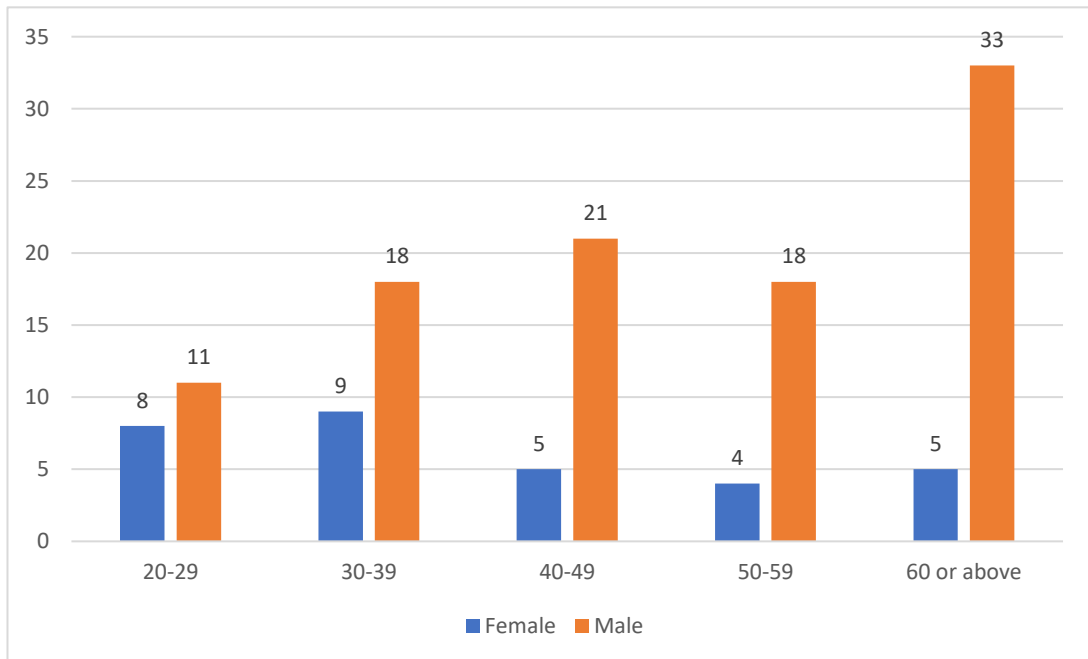
Name	Designation
Ram Subaran Chaudhary	Retired Civil Engineer
Ambeeka Chaudhary	Ex-teacher, farmer, home-maker, social activist (Tharu Mahila Sabha)
Manoj Chaudhary	Farmer, Ex- Ward Chair person
Man Bharan Chaudhary	Old/Knowledgeable
Tara Chaudhary	Home-maker, Old/Knowledgeable

## ANNEX 2: Observation from questionnaire survey

### 10.6 Demographic statistics

#### 10.6.1 Age and gender

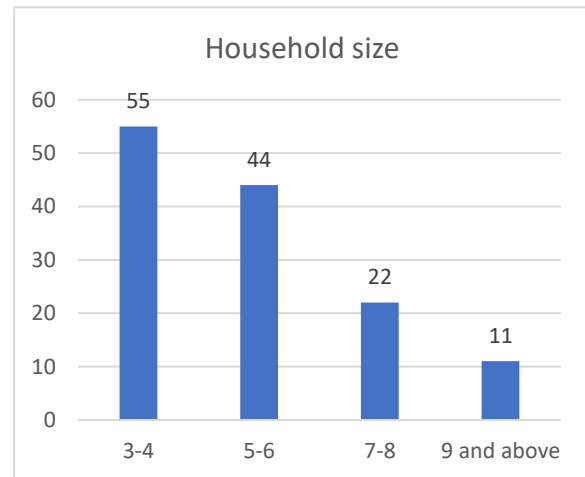
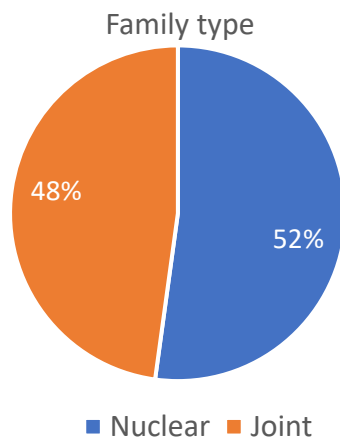
- Out of 132 respondents, majority of respondents belong to above 60 age group and the majority of the respondent were male.



- 77% were male whereas only 23% were female

### 10.6.2 Family type and household size

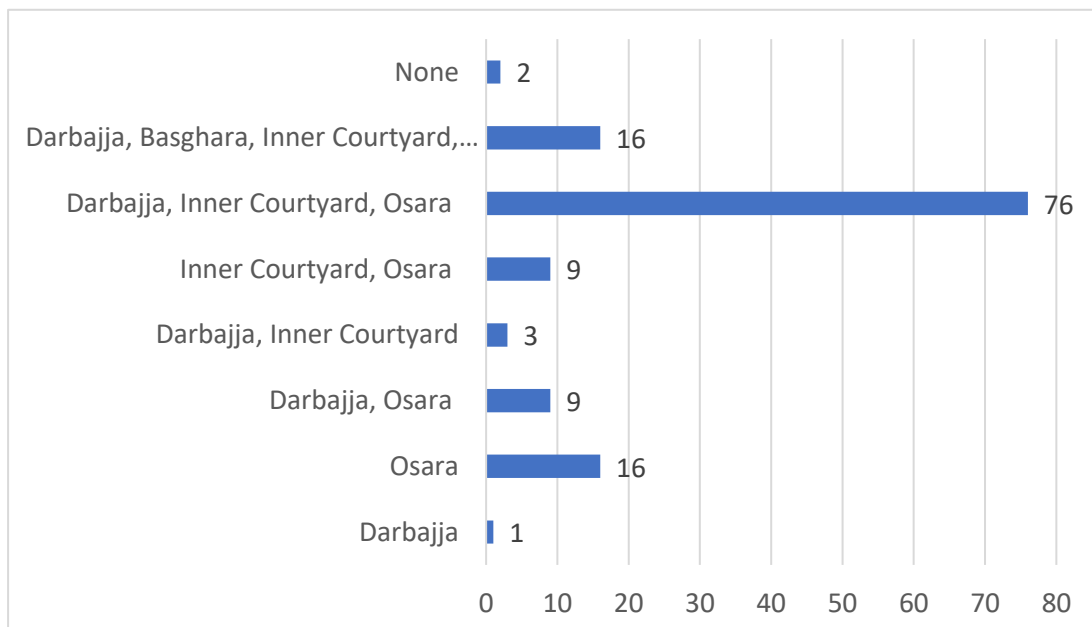
- 52 % people are living in nuclear family where remaining 48% people are living in joint family
- Majority of the respondent live in the household size of 3-4 people.



## 10.7 Building information

### 10.7.1 Traditional spaces

- Majority of the observed houses consist of Verandah, Outer and inner courtyard and few with all four traditional spaces

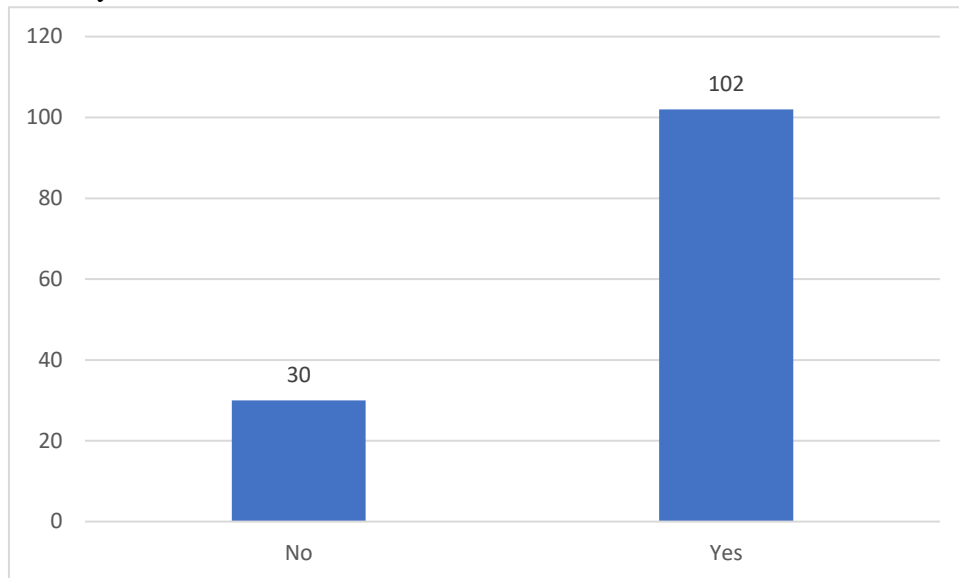


## 10.8 Courtyard details:

### 10.8.1 Courtyard details: Behavioral aspects

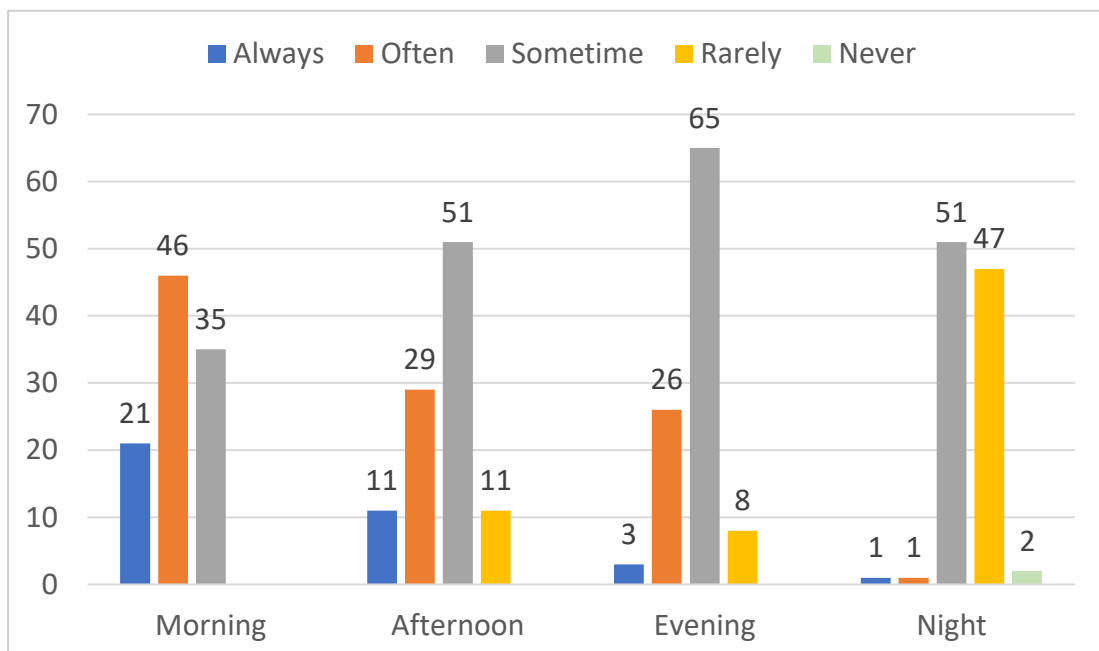
#### 10.8.1.1 Do your house have courtyard

- Majority of 102 houses still has courtyard while remaining 30 houses have no courtyard



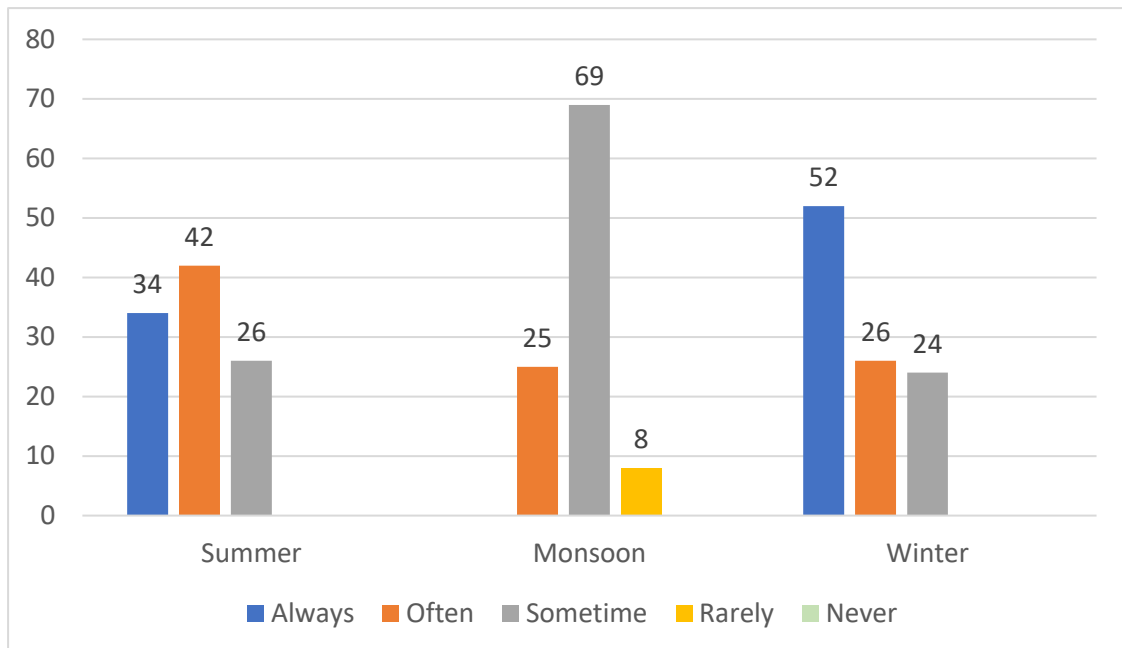
#### 10.8.1.2 Time of usage (day)

- Majority of respondent often use courtyard in the morning time, sometime in afternoon and evening and rarely in night time in a day



