AN EXPLORATION INTO THE LIVED EXPERIENCE OF ALTERNATIVE HOUSING PRACTICE

A dissertation submitted to the University of Kerala
in partial fulfilment of the requirements
for the degree of

MASTER OF SOCIAL WORK

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ABSTRACT

The 21st century is the century of environment and sustainable development. Today architects and city planners are expected to think up new neighbourhoods and cities, new public spaces, new means for production of historical urban heritage and transform land into a city with superior living conditions and in an environmentally-friendly manner. Sustainable architecture is a general term that describes environmentally conscious design techniques in the field of architecture. Sustainable architecture or sustainable alternative construction is framed by the larger discussion of sustainability and the pressing economic and political issues of our world. In the broad context, sustainable construction seeks to minimize the negative environmental impact of buildings by enhancing efficiency and moderation in the use of materials, energy, and development space. The idea of sustainability, or ecological design, is to ensure that our actions and decisions today do not inhibit the opportunities of future generations. The term can be used to describe an energy and ecologically conscious approach to the design of the built environment. If sustainability is to be given a shape, it will be a circle. Any aspect of living that can keep moving in a circle without interfering with objects outside this circle can be termed as sustainable. The key to architectural or constructure sustainability is to work with, rather than against Nature; to be sensitive so that we do not damage the natural systems.

This qualitative study attempts to explore and throw light into Alternative Housing Practice through the experience of people who are shifted from the conventional housing practice to this sustainable housing practice in Kerala. The study adopted a multiple case study design. Three families who are now living in a sustainable Alternative House for six or more than that has been selected as participants using snowball sampling. The study made use of In-depth interviews with the help of a semi-structured interview guide. The qualitative cases were subjected to thematic analysis for the interpretation of the data and findings were drawn.

The study tried to understand and explore the different themes of the lived experience of people following alternative housing practice includes inspiration to choose this path, expectations hold, the transition process of this alternative journey, the life they view

before and after choosing this housing practice and the challenges encountered as well as the ways of overcoming these challenges. The findings revealed that there are strong rooted value system, behavioural practice and clear ideas and perspectives to lead an eco-friendly life for people as well as their self- determination and self-confidence well played a role in facing the exclusion and discouragement from the near friends and social circle. The support of the spouse and other close family members were vital to move with the decision to follow Alternative Housing Practice. The findings suggested that, it would be a better enough if this area is further explored in-depth using phenomenological approach as this study is one of the first try to investigate the lived experiences of Alternative Housing Practice in Kerala. There is a dearth of research in this area in Kerala context also as well as in the Indian and Western. This study would also contribute to the knowledge base of social work especially to the practical implication to the field of Ecological Social Work.

Keywords: Alternative Housing Practice, Lived Experience, Transition Process

CHAPTER I: INTRODUCTION

INTRODUCTION

"We can sit back, do nothing and watch our planet be destroyed.

Or we can take action, become advocates and start making lifestyle choices which are kinder to people and the planet."

– Kira Simpson

Chief Seattle's (Chief Sealth) historical reply to the U.S President Franklin Pierce in December 1854 when the Government aggressively offered to buy 2 million acres of land occupied by native people in the Northwest goes like this "How can you buy or sell the sky, the warmth of the land? The idea is strange to us. If we do not own the freshness of the air and sparkle of the water, how can you buy them?". The essence of his innocent question just enlightens the idea of our individual as well as collective responsibility to keep away our deeds that can harm the natural balance of our planet with a thought that "Earth is what we have all in common".

1.1 INTRODUCTION

"Who owns the earth?" Alanna Hartzok clearly asks this question about who actually owns our home planet; it is a profound ethical and spiritual question that should be echoed inside every human being. The question cannot be answered in the same mindset from which it is asked. The answer lies beyond the concept of "ownership" and goes to the heart of the matter: that all life is interconnected. In other words, how we hold the earth is how we hold each other (Hartzok, 2008).

An old saying goes "we have forgotten how to be good guests, how to walk lightly on the earth as it's other creatures do" and this is what we are seeing all around us. The impact of human deeds in the name of "Development" has hit nature and vice versa where human era becomes part of the 'problem' rather than being a part of the solution.

Leaving the earth, a better living place than when we arrived should be the collective responsibility of mankind. The responsibility even starts from the lifestyle choices people make that should align with a thoughtful action to leave this planet a little greener and cleaner. Each one of us are the stewards of mother earth, and what we do to make it least harmful for the environment regardless how small the deed or larger in

building the dream “Home”. This study thus explores the lived experience of those people who can move beyond the politics of right versus left into a new ethical, economic, and political realm where they hold each other and the earth in love, respect, and profound appreciation through a single but most powerful deed by choosing how to live with less carbon foot-print and more sustainable way through “Alternative Housing Practice”.

1.2 BACKGROUND OF THE STUDY

One among the greater investment for human beings and in fact for most creatures is to have shelter under the sun. Mankind being a social and family man invest their life time savings to build their dream home. Building or owning a dream home is one of the most secure and happier decisions people take, but most of these decisions go in line with the unsustainable housing practice that uses environment threatening materials for house construction including cement and plastics.

After water, concrete is the most widely used substance on the planet. But its benefits mask enormous dangers to the planet and to human health. The conventional style of construction mostly uses cement as building material worldwide which is cheaper in availability but causes greater harm to the people living inside as well as to the environment. World demand for cement is projected to rise 4.5% per year to 5.2 billion metric ton in 2019. India is expected to post the fastest growth in cement demand of any major national market, advancing 8.0% per year through 2019 (Green, 2015). The material is the foundation of modern development, putting roofs over the heads of billions, fortifying our defences against natural disaster and providing a structure for healthcare, education, transport, energy and industry. If the cement industry were a country, it would be the third largest carbon dioxide emitter in the world with up to 2.8bn tonnes, surpassed only by China and the US. Our blue and green world is becoming greyer by the second, through the usage of this toxic and harmful material for construction.

All the plastic produced over the past 60 years amounts to 8bn tonnes. The cement industry pumps out more than that every two years. But though the problem is bigger than plastic, it is generally seen as less severe. The production of **cement** is very energy-intensive and generates emissions of mainly COx, SOx and NOx as well as

small amounts of mercury. Cement is an important construction ingredient around the world, and as a result, cement production is a significant source of global carbon dioxide (CO2) emissions, making up approximately 2.4 % of global CO2 emissions from industrial and energy sources (Boden, et al., 1989). Among materials, only coal, oil and gas are a greater source of greenhouse gases. Half of concrete's CO_2 emissions are created during the manufacture of clinker, the most-energy intensive part of the cement-making process. Concrete is a thirsty behemoth, sucking up almost a 10th of the world's industrial water use. This often strains supplies for drinking and irrigation, because 75% of this consumption is in drought and water-stressed regions. In cities, concrete also adds to the heat-island effect by absorbing the warmth of the sun and trapping gases from car exhausts and air-conditioner units – though it is, at least, better than darker asphalt.

It also worsens the problem of silicosis and other respiratory diseases. The dust from wind-blown stocks and mixers contributes as much as 10% of the coarse particulate matter that chokes Delhi, where researchers found in 2015 that the air pollution index at all of the 19 biggest construction sites exceeded safe levels by at least three times (Watts, 2019). Limestone quarries and cement factories are also often pollution sources, along with the trucks that ferry materials between them and building sites. According to the 2011 census of India, among the 77,16,370 total households in Kerala 47,35,079 households used "Cement" as the predominant material for construction i.e.; 61.4% (Ministry of Family and Home Affairs, 2011). So, the impact is everywhere in the nook and corner of the world.

The construction of gigantic walls, dams and other developmental projects are in the hands of policy makers and politicians while the dream home of ours is in our supremacy to make a decision. There comes the significance of choosing sustainable alternatives for housing "with hundreds of methods available now which can, to a greater level, reduce the environmental hazards of using cement and other unsustainable materials for housing. The construction of sustainable housing or Alternative Housing practice in the context of reducing environmental impact of conventional housing has different styles and ways to make use of the natural building materials and architecture from country to country concerning to the geography and climate of the place.

1.2.1 Alternative Living as a Concept

Alternative Living Practice takes up many definitions and different meanings in different contexts. Although, there is always one understanding all over the globe that it is the process of finding a solution or an alternative for an existing misfit or crisis faced, through a different way that is mostly a novel way of doing so.

Even now no exact definition exists for explaining "Alternative Living", rather the word goes in line with the term in most of the dictionaries as "Alternative Lifestyle" in which it is perceived to be outside the cultural norm. The phrase may be used by someone to describe their lifestyle. Alternative living describes a scenario in which a person's primary dwelling is something outside of the typical understanding of a suburban "home" From mobile homes to horseboxes, tiny homes to canal boats, there are countless 'unconventional' accommodation options (Kath, 2020).

a) *In Western Scenario*

In most places in the United States & United Kingdom, the young generation moves to choose different living patterns like Van life, Yurt Life, Boat life, Static Boat Life etc. Alternative living offers a simpler way of being. A life view that looks less at possessions and more at experiences. One which prioritizes LIFE. The concept of downshifting is one in which a person gives up a stressful, frenetic fast-paced lifestyle for a slower, more sustainable one (Kath, 2020).

When it comes to the perspectives of government and policy makers of the New Jersey Department of Community Affairs, United States "Alternative living arrangement" means a structure in which households live in distinct bedrooms, yet share kitchen and plumbing facilities, central heat and common areas. Alternative living arrangement includes, but is not limited to: transitional facilities for the homeless, Class A, B, C, D, and E boarding homes as regulated by the New Jersey Department of Community Affairs; residential health care facilities as regulated by the New Jersey Department of Health; group homes for the developmentally disabled and mentally ill as licensed and/or regulated by the New Jersey Department of Human Services; and congregate living arrangements. "Assisted living residence" means a facility licensed by the New Jersey Department of Health and Senior Services to provide apartment-style housing and congregate dining and to assure that assisted living services are available when

needed for four or more adult persons unrelated to the proprietor and that offers units containing, at a minimum, one unfurnished room, a private bathroom, a kitchenette and a lockable door on the unit entrance (law insider, n.d.). Here the entire context spells out the notion of "sustainability" from the picture but gives more focus to creativity and efficiency.

In the western scenario they also give Alternative housing as another way of Alternative Living / Lifestyle. This way of housing has appeal as they can provide cost savings either in construction or in long-term use. These homes are made with clay or earth, or a mixture of these with straw. These materials are cheap and easy to repair. They also succeed in reducing environmental footprint compared to traditional housing, either through materials or resource consumption. This type of housing is highly customizable and can be a stimulating challenge to build (Kath, 2020).

Home-schooling or Alternative Education is another way of Alternative Lifestyle. Home-schooling or home school (also called home education or home learning) is the education of children at home, typically by parents but sometimes by tutors, rather than in other formal settings of public or private school. In India, the home-schooling movement is gaining more and more acceptance by the parent community with a lot more parents opting to home-school their children instead of sending them to the traditional schools (Mulyadi S. , 2010).

Sustainable clothing; one type of Alternative Lifestyle option is that which aims to minimize the overall environmental damage caused. This means clothing that is made from pesticide free fibres, made in closed loop systems or with a focus on recycling and/or reducing the overall water and chemical waste. Low impact dyes are also favoured, to avoid nasty chemicals coming in contact with skin, the body's largest organ.

In the western countries, there is a new movement called "Passive House Movement" as an alternative for sustainable construction of buildings are emerging in which they have moved away from the off-the-grid utopias, and builders now strive to integrate a fully sustainable house within an urban setting. The challenge is a technological one, and the eco-friendly house has become a high-performance construction that integrates

the latest technologies. A Passive House is a combination of art and science (Auger, 2018).

One way of maximizing the efficiency of a project is to have parts and components prefabricated off-site. This allows for better quality control and, in turn, for higher building performance. Besides, it also reduces time spent on-site, lowers costs, and makes the entire project more straightforward. Nowadays, the Passive House spirit has become a sort of driving force behind the building industry in the western culture. It quantifiably reduces the environmental footprint of buildings, which is great. But more importantly for builders, it proves that building sustainably can be profitable, more efficient, and more comfortable for the end-user.

Eco-Villages are the upcoming movement started in Europe as part of Alternative Living. Eco-Villages provide a guide and model for finding the balance in human systems - social, spiritual, cultural, economic and physical - that can work within the natural system of nature. The concept is usually associated with a life in harmony with nature and a bottom-up alternative to the dominant paradigm of society (Santos, 2017).

Alternative Lifestyle has lot of lifestyles to follow like home-schooling, co-parenting and home births, Restrictive dieting like veganism, vegetarianism, living in unusual communities like communes, intentional communities, eco-villages, off-the-grid, or the tiny house movement in the different regions of the world people give different meaning in the western scenario.

b) *In the Indian Scenario*

In contradictions with the varying meanings of western perspectives on Alternative Living, the Indian culture focus more in line with following an Alternative Lifestyle even from the Vedic period and ancient times of civilisation which were more in coherence with the notion of sustainability of the environment and resources and near to a way of life which is closer to nature. Today, people are growing more responsible and more aware of their personal carbon footprint. Many are also looking at alternatives to traditional, polluting or energy-intensive products and technologies. But the practice of sustainability is not widely known.

The Co-living facilities in Urban India is viewed as an alternative living choice for Many millennials, those in their 20s and early 30s, who seeks out for studies and job leaving their home, comprising outstation students and young professionals, offer a private living space and combine it with shared facilities such as laundry, gym, Wi-Fi and common kitchen and housekeeping, among others. For someone in his first job, with a monthly take-home salary of ₹ 30,000-40,000 and living away from their home, shared living is a more secure, cheaper and quicker alternative than buying or renting a house. Co-living spaces with a community-like experience, student housing and even family rental solutions are rapidly picking up in cities such as Bengaluru, Pune and Delhi-National Capital Region (NCR), which are preferred by higher education students and young, single professionals from other states to study and work in (Nandy, 2018).

Another alternative living segment that has gained momentum in the recent past is Senior Living. Senior living, in broader terms, means homes that cater to senior citizens who by choice are looking to live independently in a peer environment. The concept, even though at a very nascent stage, is gaining importance and has great potential. As per industry estimates the elderly population in India is expected to triple from 104 million in 2011 to 300 million in 2050, accounting for 18% of the total population in 2050. Presently there are more than 30 firms into senior living housing and the demand is continuously increasing (Magazine, 2020). Coupled with the growing desire of the elderly to live independently and the projected growth of the elderly population, this trend can be translated into an opportunity for real estate developers to provide residential facilities tailored according to the needs of the elderly in India.

The alternative farming techniques that were field tested and perfected over several generations in the past portrayed the following advantages over chemical farming: (1) eco-friendly by protecting and revving life support systems and ecosystem services, (2) higher cost benefit ratio, benefiting the farmers as well as the consumers, (3) control and reduction of bioaccumulation and biomagnifications, (4) reduction in air, water and soil pollution caused by various pesticides and other chemicals, (5) control of health hazards in humans and livestock, and (6) conservation and sustainable use of on-farm biodiversity, including traditional cultivated germplasm and natural resources in agro systems (Gopalsamy & Padmavathy, 2011).

Home to six of the ten most polluted cities in the world, with its natural resources being plundered rapaciously to realize an ill-conceived vision of development and its weather patterns becoming increasingly erratic and often lethal, the country seems to be hurtling ever forward towards ecological mayhem. These adversities are addressed by several NGOs who is rooted with the principle of choosing "Sustainable Alternatives" as part of the solutions. The NGOs like Kalpavriksh, Bhoomi, Deccan Development Society, Vikalp Sangam were working towards propagation of this idea of "alternatives" on the basis of the idea of "Alternative Living" as practical activities, policies, processes, technologies, and concepts/frameworks that lead us to equity, justice, sustainability. They can be practiced or proposed/propagated by communities, government, civil society organizations, individuals, and social enterprises, amongst others. They can simply be continuations from the past, re-asserted in or modified for current times, or new ones; it is important to note that the term does not imply that these alternatives are always 'marginal' or new, but that they are in contrast to the mainstream or dominant system (Kothari & Das, 2019)."

In the national bestseller of Indian celebrity nutritionist Rujuta Diwekar's, *Indian Super Foods*, Rujuta sparks a revolution of sorts when she flouts all the popular and customary myths in modern and imported diets in favour of India's age-old healthy alternatives. She bravely portraited the idea on healthy alternatives and the healthy Indian diet, as "Eat local, eat seasonal, eat traditional" was something turned those Indians who have concerns over their food and diet to a traditional alternative over modern calory Junk food. According to her viewpoint the Indian diet is healthy, benefits one can derive from traditional, seasonal, and locally available fresh fruits, grains, and vegetables. Rujuta takes a pragmatic approach, telling readers to stop fantasizing about green tea, stop shunning fats and the carbs in your diet, stop piling on proteins in every meal because a fad diet tells you to do so, and exercise with caution. She says these traditional recipes not only have the much needed and specific healing properties; they also attend to all your body's needs that must be attended to after the fiery hormonal drama you have just undergone.

Alternative Living in context of environmental sustainability takes up the term as "sustainable living" in India. An ecologist based out of Dehradun, Soumya Prasad, has been leading a completely eco-friendly and sustainable livelihood, producing the least

carbon footprint possible. In all walks of life, she is trying to find sustainable alternative living practice. Soumya grows most of the vegetables such as brinjal, chillis, ladyfingers on her own instead of purchasing them. Apart from growing her own vegetables, Soumya purchases wheat and pulses which are grown by the local farmers. Soumya ensures that the waste generated at home is segregated as per the dry or wet category. The waste generated in her kitchen is used as manure in her garden. Another important lifestyle change that Soumya made was to start using electric vehicles for the daily commute. Her main objective behind this step was to cut carbon emissions generated from vehicles. Soumya has also made use of solar energy to get electricity in her homes. She has installed 5 kilowatts of solar panels at her home that meets all the electricity requirements easily. In her own words, she says "Leading an eco-friendly lifestyle has been a fulfilling journey for me. Once I started practising sustainable practices on day-to-day basis, I realised how easily one could adopt it and contribute towards a cleaner, greener environment. I hope more people come forward to adapt to sustainable living it so that the younger generation learns from us," (Singh, 2020).

As India's urbanization and industrialization are creating nightmares of disasters, natural calamities and other insecurities the government policy decisions also moving towards thinking of Alternative Living pattern for the people. So, in the perspective of the law and order "Alternative Living" is more concerned to exploring means and ways to address the social and political issues with a more sustainable and enduring touch.