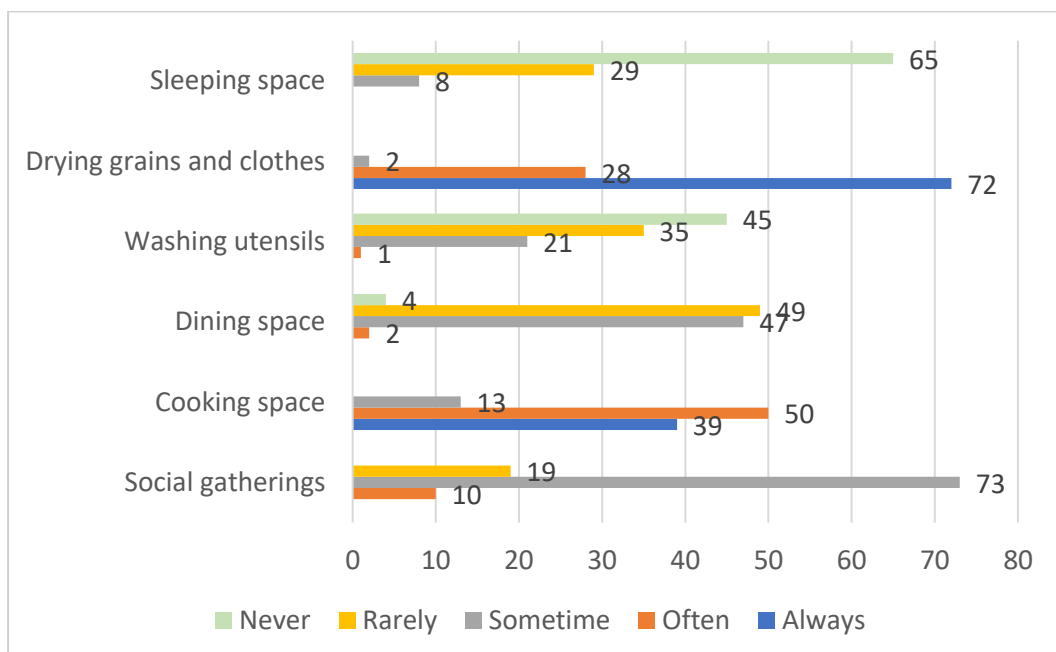
### 10.8.1.3 Time of usage (season)

- Majority of respondent often use courtyard in the summer, always in winter and rarely in monsoon season



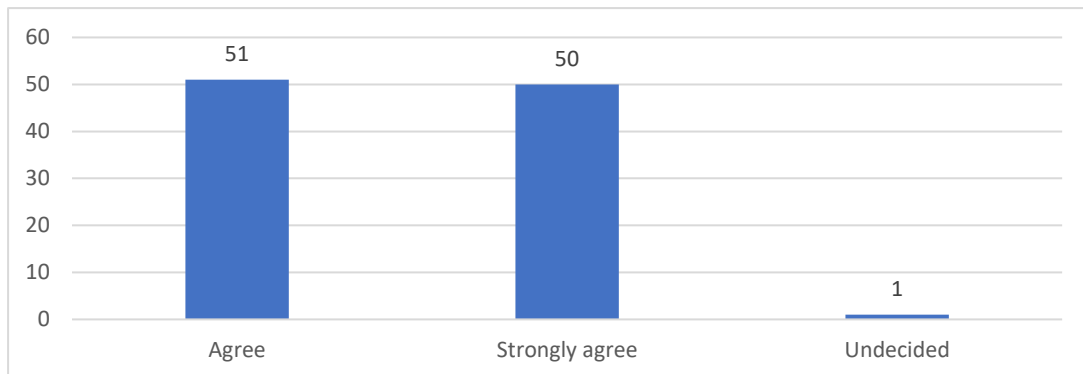
### 10.8.1.4 Activities:

- Majority of respondent often or always use courtyard for cooking purpose while few respondents use it as dining space too
- Majority of respondent always use courtyard for drying grains and clothes while few use it for washing utensils and rarely or never as sleeping space



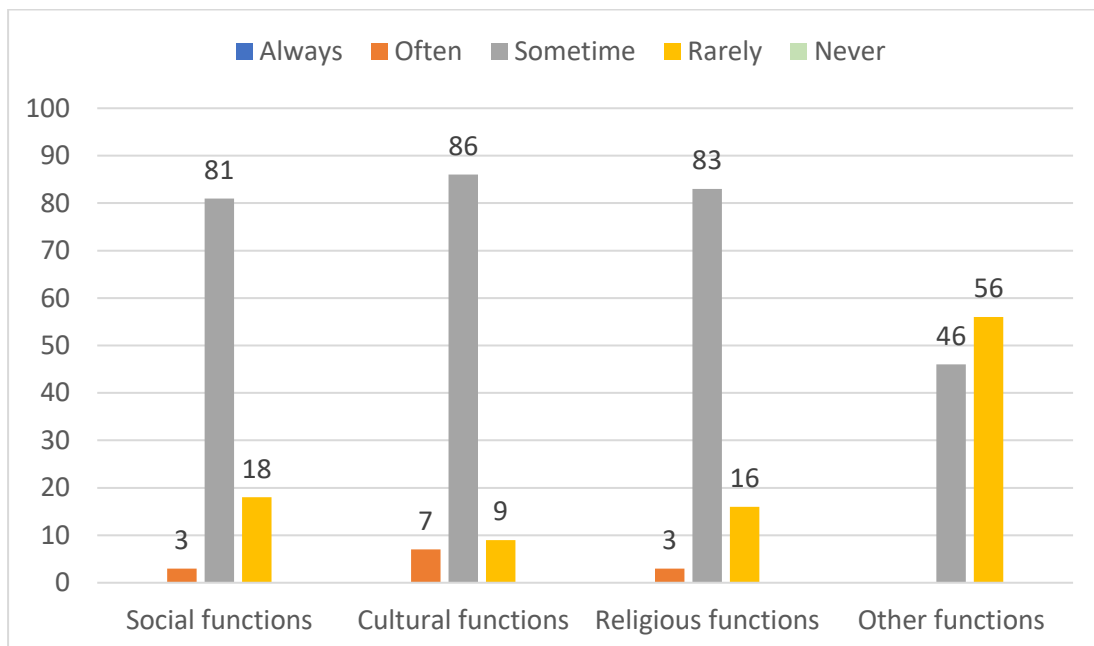
### 10.8.1.5 Courtyard as important space of the house:

- 51 respondents agree and 50 respondents strongly agree that courtyard is important social space



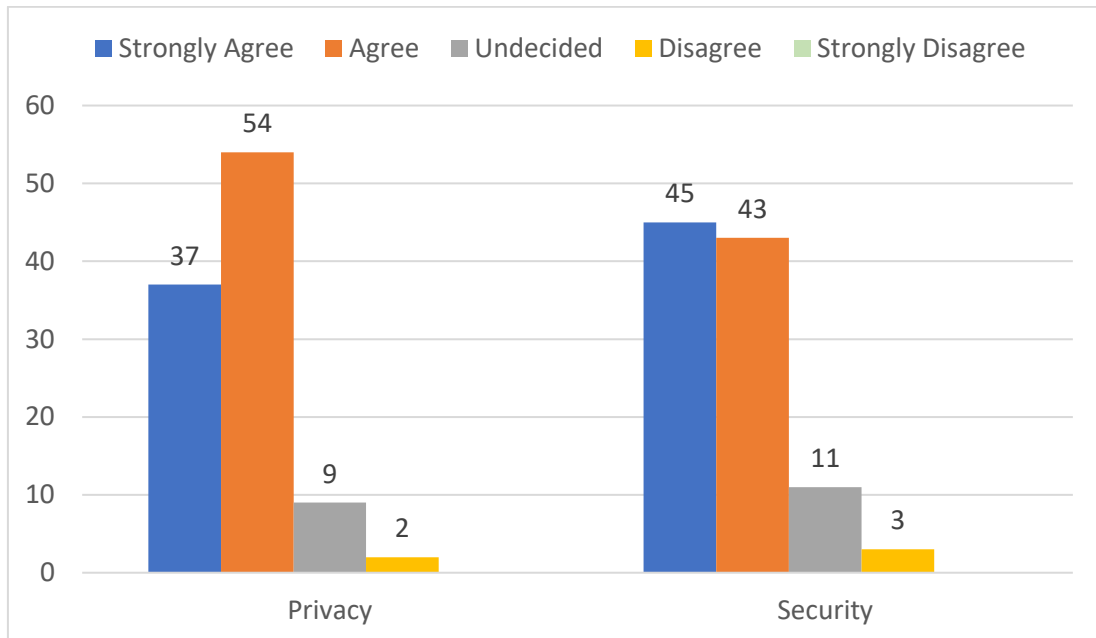
### 10.8.1.6 Type of functions in courtyard

- Majority of respondents often use courtyard for social gatherings and sometimes for cultural and religious function and rarely for other functions



### 10.8.1.7 Privacy and security

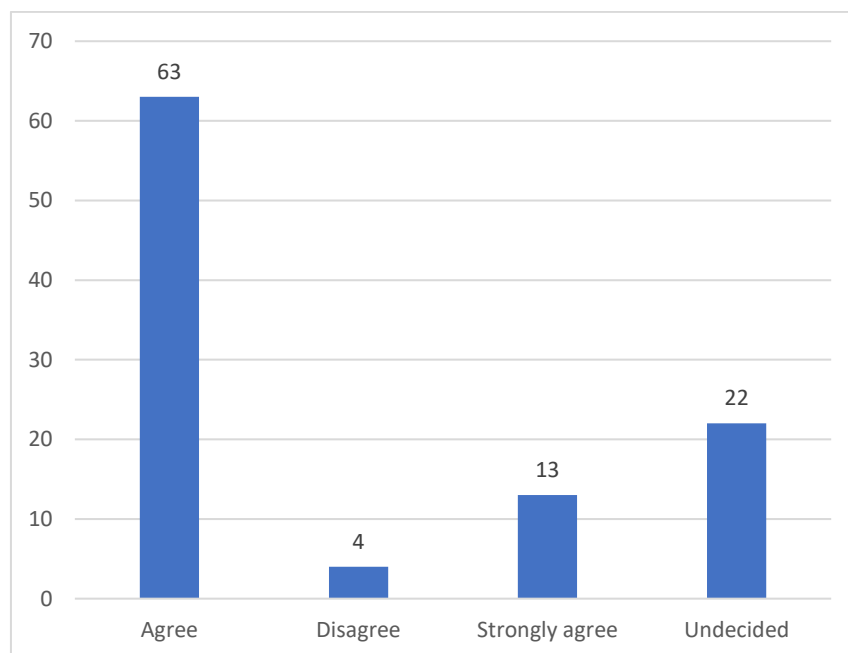
- Majority of respondents agree that courtyard is proving privacy and security to the house while few are undecided about privacy and few disagree for the security



### 10.8.2 Courtyard details: Environmental aspects

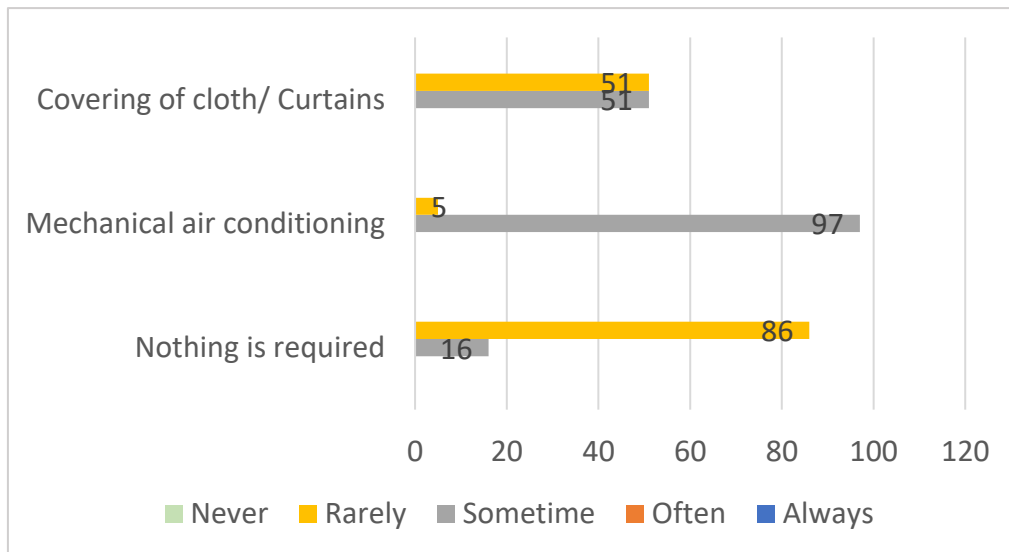
#### 10.8.2.1 Ventilation and natural light

- Majority of the population agree that courtyard is proving both ventilation and natural light in all rooms

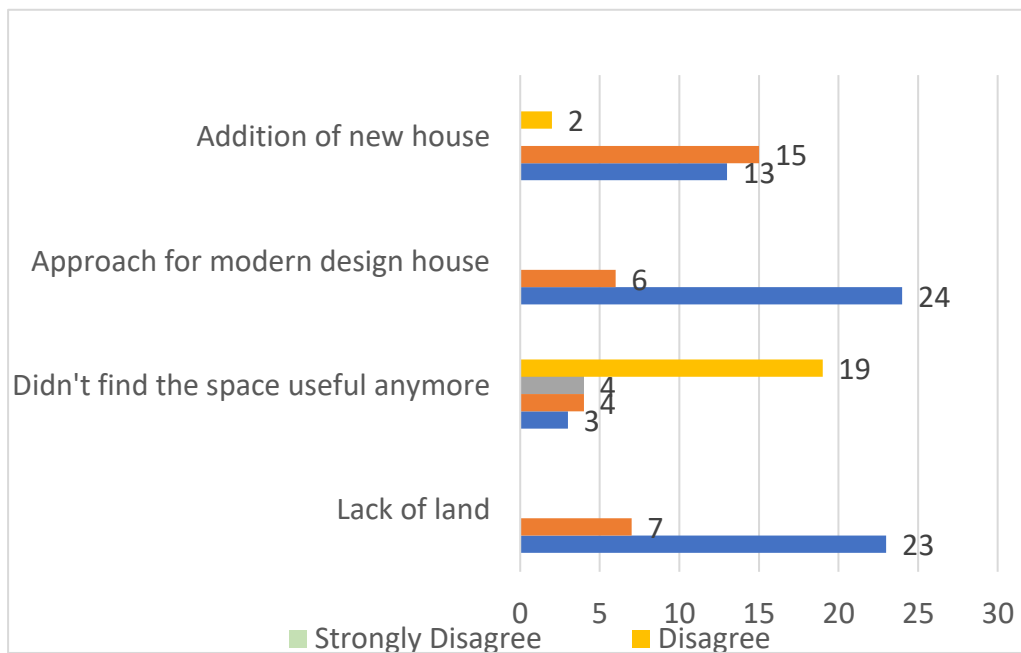


### 10.8.2.2 Avoid heat during summer

- Majority of 97 respondents sometime use mechanical air conditioning and 51 cover with cloth