The meaning given to the concept of "Alternative Living" in the Indian Scenario are in connection more with the alternatives to food habits, Co-living, Sustainable Living, eco-friendly way of living in which all these shows that Alternatives for preserving the natural resources and protecting the environment was great concern rooted in our Indian culture itself from the beginning. But the western perspectives are also influencing the way of thinking for approaching Alternative Living for Indians.

c) *In the Kerala context*

Kerala is a land made up of blended cultural diversity and the major attractions of this God's Own Land are Folks and Arts like "Theyyam and Thira" & Pooram, "Sadhya" as a delicious organic lunch and Architecture style using traditional culture of Mud

mortar, cob, straw, adobe etc. The concept of Alternative Living has the following conceptual perspectives in Kerala Culture which is more prevalent now:

- Kerala Traditional Architecture
- Alternatives organic food culture
- Alternative Schooling
- Home schooling

Kerala's architecture and design landscape has metamorphosed into one of the most interesting in the country — primarily in the realm of residential design. Mostly the traditional and newly furnished construction style and pattern is considered to be alternative solutions for naturally reducing carbon foot print when we using cement and paints that are emitting toxic gases. Kerala's first architects were expert carpenters and craftsmen, referred to as a *mestri*. They built with a mathematician's precision and a craftsperson's talent. Kerala has strong indigenous design, examples of which still stand like guardians from another era. These are structures identifiable by their lime-plastered walls, interlocking carpentry, sloping tiled roofs (essential to deal with the monsoonal onslaught), columned verandas, teak and other hardwood elements, and courtyards that bring light and rain into the heart of symmetrical structures. And all these constructions were used primarily natural building materials like cob, straw, mud mortar than cement. But then a generation of professional architects set up shop in the late 70s and changed the design landscape as well as the use of natural building materials forever. Habitat Technology Group, COSTFORD, Lauri Baker Centre for Habitat Studies are the strong organisations that are following the green concept for building Eco-friendly constructions as an alternative for conventional Housing.

Alternative Organic Farming is a holistic approach involving integrated nutrient management, integrated pest management, enhanced input use efficiency and adoption of region-specific promising cropping systems would be the best farming strategy for India and this is to an extent is practicing in Kerala. Kerala has the rich source of mineral fertile soil in the Western Ghat region and has a stronghold in the hilly and dry land farming, rain fed farming system to cater the need of organic farmers in the state.

Home Schooling is another way of Alternative Living emerging in the state by a very few parents. or home school (also called home education or home learning) is the education of children at home, typically by parents but sometimes by tutors, rather than in other formal settings of public or private school. Home-schooling is an institution of education for improving students' potencies in developing her/his creativity. Home schooling program create freedom atmosphere to innovate and create their future through their daily agenda. They feel self-efficacy to do their tasks, responsibility and learning of their school lessons.

Gothrathalam, an alternate school in Ravi Nagar colony, near Kanjiramkulam, started by Mini M.R. and Sudhi S., imparts life lessons to children of the tribal community**.** Mini comes from a tribal colony in Wayanad where she attended a local school until class four, after which, unable to take the bullying, she dropped out. It was KJ Baby's Kanavu (Dream), an alternative school, that came to her rescue. The school, which was started in a shed in 2012, aims at building these children's confidence levels and transforming their lives. At Gothrathalam, however, students are taught both Malayalam and English, which will equip them to deal with the outside world. Apart from that, they are also taught dance and art and are moulded into socially responsible individuals (Nair A. , 2015).

1.2.2 Alternative Housing as a concept

Alternative Housing has a wide range of interpretations and meaning all around the globe. By definition, no one model of alternative housing exists. The variations on the theme are numerous and scattered around every part of the country and include community land trusts, solidarity housing, Beguine convents for the elderly, artists' colonies like the 'Bateau-Lavoir' building in Paris, group living schemes for people with mental disabilities (integrated, in this case, in Peul community houses), the mobile dwellings of travellers, residential squats, solidarity-based community savings groups, intergenerational housing, residential caravans and trailers in camping and caravanning parks (in Wallonia), exchanges for group purchases of former industrial wastelands, residential complexes for former inmates, collective shelters for the homeless, and waterborne accommodation (riverboats and barges) (Madrid, 2017).

The motive behind choosing Alternative Homes or Housing practice differs from individual to individual in which what ideologies and beliefs about life they are holding has a greater influence. The motive might include minimalistic lifestyle, eco-friendly lifestyle, adventure, low-cost construction or living, off-the grid living in which all are basically following one common principle of a life which is out of the boundary of conventional living pattern.

In countries like UK where they are facing the housing crisis has adopted new alternative housing methods with different materials, innovative designs, and unique approaches to community that just might be a part of the wider solution to the increasing question of: Where are people going to live? In London, the crisis has reached such levels that 80% of the new housing built is only affordable for 20% of the city's population. **Floating homes** as a solution to the crisis where they live on an island with more than 10,000 miles of coastline and access to hundreds of major rivers. In the Netherlands, the attitudes towards living on water are quite different. About one third of the country is below sea level, so the Dutch have embraced the idea of not just living in house boats, but creating entire floating communities. One example of this is Ijburg, a floating community that includes roads, playgrounds, shopping centres and offices (Sharman, 2016).

The **co-housing movement** also part of an Alternative Housing strategy began in Denmark in the 1960s as a way for young professionals to share child care responsibilities. It was such a success that approximately 8% of the Danish population live in a co-housing community, where they share meals, gardening and general maintenance responsibilities. Many of the co-housing groups also have positive environmental goals. The basic principle for co-housing is the same: encouraging social interaction. As a way for young people to get into the housing market, co-housing communities could provide the support needed. Co-housing is also an attractive model for the ageing population; providing a healthy alternative to conventional senior housing (Sharman, 2016). This movement is now spreading across other parts of the globe with an intention to reduce individual house hold space as well as to increase social interaction.

Alternative Housing Practice with a motive to "go with the green" by making less impact on the environment and with sustainable eco-friendly construction style includes the following alternative housing ideas:

- **Earth Houses:** These building techniques include cob, rammed earth and earthbag buildings. While the first two are made with a particular mix of clay, earthbags are a more modern twist on using the earth as a building material.

    - **Cob House:** This design is similar to the adobe homes, however while adobe is formed in blocks and bricks, cob is applied in large handfuls in order to form a unique structure. Houses made with cob usually look like they were made out of clay and can withstand long years to come

    - **Earthbag:** these homes are built exactly what they sound like - with the use of bags filled with earthern materials stacked to make a house. Earthbags are stacked vertically to make straight or curved walls, or they can be stacked into a dome shaped building that need no additional framing to make a roof. The bags can be filled with a variety of earthy material**.**

- **Wood Houses:** Wood is certainly one of the most versatile and common building materials.

    - **Cordwood:** Cordwood is a sustainable building method that uses short sections of trunks and tree limbs, which would normally be used for firewood.

    - **Log House**: referred to small, rustic hunting cabins, it is not preferred by most contemporary builders. Log houses are usually made with logs that have not been milled into conventional lumber.

    - **Timber Frame**: A timber-framed home is an excellent celebration of wood on a massive scale. Timber framing

construction is a building method that utilise heavy timber rather than dimension lumber.

- **Straw Houses:** Straw has all kinds of benefits - it's inexpensive and provide excellent insulation. These qualities make straw construction a green-building method. More importantly, straw bales are a by-product of grain farming, therefore building straw houses is a great way of reusing something that would normally go to waste.

- **Bamboo Houses**: Bamboo houses are an even more eco-friendly alternative to building with timber. Bamboo is a very strong material to build with and well-constructed bamboo homes are said to withstand hurricanes and earthquakes.

- **Stone Houses:** Stone houses are about as sustainable as it can get. Build with rocks, stone houses have their natural beauty and don't require additional painting. They can be built with the use of local materials and are very comfortable.

- **Tiny Houses:** A tiny house can be built with the use of green building materials or recycled supplies. These compact houses are so small that they don't require sophisticated heating and cooling solutions, and can be easily moved to a different location and are designed to reduce our carbon footprint.

- **Shipping-crate Homes:** They are cheaper than conventional homes and the finished structure has a unique and very modern, industrial look. Their small size makes these tiny-homes a green construction method, and can make them even more eco-friendly with solar panels, green insulation and rainwater-harvesting systems

- **Wood-pallet Houses:** These homes were designed as an affordable solution for disaster relief housing. But with the eco-friendly aspects of wood-pallet housing it can also be designed

to create something more permanent. Wood pallets are extremely cheap to buy and readily available. This material is reusable, easy to recycle and easy to combine in order to create a unique, modern and energy-efficient home**.**

- **Green Roof Homes** Green roofs can aid in managing stormwater runoff and helps to reduce the urban heat-island effect. This roof construction solution reflects heat rather than absorbing it like a regular roof, and helps with lowering a building's cooling costs. They are also great insulators while requiring very little maintenance.

- **Earthship:** This kind of construction relies on reusing bottles and tin cans that would normally find their way into landfills.

- **Hobbit Homes, Modular, Tree-house Homes**

1.3 STATEMENT OF THE PROBLEM

Using energy-efficient, renewable or recycled materials lessens a person's environmental footprint, or impact on resource use and pollution. A green home produces fewer carbon emissions through efficient energy use, keeps trash out of landfills and lessens the impact of new construction on the world's finite resources. Attitudes and cultural values drive sustainable behaviour. This means that if enough people take even small steps toward sustainability in the home now, spreading cultural value will produce greater impacts for the positive environmental impact of green building down the road.

Using the right eco-friendly building materials in the right place can save construction time. Buying locally available materials supports small businesses, keeps money in the local economy, reduces the home's carbon footprint by minimizing fuel used in shipping and means your materials will be available quickly and reliably. Many conventional concrete building materials aren't optimal for the health of the people who live in the home.

Some traditional materials also encourage moisture buildup, which can lead to toxic mold or mildew problems. Both VOCs and molds cause outdoor air pollution problems.

Choosing non-VOC and moisture-resistant products, as well as installing systems that enhance air quality, protect your health and environmental health at the same time. Energy-efficient options or alternative energy sources -- like solar panels, photovoltaic cells or geothermal heating -- keep utility bills down. Long-lasting construction alternatives can also keep waste out of landfills while saving money that would have been spent on repairs or renovations (Sharman, 2016).

Sustainable Alternative homes are tuned in to their natural surroundings, incorporating eco-friendly materials and building processes. Not only are they aesthetically beautiful, offer far-reaching social, economic and environmental advantages. From the literature reviews it is understood that green homes offer sustainable substitutions from the first phase of development. The building practices minimize waste and recycle materials, which helps achieve efficient use. Best of all, as they're built to reduce energy consumption, sustainable homes reduce emissions that impact climate change.

The literature indicate that the Cement is an important construction ingredient around the world, and as a result, cement production is a significant source of global carbon dioxide (CO2) emissions, making up approximately 2.4 percent of global CO2 emissions from industrial and energy sources (Boden, et al., 1989). Thus, the sustainable alternative housing practices for decreasing the contribution of carbon foot print to the planet could be reduced to a certain extent. Hence it is relevant and important to understand why the minor group of individuals from Kerala has opted this different path for making this planet a little greener and cleaner, the process of transition from the conventional practice to the alternative housing practice and the challenges encountered in the journey. The purpose of this study is to understand the experience of choosing Alternative Housing Practice from the conventional style in the light of the respondents' perspectives and interpretations of life.

1.4 SIGNIFICANCE OF THE STUDY

The world is now at the verge of severe climatic changes and the whole natural pattern of the seasons and weather are entirely switching where floods, flash floods, earth quakes, tsunamis are now hitting badly with one after the other. The consequences of being not responsible for what the planet has given to the mankind in abundance to live were swept away with the name of so-called irrational development. The need of

choosing sustainable alternative choices for housing is pivotal and thus understanding the experience of people who have chosen the method of Alternative Housing practice should be studied in detail. Those who are following this method of housing pattern are very few in Kerala as well as in India when compared to the large general population building concrete houses. Thus, this study attempts to explore and throw light into the Alternative Housing Practice with the perspectives and interpretations of people who opted this method and the entire transition process is encoded through their experience would serve to be a base for many other studies on the topic. This will provide a scientific data support to the academicians, scholars, policy makers, environmentalists and wide range of people out there who wanted to know this about the concept and experience of people who have opted Alternative Housing. A clear picture as to the current state of affairs will be significant for the governmental and non-governmental agencies in understanding the importance of advocating and propagating the need of sustainable choices for housing and accordingly develop the strategies and approaches while they draft the action plans for programmes and policies in the areas including housing development projects etc. This study would also contribute to the knowledge base of social work and facilitate further research in this area.

1.5 CHAPTERISATION

The Chapterisation of the dissertation is as follows:

- Chapter I: Introduction
- Chapter II: Review of literature
- Chapter III: Research Methodology
- Chapter IV: Case Presentation
- Chapter V: Data Analysis and Interpretation
- Chapter VI: Findings, Suggestions and Conclusions
- Chapter VII: Bibliography and Appendix

CHAPTER II: REVIEW OF LITERATURE

LITERATURE REVIEW

2.1 INTRODUCTION

Life is correspondence with environment. Different creatures seek different environments, but everything exists at a specific place under specific circumstances. Humans' connection with nature during the history can be seen in both kind of societies, either hunter-gatherer societies; which appears around 40000 years ago and in which the people provide their need and food from wild plant and animal, or the agrarian societies; which appears about 10000 years ago and don't depend on the wild but domestic land and agriculture for its need (Moghadam, Kaur, Singh, & Wan Yahya, 2015). Even when human was civilized and has come into the city, he/she has been again dependent on nature through agriculture, domestication of wild plants and animals and even the houses were build using the locally available natural material like mud, cob, straw, stone, bamboo etc. So, even when the agricultural civilization began people were still connected with nature. Because those people believed as human beings, our greatest psychological asset is a sense of confidence in our environment.

2.1.1 Man, and Nature

Mythologies of different cultures are without exceptions severely in connection with nature and where it declares nature is everything in all mythologies, most of gods and goddess are from nature or the owner of natural power, and actually it is nature which gives meaning to them. Lynn White also confirms in his article titled "The Historical Roots of Our Ecologic Crisis":

> Since God had made nature, nature also must reveal the divine mentality. The religious study of nature for the better understanding of God was known as natural theology. In the early Church, and always in the Greek East, nature was conceived primarily as a symbolic system through which God speaks to men (White, 1967).

This is most evident in the Asian mythologies like those of Hinduism emerged in India and Japanese and Nubian culture etc. Among them the traditional Japanese culture is one of the best examples were how they *connect nature when they build homes*. Those houses are usually built from natural materials such as stone, clay, and wood. This

indicates a deep-seated preference in the Japanese side for living and transitory, for the change of the seasons, linking the relationship between spaces, such as the relationship between the house and the surrounding nature. Designers are committed to a sustainable design during using eco-friendly materials, and in this attempt to estimate and respect each object in the nature, so Japanese culture integrate some strategies in their designs in an attempt to take advantage of nature. For example, the house is raised on columns of wood to create a distance between the earth and the house, as a result creates a sustainable house that can resist the climatic conditions at the same moment which it feels and tastes the nature by: 1. Creating wind under the house and thus a natural cooling of the house. 2. Alleviation the soil moisture under the house. 3. Preservation of air disasters. In addition to using some stalks of the plants in the construction of the ceiling of houses, such as bamboo and rice, which are light weight and hollow from the inside. Thus, forming a thermal insulator and preventing wind and rain. The flooring mat "Tatami" is made up from natural trees and plants that is easily cleaned and draped, to create an aesthetic artistic modality that is integrated with magnificence of nature. Those aesthetic activities aimed to strengthening the existing properties in natural materials and the respect for others, a value not only for the aesthetic sense, but also to develop an ethical perspective, which is needed to formulate a right relationship with nature (Almuder, 2016)

The exploitation of nature led *Maurice Maeterlinck*, the Belgian dramatist and writer, to say: "*Everything seems to foretell that man, the last comer to this earth, will be the first to leave it*." After industrial revolution, everything surrounding human being was human-made; buildings, railways, roads, cars, and etc all take human away from nature. Civilized man has been more ruthlessly wasteful in his attitude toward the natural world than has served his material interests. The practical utility of land, water and forest has been diminished seriously by our determination to allow them to serve no purposes but our own.

A report titled “The Relationship of Man and Nature” published in the Monthly Letter of *Royal Bank of Canada* concludes the report by saying:

> Since the beginning, the world has presented challenges to living creatures: to crawl out of the sea to live on dry land, to climb trees and mountains, to change in keeping with changing environment. Every creature is to itself the centre of

> its own universe, but it must have contact with all surrounding creatures. The challenge to us is nothing less than preservation of our species by restoring and maintaining its essential environment. We are surrounded by, and we are part of, the eternal flux of life in an environment of natural forces. An Eastern proverb puts it: "To survive, all men must hold hands." And living things of all sorts are our kin in the wholeness of nature. If we wish to preserve our present way of life, we must come to terms with what is left of natural forest, soil, water and wildlife, and it will be on terms laid down by nature, not imposed by us. Any wrong which nature may for centuries commit, she has centuries to repair, but we, whose days are short, must walk warily lest we become the victims of the wasteland we make. (The Royal Bank OF Canada, 1960).

Today it is necessary for mankind to adjust its usage and to manage earth's remaining resources more creatively if it is to survival. This statement is validated by the findings provided by George L. Clarke, of Harvard University and Woods Hole Oceanographic Institution, says in his textbook *Elements of Ecology* that about 21,000 species of extinct vertebrates and an even larger number of extinct higher plants have been describe. Most of them extinct because of human interventions in the natural world.

2.1.2 Housing as a Basic Human Right

Housing is the basic necessity of every human being along with food and water. Everyone needs home. Shelter is necessary to have proper rest in a feasible way and should comfortable. Shelter is the basic human requirement that needs to be met on priority basis. Home is the place where a house is poured with many relations of people and it is the place where all of them in relation stay connected throughout their life otherwise being scattered at different places. Hence, home is the medium of being connected every day of our lives with our families where other families also can meet and spend some memorable moments altogether. Each of us needs a shelter and the need for shelter keeps on growing with the growth of individual. So, owning a better home is the basic requirement of current time. Food, clothing and housing are required in that order for fulfilling the aspirations of the people.

The obligation of States to take steps towards the realisation of the right to adequate housing for all is laid down in a number of international legally binding human rights

instruments. They include the Universal Declaration of Human Rights, the International Covenant on Economic, Social and Cultural Rights (Art. 11), the Convention on the Rights of the Child (Art. 27), and the non-discrimination provisions found in Article 14, of the Convention on the Elimination of All Forms of Discrimination against Women, and Article 5 of the International Convention on the Elimination of All Forms of Racial Discrimination (Kothari, Karmali, & Chaudhry, 2006).