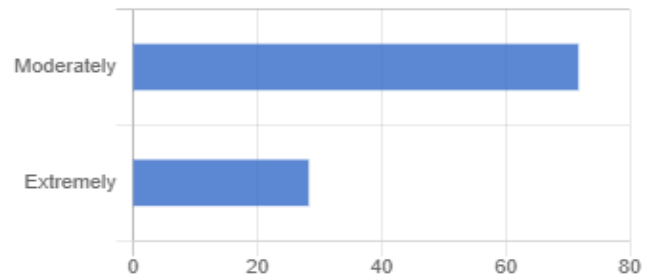
### 10.8.3 Reason of not having courtyard



## 10.8.4 Information from pilot survey: Transformation of village

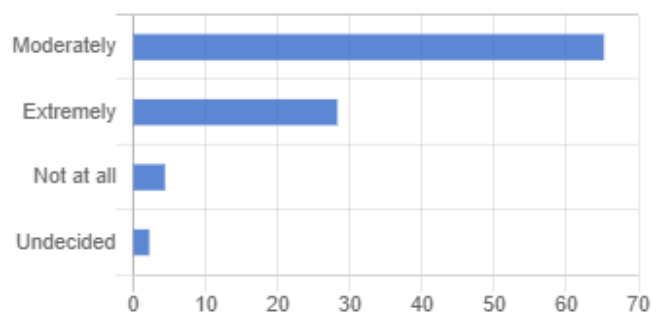
### 10.8.4.1 Changed over time

- Majority of 71.74% respondents think that physical environment has moderately transformed



### 10.8.4.2 City lifestyle influence on interior space configuration

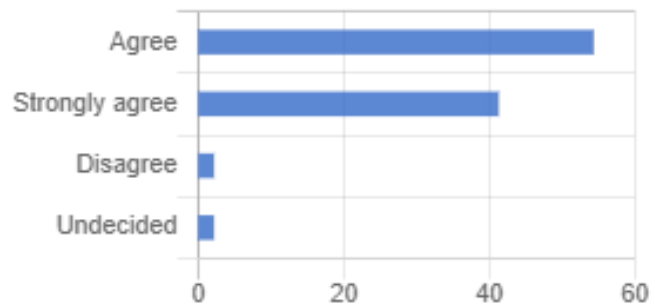
- Majority of respondents towards moderate influence of city lifestyle in the interior space configuration



### 10.8.4.3 Transformation of village: Modern material is better than traditional in terms of:

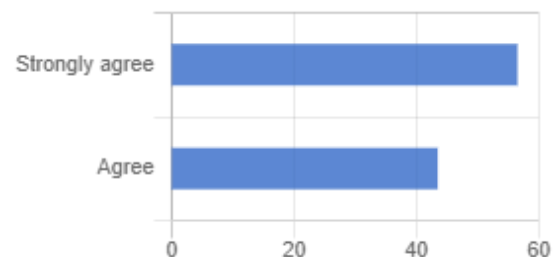
#### Construction material

- Majority of 54.35% respondents agree and 41.3% strongly agree that modern construction material is better than traditional



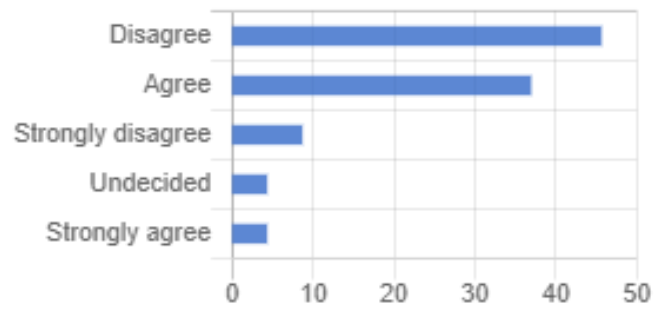
#### Strength

- Majority of 56.52% respondents strongly agree and 43.48% respondents agree that modern house is stronger



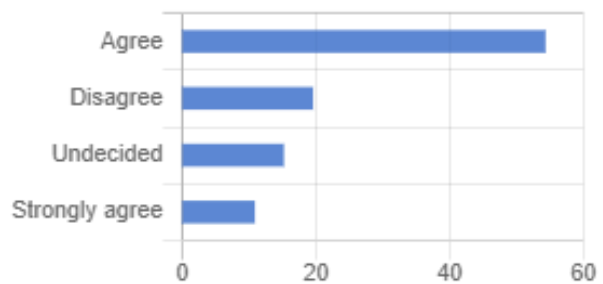
### **Thermal comfort**

- Mixed response
- Majority of 45.46% respondents disagree and 36.96% agree that modern house provide better thermal comfort



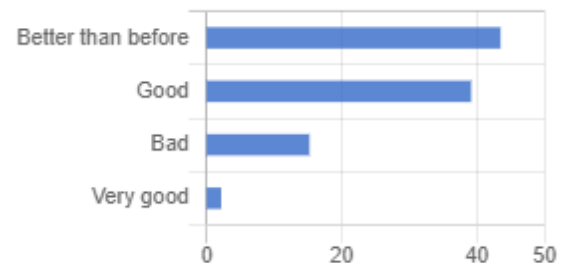
### **Functional layout**

- Majority of 54.35% respondents agree and modern house is more functional



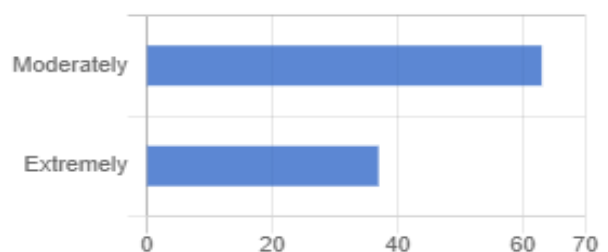
#### **10.8.4.4 Opinion on transformation**

- Majority of 43.48% respondents thinks that the physical configuration has been better than before and towards good transformation



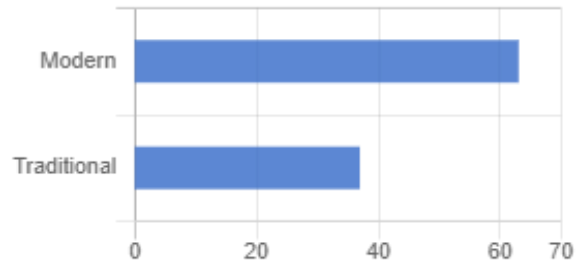
#### **10.8.4.5 Modernization contribution to loss of village identity**

- Majority of respondents thinks modernization has moderately effect on the loss of identity of village



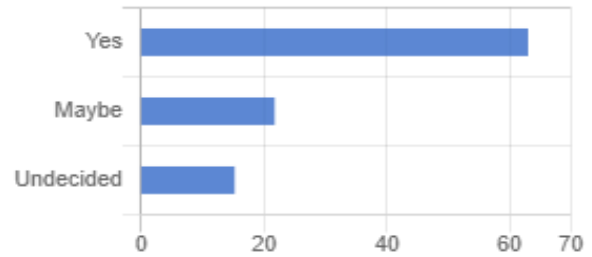
#### 10.8.4.6 Preferred house in future

- Majority of 63.04% respondents wants modern house in future than traditional house



#### 10.8.4.7 Preserve village identity

- Majority of 63.04% respondents said yes, 21.74% said maybe and 15.22% are unsure



## ANNEX 3: Plagiarism report

### Revised076march010\_Niru Chaudhary\_thesis final report.pdf

#### ORIGINALITY REPORT

10%


SIMILARITY INDEX

#### PRIMARY SOURCES

1	<a href="http://kth.diva-portal.org">kth.diva-portal.org</a> Internet	1288 words — 2%
2	<a href="http://www.iasdm.org">www.iasdm.org</a> Internet	669 words — 1%
3	<a href="http://lppm.unud.ac.id">lppm.unud.ac.id</a> Internet	418 words — 1%
4	Susanne Bodach, Werner Lang, Johannes Hamhaber. "Climate responsive building design strategies of vernacular architecture in Nepal", Energy and Buildings, 2014 Crossref	307 words — 1%
5	<a href="http://www.researchgate.net">www.researchgate.net</a> Internet	300 words — 1%
6	<a href="http://jrap.neduet.edu.pk">jrap.neduet.edu.pk</a> Internet	295 words — 1%
7	<a href="http://philippinesheritage.ph">philippinesheritage.ph</a> Internet	205 words — < 1%
8	<a href="http://mafiadoc.com">mafiadoc.com</a> Internet	204 words — < 1%


## ANNEX 4: Thesis presentation slides

### Thesis Final Presentation



**Topic on**  
**“Transformation over time in Kochila/Saptariya Tharu Architecture ”**  
 (A case of Baswalpur village, Saptari, Nepal)

Presented By:  
 Niru Chaudhary (2076-MArch-010)  
 Department of Architecture, Pulchowk Campus, IOE



### Acknowledgement

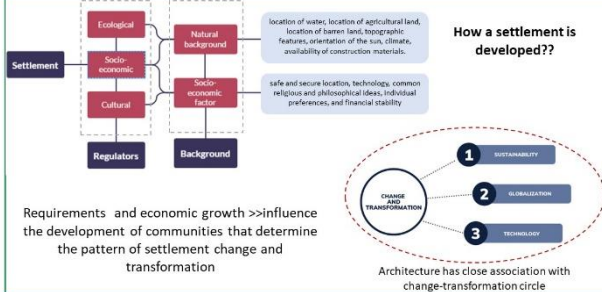
I would like to express my sincere gratitude to all who have offered their help in accomplishing this study. I would like to express my sincere gratitude to my supervisor Prof. Dr. Sudha Shrestha for her valuable time and guidance that have been very helpful for this research. My sincere gratefulness to the teachers of the department for their kind support, assistance and advice whenever needed. Lastly, I would like to thank all our friends for the spirit and commitment with which they helped in this study.

### Overview of framework

- Introduction
- Literature review
  - Urbanization, modernization and transformation
  - Tharu settlement and ecologically responsive design of Tharu architecture
- Findings from case study
- Research methodology
- The study area: Baswalpur village
- Data collection and analysis
- Findings and discussion
- Conclusion and recommendations
- References

### Chapter 1: Introduction

### Background



### Background

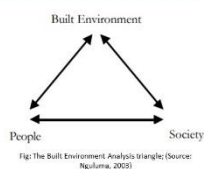
- Transformations >> dramatic in cities/rural villages of the developing countries



- Traditional Tharu architecture >> evolved in response to the needs of its users and the region's living environment (Geographic, climatic, sociological, and historical elements)
- Shrinking distance between society and cultures >> influence of the quickly changing process >> increasingly visible on a local scale
- Transformation process >> observed more in traditional settlement like tharu community

### Relevance with Built Environment Analysis

- Housing transformation research falls under the purview of **Built Environment Analysis**
- Investigates how individuals participate in the modification of the homes in which they reside
- **Result of decisions and behaviors based on culturally formed ideals**
- **User perspective >> critical in both Built Environment Analysis and this housing transformation research**
- Aims to reveal how the shift is occurring, people's wishes to possess contemporary dwellings



### Problem statement

- An **unfocused transformation** can lead to a total change that can eliminate the cultural identity of the rural
- **Beautiful and artistic traditional tharu houses** made from mud and timber >> **verge of disappearance** (Setopati Nepal's digital newspaper, 2075)
- Factories manufacturing the traditional mud tiles and other items has closed down
- **Continuous transformation in dwelling archetypes**
- **Loss of cultural identity**, failing to respond appropriately in environmental terms



### Research questions

The main research question is:

- What are the aspects of the area in which the Kochila/Saptariya tharu architecture has been changed?

Secondary research questions are:

- How Kochila/Saptariya tharu architecture has emerged in the overall period in history?
- How does the socio-economic factor affect the use of spaces and the spatial configuration in the house forms and material culture of the village?
- How can house types in the village be classified and analyzed?
- What are the people's attitudes and responses towards housing modernization?