The Universal Declaration of Human Rights (UDHR) of 1948, clearly states under Article 25 that, "Everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing, housing, medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control" (Universal Declaration of Human Rights, 2015).

The International Covenant on Economic, Social and Cultural Rights in 1966, on the basis of the provisions established in UDHR 1948, the human right to adequate housing was elaborated and reaffirmed in Article 11.1 declares that: "The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions" (PWESCR, 2015).

The scope of the human right to adequate housing, as guaranteed by Article 11.1 of ICESCR in 1966, was elaborated by the United Nations (UN) Committee on Economic, Social and Cultural Rights (CESCR) in its General Comment 4 on 'The right to adequate housing' in the year 1991 states that in order for housing to be adequate it must provide more than just four walls and a roof over one's head; it must, at a minimum, include the following elements: legal security of tenure, availability of services, affordability, accessibility, habitability, location and cultural adequacy (Kothari, Karmali, & Chaudhry, 2006).

During the National Consultation on Children and Habitat, home was described by children as a place where there is warmth, where they can eat, laugh, play, cry and which is a stable place providing them with opportunities to grow and develop. Both the United Nations Declaration of the Rights of the Child (1959) and the Convention on the Rights of the Child (1989) address the special housing rights of children. Article

27 of the Convention requires States parties to take appropriate measures to assist parents and others responsible for the child to implement the right to an adequate standard of living (Kothari, Karmali, & Chaudhry, 2006).

In 1996, the Istanbul Declaration and the Habitat Agenda reinforced the responsibilities of all governments to the provision of adequate housing, as exemplified by their creation of ministries or agencies, by their allocation of resources, and by their policies, programmes and projects. It is important to recognize that the human right to adequate housing is not limited exclusively to a physical structure, a house. It is conceived in a much broader sense that integrates housing, shelter and habitat environment as a whole. This includes the cultural, historic, social, economic, political, and legal environment as well as physical and territorial dimensions (Kothari, Karmali, & Chaudhry, 2006).

The human right to adequate housing is thus integral to the realisation of the right to live with dignity, and is inextricably linked to other human rights such as the rights to work/livelihood, health, food, water, land, education, and security of the home and person.

The Supreme Court of India, in several judgements, has held that the human right to adequate housing is a fundamental right emanating from the right to life protected by Article 21 of the Constitution of India: "No person shall be deprived of his life or personal liberty except according to procedure established by law". There have been several important court judgments that have clearly established the relation between the right to housing and the right to life, as guaranteed by Article 21. In the case of Chameli Singh and Others vs. State of Uttar Pradesh (1996), the Supreme Court provided a holistic understanding of the right to shelter and adequate housing. It declared:

> Shelter for a human being, therefore, is not a mere protection of his life and limb. It is home where he has opportunities to grow physically, intellectually and spiritually. Right to shelter, therefore, includes adequate living space, safe and decent structure, clean and decent surroundings, sufficient light, pure air and water, electricity, sanitation and other civic amenities like roads etc. so as to have easy access to his daily avocation. The right to shelter, therefore, does not mean a mere right to a roof over one's head but right to all the infrastructure necessary to enable them to live and develop as a human being. Right to shelter

> when used as an essential requisite to the right to live should be deemed to have been guaranteed as a fundamental right… Want of decent residence therefore frustrates the very object of the constitutional animation of right to equality, economic justice, fundamental right to residence, dignity of person and right to live itself (Jain, 2015).

2.1.3 SDG 11: Sustainable Cities and Human Settlements/Housing

Cities are engines for sustainable development. It is where ideas, commerce, culture, science, and productivity thrive. Urban spaces offer opportunities for people to prosper economically and socially, but this is only possible in prosperous cities that can accommodate people in decent jobs and where land resources are not overwhelmed by growth. Rapid urbanisation through industrialisation is exerting pressure on fresh water supplies, sewage, the living environment and public health. Our urban areas are also emitters of greenhouse gases and contribute to climate change. The increase of unstable activities mostly in the industrialised cities by humans is resulting in some serious results of climate change emergencies like tsunami, wildfires, flooding and drought due to global warming, rising of sea level, depletion of ozone layer causing increasing threats of cancer and land loss due to contamination of soil. Construction industries have a larger part in contributing these environmental problems all around the globe. The extensive resource depletion is occurred due to the usage of large volumes of construction materials. One of the major contributions is from the construction industries.

All round the world construction materials generate million tons of waste annually. These construction materials require high embodied energy resulting with large CO2 (Carbon Dioxide) emissions. The embodied energy of steel is about 32 MJ/Kg and for cement is about 7.8 MJ/Kg Scientific and Industrial Research Organization). The highest CO2 producing material is cement and a large amount of CO2 is produced in the processing of construction materials and in the transport of these materials If the consumption of the construction materials remains the same all around the world, then by the year 2050 the production of the cement in the world could reach 3.5 billion metric tons. But annually the production and consumption of the construction materials are increasing simultaneously, if this is the case then the production of cement itself annually could reach over 5 billion metric tons with approximately about 4 billion tons

of CO2 (carbon dioxide) emissions. Due to the abundant usage of the construction materials the impact of these materials is dominated than from the impact of the other sources. Due to the frequent changes in the lifestyle and demands of human the average life of the buildings is decreasing, the demolition or renovation of the buildings are resulted with more land-fills or recycling annually. Because of the huge consumption of the construction materials and embodied energy a high level of resource depletion is taking place all around the world (Petkar, 2014). Our rapidly growing urban world is experiencing congestion, a lack of basic services, a shortage of adequate housing, and declining infrastructure. These challenges to urban spaces can be overcome by improving resource use and focusing on reducing pollution and poverty. Unfortunately. by the black hands of industrial revolution most of the rural areas have been urbanized.

According to the statistics provided by UN states that by 2030, the world is projected to have 43 megacities with more than 10 million inhabitants each, most of them in developing regions. The world's cities occupy just 3% of the planet's land but account for 60-80% of all energy consumption and 75% of the planet's carbon emissions Half of the global urban population breathes air that is 2.5 times more polluted than standards deemed acceptable by the World Health Organization (United Nations in India, n.d.).

The demand for housing increases due to growth of population, rapid pace of industrialization and urbanization. Shelter – a home – is something that all people need, a basic right. But putting an affordable roof over our heads, without it costing the earth is something to be considered in mind when constructing a living space. The reason for that is the thought that building such a house that benefits not just current generations, but the generations to come. Sustainable housing or Alternative housing practice is a thought for the healthy survival of generations to come.

2.2 REVIEW OF LITERATURE

There are studies conducted to explore the different alternative construction methods for addressing the issues of sustainability and environmental impacts of conventional construction techniques. The first section of the review of literature are arranged in the international, national and local level studies exploring about Alternative Housing Practice as a concept. The review will also look into the experience of people following the Alternative Housing Practice and the different sustainable construction techniques,

methods and process. The end of the review will look into the research studies on the challenges and ways of overcoming those challenges during the Alternative Housing Practice.

2.2.1 CONVENTIONAL CONSTRUCTION PRACTICE AND ALTERNATIVE/SUSTAINABLE CONSTRUCTION PRACTICE

- ***Conventional Housing/Construction Practice***

The conventional housing practice basically follows a construction method which uses cement as the main raw material and other non-sustainable materials like steel and iron. This construction method was invented in the last 100 years. The **invention** of Portland **cement** usually is attributed to Joseph Aspdin of Leeds, Yorkshire, England, who in 1824 took out a patent for a material that was produced from a synthetic mixture of limestone and clay. But from the Neo-lithic and ancient iron age period itself the chief building material used was the mud-brick, formed in wooden moulds similar to those used to make adobe bricks. Even after thousands of years back some of the remanence of these marvellous architecture remain as an evidence of sustainable architecture in the ancient periods.

Conventional modern building materials are beyond the reach of the majority of the world population due to their poor affordability. The scientific review presented by Worrel, Price, Martin, Hendricks and Meida (2001) in the journal 'Annual Review of Energy and the Environment' about total CO 2 emissions from cement making, including process and energy-related emissions arrived at the conclusion that besides the escalation in the cost of building materials, rising environmental concerns due to the extensive exploitation of natural resources connected with construction and other housing development activities urge the search for alternative technological options. Cement, a vital material for construction activities, is a major contributor to global carbon dioxide emissions. Each tonne of Portland cement produced releases approximately the same quantity of carbon dioxide.

According to Hendriks, Worrel, Jager, Blok and Riemer (2004) in their study to find out the options for emission reduction of greenhouse gases from cement industry grouped environmental implications from cement industry under excessive energy consumption, emission of greenhouse gases and dust pollution of the atmosphere

besides the degradation of mined areas. The manufacturing process of cement is highly energy intensive and is one of the most energy engrossing sectors within the Indian economy. Therefore, it is of particular interest in the context of both local and global environmental discussions. Increased emission of greenhouse gases like methane and carbon dioxide is thus a major concern connected with the cement industry. 5% of global carbon dioxide emissions originate from cement production.

About 50% of the Portland cement used in building construction is consumed for primary construction applications such as masonry and plastering. The strength requirements in such building processes are of the order of 4.0 MPa, while Portland cement is ideally suited for applications with strength requirements in excess of 15.0 MPa. Pure Portland cement mortars are stiff and lack the plasticity that is very much needed in masonry construction. Lime-pozzolana cements can replace Portland cement in such cases with better performance. Pozzolanas are materials containing reactive silica and/or alumina, which although not cementitious by itself, will combine chemically with lime or cement in presence of water to form a strong cementing material. Granulated blast furnace slag, powdered bricks and tiles, burnt clay, furnace clinker, fly-ash and agricultural wastes (plant ashes) are the commonly used pozzolanas. Plant ashes having high silica content are suitable as pozzolanas. Many plants during their growth take up silica from the earth. When plant residues are burned, organic material is broken down and disappears as carbon dioxide, water vapour etc. The remaining ash contains inorganic residues, notably the silica. Examples are rice husk ash, rice straw ash, bagasse ash etc. Of all plant residues, the ash of rice husks contains the highest proportion of silica. Rice husk is an agricultural waste, which constitutes about one fifth of the 400 million tons of paddy produced annually world-wide. India constitutes 22% of the world rice production. The percentage of rice husk from rice varies due to growing conditions such as season, temperature, methods of production, location and also on milling process (Nair D. G., 2006).

In an article titled ‘Eco-friendly Construction’ published by Waghmode, Gunjal, Namdeo, Patil, & Nawani, (2019) reviewed about the impact of construction on environment; replacement of construction materials; microorganisms in bioinspired construction and benefits of biotech concrete in the book of ‘Reusable and Sustainable Building Materials in Modern Architecture’ concluded that Bio cement and bio

concrete are eco-friendly constructions methods. The green eco-friendly buildings will reduce the problem of pollution created by Portland cement. Bio cement will contribute to sustainable construction as there will be no release of toxic emissions, less CO2 emission and therefore, mitigating the pollution problem.

- ***Sustainable Housing/Construction Practice as an Alternative***

A sustainable shelter is inevitable for a greener future. Earlier people lived in houses constructed by themselves using locally available materials in nature. Thus, mud, a soft, sticky matter resulting from the mixing of earth and water became the most common material for construction. Mud was being used either in its raw nature for wall construction or in the form of mud blocks. It was also used as mortar for binding the building blocks, for plastering the walls and also for flooring in ancient times. The potential of mud as a building material has been very much explored in the ancient times and it is still being practised in many of the European, Arab and Egyptian countries. Mud is a good thermal insulating material in itself. Due to its excellent thermal regulating property ample comfort was experienced by the inhabitants residing in mud houses. It is a natural cost-effective material possessing zero embodied energy. Almost all constructions done using concrete can be done with mud too. Instead of steel reinforcements, bamboo can be used as reinforcements in mud structures. Despite the above advantages, the concept of mud housing is gaining only slow popularity.

Mud has been used as the main building material from time immemorial in different forms such as mud blocks, mud walls and mud plaster. It is a fact that the world's first skyscraper was built of mud bricks. The Ziggurats of Mesopotamia (3000-2000 BC) and The Great Wall of China (206 BC) are examples of wonders of the world made with sun dried mud blocks. The Great Mosque Djenne, Mali, Africa built in 1907 is the largest mud brick building in the world. A case study conducted by Papayianni and Stefanidou (2007) on the durability aspects of ancient mortars of the archaeological site of Olynthos revealed that most of the ancient structural mortars were mud mortars. Even though the microscopic analysis showed the presence of few shrinkage cracks located around the aggregates and inside the binder paste, the mortar structure was found quite solid.

Chandra, Eklund and Villarreal (1998) made a study on the use of cactus in mortars and concrete. Natural polymers have been used in ancient times to improve the durability of lime-based mortars and concretes. It was seen that cactus extract increases the plasticity of the mortar and improves water resistance and freeze-salt resistance. Painting of the concrete with this extract has also shown improved water resistance. Mud walls can also be painted with cactus or similar cellulose extracts to improve water resistance without damaging the breathability of walls.

2.2.2 STUDIES ON ALTERNATIVE HOUSING PRACTICE

a) Studies in the Western Context

Mud architecture began in Egypt and developed to its full extent alongside the Nile (Capaldi, 2011). In Syria, the main construction unit was brick composed of 75% earth, 20 % straw (corn or barley) and 15% water and the mortar used was fine earth kneaded with water adding corn straw and barley as reinforcement. But, the use of mud bricks has disappeared in most of the countries.

In the article published by Freney (2009) the author critiques an obscure form of sustainable architecture that addresses many of the environmental, social and economic challenges facing humanity. It focuses on the work of architect, Michael Reynolds, who has been experimenting with radical house designs and construction techniques over the past three and half decades. In the article author describes how Michael addresses pollution, climate change and resource depletion by the provision of self-sufficient, off-the-grid, ecological housing constructed substantially from 'waste' such as used car tyres and beverage containers. Passive heating and cooling, food production, water catchments, renewable energy, solar hot water, grey-water recycling and sewage treatment are all integrated into his designs, which he calls "Earthships – independent vessels – to sail on the seas of tomorrow".

There are changes in the construction methods in Central Europe which was turned to be a sustainable alternative to the conventional construction using cement. This area was subjected to study by Švajlenka and Kozlovská (2018) in which they analysed sustainability assessments of construction projects increasingly involve the use of methodologies which assess sustainability criteria throughout a product’s Life-cycle. For our analysis of suburban housing clusters designed to serve as family houses, we

chose an actual family house construction completed using a modern construction system based on wood. For the sake of comparing the modern construction method, we created an alternative model of a construction based on a traditional masonry construction system. The main objective of this contribution is to analyze selected variants of constructions in terms of environmental and economic sustainability characteristics, as part of a broader assessment of permanent sustainability, by applying the life-cycle assessment (LCA) and life-cycle cost (LCC) methodologies within specified assessment boundaries. The analysis of the construction variants in terms of embodied energy (EE) shows significant differences in favour of the modern construction system based on wood, where a 54% reduction in EE was observed compared to the traditional masonry system. These authors have concluded that renewable materials such as wood contribute to the overall reduction of the negative environmental footprint of the resulting construction. Among other findings, these authors point out that wood-based buildings are much more environmentally and economically more suitable than conventional masonry and concrete building structures.

'A case study of cob earth-based building technique in Matagalpa, Nicaragua – LCA perspective and rate of adoption' was a qualitative case study conducted by Estrada (2014) in Sweden. The purpose of this thesis was to find a building technique adequate for the inhabitants of Matagalpa, that fulfil their needs, is cheap and had a low environmental impact. The main objectives were to assess the cob building technique and compare it with the concrete block technique in order to determine the ecological performance using the LCA analysis, and to evaluate the appropriateness of the cob technique in Matagalpa through the five perceived attributes that describe the rate of adoption of a technology. A recently constructed cob building in Matagalpa, Nicaragua, was studied using screening LCA methodology applied to the construction phase, as well as by applying a diffusion of innovation framework. The cob house was assessed towards the five perceived attributes of innovations in Rogers's theory, Relative Advantage, Compatibility, Complexity, Trialability and Observability. Results regarding fossil CO2 emissions due to material production and material transportation were contrasted to an equivalent concrete block building. The major finding of the study was that Cob technique from Roger's rate of adoption perspective has a relative advantage when compared to other building techniques on the area, is compatible with

the needs and capacities of the people living in Matagalpa, Nicaragua and is a simple and sustainable technique that can be implemented by anyone.

b) Studies in the Indian Context

There are researches and article published in India about the sustainability end endurability of different natural materials for construction like mud, rice husk ash, cactus. There are studies on the effectiveness of sustainable building construction and also studies available about sustainable affordable houses etc. Unlike the conventional plasters, mud possesses a unique property known as breathability, an important factor in any wall system. If the resistance to water penetration and termite attack is properly ensured mud is the most suitable and sustainable material for a healthy living.

Coming to the Indian scenario, the construction of mud brick houses was first initiated in the ancient age during the time of Indus valley civilisation. Houses were also incorporated with the proper drainage system using earthern ware pipes. Other examples of magnificent mud construction are Adisakthi theatre and guest house in Pondicherry. According to Laurie Baker around 58% of all buildings in India today are made of mud brick, and among them some are as many as 50 to 100 years old (Miller, 2003).

The article 'Vastu Shastra Towards Sustainable Development' by Patra (2009), discusses Vaastu Shastra (an ancient Indian knowledge of architecture) in relation to the idea of sustainable development. It informs the complicated problems of urbanization and overpopulated cities of today. By drawing attention towards Vaastu Shastra , this paper discusses the built form of Indian settlements and explores the possibility of creating a living environment that is self-sufficient, ecologically balanced and culturally stimulating. It explains the concept of sustainable development based on ancient Indian traditional knowledge, through its culture, heritage and orientation towards forest sustainability, as a way to address elements within sustainable development. Further, the fundamental principles, the relevance of Vaastu-Purusha-Mandala and the history of Vaastu Shastra are highlighted with discussions on its philosophical and social aspects. Last, an attempt has also been made to create a close relationship between Vaastu Shastra and sustainable development that can redefine the present form of planning human settlement.

It is very important to have a shelter of our own. Major population of our country is below lower income group. Low cost housing projects for affordable living are major concern for the government. Indian government have started affordable housing scheme as a pilot project collaborating with public & private partnership in states of Maharashtra, Rajasthan, Kerala, Andhra Pradesh & Telangana. The first step to low cost housing material selection is to select eco friendly building materials.

This was supported by the findings of the case study conducted by Kumar and Dongre (2017) that Construction of low cost housing by using the low cost building materials increases the access to buildings by low income group people. Low cost housing can be achieved by the use of efficient planning and project management, locally available materials, economical construction technologies and use of alternate construction methods available. The profit gained from the use of such methods can decrease the cost of construction and make the low-cost housing accessible to all. In this concept; locally available materials were used like coarse rubble masonry for basement, locally available good soil for filling & fly ash, bottom ash as a substitute of cement & fine aggregate by replacing cement with fly ash up to 35%. In this case study; a prototype model was proposed.

In an article published by Reddy & Jagadish (2003) titled 'Embodied Energy of common and alternative Building materials and technologies' authors focused around some issues pertaining to embodied energy in buildings particularly in the Indian context. Energy consumption in the production of basic building materials (such as cement, steel, etc.) and different types of materials used for construction has been discussed. Energy in different types of alternative roofing systems has been discussed and compared with the energy of conventional reinforced concrete (RC) slab roof. It has been shown that total embodied energy of load bearing masonry buildings can be reduced by 50% when energy efficient/alternative building materials are used. The article concluded by discussing about the Stabilized mud blocks (SMB) – Mud, sand and appropriate stabilizer (cement or lime) is compacted using a machine to form a building block. After twenty-eight days of curing, the stabilized mud blocks are used for wall construction. Major advantages of SMB are energy efficiency (70% energy saving compared to burnt bricks), economy (20-40% savings in cost compared to brick masonry) and pleasing appearance.

c) Studies in Kerala context

The State of Kerala also hosts numerous mud constructions. The Banasura Hill Resort, the largest mud resort in Asia with the bewitching backdrop of Banasura hills, is 18 km away from Mananthavady in Wayanad District. Most of the tribal houses in this region are made with wattle and daub technique of mud construction. Mud can function as a flooring material, walling material and roofing material in a building in different forms. While it can decorate floors and roofs in the form of tiles it can function as walls either as blocks or as stabilised earth. But studies had shown the loss of such a sustainable construction method now (Gopakumar, 2010).

The research conducted by Nair (2006) was an attempt to develop a sustainable affordable alternative from rice husk ash to replace (partially or fully) cement for the primary building applications in Kerala. The search for new environmentally friendly affordable materials has led to the experimental research on the pozzolanic activities of rice husk ash. This has been done to explore the possibilities of the production of a reactive pozzolana in rural environments with minimum infrastructure and utilizing the limited skills of poor households. Both experimental studies in the laboratory and field studies on oven technology were carried out. The thesis has contributed to technological innovations of the building process by improving understanding of potential use of rice husk ash as a pozzolanic material to replace (partially) cement. This would greatly reduce the environmental pollution by the disposal of rice husk, and create less expensive and more sustainable cement for building construction. Another integration of technical a non-technical aspect has been achieved by this study by evaluating the potentials of rice husk ash as a partial replacement to cement, by combining the technical evaluation with various non-technical aspects such as affordability, availability of local materials, and know-how by unskilled people. Although the viability of these ovens for rice husk ash production has not been tested under field conditions in Kerala or elsewhere in India, this research points into a clear direction for sustainable-affordable housing utilizing renewable and less energy intensive building materials suiting to the requirements of households and as well as on the concepts of sustainability.

In the article ‘Sustainable architecture and tourism management’ by Pratheep (2013) had a detailed discussion about the effectiveness of sustainable architecture. In the

article the author state how was the Indian and Kerala architecture was sustainable and durable in the long run. In the state of Kerala, India, mud was the major construction material till the beginning of 20th century. Most of the ancient palaces of Kerala about 100 years old were made of timber and laterite. Almost all traditional houses in Kerala (Tharavadu) were made with laterite blocks plastered with mud and cow dung. Later on, with the advent of cement and concrete, the mud houses slowly gave way to concrete and steel to such an extent that today mud houses are rare in Kerala apart from the existing traditional mud houses.

In the research paper titled 'An Investigation on the potential of mud as a sustainable material in the context of Kerala' by Lekshmi, Vishnudas and Nair (2017), has conducted a detailed case study to understand the advantages of mud as a sustainable alternative to conservative materials. Practising architect (G. Shankar), practising engineers (P.K. Sreenivasan and P.I. Aravind) and an academician (Architect Eugene Pandala) were identified as experts for the interview. The discussion with experts from the field suggests that any burnt material is unsuitable for building construction. The walls of the houses should be able to breathe. Stabilisation with 5% cement is enough to make the mud walls strong and resistant to termite attack and water penetration. Other methods of tackling termite attack are through NEM plaster, roasted fenugreek seeds and crushed neem seeds. NEM plaster can also check erosion of mud walls. Lime plastering provides better finish and good appearance. In this case study, a residential building made of interlocking mud blocks and three rammed earth buildings have been presented. A similar questionnaire survey was conducted among the inhabitants of the mud houses to check their comfort level and problems if any, while residing in these houses.

'A Comparative Study on Sustainable Building Construction with Conventional Residential Building' was conducted by Vijayan, Thomas, Madhu and Thomas (2018) to develop life cycle data and cost analysis to investigate the feasibility of a sustainable residential structure constructed mainly using mud instead of traditional residential structure. In this study, the case selected was Bodhi – the mud house located in Mundakkal ,Kollam. It is designed by architect Eugene Pandala and it is a nature friendly home. The author has studied the following features of the house: The soil suitable for mud wall construction is added with 5% cement and 20% clay. Cob

technology is used for construction purpose. Terracotta tiles are used for flooring purpose. Organic forms and shapes and inbuilt bed space, side table etc. is provided. In dining area, hot air vents are provided at the meeting area of wall and roof and also from family living area to dining area. This reduces the temperature inside the room. Small sized ventilated kitchens are the specialties of the building. Permanent opening which are provided with only grills for safety purpose. From the study it may be concluded that sustainable buildings are more preferable than conventional building because it save natural resources, energy and reduce environmental impact. The running cost of Green building up to 8% less than a conventional building. It provides cooling effect in summer and warm in winter. The soil should be selected after conducting relevant test. Compressive strength of soil with 20%clay and 5% cement is high. Present work is an attempt in the direction to make people, communities and general public aware about the advantages of green buildings for sustainable environmental development and management.

2.2.3 EXPERIENCE OF ALTERNATIVE HOUSING PRACTICE

In the western context there are attempts made to study the effectiveness of community efforts towards building sustainable villages. Santos (2017) conducted a research on 'Potential of ecovillages as alternative models of sustainable development'. The paper aimed at understanding the progress, impact and obstacles of ecovillages and experience of people at a global scale during the 21st century. The sample was selected from Europe. In the study there are three dimensions were identified that help in understanding ecovillage's characteristics and goals from the perspective of the people. One of the dimensions was 'Ecology' and the findings revealed that quality of life is enhanced by enabling direct experience with soil, water, wind and living organisms (components of "Life-based systems"), satisfying people's basic needs while respecting natural cycles. Proximity to the living ecosystems of earth, resilient local food systems and less human pressure on nature are stimulated as well. Strategies include utilizing less and low-impact infrastructure, biodiversity protection and preservation of wilderness areas, ecological business principles.

The analysis of the cases from the study by Lekshmi et al. (2017) arrived at the inference about the advantage of the mud constructions is that plastering is optional. Most of the customers prefer to leave the walls un-plastered in order to expose the

beauty of laterite blocks or stones. By doing so, economy in plastering can also be achieved. If required, the walls can be plastered with mud itself. It is possible to give different shades of colours to the mud walls by mixing different textures of mud collected from various localities. The cost comparison of structure alone reveals that about 20%–25% in economy can be achieved with mud walls when compared with brick walls with cement plastering.

The findings by Marckmann, Hanssen and Christensen (2012) in their study 'Sustainable Living and Co-Housing: Evidence from A Case Study of Eco-Villages' also substantiate the results of the research conducted by Santos. The findings of the study revealed that co-housing can be a solution to the environmental challenges of smaller households by attracting one- and two-person households. The choice of more sustainable technologies appears to be the most important and direct advantage of co-housing. Thus, this case study examined and find out that co-housing communities are more motivated to and capable of installing and experimenting with technologies like solar power or composting toilets. From the data it was found that co-housing, to some degree, furthers sustainable routines and practices among residents. Again, one of the most important effects can be that it becomes legitimate in the communities to discuss everyday practices and potentially challenge and inspire each other to more sustainable behaviour. In the eco-village survey, residents of existing eco-villages were asked to describe their viewpoint and experience. The answer of the residents acknowledged the importance of social support in realizing the ideal of sustainability and 'green living':

> 'To be able to emphasize sustainability and the organic way of life and to reinforce each other in the importance of that commitment'.
>
> 'The organic way of life, that material goods are not top priority, the fact that we live surrounded by nature, that we have animals, living with others whose attitude to life is the same as mine' (p 423).

Lekshmi et al. (2017) attempt to understand the potential of mud as a sustainable building material in the study revealed the remarkable findings on the aspect of the advantages that people experience in their alternative house. To keep in line with the objective of this study, a thorough analysis of the present status of mud construction in the state of Kerala was necessary. Interviews were conducted with selected experts

practising mud construction. This was followed by case studies on their works to confirm the real situation in the field. In this case study, a residential building made of interlocking mud blocks and three rammed earth buildings have been presented. A questionnaire survey was conducted among the inhabitants of the mud houses to check their comfort level and problems if any, while residing in these houses. It has been found from case studies that majority of Keralites who wish to have mud houses prefer stabilised interlocking mud blocks to rammed earth technique. The reason for preferring interlocking mud blocks may be imparted to its easy procurement, good finish, greater strength and durability. Since it is available as a finished product, its cost is also high about Rs. 24–28 per block. It was also evident that real group of rustic earth lovers still prefer rammed earth technique leaving a natural rough earthy appearance to their buildings.

Lekshmi et al. (2017) has conducted three case studies to check their comfort level and problems if any, while residing in the alternative houses. The first case was selected from the Habitat Group Supervised Project in which they uses inter blocking mud blocks as their latest technique of construction. The residential building selected for case study at Thiruvananthapuram was made of stabilised interlocking mud blocks and has completed 11 years. The outer walls were left unplastered and one inside wall was plastered with NEM plaster. All other inner walls were cement plastered and painted. The response from the inhabitants reinstated that mud is an excellent thermal regulator. It keeps the house warm in winter and cool in summer. In addition to this, the positive energy which they feel while residing in these houses makes them energetic and enthusiastic in their day-to-day activities. The inhabitants of the second case from ‘ANPU’ home of P.K Sreenivasan in Thrissur feel great thermal comfort within the building. The smooth plastered walls give a soothing pleasant earthy smell refreshing the air within the building.

2.2.4 CONSTRUCTION: RAW-MATERIALS, METHODS AND PROCESS

The residential building of P.K. Sreenivasan itself ‘ANPU’ in Thrissur was taken for the case study conducted by Lekshmi et al. (2017) for finding out the potential use and advantages of Mud as a sustainable building material. ‘Anpu’ was constructed in a traditional Nalukettu style with an area of 1/900 sq. ft., completed in 2004 and the cost of construction was Rs. 430 per sq. ft. It was constructed using rammed earth technique.

An overlying coat of smooth plaster was applied over the rough texture in different shades of colours thus demonstrating the fact that it is possible to give variety of colours to inner walls by the art of smooth plastering. Stabilisation was done with cement and reinforcement was done with rice husk. The smooth plaster coat was made possible with mud, sand, cement and lime. Some portion of the flooring was done with wooden planks retrieved from an abandoned house and rest of the flooring was done of a material made with hibiscus flowers, coconut shells, charcoal, kajal and cement to give a smooth mirrored finish. Normally, people refrain from the concept of mud buildings due to the rough texture and dark shades within the rooms. But for the second case selected for the study used a different technique to manage this. Sreenivasan's smooth plastering technique is an answer to the above queries. A variety of natural colours may be made possible like deep red, soft yellow, yellow ochre, chrome yellow, muted brownish gold by mixing different textures of mud. He has demonstrated the same in his own residence. Now, the demand for mud buildings with smooth plaster has increased in this locality.

In the same study, Lekshmi et al. (2017) has given another beautiful portrayal of earthern construction with the example of Revathy Kalamandir, a 3D studio building at Thiruvananthapuram constructed in 2013 in rammed earth technique stands out as a master piece of Eugene Pandala. It has an area of about 12,000 sq. ft., constructed from the soil available at the nearby site. The walls are rough and are left un-plastered. Stabilisation was done with 5% cement to check water penetration and termite attack. The pillars are carved aesthetically using cob technology. Lot of ventilation and jally works are given for proper air circulation. Cavity wall required for the studio portion was done using rammed earth technique. Cement plastering was given for the soffit of arches, wall and column bases and top surface of stairs. The building stands out as an example of the effective utilisation of mud minimising the use of cement and steel. During its construction phase itself, the building was exposed to the vagaries of nature for eight long years. Yet, the structure withstood all adverse climatic conditions and still remains free from cracks and termite attack, radiating its earthy colour in the lush green KINFRA campus.

Numerous studies have been conducted on the feasibility of using fibres as reinforcements in mud construction. Sruthi (2013) conducted studies on clay-based soil

stabilised with natural polymer and fibre and found that organic fibres check the development of shrinkage cracks in Adobe. From her research, Adobe, a natural building material made from sand, clay and water with some kind of fibrous or organic material can be replaced with cement as it gives more compressive strength. Studies were also conducted on organic plastering. It is suggested from her findings of the study that normal plastering can be done with cow dung, activated carbon and fenugreek seeds which are all available naturally. Mud walls constructed using rammed earth technique presents a rough textured appearance on removing the rammed earth form work .The walls can be given a smooth appearance by the technique of smooth plastering.

Binici et al. (2005) investigated on the feasibility of fibre reinforced mud brick as a building material and found that fibres distributed randomly possess more compressive strength than those in longitudinal and transverse directions. The selection of construction techniques depends upon many factors such as the availability of suitable mud for each method, availability of skilled labour, transportation facilities and climatic conditions. Cob walls are generally used in consideration with aesthetics than functionality whereas rammed earth walls give priority to structural aspects of the building. Wattle and daub construction is more suitable for earth quake prone area. Fibre reinforcement in rammed earth construction is suitable for improving the strength and durability. Adopting the suitable soil and proper methods of stabilisation, it is possible to construct two storey mud buildings with rammed earth technique and two or more storeys with compressed earth blocks.

For Smith (2000) in his article discussing the revival of cob construction has pointed out some advantages of Cob method as sustainable alternative. Among the relative advantages of the cob technique that makes it an interesting alternative when compared with other building techniques is that with cob houses can be built with little money and a lot of manual labour that can be done by untrained men, women, and even children; since there are different stages in the building process that don´t always require great physical strength. If the cob house is built in an area where the materials can be easily found and extracted there is less need for transporting materials. From his experience and observation in the field he suggested that Cob houses are considered safe since they are resistant to earthquakes, don't burn and are not eaten by insects; and

have the potential to be shaped in different forms and even create rounded structures allowing different building shapes and sculptures to be made enhancing the cob house´s appearance and adapting it to the final user.

Th above findings were supported by Weismann and Bryce (2011) in their book on 'Building with Cob: A step-by-step Guide'. He suggested in the book, with cob, the owner can build furniture, such as benches and beds or even niches or bookshelves that may help reduce costs since there is no need to buy them elsewhere, and they can be made even after the house is finished. It is possible to add cob furniture to the building or to create niches or bookshelves after the wall has been built. Earth building techniques are labour intensive and time consuming, but mud (a mixture of earth and water) is the most available building material on the planet, and it can be used by everyone regardless their social status, potentially giving earthern buildings environmental and social value. Cob may be considered an appropriate construction technique in developing countries where conventional building material is expensive and labour is abundant, and it doesn't need high technology. Thus, reducing costs in machinery implementation and in teaching people on how to build with cob.

Cob houses are thought to have a low environmental impact during the construction phase, they use local and natural materials; and during the use phase, since they have special characteristics that can help reduce the use of cooling systems (like fans) and even control humidity indoors through moisture transfer mechanisms. Moreover, walls made up of earth are strong and capable of resisting insects, earthquakes, hurricanes, tornados and even fire.

This was supported from the study of Foster, Medero, Morton, & Buckman (2008), with the purpose to investigate the ability of cob materials to resist flood situations and documents basic failure mechanisms. This work also seeks to investigate the wettability characteristics of cob materials utilising environmental scanning electron microscopy. This paper takes the form of a literature review and case study underpinning laboratory experiments. The findings from the study concluded that Cob walls that are suitably compacted, straw reinforced and are composed and manufactured of the correct materials appear to have the ability to resist total failure when subjected to initial flood conditions.

2.2.5 CHALLENGES TOWARDS ALTERNATIVE HOUSING PRACTICE

Even with all the advantages mud buildings in Kerala gave way to concrete structures, there is clear statistical data about the sustainable traditional materials used in Kerala for construction of different buildings. As per the census of India the use of traditional materials (mud, laterite and lime) for walls in Kerala decreased from 63.7% in 1961 to 30.4% in 2001. The census data is a clear evidence of the slow disappearance of mud houses in Kerala (Nair D. G., 2006).

This data was concluded by the findings of the qualitative research by Lekshmi et al. (2017). This study points out some important facts as the reasons towards the decline of mud constructions in Kerala. They are grouped under socio cultural factors and technological factors where Socio cultural factors deals with the Acceptance, awareness and availability. Poor Acceptance of mud construction in Kerala is mainly due to the prolonged construction period and availability of skilled labour. Mud construction is not advisable in rainy season and hot summer seasons. Kerala receives heavy rainfall from the two major rainy seasons. Lack of proper awareness and unnecessary fear among people about the durability of mud buildings make them refrain from mud construction. People in general prefers materials and methods, which are readily available and easily accessible. Hence, they are reluctant to shift from the conventional materials of construction (bricks, cement, concrete blocks, etc.). This is justified by the case studies in the study which reveal the superior preference of interlocking mud blocks over other technological options which are cast in-situ type. Even though mud constructions are strong and durable people are suspicious about the reliability aspects. Most of the technology is not accessible to common man. Lack of skilled labour may result in poor aesthetic appearance with bulges and cracks demanding proper maintenance comes under the technological factors.

Alqahtany (2020) conducted a quantitative research on the topic people's perceptions of sustainable housing in developing countries: the case of Riyadh, Saudi Arabia. The questionnaire survey method was used to collect the data and the analysis of the data was done by using descriptive statistics using the aid of SPSS. The findings reveal that there is a lack of people's awareness about the sustainable housing. However, the people had shown a positive regarding the willingness to live in a sustainable housing

in the future as well as to adjust their current houses to be more environment friendly houses.