### Scope and limitations

**Scope:** To approach the importance of continuity of traditional systems for adaptation in contemporary design practice

**Limitations:**

- Study >> limited to stand-alone residential buildings
- Choice of buildings >> on the degree of level of transformation (i.e., from traditional to contemporary type)
- Detailed observation of tharu houses limited to 12 nos. only

## Chapter 2: Theoretical framework

Urbanization, modernization and housing transformation

### Urbanization, Globalization and modernization

Urbanization	Globalization, social change and continuity	Modernization
<ul style="list-style-type: none"> <li>➤ Increased rate of urbanization &gt;&gt; fast expansion of the urban economy and social transformation</li> <li>➤ Rural regions &gt;&gt; served as a buffer zone for urban sprawl &gt;&gt; new homes and new projects</li> <li>➤ Urbanization &gt;&gt; tied to modernity and globalization &gt;&gt; social, economic, and environmental changes</li> </ul>	<ul style="list-style-type: none"> <li>➤ Societies &gt;&gt; change over time</li> <li>➤ Coming in contact with others, in-migration, out-migration composition</li> <li>➤ Change of values, social culture and practice changes</li> <li>➤ Not preservation oriented &gt;&gt; rather Continuity oriented</li> <li>➤ Local cultural identity &gt;&gt; essential in this age of globalization</li> </ul>	<ul style="list-style-type: none"> <li>➤ Aspire for urban standards of living &gt;&gt; changing needs and demand; changing lifestyles</li> <li>➤ Traditional houses are undergoing transformation &gt;&gt; influenced by the modernizing effect of capital economy</li> <li>➤ Traditional homes &gt;&gt; Challenging to integrate modern living habits into a traditional setting</li> </ul>

### Theoretical framework for classification of house type

According to Lawrence,

- Stylistic rules governing how building facades are constructed
- Socio-economic factors >> inhabitants' work status and income
- The number, size, and configuration of housing units
- The design and construction of the structures >> utilized by both experts and laymen to understand

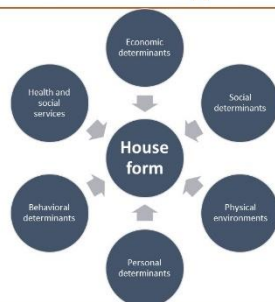


Fig: Determinants of house form

### Transformation process and motives

- Growth of family size,
- Desire of generating income
- Response to harsh climatic conditions
- Desire to copy prevalent housing forms
- In search of security and privacy

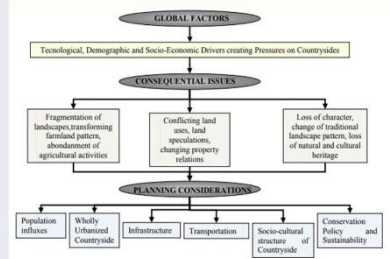


Fig: The conceptual diagram of the causes and consequences of transforming countryside

### Transformation process and motives

- Growth of family size,
- Desire of generating income
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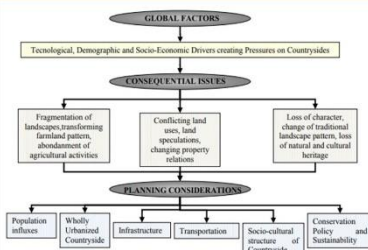


Fig: The conceptual diagram of the causes and consequences of transforming countryside

### Understanding Ecologically Responsive design of Tharu architecture

### Ethnic architecture Vs Vernacular architecture



Fig: Representation of Mokha art on Tharu house making identifiable; (source: Abari)

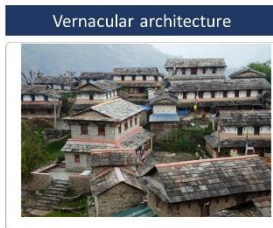


Fig: Vernacular architecture of hilly region; (source: Dreamstime.com)

### Tharu settlement - History

#### Origin of Tharus

- Migrated from the Thar Desert of Rajputana in northwest India >> Controversial
- Mongoloid people >> Ethnic group of lowland Nepal
- Many subgroups >> distinct language and customs



(Source: Setopati)

#### Origin of Kochila Tharus

- Historically discovered under influence of the Brahminical and Vaisnava culture of the Mithila kingdom (Eichentopf & Mitchell, 2013)
- Koshila or Kochila >> related to the name of the river Koshi on the bank of which they used to live (Krauskopff, 1995)

### Evolution of tharu architecture

#### Tharu community, building planning and form in history

- Traditional tharu village follows strong social and religious norms
- Small populated villages
- Scattered pattern village at 1-2 km distance
- North-south oriented
- Courtyard plan
- Cluster design
- Narrow alleys
- Detached unit



Fig: Cluster planning of typical traditional Tharu settlement in Barhija, a western Terai district

### Evolution of tharu architecture

#### Tharu house characteristics

- Plain lands >> jungle side or river side
- Eco-friendly house constructed of local materials like mud, wood, thatch, grass, etc.
- Aligned with longer sides along north-south orientation

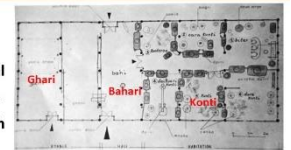


Fig: Typical Tharu house layout

#### From North to South the house is divided into three sections

- The southernmost area is "Ghari" (place to keep cattle's cow, buffalo, goat, etc.)
- The next middle section "Bahari" is a semi-public area.
- The northern section called "Bhitar" contains the "Konti" sleeping room, "Bhansa" the kitchen and "Deurar" the deity room.

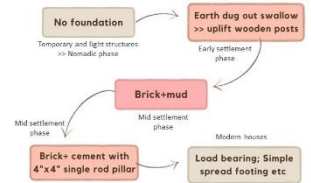
### Evolution of tharu architecture



### Evolution of tharu house throughout history

- Tharu settlements has evolved over time in response to user needs
- Historically, tharu dwellings >> temporary structures >> Nomadic tribe
- Nomads >> travelling in search of a safe and better place
- With time >> necessity of permanent house >> economic stability and cultural characteristics

#### FOUNDATION



### Evolution of tharu house throughout history

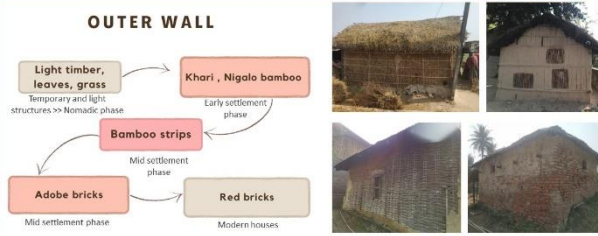


Fig: Evolution of outer wall in tharu architecture

### Evolution of tharu house throughout history

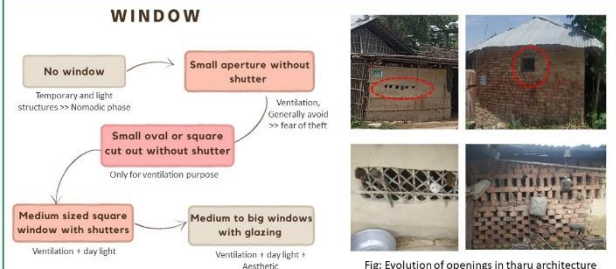


Fig: Evolution of openings in tharu architecture

### Evolution of tharu house throughout history

**Slope roof**

1 चार पाख्रे (चौखटाहा)

2 दोपाख्रे घर (दुपही घर)

3 पोखरापटन

**Roofing materials**

Thatch, grass → Khapada, mud tiles

Cement tiles → CGI sheets → Cement

चार पाख्रे (चौखटाहा)

दोपाख्रे घर (दुपही घर)

पोखरापटन घर (all corners are connected)

Fig: Khapada roof/घर: चौखटाहा घर

Fig: Cement tiles on roof, दोपाख्रे घर

### Climatic-responsive design of tharu house- Environmental dimension

	Tharu house in Chitwan	Traditional terai houses	Rana tharu house	Dangaura tharu house	Kochila tharu house
Settlement pattern	Scattered clusters	Loose clusters of semi-enclosed compounds	Loose pattern around open courtyard	Loose, along the road side	Loose building clusters along road
Building form	Rectangular	Rectangular floor plan	Compact layout	Elongated	Elongated
Building orientation	N.S.	N.S.	Longer façade north-south wards	Longer side east-west oriented	Long facades east-west
Building stories	1	1	1.5	1	2
Internal space arrangement	Horizontal, few divisions	Horizontal manner, almost undivided open space	Horizontal, mezzanine used as storage	Horizontal, few division	Mainly horizontal, 2nd floor includes open veranda
Semi-open spaces	Veranda	Veranda	Open courtyard, veranda	Veranda	Open courtyard, veranda in second floor
Wall material	Wattle and daub, straw and mud, timber, bamboo	Mud plastered woven cane mat tied on timber frame	Mud plastered timber/bamboo walls	Low walls of wood and bamboo covered by mud layer	Lumber on timber structure

### Climatic-responsive design of tharu house- Environmental dimension

Wall thickness	Very thin	Thin, permeable to air	Thin	Thin, permeable to air	
Roof material	Thatch	Thatch or tiles	Thatch	Bamboo lathes with thatch covering	Thatch
Roof type	Pitched roof	Hipped roof	Pitched roof	Hipped roof	Pitched roof
Roof overhang	Wide	Wide	Large	Large	Large
Foundation	Plinth of stone and mud	Stone plinth or wooden piling	Earth/stone plinth	Slightly raised platform	Earth/stone plinth
Floor	Compacted earth with fine mud layer	Compacted earth or clay tiles	N.S.	Covered by mud layer made	N.S.
Ceiling	High ceilings	High ceilings	High ceilings	High ceilings	N.S.
Openings	Very small	Upper part of exterior wall is made of loose bamboo strips	N.S.	Few and small openings	Few and very small, doors are largest openings

(Source: Shiferaw, 1998)

### Different dimension of tharu architecture

**Social dimension**

DEPARTURE OF SOUL AND CONCEPT OF REBIRTH

YOUTH MARRIAGE FAMILY EMERGENCE

**LIFESTYLE AND LIVELIHOOD OF THARUS**

1. Agriculture  
2. Animal husbandry  
3. Kamariya Parbat  
4. Majhkoet

1. Celebrating rituals, Ceremony, Festivals  
2. Pind  
3. Chaur  
4. Pongal & entertain

FOR SURVIVAL, THEY ENGAGED IN VARIOUS ACTIVITIES

MONEY OBTAINED USED FOR:

(Source: Animate practices among Tharus of Dang and Doodhadi, Prasant Rana)

Figure 29 Life style and livelihood of tharus

### Relationship of socio-cultural aspect with built space in Tharu settlement

Types of spaces	Functions
Courtyard	<ul style="list-style-type: none"> <li>Major space for social interaction</li> <li>Festivals and social functions</li> <li>Utility area: washing, bathing, sun drying grains, clothes</li> </ul>
Verandah	<ul style="list-style-type: none"> <li>Buffer zone between private (dwelling) and public space(courtyard)</li> <li>Used as dining space in daily use as well as in occasion and ceremonies</li> <li>Sleeping purposes, storing of agricultural products and other household goods; dhiki, jato</li> </ul>
Guest/entrance hall	<ul style="list-style-type: none"> <li>Semi-public Space for entertaining guests and social interaction</li> </ul>
Khet (agricultural field)	<ul style="list-style-type: none"> <li>Important economic lifestyle</li> </ul>
Walls	<ul style="list-style-type: none"> <li>Design of house; agriculture based</li> <li>Display of traditional wall art like mokha art</li> <li>Peacock design: human happiness, passion and bliss</li> </ul>

(Source: Sumari, 2020)

### Comparative study of traditional tharu house and contemporary house

Parameters	Traditional kochila tharu house	Contemporary house
Planning	Courtyard planning with single row detached dwelling unit	Often compact planning
Building form	Elongated	Often rectangular
Building materials	Mud, Bamboo, Timber, Thatch, Tiles- low embodied energy	Cement, Iron, brick, glass- comparatively high embodied energy
Building height	Single storey, sometime with mezzanine space	Residential, generally 2-3 storey in terai region
Internal space configuration	Mainly horizontal	rectangular, multiple function under single roof
Openings	Few and very small, doors are largest openings	Medium to large window
Semi-open spaces	Open courtyard, veranda	Verandah
Wall	<ul style="list-style-type: none"> <li>Thick mud made of combination of burnt and sundried bricks; Lumber on timber structure</li> <li>50-600mm thick wall-insulator</li> </ul>	<ul style="list-style-type: none"> <li>9" thick at exterior ; 5" thick at inner partition</li> <li>Red brick and cement mortar</li> <li>Cement plaster both side of wall</li> </ul>

### Comparative study of traditional tharu house and contemporary house

Parameters	Traditional kochila tharu house	Contemporary house
Roof type	Slope with long projection up to verandah, avoiding heat to the inner rooms	Generally flat, modern design with less projection and overhangs
Roofing material	Thatch or tiles	RCC
Foundation	Earth/stone/brick plinth	RCC with pillar
Floor	Compacted mud flooring	Cement concrete flooring, tiles
Thermal comfort	Comparatively cooler than concrete house	Concrete Absorbs heat during day in summer, uncomfortable interior
Ventilation	Courtyard design to break the house into smaller with more walls opening onto the outdoors, much easier to encourage a gentle breeze into the home	Rely on mechanical air conditioning
Natural lights	Equal dispersion of natural light in all room in courtyard house	Not enough in Inner core of big house

(Source: Shiferaw, 1998)

## Chapter 3: Case study

1. Transformation of vernacular architecture of India
2. Transformation of Rural Settlements in Bangladesh
3. Spatial Transformation of Dutch period Town Houses in Galle Fort, Sri Lanka

### Findings from this case study

- Land distribution among relatives
- Expansion of families from generation to generation
- Status and financial development
- Nowadays, people require all facilities of a homestead in a single zone >> **separate house concepts are losing its form**
- Changes in the agriculture system, such as the **dependency on machine** and the process of rice processing
- Easy highway **connectivity with capital city** through Jamuna bridge

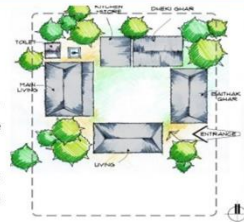


Fig: Common spatial form of rural settlement in Bangladesh

(Source: Rashid, 2017)

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## Chapter 3: Research Methodology

### Research Designs, Choice and justification of design strategy

- Transformation process >> **Exploratory descriptive explanation of the phenomena**
- The nature of the research topic, objectives, and research questions justifies the use of a case study strategy
- According to Yin (2009), "**case studies allow a study to keep the holistic and meaningful qualities of real-life occurrences.**"
- Applicable >> housing change occurs in a 'real world' environment



Figure: Flowchart of research methodology

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### Conceptual framework

#### Paradigm

##### Transformative paradigm

(Knowledge is not neutral and it reflects the power and social relationships within society, and thus the purpose of knowledge construction is to aid people to improve society- Mertens, 2003)

#### Ontology

Modernization and urbanization has led to the transformation of Tharu settlement

#### Epistemology

This research intends to produce knowledge by looking into:

- The **changes in the lifestyle and its relationship with the space configuration**;
- The **forces** (Occupational shift, educational shift, changes in family structure, etc.);
- **Relationship with their changed social life, cultural life with the spaces**, both interior and exterior

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### Data collection and Analysis

#### Baseline survey approach and indicators

- For the **observation of houses**, the **ideal configuration of traditional layout of Saptariya tharu architecture** is used as a **baseline reference**
- The **evaluation indicator** were derived majorly into three parts: **Construction material and technology; Spatial configuration, schematic plan and photographs**

Baseline survey checklist for buildings

House no.	House category	No. of Building storey	Construction technique	Parameters for observation of transformation		
				Building materials	Spatial organization	Schematic plan
1	A	1	<ul style="list-style-type: none"> <li>Foundation</li> <li>Wall</li> <li>Window</li> <li>Roof</li> </ul>	<ul style="list-style-type: none"> <li>Outer courtyard</li> <li>Guest Hall</li> <li>Inner courtyard</li> <li>Verandah</li> <li>Internal layout</li> </ul>		

(Source: Putra and Lozanovska, 2017)

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### Research Method

#### Sample framing, sample size and sample procedure

- Research comes under **Purposive sampling**
- Total tharu household number in Baswalpur village according to 2021 census preliminary report= **202**
- Observation of selected houses = **12**
- Sample size = **132**

Confidence level = 95%

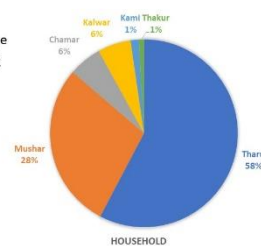
Z-score (for 95%) =1.96

Margin of error (e) = 5%

P = 0.5

$$\frac{z^2 \times p(1-p)}{e^2}$$

$$1 + \left( \frac{z^2 \times p(1-p)}{e^2 N} \right)$$



37

### Data collection and Analysis

#### Research Variables

- Research variable include **Household size; Household income; Types of house configuration; Material living conditions; Education and work; Construction technology; Changes in building, etc.**

➤ For data collection >>> **KOBO Toolbox**

➤ For data analysis >>> **Excel**

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## Chapter 4: The study area: Baswalpur village, Saptari, Nepal

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### The study area: Baswalpur village, Saptari

#### Physical geographic settings

- Baswalpur village is chosen as the case study area to illustrate the **dramatic change of housing transformation of Kochila Tharu settlement**
- Old name "Labrajpur"

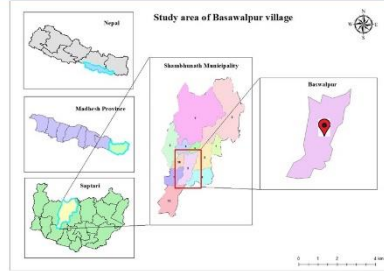


Fig: Location map of Baswalpur

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### Population and ethnic groups

- Total population= 1300 (According to preliminary census data of 2078 B.S.)
- Total household no.= 350
- Tharu household no.=202
- Mushar household no.=100
- Chamar household no.=20
- Kalwar household no.=20
- Kami household no.=5
- Thakur household no.=3

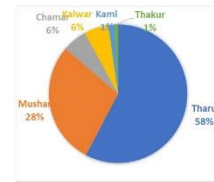


Fig: Ethnic groups of Baswalpur



Fig: Settlement pattern of Baswalpur village, Saptari, Nepal

- Majority population: **Tharu**
- Others : Thakur, Kalwar, Kami, Chamar Mushar

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### Village layout and settlement of Baswalpur village

- Linear street pattern in north-south axis
- Small populated village
- Courtyard plan settlement
- Cluster design
- Detached unit

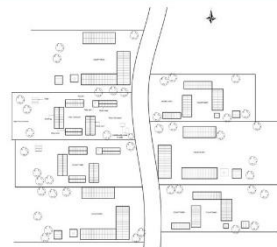


Fig: Schematic plan of settlement pattern of Baswalpur village, Saptari

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### Tharu house Characteristics of Baswalpur village

#### Allocation of spaces

- Public space:** Outer Courtyard (Darbaja)
- Semi private-space:** Cattle shed (Gahali), guest hall (Basghara), Inner courtyard (Angnaa), verandah (Osara)
- Private space:** Dwelling space, deity room (Gosai ghar), kitchen (Bhatninha ghar or Bhansa ghar)



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### Tharu house Characteristics of Baswalpur village

#### Public space: Darbaja (Outer courtyard)

- Important space>> Serves the space for public activity
- main frontal space of the plot
- In usual days, the space is used for the **cattle herding** and cattle eatery area
- During occasions>> **place for Janti/ social gathering**



Fig: View of Darbaja from street



Fig : Social gathering for marriage ritual on Darbaja



Fig: Prepping for Swayamber, ritual of marriage, in Darbaja

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### Tharu house Characteristics of Baswalpur village

#### Semi-private space: Basghara (Entrance/Guest hall)

- usually detached or semi-detached of single row house structure
- located on the **frontal face of the site and usually visible from the street**
- Social gathering, welcoming of guest and other family gathering**
- Present context, Community people easily sociable>> concept of Basghara >> Lost



Fig: View of Guest Hall from outer courtyard

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### Tharu house Characteristics of Baswalpur village

#### Semi-private space: Gahali (Cattle shed)

- Space for **housing cattle**
- Detached or semi-detached from the main dwelling units
- Final funeral rituals is also performed** by the sons of the demised person along with priest inside the cattle shed



Fig: Gahali (Cattle shed)



Fig: Performing funeral ritual in Gahali (Cattle shed)

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### Tharu house Characteristics of Baswalpur village

#### Semi-private space: Angnaa or Aagan (Inner courtyard)

- Important space>> daily and occasional both
- Gathering space, social space, celebration space, drying area for grains**
- Space for household purposes
- Best design for hot climate



Fig: Using Inner courtyard to dry grain



Fig : Marriage feast preparation going on in Angnaa (Inner courtyard)



Fig : Maruwa (Temporary structure to perform marriage ritual)

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### Tharu house Characteristics of Baswalpur village

#### Semi-private space: Osara(Veranda)

- Act as buffer zone >> protecting rooms from direct sun rays
- Used for dining, sometime sleeping purpose
- Space for chulo, dhiki, storage space for grains



Fig - View of Verandah (Osara)



Fig: 1' Osara (Verandah) on the modern house



Fig: Marriage rituals on aagan and viewers on verandah

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### Tharu house Characteristics of Baswalpur village

#### Private space: Dwelling spaces (Sleeping spaces)

- Locally called "Sutaibala kothli" >> Sutne kotha
- usually separated from Basghara
- Located rear, inside most part of plot
- Not directly visible from street
- Usually single bay structure
- Usually provided with mezzanine space called "Maccha"
- Storing onions, potatoes, garlics
- Also for sleeping purpose and storage



Fig: Dwelling unit with mezzanine space

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### Tharu house Characteristics of Baswalpur village

#### Private space: Kitchen (Bhatninha Ghar)

- Locally called "Bhatninha ghar" >> bhat pakaune ghar
- detached or semi-detached portion of the dwelling area
- Placement of Kothi/Koith >> Grains storing vessel



Fig: Placement of chulo in aagan



Fig: Kitchen with horizontal window

#### Private space: Diety room (Gonsai Ghar)

- Most private and restricted space of tharu house
- Separated unit or partitioned within the same sleeping spaces
- Usually small openings provided for ventilation

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### Socio-economic scenario of people in Baswalpur

#### Family size and household number

- Earlier >> maximum joint family >> served manpower for agriculture activities
- Now >> more nuclear family >> majority of household have 3-4 nos. of family member

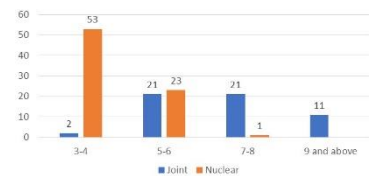


Fig: Family type and household number from the surveyed data

52

### Socio-cultural practices seen in Baswalpur

#### Festivals- Maghi and Jitiya



Fig: Glimpse of Maghi Mahotsav celebrated in baswalpur



Fig: Married ladies prepping for Jitiya ritual; (Source: Music Nepal Ethnic)

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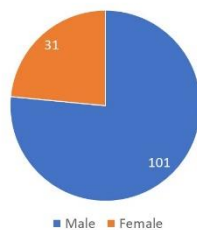
### Chapter 5: Data collection and Analysis

54

### Number of respondents

Total number of respondents= 132 (Structured questionnaire survey)

- The sample distribution for the socio-economic and demographic survey, as well as includes the perception survey



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### Transformation in practice of house forms

#### Different types of housing transformation (Source: Nguluma, 2003)

- A horizontal transformation that involves adding rooms to the old home
- Demolition of old homes and construction of brand-new ones
- Replacement of mud and pole structures in phases.
- Constructing new concrete block structures next to outdated pole and mud structures
- Interior modifications
- Aspiration to live in modern home

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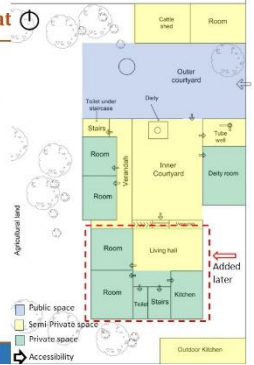
### Different type of housing transformation

#### 1. Horizontal expansion

- Extension projects range from expanding an existing room or rooms to building a fully new living unit to an existing one
- Provide space to the extended family members



Fig: Compact planning type of house was horizontally extended (Residence of Ram Piyari Chaudhary)



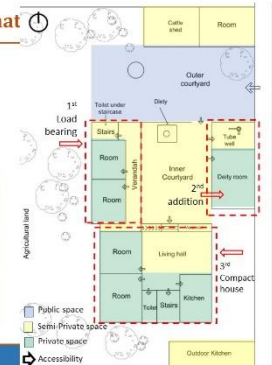
### Different type of housing transformation

#### 1. Horizontal expansion

- Residence of Mrs. Ram Piyari Chaudhary
- Occupation: Retired school principal

#### Reason for horizontal expansion by respondent:

- Fire casualty in 2046-47 B.S.>> Owner re-built house in phases
- First phase - Load bearing
- Second phase- brick-cement bonded single room
- Third phase- Compact style RCC house
- Prepping for retirement>> Wish for secured shelter
- Approach for modern living



### Different type of housing transformation

#### 2. Demolition of old homes and construction of new ones

- Demolish outdated mud and timber houses
- Often construct new wall of concrete around existing mud and timber structures



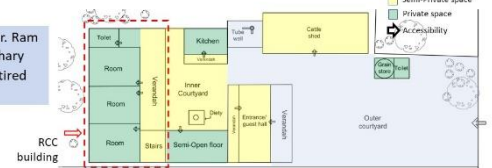
Fig: Replacement of mud house into RCC house; Residence of Mr. Ram Subaran Chaudhary after transformation

### Different type of housing transformation

#### Reason for demolition and construction of new structure by respondent:

- Residence of Mr. Ram Subaran Chaudhary
- Occupation: Retired Civil engineer

- Construction material degraded with the course of time >> needed serious repairing or replacement
- Difficulty in mobility >> destruction by rats beneath the mud floor
- Completely demolish with same traditional style interior configuration



### Different type of housing transformation

#### 3. Replacement of mud and timber structures in phases

- Replacing one room after another, whereby a room built of mud and timber is demolished, the wall being replaced by concrete blocks

#### Reason for replacement of mud and timber structure in phases by respondent:

- To be free from time consuming labor induced repairing/ maintaining work
- Opted for one-time investment on strong and durable construction materials



Fig: Addition of pillar and concrete block in old mud structure; Residence of Mr. Raj Kumar Chaudhary (School teacher)

### Different type of housing transformation

#### 4. Constructing new concrete block next to outdated mud and timber structures

- Those with large plots build one to three or more rooms using concrete blocks and then demolished their mud and wooden poles structure in use
- The new structure is then extended to a larger unit

- Residence of Mr. Ramakant Chaudhary
- Occupation: Skilled worker, Farmer

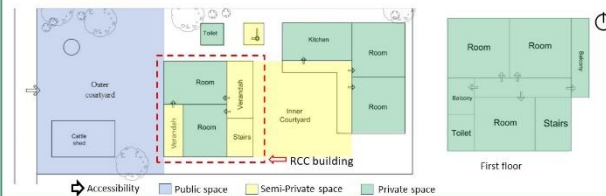


Fig: Contemporary two storey house was built beside traditional house; Residence of Mr. Ramakant Chaudhary

### Different type of housing transformation

#### Reason as described by respondent:

- Family member >> Contractor/Construction business
- Degradation of traditional material and Leakage problem in existing mud structure
- Expansion of sleeping rooms, approach for modern design



### Different type of housing transformation

#### 5. Interior modifications

- In certain cases, interior walls are removed in order to increase size of rooms
- Also include wall extension for higher ceiling level, replacing tiny window to big ones

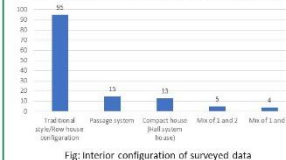


Fig: Interior configuration of surveyed data



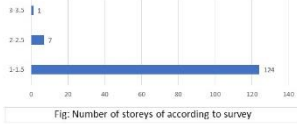
Fig: Interior modification according to city lifestyle, Residence of Mrs. Ram Piyari Chaudhary

- From survey, most respondent still lived in traditional style interior configuration
- One respondent said: Compact style interior planning >>easier for daily household activity

### Different type of housing transformation

#### 6. Vertical extensions

- Occurred when no space is left for horizontal expansion
- From survey, most respondent still lived in one storey house



Reason given by respondent:

- Limited land due to re-distribution of land among relatives
- Accommodation of needed spaces >> moved vertically



Fig: Vertical expansion of house due to limited plotland; Residence of Mukhilal Chaudhary

### Different type of housing transformation

#### 7. Aspiration to live in modern house

- From survey, majority of 104 respondents out of 132 preferred modern house over traditional ones
- According to respondents, mud houses associate with poverty and hence low status

Reason given by respondent:

Mr. Hari Chaudhary  
Occupation: Teacher

- Degradation as a cause
- Expansion of sleeping space, toilet inside house
- Compact planning house
- Opted for urban living style



Fig: Compact style house of Hari Dev Chaudhary

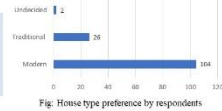
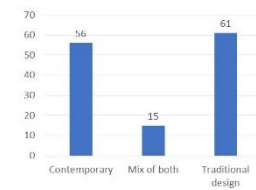


Fig: House type preference by respondents

### Observation from survey: Building information

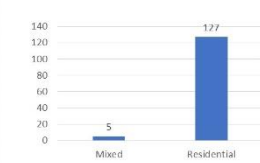
#### 1. House typology

From the survey, it is observed that traditional and contemporary style of houses were nearly in equal number



#### 2. Building use

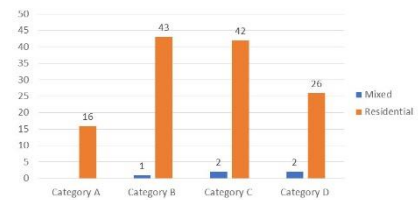
Majority of observed houses i.e., 127 no. houses were residential and rest 5 no. of houses with mixed used