The major drawbacks with raw mud are its vulnerability to erosion, termite attack and development of shrinkage cracks. Hence, it has to be properly stabilised to improve its physical and mechanical properties using natural or chemical stabilisers. In ancient days, cow dung was used as a stabiliser to protect the mud walls and to enhance the durability. Conventionally, lime and cement are used as stabilisers along with mud depending upon the soil composition. But there are studies carried out to find out measures to tackle this prevalent issue.

Estrada (2014) in her case study of Earthern Cob house using the five perceived attributes of innovations in Rogers's theory has found out certain disadvantages experienced by the people. Cob is an ancient building technique that uses a combination of clay, sand, straw and water; to form lumps that when put together will form a wall. But the challenges start from the selection of construction site. Because site has to be picked carefully considering water and suitable clay supply if CO2 emissions due to transport want to be reduced. Then the Materials are heavy making transport difficult for people. Most importantly technique is time consuming and labour-intensive. The season also affects the construction. It is then Better to build during dry season. And other challenges from the analysis are it needs good roof and solid and dry foundations and Bad insulation properties.

In the same study mentioned above also discussed in the findings about some of the important challenges in the socio-cultural environment of the society and its perception and acceptance towards the technique. Estrada (2014) find out from the study that big obstacle for the diffusion of cob technique is the wrong perceptions and lack of awareness and acceptance in social system. The findings were drawn from the observation and interview with people. People are likely to understand that earth is an option for building houses but not many people in Matagalpa or even in Nicaragua know how to build with cob technique so some training and guidance were needed. The other challenge was the lack of familiarity. There is only one finished house in Matagalpa and many people don´t know about it. This may make it hard for others to know that there is an existing cob house in the area and miss the opportunity of visiting

and “trying” it. The researcher also noted, since cob is not a widely spread technique and there is only one house built with cob in the area, the observability is limited.

The findings of this paper also validate by the findings of Seyfang (2010), in his paper ‘Community action for sustainable housing: Building a low-carbon future’, about building and spreading sustainable housing in the UK. He also discussed in detail about the Cultural, social, political, economic and technical barriers in sustainable constructions.

2.2.6 OVERCOMING THE CHALLENGES

Lekshmi et al. (2017) found out from the case study and expert interview that socio-cultural and technological factors play a role towards the decline of mud constructions in Kerala. Taking into consideration all the above aspects, this study recommends the following measures which could be implemented to overcome the issues responsible for the decline of mud buildings and to promote the existence of mud buildings in Kerala. These measures are discussed below:

1. Selection and testing of soil: The soil should be selected after conducting relevant field tests in the presence of a practising engineer. Top soil should be avoided.
2. Technology: Based on the nature of the soil and client’s choice a suitable technology (cob, rammed earth, wattle and daub, inter locking mud blocks) may be adopted for the mud building. If the soil at the site does not match the requirements, it has to be transported from nearby sites.
3. Stabilisation: Depending on the soil composition, proper stabilisation is to be done with cement, lime, cow dung, etc. Fibre reinforcement with coir fibres, straw fibre, banana fibre, bagasse fibre, etc., will check shrinkage cracks.
4. Planning: The construction of mud buildings has to be carefully planned so as to avoid too wet and too dry climates.
5. Finishing: The construction using interlocking mud blocks presents a neat finish, hence no need for external plastering. But for all other techniques smooth plastering with mud can be done over the rough textured walls to get a smooth and glossy appearance. Sometimes one or two coats of lime plaster can also be applied for a brighter finish.

6. Precautions: At least one skilled mason should be there to supervise the entire work. While erecting rammed earth frame work care should be taken to keep the alignment vertical otherwise the wall will be inclined once the frame work is removed. Eave's projection of 2 ft. should be provided throughout the walls. Proper measures for tackling termite attack and erosion as mentioned in Table 2 may be implemented.

The major drawbacks with raw mud are its vulnerability to erosion, termite attack and development of shrinkage cracks. Conventionally, lime and cement are used as stabilisers along with mud depending upon the soil composition. But there are studies came up with other natural sustainable solutions for this problem.

Fibres used as reinforcement in mud can be used for different purposes in different forms. It can be used for reinforcing mud blocks or mud walls and for reinforcing mud mortar to prevent cracking. Hejazi, Sheikhzadeh, Abtahi and Zadhoush (2012), in their study found that plant roots, shredded tyres and recycled waste fibres can also be used as reinforcement in addition to factory manufactured synthetic fibres. It was also observed that shrinkage crack reduction and hydraulic conductivity of compacted clay soil have been increased with an increase in fibre content. Recent studies show that the incorporation of fibres into the soil matrix would enhance the strength and durability of soil mixes. Mud can be applied as a plaster material for straw bale buildings, an eco-friendly concept. Ashour and Wu (2010) made a study on the shrinkage of natural plastering materials for straw bale buildings affected by reinforcement fibres and drying. They observed that the reinforcement fibre had greater effect on the drying shrinkage than sand.

Estrada (2014) in her study suggested some strategies to tackle down the challenges with the slowing attribute, 'trialability' and 'observability'. She recommended by starting with small projects like small ovens and benches in order to understand and become familiar with the techniques. The cob building technique is easy to "try" since small things such ovens or benches can be built easily and relatively fast, giving the user the opportunity to get familiar with this technique. She also suggested the need of the involvement of policy makers and government to initiate programs to make people familiarize, aware and become confident in the construction. The study also recommends the advocacy and collaboration from the voluntary organizations to help

deal the acceptance and awareness aspect to the macro level. Some change agencies such as NGO´s could help establishing guidelines and educating decision makers since it seems that there are few or no institutions and policies promoting green building techniques in the area, minimizing the possibility for people to learn about building with cob or to have proper help or advice on the subject when needed. One way may be changing from top-down transfer of technology to a feedback model approach which includes the experiences of the users and includes them in order to enhance it. There is a need to improve citizen's quality of life but unfortunately, in many cases, this is linked to environmental degradation. The cob technique may be a way of decoupling these two aspects (citizen's quality of life and environmental degradation). Cob enables families to build affordable and customized houses at a low price when compared to other houses, and through the extraction of materials for the cob mixture and the reclaiming and reuse of other materials extensive and intensive damage to the environment can be minimized.

In the study by Seyfang (2010), proposes to enhance "community-led solutions" that "innovation refers to the successful exploitation of new ideas". However, in order to exploit new ideas and diffuse them there has to be a technological and social behavioural change. One way to accelerate this change maybe be to take advantage of the niche the cob technique innovation already has in the area since it seems to be highly compatible with previous innovations (adobe, wattle-and-daub).

Based on the book review of *"Low Impact Development- Planning and People in a Sustainable Countryside"* of Fairlie by Gilg (1997) explained the requirements suggested by the author for a "low-impact development. Cob house can be considered such a low-impact building, since it is temporary (in nature´s time scale), small-scale (cob houses are mostly small and compact), made with local materials (the proportions of the materials needed can be changed according to the quality of the local materials), protects wildlife and human wellbeing (no toxic materials are used and no aggressive processes are needed), it requires small amounts of non-renewable resources (the main activity that uses non-renewable resources is transportation which can be reduced), and, in many cases, it is linked to a living philosophy that aims to protect the environment. So, when the cob house is built properly, taking into account the surrounding environment (inclination of the terrain, sun light, wind, etc) and using locally available

materials (wood, clay, dirt etc) may be considered as requirements to be a “low-impact development” based on Fairlie.

2.3 RESEARCH GAP

The studies discussed above have looked at the various dimensions of Alternative Housing Practice as a concept, lifestyle, as a movement, process and change. There are terms like Sustainable Construction, Sustainable Architecture, Sustainable lifestyle practice are observed in certain context synonymous to Alternative Housing Practice. There are multiple studies investigated in the international or western context like effectiveness of sustainable building materials over conventional building materials, checking the durability and sustainability of different earthern constructions technique, about the role of eco-villages in sustainability. When it comes to the Indian studies it has more inclination to conduct qualitative research to understand and explore the effectiveness of Low-Cost affordable housing, studies on the impact of using cement and other volatile building materials and role of Indian Vaastu Shastra towards sustainable architecture. In the Kerala context the studies were focusing more on investigating the durability and strength of sustainable building material like Mud, Rice Husk Ash, Sustainable Architecture. None of the above-mentioned studies have looked at the effectiveness or sustainability of using a sustainable alternative construction or housing from the point of view and experience of any of the inhabitants as an exploration of their journey towards this alternative housing practice. And there is lack of social work research found in theses area with respect to the ‘Ecological Social Work’ as an emerging field of practice in the profession. Thus, the present study is one of a first kinds, aims to understand and explore the life inspiration, expectations, transition process, challenges and ways of overcoming of people who are following Alternative Housing Practice from the Conventional style would help to fill this literature gap.

CHAPTER III: METHODOLOGY

METHODOLOGY

This chapter deals with the methodology adopted for this study. An attempt is made to narrate the methods and techniques used to identify respondents or families who choose Alternative Housing Practice not less than six years and who were used to live in the conventional house before. This chapter includes research design, pilot study, the setting for the study, population, sample, tools, and method of data collection and how the data will be analysed and interpreted to arrive at certain findings, suggestions and conclusions based on the study.

According to YIN (1984), Case study is defined as ―an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-world context especially when the boundaries between phenomenon and context are not clear. Case studies, in their true essence, explore and investigate contemporary real-life phenomenon through detailed contextual analysis of a limited number of events or conditions, and their relationships. Through case study methods, a researcher can go beyond the quantitative statistical results and understand the behavioural conditions through the actor's perspective (Zainal, 2007).

3.1 TITLE

An Exploration into The Lived Experience of Alternative Housing Practice

3.2 RESEARCH QUESTIONS

- What were the **inspirations** for choosing Alternative Homes?
- What were the **expectations** you had while shifting into Alternative Homes?
- Describe the **transition process** leading to alternative Housing practice?
- How do you view the **life before and after** this transition of Alternative Housing Practice?
- What were the **challenges** you came across while opting Alternative Housing Practice?
- What were the **ways of overcoming** the challenges in this transition process?

3.3 CONCEPTUALIZATION

The conceptual frame work has been derived from the conceptual understanding that has been developed through the literature review and the concepts discussed in the previous chapter.

3.3.1 DEFENITION OF CONCEPTS

	Term	Conceptual Definition	Operational Definition
1	Lived Experience	Personal knowledge about the world gained through direct, first-hand involvement in everyday events rather than through representations constructed by other people. It may also refer to knowledge of people gained from direct face-to-face interaction rather than through a technological medium (Oxford Reference, n.d.).	In the context of this study, Lived Experience refers to the individual experiences of a person who opted to practice the alternative housing through exploring the inspirations, transition process, challenges and all the experiences they had gone through this change to Alternative Housing Practice.
2	Alternative Housing Practice	By definition, no one model of alternative housing exists. The variations on the theme are numerous and scattered around every part of the country and include community land trusts, solidarity housing, Beguine convents for the elderly, artists' colonies like the 'Bateau-Lavoir' building in Paris, group living schemes for people with mental disabilities (integrated, in this case, in Peul community houses), the mobile dwellings of travellers, residential squats, solidarity-based community savings groups, intergenerational housing, residential caravans and trailers in camping and caravanning parks (in Wallonia), exchanges for group purchases of former industrial wastelands, residential	Alternative Housing, in the context of this study is the construction of a house with sustainable construction materials like Mud, Brick, Bamboo, etc to live an eco-friendly life with an intention to help and protect the environment from using harmful non-sustainable materials for construction.

		complexes for former inmates, collective shelters for the homeless, and waterborne accommodation (riverboats and barges) (Madrid, 2017).	
3	Inspirations	The process that takes place when someone sees or hears something that causes them to have exciting new ideas or makes them want to create something / a person or thing that is the reason why someone creates or does something (Merriam Webster, n.d.)	The word Inspiration in the context of this study refers to the individual, familial, societal or even any non-living objects or any other stimulants or factors influenced or given a drive to choose the current Alternative Housing Practice over conventional housing.
4	Expectation	According to Cambridge dictionary, it refers to the feeling that good things are going to happen in the future or it is the feeling of expecting something to be happen.	In the context of the study, Expectation refers to the any kind of changes, hopes, values or standards of lifestyle would happen along with their shift into Alternative Housing.
5	Transition Process	It is the process in which something changes from one state to another/ To transition from one state or activity to another means to move gradually from one to the other (Collins, n.d.).	Transition Process in the context of this study refers to the entire process which begin from the decision-making process to shift from conventional housing practice to the alternative home and construction of the Alternative house and the time till when they started living there.

6	Challenges	A new or difficult task that tests somebody's ability and skill / to have to deal with one / a call to prove or justify something (Oxford Dictionary, n.d.)	Challenges in the context of this study are the physical, psychological, financial and social issues or any crisis faced during and after the process of transition to Alternative Housing Practice.

Table 1: Definition of Concepts

3.4 PILOT STUDY

A pilot study is a small-scale preliminary study conducted in order to evaluate feasibility, time, cost, adverse events, and affect size in an attempt to predict an appropriate sample size and improve upon the study design prior to performance of a full-scale research project. The researcher assessed the feasibility of the study and the availability of the respondents through the pilot study.

The researcher conducted the pilot study at Vazhuthacadu, Trivandrum on a respondent family member who are living in an Alternative Brick House build with the help of Habitat Technology Group Trivandrum. But they left their home eight months ago. Based on the pilot study, it was understood that a snowballing approach would save best to generate a viable sample. The researcher approached the same key informant to administer a self -developed semi structured interview guide, and made appropriate changes based on the feedback and validation by the client.

3.5 RESEARCH DESIGN

The research design refers to the overall strategy that is chosen to integrate the different components of the study in a coherent and logical way, thereby, ensuring that the research problem will be addressed effectively. It constitutes the blueprint for the collection, measurement, and analysis of data.

The research design adopted in this study is **multiple case study**. The case study research design is an in-depth study of a particular situation rather than a sweeping statistical survey.

3.6 RESEARCH SITE AND PARTICIPANTS

The research site of the proposed study encompasses all the residential Keralite families who chose Alternative Housing Practice for more than six years over conventional housing. Three families who chose and currently following Alternative Housing Practice has been selected as participants.

3.7 SAMPLING STRATEGY

Given that there were not many families disposed to such a study and given the context of COVID and the researcher had to get back to snowball approach to sourcing units. Three subjects were identified through snowball sampling. The study made use of face-to-face in-depth interviews on various themes. The researcher selected **3 families** who are following the Alternative Housing Practice. The subjects were selected based on the following criteria:

3. 7. 1 INCLUSION CRITERIA

- Alternative House build with 90% of any sustainable building material.
- The families must have lived in the conventional housing like those which built using concrete like non-sustainable material before choosing Alternative Housing Practice.
- The families should have experience of living in Alternative House more than six years and continuing.
- They must be living in the territory of Kerala.
- They must be a family of at least two accompanied each other from the beginning of this transition from Conventional Housing to Alternative Housing.

3. 7. 2 EXCLUSION CRITERIA

- Alternative House Build with sustainable building materials but used non-sustainable materials like cement more in proportion.
- The families who are following Alternative Housing Practice but not lived in Conventional Housing before.

- The families who are living in Alternative House but less than six years.
- The families who are practicing Alternative living practice but living outside Kerala.

3.8 SOURCES OF DATA

3. 8. 1 PRIMARY DATA

Primary data were collected directly from the families who are living in Alternative Housing for more than six years.

3. 8. 2 SECONDARY DATA

Secondary data includes information from Documents, books, reports of surveys and studies, literature pertaining to Alternative Housing and other relevant publications.

3.9 DATA COLLECTION

Primary data were collected directly from the families who are living in Alternative Housing for more than six years. The researcher visited the families at their home and the interviews were done in Malayalam were then translated and transcribed into English. The researcher recorded the voices with the permission of the respondents prior before the interview. Even if the fact that the researcher had already prepared a semi-structured interview guide, she preferred not to strictly adhere to the same. Rather, the respondents were given the chance to describe their journey and their transition process as they experienced it.

The researcher was able to interview all the cases at their home except one due to Covid restrictions visiting their alternative home was not possible. Researcher spend one whole day with two of the respondents and six hours with the other one. Participant observation was made use to observe the construction pattern and materials used for the house as well as the patterns of lifestyle and other habits of the respondents in accordance with what they are saying. The researcher was able to touch, feel the entire construction. All these were helpful to collect the data with more life and richness in it.

3.10 TOOLS FOR DATA COLLECTION

The interview schedule was prepared to find out the socio-demographic profile of the family. This schedule consists of closed questions, dealing with the socio-demographic profile like Name of the House, Type of Construction, Name of Family members, No. of Family members, Type of family, Educational Qualification of family members, Economic Status and Occupational status of the members are collected from the respondents.

A semi structured interview guide was prepared based on the research questions. Certain modifications were made to the questions after the pilot study was conducted. face-to-face in-depth interviews and discussions were conducted as the techniques of data collection to elicit information from the respondents.

3. 11 DATA ANALYSIS

The data collected through in-depth interviews is subjected to the process of analysis in qualitative research with the primary aim to understand the research concerns from the people's perspective. The analysis of the qualitative cases studies was done through thematic analysis. In the entire process of data analysis carried out with the aim of creating concepts, discovering new patterns from the emerging concepts, seeing how these concepts emerge and explaining why the particular concepts emerge.

3.12 ETHICAL CONSIDERATION

The interviewees were informed about the study as being part working up to her dissertation; they were informed prior to the interview, that their identities would not be revealed, and that the interview would be voice recorded for the purpose of convenience and affirming that full confidentiality would be maintained and the data collected would not be used for any other purpose other than this study.

The researcher 's intention is to understand the concept of Alternative Housing Practice from the perspectives and understandings of the respondent's view of their experience and how they give meaning and life to the concept and thus understanding and interpreting the data to derive new meanings and themes as well as to use for self-reflection on the matter of environmental sustainability.

The researcher has tried her best to avoid any random judgement or prejudice, and openly looked at the perceptions and views and trying to understand the contexts and their responses from their point of view, rather than intervening and influencing the interview with pre-occupation over the subject.