### Observation from survey: Building information

#### 3. Building category and building use

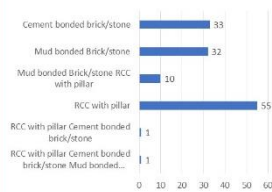
From the survey, it is found that 43 houses belong in category B and 42 houses belong to category C, 26 houses in category D and 16 houses in Category A



### Observation from survey: Building information

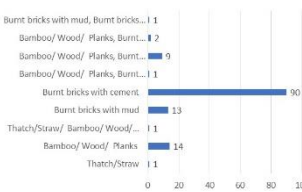
#### 5. Building materials: Foundation

It is observed that majority of houses has foundation of RCC with pillar



#### 6. Outer wall

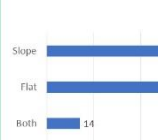
Majority (90 no.) of observed houses used burnt brick with cement as outer wall



### Observation from survey: Building information

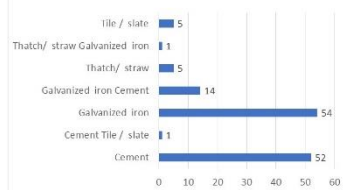
#### 7. Roof type

It is observed that majority of houses has slope roof



#### 8. Roofing material

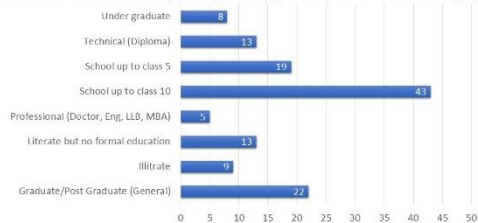
Majority of 54 survey houses has galvanized iron roofing, 52 houses have cement roofing



### Observation from survey: Socio-economic condition

#### 9. Education level

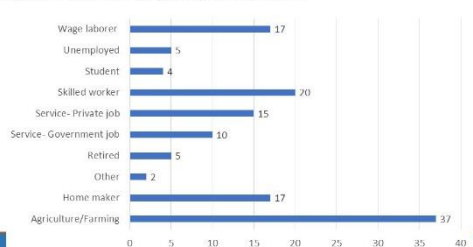
Majority of the respondent has perused the education level up to class 10 while others has completed education level like class 5, undergraduate, graduate, etc. as shown in the graph below



### Observation from survey: Socio-economic condition

#### 10. Occupation

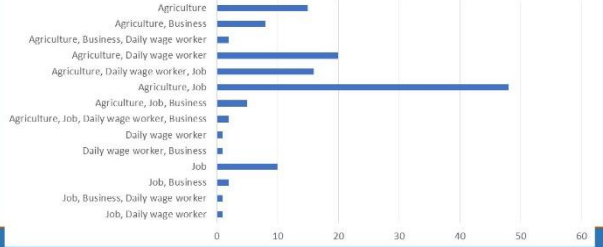
Most of the respondents are still involved in agriculture activities followed by skilled worker like carpenter and painter along with daily wage worker



**Observation from survey: Socio-economic condition**

**11. Main source of income**

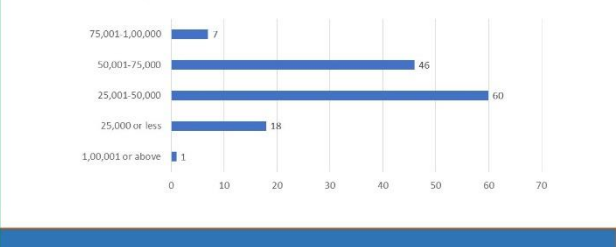
It is found that respondents majority of family members are involved into agriculture and job as economic activities



**Observation from survey: Socio-economic condition**

**12. Monthly income of family**

60 number of respondents are having monthly combined income of 25,000 to 50,000, 46 respondents with 50,000



**Chapter 6: Classification and analysis of house types**

**Classification of observed houses**

**Selected on the basis of**

- Degree of transformation in material, shape and function of houses
- Total of 12 houses were analyzed

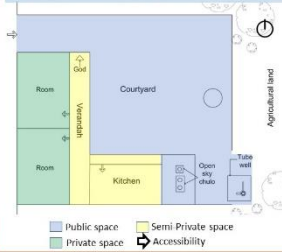
**Categorized on four types (Dwijendra et al., 2017)**

- **Category A** (No/Min transformation in building material)
- **Category B** (Huge transformation in building material)
- **Category C** (Transformation in building material, house shape and function with addition of new space)
- **Category D** (Complete Transformation in building material, house shape, function with addition of new space with new function)



**Category A**

- Residence of Ram Sila Sada
- Occupation: daily wage worker, Farmer

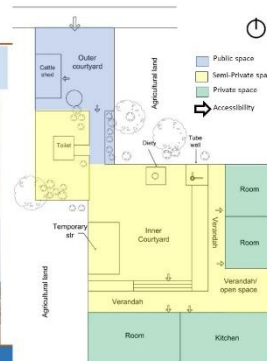


**Category A**

House no.	House category	No. of Building story	Parameters for observation of transformation				Environmental response
			Construction technique	Building materials	Spatial organization	Socio-economic status of occupant	
1	A	1	Wooden beam and post	<ul style="list-style-type: none"> <li>Foundation: Mud bonded brick</li> <li>Wall: Thick mud brick wall</li> <li>Window: Small opening</li> <li>Roof: Thatch</li> </ul>	<ul style="list-style-type: none"> <li>Outer courtyard: Absent</li> <li>Guest Hall: Absent</li> <li>Inner courtyard: Present</li> <li>Verandah: Present</li> <li>Internal layout: Single row structure with two rooms</li> </ul>	<ul style="list-style-type: none"> <li>Farmer by occupation and daily wage worker</li> </ul>	<ul style="list-style-type: none"> <li>Courtyard planning</li> <li>Local material- Mud, bamboo, Thatch</li> </ul>

**Category B**

- Residence of Charushila Chaudhary
- Occupation: Home maker, Social worker



**Category B**

House no.	House category	No. of Building story	Parameters for observation of transformation				Environmental response
			Construction technique	Building materials	Spatial organization	Socio-economic context of occupant	
2	B	1	Load bearing	<ul style="list-style-type: none"> <li>Foundation: Mud bonded brick</li> <li>Wall: Cement bonded brick</li> <li>Window: Medium opening</li> <li>Roof: CGI sheet</li> </ul>	<ul style="list-style-type: none"> <li>Outer courtyard: Present</li> <li>Guest Hall: Absent</li> <li>Inner courtyard: Present</li> <li>Verandah: Present</li> <li>Internal layout: L-shape, Single row with two rooms on south and east</li> </ul>	<ul style="list-style-type: none"> <li>Involved in farming, Medical sector, social worker government job and business</li> </ul>	<ul style="list-style-type: none"> <li>Courtyard planning</li> </ul>

### Category C

Single bay structure without verandah    Hall system house    Single bay structure with verandah

Inner courtyard

Fig: House composition

- Residence of Ram Piyari Chaudhary
- Occupation: Retired school principal

Public space  
Semi Private space  
Private space  
Accessibility

### Category C

House no.	House category	No. of Building storey	Construction technique	Building materials	Spatial organization	Socio-economic context of occupant	Environmental response
4	C	1	Frame structure	<ul style="list-style-type: none"> <li>Foundation: RCC with pillar</li> <li>Wall: Cement bonded brick</li> <li>Window: Medium opening</li> <li>Roof: CGI sheet + RCC</li> </ul>	<ul style="list-style-type: none"> <li>Outer courtyard: Present</li> <li>Guest Hall: Absent</li> <li>Inner courtyard: Present</li> <li>Verandah: Present</li> <li>Internal layout: Compact house typology from south; single row house with 2 rooms in west; Single slope house in east</li> </ul>	Involved in farming, engineering and medical sector	Courtyard planning

### Category D

- Residence of Mukhilal Chaudhary
- Occupation: Farmer, Wage worker

Public space  
Semi Private space  
Private space  
Accessibility

### Category D

House no.	House category	No. of Building storey	Construction technique	Building materials	Spatial organization	Socio-economic context of occupant	Environmental response
6	D	2.5	Frame structure	<ul style="list-style-type: none"> <li>Foundation: RCC with pillar</li> <li>Wall: Cement bonded brick</li> <li>Window: Medium opening</li> <li>Roof: RCC</li> </ul>	<ul style="list-style-type: none"> <li>Outer courtyard: Absent</li> <li>Guest Hall: Absent</li> <li>Inner courtyard: Absent</li> <li>Verandah: Present</li> <li>Internal layout: Row house characteristics; vertical planning, passage system of house with Compact planning</li> </ul>	Involved in farming, skilled worker, daily wage worker and business	<ul style="list-style-type: none"> <li>No response</li> <li>No proper circulation within building</li> </ul>

### Comparative analysis of architectural transformation in form and layout

Parameters	Style of houses analyzed (transformation)			
	Category A	Category B	Category C	Category D
<b>Spatial organization</b>	<ul style="list-style-type: none"> <li>Courtyard planning</li> <li>Public meeting and seating spaces like aangan, baghara, osara is provided</li> </ul>	<ul style="list-style-type: none"> <li>Courtyard planning</li> <li>Osara, baghara, aangan is also provided in both new and old house</li> <li>The interior spaces are still not much influenced urban lifestyle</li> </ul>	<ul style="list-style-type: none"> <li>Overall composition- courtyard planning</li> <li>Multiple functions under single roof are seen in newly constructed house</li> <li>Spaces for public meeting and sitting become smaller and concept of baghara is lost.</li> </ul>	<ul style="list-style-type: none"> <li>Row house type planning</li> <li>Vertical planning</li> <li>Compact city style interior spaces</li> <li>Concept of osara, aangan, baghara is lost</li> </ul>
<b>Effect</b>				
<b>Cause</b>	<ul style="list-style-type: none"> <li>Vernacularism is followed purely and local art and craft is used in the planning and layout</li> </ul>	<ul style="list-style-type: none"> <li>Change is dwelling unit spatial configuration</li> <li>Little urban influence</li> </ul>	<ul style="list-style-type: none"> <li>Gradual shift from agriculture and other occupations</li> <li>Change is dwelling unit spatial configuration</li> </ul>	<ul style="list-style-type: none"> <li>Shortage of land for courtyard planning</li> <li>Land distribution among families</li> <li>Multiple facilities under single roof</li> </ul>

### Comparative analysis of architectural transformation in form and layout

Parameters	Style of houses analyzed (transformation)			
	Category A	Category B	Category C	Category D
<b>Construction technique</b>	<ul style="list-style-type: none"> <li>Traditional construction technique</li> </ul>	<ul style="list-style-type: none"> <li>Old house- traditional construction techniques</li> <li>New house- frame structure (modern construction technique)</li> </ul>	<ul style="list-style-type: none"> <li>Fully modern construction technique (load bearing and frame structure)</li> </ul>	<ul style="list-style-type: none"> <li>Fully modern construction technique (frame structure)</li> </ul>
<b>Effect</b>				
<b>Cause</b>	<ul style="list-style-type: none"> <li>Limited approach to availability to local materials</li> <li>Less economic stability</li> </ul>	<ul style="list-style-type: none"> <li>Shortage of timber and bamboo</li> <li>Changing market with availability of new types of building materials</li> </ul>	<ul style="list-style-type: none"> <li>Availability of light weight and new materials</li> <li>Government policies and afforestation measures</li> </ul>	<ul style="list-style-type: none"> <li>Availability of light weight and new materials</li> <li>Government policies and afforestation measures</li> </ul>
<b>Building materials</b>	<ul style="list-style-type: none"> <li>Mud and bamboo wall</li> <li>Small openings for ventilation</li> <li>Thatch roof</li> </ul>	<ul style="list-style-type: none"> <li>New structure- use of concrete and bricks, glazing, use of CGI sheets on roof, flat terrace</li> </ul>	<ul style="list-style-type: none"> <li>Use of concrete and bricks on wall</li> <li>Glazed windows</li> <li>Flat terrace</li> </ul>	<ul style="list-style-type: none"> <li>Use of concrete and bricks on wall</li> <li>Glazed windows</li> <li>Flat terrace</li> </ul>
<b>Effect</b>				

### Comparative analysis of architectural transformation in form and layout

Parameters	Style of houses analyzed (transformation)			
	Category A	Category B	Category C	Category D
<b>Building materials</b>	<ul style="list-style-type: none"> <li>Unstable socio-economic status of occupant</li> </ul>	<ul style="list-style-type: none"> <li>Scarcity of timber and expensive nature of vernacular materials</li> <li>Changing market with availability of new types of building materials</li> </ul>	<ul style="list-style-type: none"> <li>Changing market with availability of new types of building materials</li> <li>Urge for contemporary aesthetic appeal</li> </ul>	<ul style="list-style-type: none"> <li>Changing market with availability of new types of building materials</li> <li>Ease of erection of temporary or permanent structures for additional built-up area</li> </ul>
<b>Cause</b>				
<b>Thermal comfort</b>	<ul style="list-style-type: none"> <li>Courtyard planning and traditional housing form</li> </ul>	<ul style="list-style-type: none"> <li>Courtyard planning</li> <li>Service of air conditioning, mechanical, electrical equipments</li> </ul>	<ul style="list-style-type: none"> <li>Courtyard planning</li> <li>Dependency on artificial air conditioning</li> </ul>	<ul style="list-style-type: none"> <li>Fully dependent on artificial air conditioning</li> </ul>
<b>Effect</b>				
<b>Cause</b>	<ul style="list-style-type: none"> <li>Easy approach to basic infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of economic conditions</li> <li>Easy approach to basic infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of economic conditions</li> <li>Easy approach to basic infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of economic conditions</li> <li>Easy approach to basic infrastructure</li> </ul>

### Underlying factors for transformation

It is observed from the survey that change in life style and easy in available of modern materials is major reason for the transformation of the village

Factor	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Construction of new house forms	81	91	11	15	0
Easy in availability of modern materials	85	87	11	15	0
Urban influence	76	65	14	45	0
Change in lifestyle of traditional spaces	73	89	14	18	0

## Chapter 6: Findings and Discussion



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### Findings & Discussions

#### A. Physical transformation

##### Construction of new house form

- Most of the houses in the village have **retained the courtyard planning**
- What have **changed** are the more **private areas** beyond these spaces. Reasons could be;
  - a. need for more space due to larger families – **additions and fragmentation**
  - b. need for **modern day requirements** - internal bathrooms, kitchens
  - c. social habits of occupants in relation to space usage
- Nowadays, **people require all facilities of a homes in a single zone >> separate house concepts are losing its form** and turning it into a wider house than previous one with all the facilities under a single shade



### Findings & Discussions

#### Re-distribution of land

- Conversion of the family into single structure from joint structure
- Expansion of families from generation to generation; **Land distribution** among relatives
- Increase of wealth, economic assurance and technical excellence



#### Change in materials and construction techniques

- People are getting more interest towards modern material; **they think it's more durable and stronger**
- People are **shifting to modern construction techniques** so as to lessen the hard work and **regular maintenance** required in local construction technique
- Change in easy availability of new materials



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### Findings & Discussions

#### Reflection of urban influence

- **Direct involvement with the city and city dependency** are affecting the taste of the residents which often influence conventional beliefs
- Along with the change in lifestyle, the need for functional spaces as physical demarcations of their social beliefs and norms changed
- Adopted **compact planning** of city lifestyle >> finds more convenient

### Findings & Discussions

#### B. Occupational transformation

- Change in livelihood: Transition of farming as main occupation to secondary occupation
- Increase of wealth, economic assurance and technical excellence

Cause	Effect
<ul style="list-style-type: none"> <li>• Earning from agriculture is not sufficient in the present socio-cultural and economic milieu</li> <li>• Lack of infrastructure and policy to promote agricultural activities</li> </ul>	<ul style="list-style-type: none"> <li>• Traditional social segregation has decreased but economic segregation has increased</li> <li>• Decrease in interest in hard working agricultural activities</li> </ul>



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### Findings & Discussions

#### C. Environmental dimension

- Most house **retained courtyard planning**>> introduces **cross ventilation into a building**
- **Verandahs** on either side of the main functional spaces that **created a buffer zone preventing heat transmission**
- Other than that, modern materials like brick and cement traps more heat >> discomfort interior during summer

#### D. Contradiction between modern and traditional building materials

- Peoples' admiration towards modern materials >> associated with durability and stronger
- Its is found that residents spend a lot of time in repairing or re-constructing houses built with traditional materials

### Conclusion

- The previous social framework for the use of traditional home space has changed to **personal preferences in managing the activities and functional needs of residents**
- Each home >> own way of respecting original home and evolving its structure>> **Result of individuals exploring new motives and possibilities**
- Revealed from the field study >> **significant changes in the construction materials and least changes in the form and layout of the houses i.e. courtyard planning**
- **Land distribution and expansion of family structure; direct involvement with city** >> changing the taste of residents
- Increasing stability and economic assurance>> **different style of housing form developed**
- Thermal comfort maintained by the means of **artificial air conditioning**
- **Category C type house is observed more** >> Between traditional and modern >> indicates the **medium level of transformation**



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### Recommendations

#### The government

- Establish a proper division of labor >> public, private, and unorganized sectors of society, including established local committees and non-governmental organizations (NGOs)
- The conservational decision-making in general should be a **collaboration between the central government and the local government**

#### The Private sector

- The owner should share responsibility for the intentional development of the community's local identity
- Contractor should be made aware

#### Community based organizations

- Tharu Kalyankarini Sabha, Tharu mahila Samaj and Tharu bidhyarthi sabha >> must create and promote opportunities >> search possibility for tourist attraction
- Preserving cultural and architectural heritage >> active sustainable development strategy >> revitalization

## Recommendations

### Building materials and construction technology

- Promote the use and production of local building materials and raise awareness of the potentiality of local building materials
- Clear policy on the promotion of locally available and use of naturally occurring materials should be made
- Need for training institutions >> local authorities and private sector organizations such as contractors and producers of building materials
- Development activities >> perspective of sustainability using sustainable and indigenous materials and construction techniques like CSEB block construction, rammed earth construction

### House type for terai climate

- **The courtyard planning is preferred** >> prevalent design in case study area



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## Recommendations

- **Local byelaws and building guidelines >> traditional façade and courtyard planning >> interior spaces can be changed**
- **Engaging the community in the conservation process** plays a crucial role in sustaining the historical buildings and sites
- Encouraging the communities in historical city centers to focus on **investing in existing potentials of the historical sites**

### Recommendations for further research

- Focus on the identification and study of different types of courtyard houses
- Investigate its potential in guiding future housing designs
- Courtyard design variants and microclimate performance



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**Thank you !!**



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## **ANNEX 5: 12<sup>th</sup> IOE Graduate conference paper**



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Date: October 7, 2022

### To Whom It May Concern

This is to confirm that the paper titled “*Transformation over time in Kochila/Saptariya Tharu Architecture: A case of Baswalpur, Saptari, Nepal*” submitted by **Niru Chaudhary** with Conference ID **12090** has been accepted for presentation at the 12<sup>th</sup> IOE Graduate Conference being held in October 19 – 22, 2022 at Thapathali Campus, Kathmandu.

Khem Gyanwali, PhD  
Convener,  
12<sup>th</sup> IOE Graduate Conference



# Transformation over time in Kochila/Saptariya Tharu Architecture: A case of Baswalpur, Saptari, Nepal

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## Abstract

Tharus are one of Nepal's major ethnic groups, and Tharu architecture is an excellent example of ethnic architecture with an ecologically responsive design. However, as a result of urbanization, many Tharu settlements are shifting to fit modern demands, and traditional houses have been modified, with contemporary appliances, new spaces, and domestic life added that bear little resemblance to the original. This study presents an exploration of the transformation of the built form in traditional settlements of Kochila Tharu community. A survey of traditional settlements of the southeastern part of Nepal i.e., Baswalpur village of Saptari district is undertaken in order to extract an urban pattern or a rationale from what may appear as capricious disorder. The objectives of this research are to investigate the paradoxical phenomenon of the house transformation in this village; to determine the extent of the impact of the transformation; to identify the factors that contributed to it. To investigate the effects of changing physical configuration on the values and meanings of traditional homes, field observations were made at a few houses chosen using the purposive sampling technique, and interviews were conducted. With the identification of these factors, it is anticipated that this study will serve as a reference on house transformation and offer a reasonable perspective for community and government to take development measures on the transformation of traditional homes in Baswalpur village.

## Keywords

Urbanization, Modernization, Housing Transformation, Traditional Kochila Tharu settlement, Urban influence

## 1. Introduction

### 1.1 Research Background

The worldwide expression of changes due to sustainability, globalization and technology in architecture has led the transformation process. Architecture has close association with change and transformation and concepts such as globalization, sustainability, ecological approaches and technology diversify the change-transformation circle [1]. To develop every settlement, a number of ecological, socioeconomic, and cultural regulators are at action that are produced from two different backgrounds [2]. Some of them are created using natural background knowledge, such as the location of water, the location of agricultural land, the location of barren land, the topographic features, the orientation of the sun, the climate, and the availability of construction materials. Others arise from socioeconomic factors, such as a safe and secure location, technology, common

religious and philosophical ideas, individual preferences, and financial stability. These controllers act as a settlement's background forces and aid in the settlement's gradual transformation [2].

In addition, the requirements and economic growth of these settlements influence the development of communities that determine the pattern of settlement change. Some of trends underlying transformation be seen as logical responses to changes in culture and society. For example, certain changes in the traditional settlement have been necessary to alleviate the housing shortage. Likewise, other changes reflect desire to live a more comfortable lifestyle [3]. Likewise, in most developing countries, contemporary buildings are unlikely to meet local conditions because transferred technology and imported designs fail to meet physical and psychological needs. Furthermore, blindly copying new concepts without any alteration has negative consequences for the old social, environmental, and cultural values of the area

[4]. What's more unexpected is that, despite significant use of new building materials, processes, and equipment, new projects have failed to respond appropriately in climatological or environmental terms [3].

Traditional Tharu architecture, like most other similar examples around the world, evolved in response to the needs of its users and the region's living environment. Geographic, climatic, sociological, and historical elements all have an impact on a region's architectural style. Many developing countries have seen a major change in architectural design systems that were previously used, with no way of adapting to the new style. As a result, local architectural forms, which have been reacting to people's physical and cultural requirements for thousands of years, appear to be overlooked. The majority of old residences are being turned into contemporary amenities from a similar archetype. Even though many characteristics of traditional homes were finest in their context, it is challenging to integrate modern living habits into a traditional setting. In addition, the new generation is drawn to the quick accessibility of all of the modern hi-tech age's conveniences.

### 1.1.1 Research questions

The objective is to explore how housing is changing, how space is used, and the spatial characteristics of interior and outdoor space in traditional rural villages. The research questions are listed below:

- What are the aspects of the area in which the Kochila/Saptariya tharu architecture has been changed?
- How does the socio-economic factor affect the spatial configuration of the Tharu house form?

## 2. Literature review

### 2.1 Origin of Kochila/Saptariya Tharus in Nepal

Nepal is one of the multi-cultural countries with different indigenous groups living together in harmony. Tharus are believed to be one of the largest and oldest ethnic group seen in the southernmost part of Nepal and Nepal's southeast border India. "The Tharu, however, recognize many different subgroups distinguished by clan, region, cultural differences, and language" [5] and and endogamous sub-groups of

Tharus are Rana, Katharia, Dangaura, Kochila and Mech [6].

Study says, the Kosila Tharu of the eastern Terai were historically discovered under influence of the Brahminical and Vaisnava culture of the Mithila kingdom [5] and regarding the ethnonym of their language name, Krauskopff said that the ethnonym Koshila or Kochila could be related to the name of the river Koshi on the bank of which they used to live [7]. The eastern tharus, called Koshi or Koshila or Kochila tharus, are stattered in several districts from Morang to Rautahat, including Udayapur, Inner terai valley. The Koshila tharu, who seem to have mostly migrated westward are fewer and fewer in the districts of Siraha. They claim Saptari and Siraha districts as their main home but many also live in the Sunsari district on the other side of koshi river. Interestingly, there are also probably subgroups or endogamous units, such as the Lamputchwa tharu of Morang district who are considered different by the Koshila Tharus. The Kochila/Morangia tharu, located mostly in Morang and Sunsari, are distinguishable from other Tharu who name themselves Kochila in Siraha, Udayapur, and Saptari districts by attire, rituals, and language, according to Boehm. But commonly, Kochila tharu is also called as Saptariya tharu, as dominating Kochila tharu people reside in Saptari district [8].

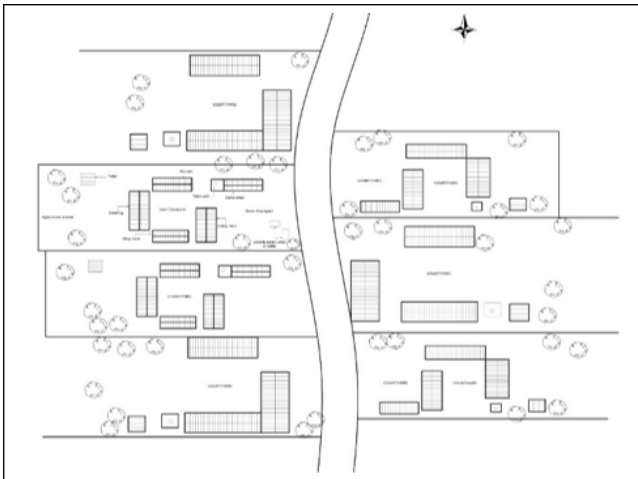


Figure 1: Distribution of Kochila Tharu in Nepal

### 2.2 Settlement planning and layout of Kochila Tharu house in Saptari

Kochila Tharu village of Saptari district are found to have linear settlement pattern. The majority of the Saptari district's villages have a main road that runs along a north-south axis and includes several branch village roads. The houses lie on the either side of the village lane, oriented north-east and running across the entire length of the settlement. The construction

pattern is identical i.e., long and single storied with an adjoining kitchen garden. But, now two storied houses are also constructed to meet the modern requirements. Normally, a village comprises just a single row of houses on either side of road, but some villages consist of several rows of houses too. The houses for living purposes are oriented towards the street and rest of the land behind the house is left for agricultural spaces as we can see on the picture below.



**Figure 2:** Layout of dwelling units in Saptariya Tharu village

### 2.3 Urbanization, Globalization and Modernization

The rate of urbanization has increased year after year in Nepal due to the fast expansion of the urban economy and social transformation. Cities and villages have expanded into the surrounding countryside, and new homes are being constructed among the fields, transforming farms and communities into new housing projects [9]. Likewise, rural regions have served as a buffer zone for urban sprawl, they also have the potential to become new urban development zones. In this regard, identifying the distinctive characteristics of the rural village based on location and historical process is critical in order to ensure the area's survival. Local cultural identity is becoming increasingly essential in this age of globalization. Similarly, many researchers contend that urbanization reflects changes throughout whole cultures and is a multifaceted representation of physical, geographical, institutional, economic, demographic, and social aspects [10]. Furthermore, the phenomena of urbanization are inextricably tied to modernity, industry, and the sociological process of rationalization, with urbanization causing massive

social, economic, and environmental changes.

### 2.4 Modernization and housing transformation

A modernization paradigm, one of the key currents in development theory within the social sciences, is used to align such transformation. Modernizing homes mostly involves switching from conventional to contemporary building materials and altering how space is used. Other causes identified for the modification of homes include the shift from a subsistence to a cash economy and the desire to lead a contemporary life. Due to the shift to a modern economy, urban inhabitants choose to live in "modern" homes that meet specific requirements, especially those who have acquired a certain degree of social prestige in terms of good education, prosperous businesses, and public employment [11].

The prevalent motivations of transformation of houses can be summarized as follows: socio-culturally determined aspirations; growth of family size; desire of generating income (subletting, kiosk, stable, local bar, handicraft etc.); response to harsh climatic conditions, desire to copy prevalent housing forms and aspiration to live in modern houses [12].

## 3. Research Methodology

This research is based on non-exact science since it studies human behavioral pattern, space and social relationship. This research takes qualitative as well as quantitative approach and utilizes a case study strategy within the transformative paradigm since knowledge is not neutral and it reflects the power and social relationships within society, and thus the purpose of knowledge construction is to aid people to improve society. The ontological claim is that modernization and urbanization has caused transformation of traditional architecture and settlement. Further, this research intends to produce knowledge by looking into the changes in the lifestyle and its relationship with the space configuration; the forces (Occupational shift, educational shift, changes in family structure, etc.) behind the transformation; relationship with their changed social life, cultural life with the spaces, both interior and exterior. Consequently, epistemological assumptions are established based on people's preferences for modern designs.