3.13 ASSUMPTIONS, LIMITATIONS AND SCOPE

- The pandemic situation due to Covid-19 has posed a restriction over the researcher to visit one of the respondent's home. Even though the researcher was able to reach to the village side of Kannur to meet one of the respondents, the other respondent from Idukki researcher couldn't meet them at their home but interviewed from Trivandrum.
- There were some houses which were built completely using sustainable materials but the family members were senior citizens and the place were locked under containment zone because of Covid-19 spread in Wayanad. As the researcher wanted to visit at their homes to collect rich data through experiencing the construction too has to leave this respondent aside.
- The constraints placed on the researcher by the course timeline and restricted the research to a peripheral level. Further availability of time might have helped the researcher to gather more data through multiple interviews and discussions.
- At the academic level, social workers can intervene with 'social work research' into the different sustainable housing practices, their effectiveness, impact on the environment etc.
- The transition process and the changes in the life before and after choosing alternative housing practice of individuals could be further investigated and explored in depth. But due to the time constraints placed by the academic schedule the study could not take up to that level by the researcher. A phenomenological approach to this study could better serve this need.
- From the literature review, it was found that the present study is one of the first kind in the academic platform exploring the lived experience of Alternative Housing Practice from the inhabitant's experience and journey of transition. So, this research can better serve as a first-hand resource material to those socially-committed enthusiasts from all the avenues of life like academicians, students,

professional, policy makers and even the public to understand, further investigate and study from the light of the findings and suggestions of this study.

CHAPTER IV:

CASE PRESENTATION/ NARRATIVES

4.1 CASE 1: "Castros" Earthern Cob House in Kulamavu, Idukki.

The researcher met and interviewed Mr. A at the Nishagandhi Auditorium on the sprawling premises of the Kanakakkunnu Palace that hosts several eminent cultural events in Thiruvananthapuram. Mr. A has come to Trivandrum for completing a committed Landscape work and interior designing of one café and two restaurants in the town. Due to the spread of Covid-19 and government restrictions on traveling to other districts in the month of March 2021 the researcher couldn't visit his Earthern Cob House in Kulamavu, Idukki. Mr. A shown keen interest and happiness to share his journey from the beginning till now towards the culture of "Minimalism" and Alternative Housing Practices. Mr. A spent the whole day with the researcher to share his life journey along with site visit to his work places to show how he implement his green ideas to keep his work eco-friendly and tie with the nature. Researcher also met with his two friends who also shared how his thoughts and views on Alternative Living and Housing Practices influenced their lifestyles and views on housing and living.

Mr. A is a 35-year-old young and energetic belongs to a lower middle-class family from Kudiyamala, Kannur. His father was working as a carpenter and his mother was a homemaker had two younger brothers. Even though he was an active and smart student and wanted to study further in college but he was compelled to end his academic life after twelfth grade due to the poverty and economic crisis pertained in his home during that time. He went to work in a brick kiln during the summer holidays while he was still in school. He started going to work after his father had an accident at work and fell below his waist and become paralyzed and ill. He would go to all kinds of work as a helper in construction site, washer in private and public bus at night, helper and driver in private bus, lorry in the beginning to help out his family. He had to be able to do all his basic things with the money he earned.

He is now living in his 'Earthern Cob House' called "Castors Project" which is taken from Latin word 'Castra' referred to castle, fort or plot of land. This 890 Sq. Ft. with two bed, one bath, one kitchen, one floor. This cob house is constructed on a hill side that has a steep slope from east to west near to the Kulamavu Reservoir project, Idukki. He is living with his Wife (32) who is a postgraduate in Mass communication and Journalism and working as a professional photographer and also engaged in other arts field also along with his own two younger brothers who is involved in artisans, painting,

landscape designing and photography. He has also other two boys living with him who are not his own brothers but are staying with them for the past five years. He is currently skilled in working many unique fields like Mason, Photography, Driving, Earthships or Cob House building, Plumbing, Painting and Interior Space Designing, Landscape designing and still trying to learn new vocational skills. He is a daily wager and finds time to travel across the country to know more about the alternative living methods as well as to update his skills and knowledge in vocational works. Mr. A and his wife along with his four brothers doesn't believe in working under someone's pressure and guidelines rather they would like to build up their own space and time in their life through working and depending on their own abilities and thus find work. So, that they would get ample time to travel and explore different alternative lifestyle practices across the country.

Mr. A says "It does not make sense if our abilities are recognised in someone else's certificate. If I had lived according to the public opinion, I would never have been able to build a house like this or live my life in my own conditions"

He left home at the age of 18 in 2002 and engaged in various occupations. When he left home in search of work, the first thing he did was to earn money to meet his basic needs, including clothing, food and shelter.

Mr. A says "The beginning towards this journey actually what I believe is the inspirations from the survival of the troublesome and miserable condition of my childhood. In order to alleviate the poverty and famine of that period, I had to quit my studies and to engage in all sorts of work, such as works in brick kilns, cement construction site, helping masons at construction sites, helper in trucks and containers, driver in private bus."

Then after a period of time he started to do all kinds of physical works. He engaged in multi-various occupations right from his childhood. He utilized all the skills he learned from the cement construction site, baking brick kiln, wall and interior designing, towards the construction of his earthern home. He was very passionate to work in the fields of driving and photography. All these circumstances increased his confidence to live life ahead.

He says "I was always asking doubt and curious to learn new knowledge. I was an active listener and observer. So, all this was the foundation and inspiration towards this different journey. Whatever I learned from these experiences, all the memories related to my miseries, struggles, trauma, survival during that period was the beginning of this journey. I was able to use what I gathered from those experiences towards this Alternative lifestyle."

Mr. A said the value of "Minimalistic Culture" they upheld is what led them to the thought of constructing their living space using the cob house construction method. They all believe that we should learn to live with maximum utilization of minimum resources and do not crave and seek for unwanted and useless possession of materialistic. His family members also follow this path to maximum reduce the usage of unused and unwanted materials and objects in their life like dress, household furniture, kitchen utensils and other daily living things.

He shared "We all started this journey together because we believed in ourselves. We all went through miserable and famine conditions in our past life. So, we started to think why people can't meet their needs or more than that what is actually needed to live a human life in this earth. This led us into the thought of practicing "minimalistic culture" in our lives with an eco-friendly viewpoint. So, this led us to select the hilly forest region of Kulamavu with an aim to live close to the nature. There we live with minimum and necessary utensils, furniture and food. For me the purpose of my dress is to cover my body from sun and rain than to show others how many branded jeans I have with me."

This earthern cob house construction was started in 2014 and in his view point, his home is also growing and changing along with them. He doesn't want to introduce his earthern cob house as a "Home" which is said to be completed after a few years rather he would like term it as their "Living Space" which has life and spirit within it. He believes that when we say the "house construction is completed and home is ready" then it is dead; we are not living in a home. Whereas he thinks our home should also be treated as a living thing and should take care of its each and every part, experimenting innovative ideas to renovate our living space to feel that we are not living in a non-living building rather we are part of our living space.

Mr. A said: “We wanted to build a house which is cost-effective and weightless to us and to earth. We would like to explore and experiment all possibilities and new creations to our “living space” to make it more livable and thus the house starts breath in and out. We wanted to live in a light-weight earthern home made by our own hands inside or close by the wilderness and the beauty of a forest away from all the disturbances of city life.”

Mr. A says “Then we communicated and convinced our plan with my parents to follow the earthern cob house construction and also our desire to live in the forest region of Kulamavu with my parent. They are very happy for what we have become and how far we have come by our hard work. My parents, my wife and my brothers stood by my side from the beginning of our project and we together still work on our “living space” to make it more eco-friendly and better.”

The construction of their earthern cob house was built by them all together. So, the construction was a mode of “Owner’s Building Style” where there are no professionals welcomed in the construction process rather the family or the owners themselves involved. He traveled long distance to the northern parts of India with his family and often alone, and along the way talked and visited many villages and people who follow earthern mud house construction. Some of the meet up accidentally happened during the journey. Then from them he learned on how to build earthern house using mud mortar and other natural building material for construction. Then he read books on the construction of cob house by Alex Sumerall and other different authors.

He said “I already had the experience on how to build house, compound wall and other construction methods. But I was unaware of how to build an earthern cob house until I met those masons and artisans from Gujarat and Maharashtra. They also inspired me to follow my dream. They were so skilled and I was amazed by the style and design of their construction of their own homes. It was cool inside the house even in the scorching hot sun outside. We met them during our Himalayan Trip. We wanted to hand-sculpt our ‘living space’ without any predesign or pre-plan or professional’s involvement is required. We just painted and made it out of our imagination There is nothing happier than living in a home built with our own hands under the sky.”

They stayed there for a few more days and learned the tricks on how to make mud mortar and some major techniques to construct earthern cob house using mud or clay,

straw, lime and water. His wife and brothers are good at sculpture and wall designing. So, they made the interiors of the house.

Mr. A mostly used the natural resources available from his own land includes clay or red subsoil which has a natural plasticity, as well as straw, sand, lime and water from near his house. The furniture was made of wood that was cut down during the construction of the house. But to make an ecological balance they planted tree saplings in their yard.

Mr. A said "As you know we live near to the forest region of Kulamavu, where people use to come and drink toddy and leave the bottles in the forest. We picked up these bottles and used to construct one of our walls. Many parts of our house are decorated with a variety of raw materials such as colored beer bottles, cans, ornaments that many people leave behind during our travels."

It has been six years since he and his family started living in this earthern cob house. Long before such a life began, his family had begun to adapt to a lifestyle in harmony with nature.

Mr. A recollected "We were following a lifestyle of minimalist living long before we started our home project. We always tried to be careful enough to reduce the use of plastic at any cost. Thus, we always carried a big steel water bottle, spoon, plate and yes paper pens, cloth or jute bag etc. We were also using very minimal purchase of clothes, accessories and other materials."

Mr. A and his family felt the construction of home with their own hands was a new experience and they are still trying to learn more techniques regards to the construction of the same. The major change observed is that along with earthern cob house they also started to become more self-sufficient through having a natural vegetation in their kitchen garden which is now providing vegetables and fruits to their table. They also watched how beautiful their life become after they started to live in the woods along with beautiful sight of southern red muntjac or Barking Deer, herd of wild swine or wild pig visit to the plantation, elephants, the singing voice of birds.

He says "We started to realise living in harmony with nature is not just about living in a mud house but should be more than that. Later as part of this life, we grew vegetables organically at home and planted a variety of fertile trees like Nagpur and Chinese

Orange, Mangosteen, Jack fruit tree of different kinds. I was accustomed to farming from an early age itself so this was not difficult for me."

They also took an innovative step to make sure they are creating less impact to the forest. When they built the home, it was built by letting three trees to remain and the sit out is constructed around it. So, now they have three trees inside the house. They also have a small biogas-plant from which the cooking gas requirement is met. The slurry left is also used as a natural fertilizer.

Mr. A said "We do not use fan or cooler in our home. We don't actually need it there…and our consumption of power is minimal. We are staying in home only during the summer season. Most of the other time we travel and engage in works. We freely all kinds of animal species who were there let live there."

Kulamavu is a forest region at the entrance of Idukki district. The site he and his family chose was a piece of forest. There were some challenges encountered during the migration to the Kulamavu property site. It was not easy for them to make least impact of human invasion in the forest even though they want to live in harmony with nature.

Mr. A says "No matter how hard we try, as man moves into the forest to live, various impacts will take place in the forest. We try to keep as much plastic as possible out of the woods, but the bread cover and milk comes in plastic. The actions of our human beings affect the balance of the forest, even in a small way it does matter a lot. We had to put a lot of conscious effort to lessen the impact of our invasion and it was difficult in the beginning."

Mr. A said it is very necessary to learn and understand the ecological balance and diversity exist in the forest before you step into it. They started exploring what are the kinds of species exists in their place and how can they live there without affecting their life cycle or ecological balance. So, it took a lot of time to sync with the symphony and balance of nature.

The place where they live is a very steep slope with no level. Therefore, it is very difficult to carry heavy items home. So, the easy mobility and transportation is difficult in this hilly place. On the other hand, it was also difficult and challenging to convert the forest land suitable for vegetation and agriculture.

He says “If you need to bring rice or wheat sacks of 50 kg. or timber or any kind of heavy items, you have to climb a number of steps. My back hurts a lot when I bring such a heavy load. So, it was quite difficult in the beginning and took a lot of physical man power.”

The other major issue still they address is the difficulty in socializing and acquaintance with the native residents in Kulamavu. As he says “the current issue we face is the difficulty in socializing with the native people in Kulamavu. Because in the beginning people were closely watching us like what we are doing here in the forest. They were not ready to accept us in the beginning. They thought we are doing something illegal in the forest and as a result we even called to police station once. That was mentally quite disturbing for us in those times. We took a great effort to convince the authorities regarding our intention. Still people do not get the idea of living in a mud house inside the forest. Some of them still doubt us. Some of them said we are mad. Still, we face these issues”

As they are living near or inside the forest, they had to face the visit of herds of wild pigs and elephant and sometimes the visitors are deadly poisonous snakes. He says “Sometimes large herds of wild pigs and elephant come to the backyard and plow and destroy the crops we have grown and tear down the fences. When it comes to barking deer, it first eats the green stalks of plants that have started to germinate. So, it is most often difficult to keep the plantations and crops to grow. We twice catch King Cobra of 14 feet near from our wood shed.”

Mr. A had the full support of his family and friends with him throughout this journey. Mr. A says “My parents were given full support when they were convinced about the project. My wife stood by my side and had given her ideas to it. She is a very intelligent and smart women. My brothers were also played an integral part during the construction of our home.”

The issue with the steep slope and long steps were managing by changing the heights between one step to the other. Because of the practical lessons from his experience as a mason and creative artisans work, he constructed and renovated a natural mud and wooden steps into home. The issue pertaining with the socialisation is addressed through engaging in common events with them and working for their landscape designing and interior, photography during any important occasions etc.

Mr. A said “Later we figure out how to socialize with the native residence of Kulamavu. They are village people. So, we took conscious effort to find out time for them…visiting their home, participating in their small gatherings and functions like birthday or wedding party, taking photographs and video editing of the event at free of cost or for a small amount, helping them to renovate or landscape their home and land…and later they are convinced…not everybody but some of them. And we invited them to have a visit around our cob house. But it was once. Because we do not appreciate visit of mass into the forest. And we do not encourage celebrations and party inside our cob and around the forest region.”

They all together tried to address the impact of their invasion into the forest by being more careful in handling the biowaste and reducing the maximum intake of non-bio degradable objects. As he says “We always tried to reduce maximum intake of plastic into the woods and into our home. Thus, if any come, we reuse it rather than throwing it away or burn it. To reduce the intake of bread cover and milk cover we started recently cooking bread at home and using standard milk powder often. We reused our old plastic and glass bottles for designing the walls and bottle art work. My wife is interested in bottle hang gardening.””

Even though they often had to face the visits of their wild friends and destroying their crops, still they let them freely roam around here and there. He said “It is actually their home and we trespassed there. So, in my view point we don’t have any rights to sweep them away. We are happy to let them have some of our food crops and our space. After few years since we have been lived there, they become acquaintance with us.”

4.2 CASE 2: "Variyakonam" Bamboo-Mud House in Nedumangad, Trivandrum.

The researcher reached Karakulam by Nedumangad bus, from there took an autorickshaw and drove to the home. The house is built on a hill slope. Autorickshaw driver said this home is well known in their town about its features. When the researcher arrived at the destination the owner was not at home. By the time researcher met their neighbours and they said in the beginning of the construction they thought this man is insane. But now they could feel the difference in building a home with mud versus cement.

From the outside, the house looks like a four-story house having a beautiful sight of shining darkish-grey clay paint in the walls with red stone and bamboo. Around the house were plants decorated with a variety of flowers. The house is built in a triangular tower pattern with a slight elevation according to the geography of the location. There were small steps paved with red laterite stone or Chengallu with mud plastering finish to get home. After a while, Mr. B reached home with his family. Mr. B, 42 years old working in the Kerala police force at Nedumangad police station range living here along with his wife Mrs. B (38) working in the office of General Education Department, Government of Kerala and two girl children at the age of 7 and 12. The family shifted to this 1250 Sq. Ft alternative house in the year 2014. Till then they were living in the police quarters.

Mr. B has a zoology science group background in his degree and it has helped him identify the need and importance of living in harmony with nature that every species is depended each other for its survival.

He says "When I was studying, we met several environmental activists who were professors, authors and from other fields. I don't remember all of them but a few like John C. Jacobs sir, V.S Vijayan mash, K.P Joy sir. There ideas and thoughts on the need of protecting our nature strike my thoughts. But later I went with the flow of my life. But still the fire was within me. I realised it long after when I met my friend in my workplace who has these same thoughts for nature-friendly lifestyle to follow. We were later become part of environment protection tribunal and related clubs where we met some of these people again and reignited our spirit."

Mr. B and his friend later bought this place. They together started construction of their house. For constructing a house using natural material mostly, they started to search for a person who can help them professionally and they found Ar. P. B Sajan, Joint Director, COSTFORD Trivandrum and Member Secretary, Lauri Baker Construction. Then they visited different types of alternative homes and constructions made of clay and mud, bamboo, Adobe-Brick, Laterite-Mud styles along with Mr. Sajan. After the meeting and exposure with the constructed mud and bamboo houses, both of them got the inspiration and courage to leave the conventional construction and follow the alternative housing practice.

Mr. B said "Sajan sir is one of the disciples of Laurie Baker and he is assuring this method of construction is safe and strong…then why should we doubt an expert's advice. He was such an inspiration and support throughout"

Mr. H had some expectations before shifting to this new mud home as well as certain things he wanted to do during the construction. Mr. B shared his thoughts on this "I studied zoology and has some experience with Naturopathy. So, I knew the curing and amazing thermal capacity of mud. So, I was adamant in using mud for my house even Sajan sir proposed brick house. I thought it is better to live in a house which is made of mud."

They were living in the police quarters and there was no facility for proper waste management and Mrs. B wanted to have a biogas energy system to properly segregate the biowaste.

She said "The one thing I always asked for the installation of a Biogas plant in our new house, because being a homemaker I was the one who has to handle the all-waste management. When we were living in our quarters, I really struggled with this."

He was also aware of the negative consequences that can happen with the cement construction. So, he decided to use as much as less cement in his house construction. He was also wanted to involve the native and local masons and artisans for the construction.