The transformation process is exploratory descriptive

explanation of the phenomena so the nature of the research topic, objectives, and research questions justifies the use of a case study strategy. The case study research technique is applicable in this study since housing change occurs in a ‘real world’ environment and is focused on present context so, the result may be varied according to time changed. And, a descriptive theory can be generalized through quantitative and qualitative analysis.

To investigate the ongoing transformation of Baswalpur village, 12 houses were selected using purposive sampling technique and socio-economic and demographic data was conducted for 132 respondents using structured questions.

**4. Study Area: Baswalpur Village**

Baswalpur or Basbalpur is a developing market town in Sambhunath Municipality, ward no. 9 in Saptari district of Madhesh Province and in the Sagarmatha zone of south-eastern Nepal. It lies in the coordinates of 26.60°N latitude and 86.67°E longitude. The village is surrounded by agricultural land and other villages from all sides within approx. distance of 2-3km.

The study area for the research involved the observation of traditional as well as transformed residences of the Tharus group, as Tharus constitute the majority of the population in the village. In addition, since there are not enough traditional buildings in the tharu community area, Mushar basti was used to observe other traditional houses in Baswalpur village. Further, the observation is focused on the transformation and change taking place in Baswalpur village.

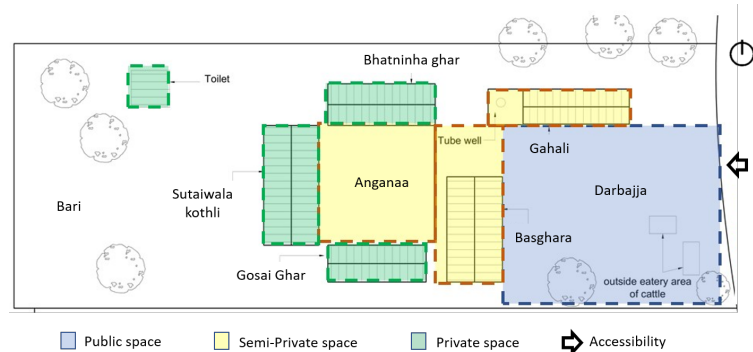
**4.1 Settlement pattern and house layout of Baswalpur**

The settlement pattern is similar to that described in the preceding section of the literature review, but the internal layout of the typical Tharu home of Baswalpur differs from that of the mid-eastern and western Tharu houses in terms of space configuration and space name in local language.

**4.1.1 Allocation of spaces**

- Public space: Outer Courtyard (Darbajja)
- Semi private-space: Cattle shed (Gahali), Entrance/guest hall (Basghara), Inner courtyard (Angnaa), Verandah (Osara)

- Private space: Dwelling space (Sutaiwala Kothli), deity room (Gosai ghar), kitchen (Bhatninha ghar)



**Figure 3:** Zoning of Kochila Tharu house on the basis of privacy

**5. Site Observation and Data Analysis**

The focus of the first study, which is based on field observations, is physical change. The second one was based on a questionnaire survey that sought to identify the socioeconomic context and perception survey. 132 respondents were surveyed through the research among the total household of 202 tharu houses. More male than female respondents were readily accessible for the study. The table below shows the sample distribution.

**Table 1:** Sample distribution

Male	Female	Total
101	31	132

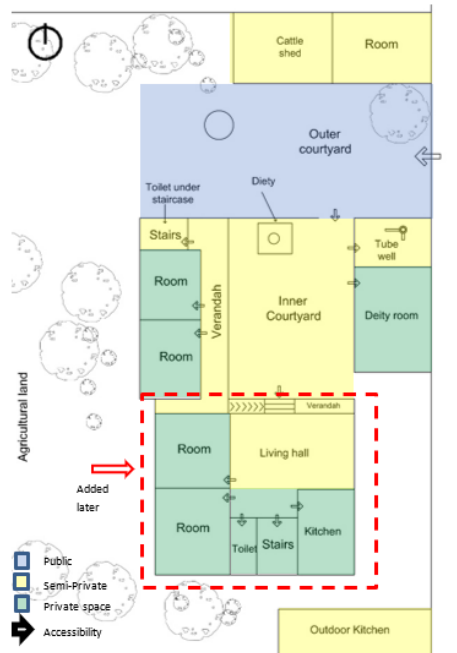
**5.1 Different type of housing transformation**

**5.1.1 Horizontal extension**

Horizontal extension projects range from expanding an existing room or rooms to building a fully new living unit to an existing one providing space to the extended family members.



**Figure 4:** Horizontal extended new house



**Figure 5:** Compact planning type of house was horizontally extended (Residence of Mrs. Ram Piyari Chaudhary)

### 5.1.2 Demolition of old homes and construction of brand-new ones

One way in which this transformation takes place is the construction of new walls of concrete blocks or bricks around an existing mud and poles structure. Occupiers move into the built-up part to allow demolition of the old structure. Respondent pointed out degraded and outdated traditional house for the replacement.



**Figure 6:** Replacement of mud house into RCC house; Residence of Mr. Ram Subaran Chaudhary after transformation

### 5.1.3 Replacement of mud and pole structures in phases

Another type of transformation is that of replacing one room after another, whereby a room built of mud and poles is demolished, the walls being replaced by concrete blocks. The reason for replacing the mud wall and timber post is that the process for maintaining and repairing is very hardworking and time consuming for the respondent.



**Figure 7:** Addition of pillar and concrete block in old mud structure; Residence of Mr. Raj Kumar Chaudhary

### 5.1.4 Constructing new concrete block structures next to outdated pole and mud structures

This type of transformation usually takes place in a larger plot, where it is possible to erect a new structure adjacent to the old one as shown in above figure, which is normally extended step by step until the whole house is completed. From the observed houses, maximum was following this type of transformation process. The degradation of traditional house and urge to extend sleeping spaces is the reason for this transformation as described by the respondent.



**Figure 8:** Contemporary two storey house was built beside traditional house; Residence of Mr. Ramakant Chaudhary

### 5.1.5 Interior modifications

Modifications are made gradually over time; the use of interior space involves occupants moving from one room to another. In certain cases, interior walls are removed in order to increase the size of rooms. The urge for opting modern house with modern amenities for the younger generation is the key reason for the modification as described by the respondent.

However, the observation from the survey revealed that maximum of the houses still follows the traditional row house configuration and few with passage system house and compact houses.



Figure 9: Interior modification according to city lifestyle, Residence of Mrs. Ram Piyari Chaudhary

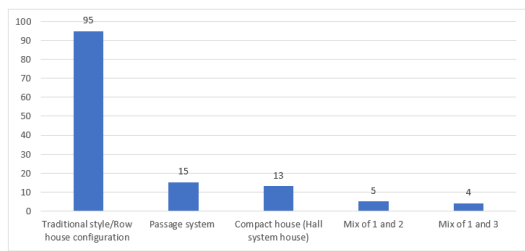


Figure 10: Interior configuration of surveyed data

### 5.1.6 Vertical extensions whereby rooms are added vertically to accommodate additional functions

Vertical extension is another form of transformation started to be observed in the Baswalpur village where there is no space left for horizontal extensions. From survey, it is found that maximum respondents lived in one storey house.



Figure 11: Vertical expansion of house due to limited plotland; Residence of Mukhilal Chaudhary

### 5.1.7 Aspiration to live in a “modern” house

The majority of the 104 respondents preferred modern house over tradition ones and prefer not to live in mud house. According to the respondents in this study,

these houses are built of traditional materials and associated with poverty and hence low social status. Thus, most people want to change their houses to concrete block structures. Durability is a quality that, in the opinion of our survey respondents, defines a better dwelling. The belief that industrially manufactured construction materials are more durable than conventional building materials is widespread among villagers.



Figure 12: Compact style house of Hari Dev Chaudhary

### 5.2 Other building information from survey

From the survey, it is observed that maximum houses are used for residential purpose while only few is used as mixed used purpose. Maximum houses used RCC with pillar as foundation; burnt bricks with cement in outer wall; galvanized iron sheet and cement were both observed in equal manner where majority of houses has slope roof typology.

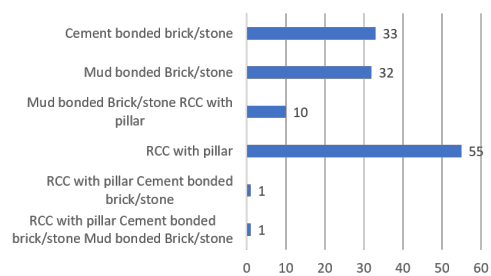


Figure 13: Materials used in Foundation

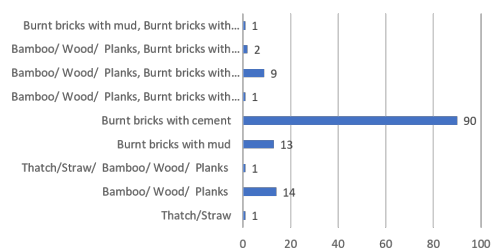


Figure 14: Materials used in Outer wall

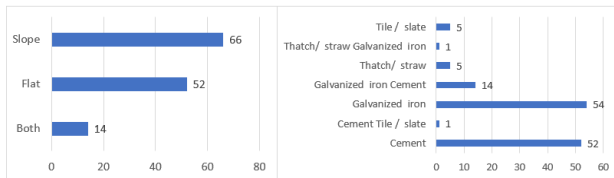


Figure 15: Roof type and roofing materials

### 5.3 Transformation in socio-economic condition

It is observed that maximum of the household includes agriculture and other secondary jobs as their main source of income. Majority of the respondent has pursued the education level up to class 10 while others has completed education level like class 5, undergraduate, graduate, etc.

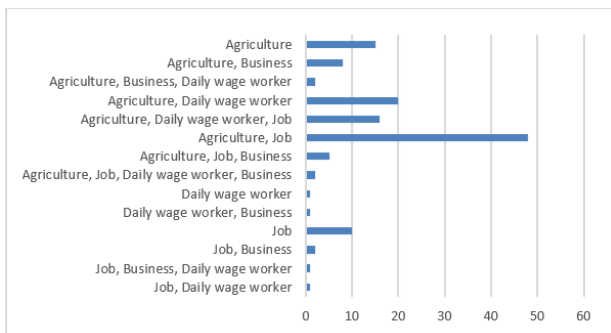


Figure 16: Main source of income

### 5.4 Underlying reason for transformation

According to the survey, the main reason for the village's transformation is a shift in lifestyle and the easy availability of modern materials.

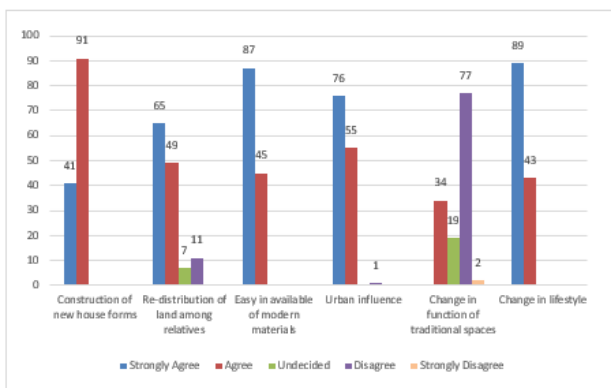


Figure 17: Underlying reasons for transformation

## 6. Findings and Discussion

The results of the above studies highlight the fact that social structure is one of the main factors in housing transformation that leads to the transformation of rural settlements as a whole. Discussions are made on the following points.

### 6.1 Physical transformation

#### 6.1.1 Construction of new house form

Most of the houses in the village have retained the courtyard planning. What have changed are the more private areas beyond these spaces. Reasons could be: need for more space due to larger families – additions and fragmentation; need for modern day requirements - internal bathrooms, kitchens; social habits of occupants in relation to space usage. Nowadays, people require all facilities of a homes in a single zone; separate house concepts are losing its form.

#### 6.1.2 Re-distribution of land

Conversion of the family into single structure is another reason for land distribution including expansion of families from generation to generation, land distribution among relatives.

#### 6.1.3 Change in materials and construction techniques

People are becoming more interested in modern materials because they believe they are more durable and stronger. People are changing to contemporary building techniques in order to reduce the amount of hard labor and frequent maintenance necessary in traditional construction techniques, which also includes the ease of access to modern materials.

#### 6.1.4 Reflection of urban influence

Direct involvement with the city and city dependency are affecting the taste of the residents which often influence conventional beliefs. People find more convenient in compact planning houses.

### 6.2 Occupational transformation

Change in livelihood is observed which include transition of farming as main occupation to secondary occupation like business, job and insuring increase of wealth, economic assurance and technical excellence.

### 6.3 Environmental dimension

Most house retained courtyard planning which introduces cross ventilation into a building. Verandahs on either side of the main functional spaces that created a buffer zone preventing heat transmission. Other than that, modern materials like brick and cement traps more heat causing discomfort interior during summer.

### 6.4 Contradiction between modern and traditional building materials

Peoples' admiration towards modern materials is associated with durability and stronger. It is found that residents spend a lot of time in repairing or re-constructing houses built with traditional materials.

## 7. Conclusion

The tradition of housing construction in the village of Baswalpur is influenced by the modernization process in which the universal values of the living environment have replaced the lifestyles practiced locally. The previous social framework for the use of traditional home space has changed to personal preferences in managing the activities and functional needs of residents. Today, each home has its own way of respecting the original home and evolving its structure. As a result of individuals exploring new motives and possibilities, the living environment today is very different from the past. It is observed that, there has been significant changes in the construction materials and minimum changes in the form and layout of the houses in Baswalpur village. The internal layout of the houses can also be seen influenced by urban lifestyle as most of the young generations is found to be living in city areas for study or for job and hence the replications can be seen on the housing style. Therefore, as a result of observation, it can be said that socioeconomic factors of society have the greatest influence on the transformation of traditional houses in Baswalpur village.

This kind of settlement are not preservation oriented rather they are continuity-oriented and they seek to create continuities of such expressions as traditions, beliefs and intangible values into the future through

the acts of value to the present. So, allowing sufficient time (may be generations long) to change and letting the society make the change through its own mechanism would be in the best interest of cultural and social diversity of mankind.

## Acknowledgments

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