He says: "When you realise the amount of carbon dioxide that can emit from the cement manufacturing and the environmental and health problems that can happen due to air pollutants released from paints, we will quit the use. Not only that, it is the cement and

steel manufacturing industries. They are also earning marginal profit by raising the price of this nothing but useless harmful product. So, I was decided to give a job opportunity to the local workers. Thus, we can support the local economy. They got one-year full stretch work from here. They are natural workers who are using natural materials. They had a good hand-on experience with this construction methods and technique"

When the decision was made to build a sustainable and eco-friendly house Mr. B was confused about whom he should ask for professional support. Finally, after few searches they came to know about COSTFORD- Centre for Science and Technology for Rural Development, Trivandrum who follows a low-cost eco-friendly construction method using burnt clay bricks, bamboo, cob, mud etc. They met Ar. P. B Sajan, Joint Director, COSTFORD Trivandrum and Member Secretary, Lauri Baker Construction. The team of professionals and engineers from COSTFORD had a discussion with Mr. B and they drafted a blueprint of their desired mud home.

Mr. B says "Every evening after my work and in the weekends, I came here during construction and become a part of the work. I was happy to look at each stage of my work how it progresses and how it evolves. The engineers from COSTFORD always had communication with us in each stage. They always asked our likes and dislikes, how we want our kitchen to be like, the arch for the living room, the corridors and the unique family space we had at the second floor.

The construction finished within one year. The construction method for walls using mud was just like Cob method. The mud is mixed with straw, husk, shell lime powder and mashed manually 5-6 times and is allowed to ferment for 10 days to destroy the termite eggs in the soil. Once the mud is ready, mud balls are made out of it and stacked one on top of the other. The filling between the balls, plastering and painting is also done using mud only. The beam and roof of the ground floor and first floor is made by stacking treated bamboo. The house is constructed with a total sum of 38 lakhs among most of them spent for the labour cost.

The material required for the house including mud, windows, rails, upstairs were mobilized from the locally available resources. The whole amount of mud required for the house got from the site itself. They mobilised windows, rails and used-upstairs from the rubble of the demolished house at a cheap rate. The 100 years old brown clay roof

tile was collected from the renovation of a government school building nearby for free of cost. The waste bottles were used to decorate the walls. COSTFORD mobilise Kattadi poles and Bamboo Ply for ceileing the roof.

Mr. B says “We tried our maximum to use locally available raw materials for cost-effectiveness. We collected all the windows, rails, roof tiles and other required materials by ourselves. So, transportation fee for that was reduced. Mud was taken from the site itself and clay roof tile from a school … all with free of cost. This helped us a lot to keep our work within in the budget limit.”

Mr. B and his family was living in the police quarters in the city. The life there was not easy for them except the children as they had lot of friends to play with. He says “We were living in the ground floor of a four-story apartment and the life was there difficult. The drainage system was not working properly all the time. The air was polluted as we were living near to the main road. Even in the mid night we could hear the loud noise of Ambulance airhorn. We had to run the AC for almost all the time otherwise we couldn’t sit inside the room. The building was just burning… in the summer you just can’t switch off the fans for a second.”

Mrs. B added “The rooms were tightly packed and you cannot even breath. It was difficult for me to manage the kitchen waste and plastic a there was no proper waste management facility working then. We just had the option to burn the plastic near to the apartment. Those days were so exhausting.”

Even if they wanted to practice their nature-friendly lifestyle they couldn’t even think about it in the hustle-bustle of city life. But after shifting to their Mud home, they had different experiences and feelings. They got the enough place and time to make changes along with their home and this home has made some changes in them.

Mr. B says “the thermal capacity of the mud is what we are experiencing here. When we come from the scorching sun outside, we experience a cool warming temperature inside. And when it is raining outside, it is warm inside. This is how mud walls are working. Actually, we can say our walls are breathing! We feel so comfortable, cosy and relaxed when we live here. So, I always feel like our physical and mental health has also improved. We also use solar energy for a great sum of our energy requirements.”

Mrs. B shared what are the changes happened as part of shifting to the Mud House as "We have a biogas at the basement and our toilet has a connection to it. So, waste management is better now. The slurry from the biogas is used as a natural fertilizer in our kitchen garden. We follow natural vegetation to grow necessary vegetable like Potato, tapioca, beans, bitter guard, brinjal, ladies' finger, papaya etc. Kudumbashree workers came here thrice in a month and they collect back all the plastic to the recycling centre. So that problem is also solved. And now we consciously make effort to reduce the use of plastic and reuse what we left. We encourage our children to be plastic-free. They are carrying steel bottle and tiffin as well as refilled pen or paper pen. We are happy now. We have solar system as well."

In the beginning Mr. B doesn't had the support of his family and most of his friends said he is insane. During the construction people look at them with curiosity and thought they are doing something funny. It was difficult to answer the questions to the people at those times.

He says "When my wife saw the land we chose, she was dissatisfied with the slope of this hill and full of stones. Some of my friends told me this is not a good idea; you should quit this plan. The reason that they thought that mud is not strong and longevity is doubted. Neighbours here definitely didn't believe that we are building a house here. Friends in my workplace even commented like "there is two insane police men with an architect running behind some foolish idea". My brothers and family always tried to discouraged me to quit this dream. They could not agree or believe that mud house is strong and safe. They could not agree or believe that mud house is strong and safe. In the beginning it was quite mentally difficult to address these comments and questions."

The other issues with the house are that relate to the construction. The ground and first roof were sealed using bamboo and mud in between. In order to make it strong they filled the vertical space between the bamboo piling with concrete too. Now when the children play on the first floor the pieces of concrete falls below. It is not a big deal. In those time, they had no other technology rectify it but now they developed it.

Mrs. B says "The other issue is with the dust. Other than conventional concrete housing mud house has more absorbing nature towards dust and humidity. If you are out of home for a week, then when you return you had lot to do."

The children said they don't have friends here to play with. Socialization was difficult during the initial stages for the children when they shifted here as the home is in a rural village. There are no children here at their age to play with. So, they are feeling loneliness often. Both parents are working and get back home late in the evening after the children back from home.

Mr. B says "The paint of the wall is made using the sedimented mud from the site and it is unique and the mixture won't get for second time how hard we try. When children play, they may hit the wall and paint got peel off. Then you can't paint it again with that same colour and texture.

The friend from the workplace of Mr. B who had the same interest to build an eco-friendly home was the main source of support for him from the beginning till the end and during all the struggles. The support of his wife was with him since when she realised this is a better choice to live. Ar. Sajan along with his team of professionals from COSTFORD also stood with him during the construction process.

Mr. B says "When you are decided to step into an action plan to pursue your dream, you should also be confident and courageous enough to face any challenges that can came in your way. I was determined and thus I let everyone to call me insane if they want to. Even though it was quite difficult to face these comments in the beginning, later I started not to bother about them. I don't bother, because I was determined to not give up my vision. I enquired and collected the details from trustful source like Sajan sir from COSTFORD and saw houses built with mud and bamboo with my own eyes. Thus, I was confident to start my work ahead."

The other difficulties in terms of the paint colour, falling off the cement is manageable for the family. The issue regard to the socialization of the children is managed through admitted them to evening karate class for the elder one and musical class for the younger one after class. Mr. B is also interested in arts and music so in the weekends he also accompanies children often.

Mr. B says "The children were so happy when they got the space to mingle with other children and the dance class also went well. Whenever I got any chance to leave early from my office I would love to join with my children. We also had our cultural space in our home. That beautiful evening makes our memories to the best."

4.3 CASE 3: "Nanavu" Earthern Mud House in Chakkarakkall, Kannur.

The researcher and her friend arrived at Chakkarakkall bus stand after one hour journey from Kannur bus stand and auto rickshaw. From here, they entered into a mud road of 150 meters from the left side of Chakkarakkall-Anjarkandy main road. About 50 meters before the destination, both the sides of the mud road were sighted with paddy and plantation field, at the end we were welcomed by a natural arch made of passion fruit vines.

We met the couple at their Earthern Mud House called "Nanavu- Home of Harmony" which is an energy efficient and eco-friendly house. The couple turned their 34 cents into a small forest with preserving 100 different species of trees, plants and blessed with the visit of rare species of birds and butterflies into their forest. The couple is living a simple and sustainable life in all forms with an aim to preserve mother nature but without making any human invasion or intervention.

Mr. H and Mrs. H are at the age of 62 and 58 but still living a life full of energy and work hard on their paddy field, plantation and vegetable garden to become self-sufficient in producing required food for themselves. Mr. H is a formal technical employee in the government water authority department in Kannur. And Mrs. H is part of a community of farmers and gives guidance to them to practice natural farming. The love for nature that the duo shared became the reason for the couple couple's union as a whole. They tied their knot at 2007. It has been ten years since this family started living in this micro-paradise home inside the small forest. 'Nanavu' was built in 2010. This eco-friendly adobe mud house was built at a total cost of Rupees Four Lakhs only. The total material cost of this house is Rs. 50,000 and labour cost came around Rs. 2.5 lakhs. 'Nanavu' is a 960 Sq. Ft abode consisting of spacious bedroom, sit out, hall, bath, Kitchen and a study and reading space.

Mr. H and Mrs. H are active volunteers in the Environment Protection Clubs and groups in Kannur. Mr. H was a government employee and quit his job in 1996 and Mrs. H also quit her teaching profession in 2012. They wanted to live in close harmony with nature. They did not want the fast pace of artificial city life. But instead, they created their own little natural micro-paradise giving back to the planet more than what they gain. This

couple are living their dream, a dream of living naturally away from the humdrum of the city.

Mr. H shared his philosophy and expectation regarding why they choose to live a life close to nature putting behind the reputed government job, saying “We are doing an experiment on how-to live-in harmony with nature. For the past 25 years, we are living like this. Our main goal is to lead an energy-efficient lifestyle and also live in a nature friendly way without any exploitation or human intervention in nature. I started to think about this life as a change to live more harmonious with nature. I was active in the strikes of ‘District Environmental Samithi’ from 1996 onwards. It reinforced and gave me a platform to think, act and live with nature and expect less from it.”

Mrs. H added “We understood that the earth was created not just for human but for all living organisms and our species cannot survive without each other. Always try to take as less as possible from the nature. The principle of Minimalism. This was our philosophy of life and that was our aim.”

Both of them were active in the fore-front to advocate for environmental protection and participated in several strikes and rallies in the past 30 years. They announced their presence and support everywhere across the state in fighting against the rules and laws of government and corporates who are introducing mammoth developmental projects and harming the ecological balance of the nature for their profit. They were members of different associations and organization who hold the same view point. Still, they try to attend to those immediate emergencies to the need of nature to be protected from harmful human interventions and give their support. So, both of them hails from a background of work space and social circle which has the same perspective and idea to preserve mother nature.

Mr. H says “We follow the Gandhian principle of self-sufficiency and live a simple life as much as possible. So, from we also wanted to have our own food garden and produce most of all the required vegetables, rice, cereals and fruits for us. We also planned to have a zero-waste life. we wanted to have our own production of cooking gas through implanting a Biogas plant along with the mud home. The profit-oriented attitude of the mainstream community and exploitation of nature in the name of progress is what we could not agree with. Nature has everything for our need but not for our greed. . We had a long-term preparation and plan to promote and take practical classes to our local

farmers on how to do natural farming. We also wanted to support our local economy through giving one-year full term job here with our project."

It was Mrs. H's dream to live in a house made of mud inside a forest. Mrs. H says "From my childhood onwards, it was my dream to create a forest and build an eco-friendly small mud house in it. During my college days, one of my professors was Prof. John C. Jacob. He is one of the prominent personalities in the field of Ecological Preservation and wrote the first book related to nature-friendly living. He was a climate activist. He told me that a house should be suitable for nature and mud were perfect for it. So, from the 1980s, I started planning to build a mud house."

Both of the couples follow the principle of "minimalist living". They were influenced by the thoughts of Gandhiji, Nadaraja Gurukkal, Osho etc. They do not believe in the possession of material world. Mr. H's mother was also living a lifestyle which follows the vegetarianism and natural lifestyle. The couple were fascinated by the low-cost construction technique of renowned architecture Lauri Baker. So, they choose it for the construction of "Nanavu".

Mr. H and his wife approached different organisations like Habitat, Trivandrum to help them out in building Mud House. But most of them were demanding nearly a sum of 35 lakhs for the construction. Later they met one of their friends who was a mason and had an experience in working under Architect Shankar from Habitat Group of Technology from Trivandrum. But this friend had exposure only to Brick model of construction. Then he went for an experience and exposure to learn the construction technique of Earthern Cob or Mud construction from masons in Trivandrum who had a great experience in the field. He returned back to Kannur along with masons from Venjaramood, Trivandrum for the construction. The construction prolonged for one and half year and all of the workers stayed near to the construction site. Mr. H and Mrs. H were also involved actively in the construction process along with their friend and other workers.

He says "The mud should be dug out from at least 2.5 feet below the topsoil. If you take 2-3 feet soil from the foundation of your house you get enough mud for the construction. The construction method for the mud house is very simple. Because mud is mashed manually 5-6 times and is allowed to ferment for 10 days to destroy the termite eggs in the soil. One bucket of shell lime powder is added to the mashed mud

for that. The mixture is again mashed and kept for 10 days. Once the mud is ready, mud balls are made out of it and stacked one on top of the other. Once the side wall reaches at a height of 75 c.m the stacking is stopped, so that the wall gets dried. This process is repeated until the walls are fully constructed".

Mrs. H added "Mud was taken from here itself, wood from old trees, mostly coconut tree wood from our site was used for the construction of doors and windows. Nowadays, humans are hurting the nature by making houses built with high amounts of cements and steel which is not the natural way to live. We used locally made terracotta tiles were used on the floor and roof. Mud plastering was done and then clay paste pigments were used as paint. Other artificial wall paints can affect the microorganisms, ants and birds because it releases toxic chemicals to the air. Only 10% of cement is used in the beams."

But Asha from college days itself started to dream of leading an eco-friendly lifestyle and tried her best to follow the guide lines of her prof. John C. Jacob who was a climate activist and author of books published on Nature-Friendly lifestyle. Mr. H started to involve in the environmental protection strikes happened across the state as part of an active member of District Environment Protection Samithi in Kannur. It paved a strong vision to lead a life close to nature. So, before building 'Nanavu' he already started to follow a lifestyle which is close to nature so as his wife.

Since 1999 Mr. H never used any modern medicines. He always taken care of having a food style including vegetables, fruits, grains. Their diet includes raw food at night mostly a fruit item and cooked meal in day time. The food grains and vegetables for cooking were produced from their farm through Natural Vegetation Method. They don't prefer to have sugar contents in their food and completely ignored coffee and tea from their diet pack. There is no cosmetics or luxury perfumes or scents used in the house. They don't buy new clothes or any accessories as per new occasions or festivals unless the used one become completely destroyed. All these lifestyles were part of the life of this couples even before they stepped into their Mud house.

Mr. H says "People think life is something else. Like having a lot of money, power, fame and earning more profit is the only mantra in life. Honestly, man doesn't need all of this to live. Man can live a simple and easy life and still be successful. The intake of the diet is varied according to the severity of the disease. If the illness is severe, I will

switch to fasting for a day and give my digestive system a complete rest. You can take herbal juice or coconut water in between to stay hydrated."

Mrs. H added "We do not use strong detergent or floor cleaner to completely wipe out all bacteria. We maintain an average hygiene. We do not demand to have our floor to be shined like a glass. That's why the origin of Naturopathy become so relevant today. Changing dress after every bath even if it is clean…I don't understand the logic. I get allergic with the use of perfume. We do not appreciate people entering here with using chemical perfume which can affect the ecological stability and equilibrium of 'Nanavu'. The paraffin oil used in it disturbs birds, ants and other useful microorganisms and can even damage our eye, ear and brain in the long run."

They were following the Gandhian principle to become Self-sufficient where the made into reality by growing their own food in their natural food forest. Since 2002 they maintained a forest without making any farming intervention method rather allowing the forest to grow by itself. Now it provides more than 15 edible fruits and more than 20 herbal species for medicinal purpose. They are following a farming method similar to zero budget natural farming. They use negligible number of natural fertilizers and put small quantities of cow dung and biogas slurry.

Mrs. H says "If you want to do farming, then you should observe a forest. We know how a plant grows in the forest. No one water it or applies fertilizers but the plant grows without any diseases and bear fruit. This fruit will be a balanced one and will taste better."

The couple were living in this house for the past 10 years. They actually do not use any fan or cooler. Because the energy consumption is very low. The couple does not use more than 15 units of electricity in a month. The electricity bill comes around 100 to 150 rupees. They draw their power from a 1.15 kilo volt roof top solar system and use 'Biogas' to serve the energy requirement in the kitchen. All organic waste along with the human excreta is converted into biogas fuel which is used for cooking and the slurry is rich in nutrients is used as soil fertilizer. Thus, the waste management is fully efficient.

Mr. H says "Normally electricity produced by exploiting nature like hydro projects, nuclear plants are bad for the environment. Producing electricity by damming rivers

and by nuclear fission is against the law of nature. It is better if we can produce energy ourselves. We are having solar energy here. This is enough to run all our electronic devices such as laptops, television, camera, mixing grinder. But we always keep a check on our consumption and try to use electricity judiciously."

The energy frugality can be catch by the fact that this house does not have a refrigerator. Instead, food is preserved using an earthern container "Matka" build in the floor of the kitchen. This is a natural cooler. The cooler is lined with clay bricks and is filled with sand and clay. A mud pot is placed in the centre of the cooler and is sprinkled regularly, which cools down the mud pot. The temperature inside the mud pot is around 10 degrees Celsius. due to this, food stays fresh inside without loss of nutrition. Moisture of the sand should be maintained; without moisture the cooler can't function. Water the sand regularly for the container to remain cool.

'Nanavu' has a special property with its mud walls. It has a very amazing thermal property. Mud walls absorb excess moisture during humid days and regulate the temperature inside the house. So, the couple called their home as a "Breathing House".

Mrs. H says "No matter how hot it is on the outside the house is generally cool during the day time. Because the hot air on the outside has to pass through the clay walls before entering the house, which takes some time. By the time this hot air gets in, it's evening already. And the weather on the outside is cool too. Then once again, cold breeze flows through the night. Our house just breathes like us.

They shared their rejuvenating experience as they started living in their dream home as "We are feeling we are living a blissful life here. We feel blessed and energetic by hearing a quail song, watching birds taking bath and butterflies flying around us. We are just leading a relaxed and healthy life every day. We have enough time to spent on our farm land, take a sunbath near our pond, observe and study birds and plants and engage in environmental activism as well."

The couple faced different challenges in terms of leading this lifestyle. They were questioned by the local police twice at their home doubting they are spreading wrong messages to people or doing illegal activities over there. And one reason behind this questioning was due to the wrong number of land possession information passed by a YouTube channel who documented their life. The couple said this will happen when

people came here with some fascination to see what they have done so different and not because they want to know how they can preserve nature.

Mr. H said" We faced these physical struggles and mental torture in the beginning. All this happened because they are afraid of the right and positive change that can influence people and move them out of their hand. The government and corporates are profit oriented and we are against their law of business profit. They are afraid of the powerful change that we can make that can shatter their kingdom. In the beginning it was difficult for us to manage the situation. Because my mother and sister are living nearby. They become very afraid. It affected us also."

The other major problem they faced often is when they happened to visit their friends or family members, they offer them coffee, tea or milk along with bakery items. All this food items are not in the couple's diet list. They completely avoid any kind of sugar contented food items.

Mrs. H says "People become so offended if we don't drink the sugar loaded bakery items or caffeine. This is now become a common ritual like and it's so suffocating. We consume food as medicines where it is a serious matter. If we intake food without having appetite and within proper time interval for digestion then we will end up in consuming medicine as food for survival."

They also face difficulties during monsoon season to grab enough biowaste or food waste for Biogas since they follow a minimal consumption of food during those times. They prepare food less than what requires to make sure they don't waste any leftover. During monsoon season they follow medicinal and herbal diet which mostly include leafy items and vegetables which is mostly half cooked.

Mr. H has a strong will power and dedication to follow his instincts and perspectives in regard to Eco-friendly and minimal living lifestyle. He is stubborn in his stand and never ready to compromise with his values at any point of time. His wife and his close relatives stood with him all the time to preserve mother nature.

He says "We can live in two ways; one which is after superficial revolution to gain more profit, money and status and the other is to live in harmony with nature according to the laws of nature. It is very easy to follow what the mass is going with the business mind in everything but there is a strong conviction and realisation is needed to get out

of this grip and live with nature. We should learn to take less from nature and give more back, because taking resources that kept for tomorrow and using it to satisfy our greedy needs of today is an absolute horrible mistake we are doing right now.

Even though the couple faced a lot of stress during those times of struggles and troubles by local police, they were mentally supported by their old friends who participated in the environmental protection strikes since 1996. They were arrested and blackmailed by police and corporates to stop the strike during those times but they survived all of that. So, all this experience and network of people from District Environment Protection Samithi helped them withstand and face all the troubles by police after they build the mud house.

Mrs. H added "Nature has a natural rhythm and flow to balance it equilibrium through the food chain circle. If any one part of this chain is broken the entire system will have the effect. What is actually violence in my view point is the unnecessary human invasion and intervention affect this food cycle of nature. Human's achievement and development in whatever field is gained only through the exploitation of natural resources. There is no source for making so much profit and money other than from nature."

So, the couple was very determined and strong in their stand to protect and preserve their mother nature at any cost. This is how they face and overcome their challenges with the government and corporates. They also take a stand in conveying their position and concern regarding the food pattern and diet they follow whenever someone visit their home or they become guest to others. They will convey their stand in the beginning of the conversation itself or prior before the visit through phone call to avoid confusions and any kind of embarrassment to the host. And also, they will also give some practical is to the family to stay healthy using natural sugars like honey, sugarcane juice instead of white sugar. They would also take effort to carry some organic fruits and vegetables along with them to gift the host family.

During the monsoon season the family depend upon the nearby 'Tharavadu' and other two neighbouring homes for the adequate amount of biowaste to be collected for the biogas plant to run properly. This helps them meet the required amount of biowaste to be needed for the plant to produce gas.

CHAPTER V: THEMATIC ANALYSIS AND DISCUSSIONS

5.1 INTRODUCTION

Qualitative data analysis is the process in which we move from the raw data that have been collected as part of the research study and use it to provide explanations, understanding and interpretation of the phenomena, people and situations which we are studying. The thematic analysis is one of the most common forms of analysis within qualitative research. Thematic analysis emphasizes pinpointing, examining and recording patters or themes within the data available.

The sections are divided into: 1) Case Profile of the Respondent 2) Personal Profile of the Cases 3) Thematic analysis of the cases and its discussion.

5.2 GENERAL PROFILE OF THE CASES

Case	Name of the House	Type of the House	Year of shifting
1	**Castros**	Earthern Cob House	2014
2	**Variyakonam**	Bamboo-Mud House	2014
3	**Nanavu**	Earthern Mud House	2010

Table 2: General Profile of the Cases

5.3 PERSONAL PROFILE OF THE CASES

Case	Number of Family Member	Relationship, Age and sex of family members	Educational Qualification	Economical Status	Occupation of the key bread winners
1	6	Mr. A – M/35 Mrs. A- F/32 4 Brothers age range between 21-28	Mr. A – Plus Two Mrs. A- Post Graduation Two brothers – Graduates	Middle	Mason, Landscape and Interior Designer

			Other Two- Plus Two		
2	4	Mr. B – M/ Mrs. B – F/ 2 Children F/ F/	Mr. B – Graduate Mrs. B- Diploma, Graduate,	Middle	Police, Government Employee at Dept. of Education
3	2	Mr. H – M/ Mrs. H – F/	Mr. H- Graduate Mrs. H- TTC & Graduation	Middle	Farmers

Table 3: Personal Profile of the Cases

The profile of the cases or families give a basic socio-economic understanding and type of sustainable alternative housing practice they follow. The researcher conducted three case studies of families who follow a sustainable alternative housing practice in which two of them constructed Earthern Mud or Cob House and the other one has Bamboo-Mud House. It has been 10 years since one of them started living in the alternative house and the rest of the two have been living in their home for six years. Two families have no children and one among them have four brothers living with them. The other family have two girl children. All the three families belong to middle class family. All of them (excluding the children) had completed their schooling and two of the family, the members are employed. One of the family engaged in Agriculture and farming.

5.4 THEMATIC ANALYSIS OF THE CASES AND DISCUSSION

5.4.1 RESEARCH QUESTION 1

"*What was the **inspiration** for choosing Alternative Home?"*

- **Theme 1: Inspiration for Choosing Alternative Housing Practice**

Here the researcher tries to understand and explain the influencing factors that inspired the family members to follow the path of Alternative Housing Practice leaving their conventional housing and lifestyle. All of them more than one and different sources from which they are inspired to follow the path of Alternative Housing Practice. From the data collected it was found that all of them were **influenced by meeting people** who are following eco-friendly lifestyle and two of them got direct exposure to people who are living in sustainable alternative houses. Two of them had **strong value system** adhered to which led them eventually to follow this Alternative Housing Practice. One of them drew inspiration from his **own life experiences** while **academic knowledge and background** had influenced other one of them towards alternative housing practice. Two of them are active in working **clubs or associations and organisations** which aims for protecting and preserving nature. The experience and exposure from these organisations also inspired these two to follow the eco-friendly housing practice.

Based on the first theme four subthemes were generated:

- ✓ **Sub Theme 1: Inspiration from People**

From all the three cases (families), one elder member from each family had the opportunity to meet experienced people who are following an eco-friendly lifestyle and inspired from them. Two of them were influenced by the **thoughts, ideas and works of famous environmentalis**t in Kerala to whom they had direct exposure with. Two of them happened to came across to meet with **mason/architect who are living in alternative houses build by themselves** which helped them to reassure their confidence in following their dream and to clarify their doubts.

- **Exposure with Environmentalists**

John C. Jacob was one of the **pioneers** of the **environmental movements** in Kerala, who is an ardent naturalist who had devoted his life to conserve the biodiversity of the western Ghats and fought relentlessly for it. He had written lot of books on this matter. Two of the following had the opportunity to meet him during their college days. They were moved by his thoughts and actions for protecting and preserving the nature as they said so. Mr. B (Case 2) also had the exposure with **Mr. V.S Vijayan** who is also a famous **environmentalist and wildlife biologist** and **Prof. K.P Joy** who is a distinguished **environmental scientist and social activist**.

Mr. B from **Case 2 (Variyakonam Bamboo-Mud House)** recalls "*When I was studying Zoology, we met several environmental activists who were professors, authors and from other fields. I don't remember all of them but a few of them who influenced me a lot. They are* ***John C. Jacob's sir, V.S Vijayan mash, K.P Joy sir****. There ideas and thoughts on the need of protecting our nature strike my thoughts."*

Mrs. H from **Case 3 (Nanavu Earthern Mud House)** recollects "*During my college days, one of my professors was* ***Prof. John C. Jacob****. He is one of the prominent environmentalists in the field of Ecological Preservation and wrote the first book related to nature-friendly living. He was a climate activist. He told me that a house should be suitable for nature and mud were perfect for it."*

- **Exposure with Native Cob House Builders/Masons**

Mr. A from **Case 1 (Castros Earthern Cob House)** had an exposure to saw the construction of earthern mud house without using any cement or non-sustainable materials. Thus, he stayed there for few days and learned the techniques of earthern cob house construction during his long trip to Himalaya. This inspired him to try this construction by himself without asking the help of anyone. And **Mr. B** from **Case 2** visited and met **people** who are **living in mud house, cob house, bamboo and clay burnt brick houses** which given him such a confidence and inspiration to go ahead with his plan. He visited these houses along with his **natural builder and architect** who is one of the family member and disciple of Lauri Baker. He visited the **natural clay brick and bamboo house** of this architect too.

Mr. A from **Case 1 (Castros Earthern Cob House) recollects** "*But I was unaware of how to build an earthern cob house until I met those* ***native masons and artisans from Gujarat and Maharashtra****. They also inspired me to follow my dream. They were so skilled and I was amazed by the style and design of their construction of their own homes."*

Mr. B (Case 2) recalls "***Sajan sir*** *is one of the disciples of Laurie Baker and he is assuring this method of construction is safe and strong… He is the one who practice what he preaches.* ***He is living in natural home. I saw it with my own eyes****. then why should we doubt an expert's advice. He was such an inspiration and support throughout"*

✓ Sub Theme 2: Inspiration from the Value System

Two among the three had expressed that **the values and vision** they preserve and upheld in their life had played a key role then and now for continuing their journey of alternative lifestyle. This later guided them to choose to live in an alternative house build with natural material. They said they wanted to practice what they upheld and believe in life.

- **Minimalistic Culture**

Two of them had the same value system called "Minimalistic Culture influenced them to lead a life close to nature that is living with less by getting rid of unnecessary and excess stuff and live a life without the influence of worldly possessions

Mr. A (Case 1) says "*We all went through miserable and famine conditions in our past life. So, we started to think why people can't meet their needs or more than that what is actually needed to live a human life in this earth. This led us into the thought of* ***practicing "minimalistic culture"*** *in our lives with an eco-friendly viewpoint."*

Mrs. H (**Case 3)** stated "*We understood that the earth was created not just for human but for all living organisms and our species cannot survive without each other. Always try to take as less as possible from the nature. The* ***principle of Minimalism****. This is our philosophy of life and that was our aim."*

- **Gandhian Principle of "Self-Sufficiency"**

Influence by the Gandhian Philosophy of "Self-Sufficiency also led one of them follow their dream. This principle also helped them realize it is the best possible value that could help them lead an eco-friendly life to its fullest.

Mr. H (Case 3) said "*We follow the Gandhian principle of self-sufficiency and live a simple life as much as possible. So, from we also wanted to have our own food garden and produce most of all the required vegetables, rice, cereals and fruits for us. The profit-oriented attitude of the mainstream community and exploitation of nature in the name of progress is what we could not agree with."*

✓ Sub Theme 3: Inspiration from Life Experiences

The bitter and misery filled childhood experience of poverty which led later to acquit basic craft-construction skills to survive as a daily wager was a great foundational energy and inspiration to one of the respondents. While the other one has got exposure from the academic field visits when he was studying in college as an undergraduate in zoology. This has also given him knowledge about the healing capacity of nature and mud which has left a spark inside him.

- **Childhood Hardships and Survival**

One of the three said it was his hardships and poverty from the childhood influenced him to follow this lifestyle. **Mr. A (Case 1)** left home at the age of 18 and engaged in various occupations due to the poverty and sufferings. He engaged in all the possible physical works he can do at that age and later he worked in construction site and become a mason. He was able to use his artistic skills to excel in the landscape designing, wall paper and paint art and interior designing. Even after all this work, in the beginning they had nothing left behind to save. Later he realized he is not a man for a city life but to live close to nature. Then after he said all the **knowledge and training gained from those miserable childhood paved a way and foundation to this journey**.

Mr. A (Case 1) says "*The beginning towards this journey actually what I believe is* ***the inspirations from the survival of the troublesome and miserable condition of my childhood.****"*

- **Academic Exposure**

One of the family members from case 2 found his degree education background and the knowledge he got during his **internship in Naturopathy** at college days helped him to understand the curing capacity and different unique characteristics of mud. That led him to have a house made of Mud. Even though his architect proposed using clay brick for construction, he denied and wanted mud as the main construction material.

Mr. B (Case 2) says "*I studied zoology and has some experience with Naturopathy. So, I knew the curing and amazing thermal capacity of mud. So, I was adamant in using mud for my house even Sajan sir proposed brick house. I thought it is better to live in a house which is made of mud."*

- ✓ **Sub Theme 4: Inspiration from the Involvement in Environmental Protection Activism**

Two among the three had the experience of actively participating in the activities like dialogues ad discussions, strikes for environmental protection which give them the insight for the need of practicing a lifestyle close to nature. Because they wanted to practice what they preach and stand before other people. One of them were very active during the late 90s in participating in very famous hunger strikes, rally like that for Athirapally strike, Endolsulphan rights for people and was an active organizing member of **District Environment Protection Samithi in Kannur**. The other one is still part of **State Environment Protection Tribunal** and active in his **Police nature clubs** which helped him meet people from different area living a life close to nature. So, it helped him to move ahead with his dream of having an eco-friendly house.

- **District Environment Protection Samithi in Kannur**

Mr. H (Case 3) stated ". *I started to think about this life as a change to live more harmonious with nature. I was active in the strikes of 'District Environmental Samithi' from 1996 onwards. It reinforced and gave me a platform to think, act and live with nature and expect less from it."*

- **State Environment Protection Tribunal and Police Nature Clubs**

Mr. B (Case 2) says "*But later I went with the flow of my life. But still the fire was within me. I realised it long after when I met my friend in my workplace who has these same thoughts for nature-friendly lifestyle to follow. We were later become part of environment protection tribunal and related clubs where we met some of these people again and reignited our spirit."*

5.4.2 RESEARCH QUESTION 2

"*What were the **expectations** you had while shifting into Alternative Homes?"*

- ➢ **Theme Two: Expectations regarding Alternative Housing Practice**

Here the researcher aims at exploring about the expectations the families had before they shifted to Alternative Housing Practice. The expectations they had about the home or about the lifestyle related to the housing practice which they wanted to follow or wanted to have. All of them shared same and different expectations in which in which all of them shared their expectations regarding the **construction material and method** to be used. They all had expectations regarding the **changes in different lifestyle pattern** including **biogas plant, kitchen garden** etc. they want to bring up along with the housing practice. Two among the three shared their expectation regarding their **location of the house** should be and how to reach for their **social commitments**. All of them shared their stand on **involving themselves in the construction process**.

Based on the second theme four sub themes were generated:

- ✓ **Sub Theme 1: Expectation regarding the House and Construction**

All of them had their expectations regarding the natural construction material to be used for and the method of construction to be followed. The major expectation regarding the construction material is the use of **MUD** as a **cost-effective raw material** because two of them told they were already aware of the thermal capacity, cooling and healing nature of mud. So, all of them wanted to use main material for construction. And one of them had gone through a practical lesson from native Rajasthan masons about the **Earthern Cob House natural construction method** because of it is one of the easy methods in terms of the cheaper availability of the required raw materials like clay/mud, soil, straw, water, shell lime powder. So, he also wanted to have such a construction method to be followed. Building home without any involvement of professionals but by their own hand and thus **hand sculpting their home** was also an expectation.

- **Mud as a Construction Material**

Mr. B (Case 2) says *"I knew the curing and amazing thermal capacity of mud. So, I was adamant in using mud for my house even Sajan sir proposed brick house."*

Mrs. H (Case 3) states "*So, from the 1980s, I started planning to build a mud house. The right way to live or build a house is similar to how birds make their own nests. That's why, we made a house of clay, which is natural."*

The above findings are in congruence with the findings of the study titled 'A Comparative Study on Sustainable Building Construction with Conventional Residential Building'. From the study it may be concluded that sustainable buildings are more preferable than conventional building because it save natural resources, energy and reduce environmental impact. The running cost of Green building up to 8% less than a conventional building. It provides cooling effect in summer and warm in winter (Vijayan, Thomas, Madhu, & Thomas, 2018).

- **Earthern Cob House Construction Method**

Mr. A (Case 1) said, *"We stayed there for a few more days and learned the tricks on how to make mud mortar and some major techniques to construct earthern cob house using mud or clay, straw, lime and water. That was a rich experience. We wanted to build a house which is cost-effective and weightless to us and to earth."*

This is substantiated by the study that shows the findings that Cob houses are considered safe since they are resistant to earthquakes, don't burn and are not eaten by insects; and have the potential to be shaped in different forms and even create rounded structures allowing different building shapes and sculptures to be made enhancing the cob house´s appearance and adapting it to the final user (Smith, 2000).

- **Owner's Build Construction**

Mr. A (Case 1) stated **"***We wanted to hand-sculpt our 'living space' without any predesign or pre-plan or professional's involvement is required. We just painted and made it out of our imagination. Then we started our construction by ourselves. My wife and brothers are good at sculpture and wall designing. So, they made the interiors of our house beautiful. There is nothing happier than living in a home built with our own hands under the sky."*

This theme is in parallel with the findings from the study pointed out the relative advantages of the cob technique that makes it an interesting alternative when compared with other building techniques is that with cob houses can be built with little money and a lot of manual labour that can be done by untrained men, women, and even children. So, this is also inspiring people to hand-sculpt own home (Smith, 2000).

✓ **Sub Theme 2: Expectations regarding the changes in lifestyle pattern**

Two of them had expectations to bring out changes in terms of their **energy utilization, production and waste management**. And one of them wanted to follow the **natural vegetation method** to become **self-sufficient** in producing their daily food requirements as they would like to follow the principles of Gandhian Philosophy.

- **Biogas Plant**

Two of them wanted to have a biogas plant along with their alternative home for proper disintegration and waste management and energy utilization.

Mrs. B (**Case 2)** recollect "*The one thing I always asked for is the installation of a Biogas plant in our new house. Because being a homemaker I was the one who has to handle the all-waste management things. When we were living in our quarters, I really struggled with this."*

Mr. H (Case 3) said "*We also planned to have a zero-waste life. We wanted to have our own production of cooking gas through implanting a Biogas plant along with the mud home."*

- **Natural Organic Farming**

The couples from Case 3 wanted to extend their natural farming kitchen garden to an extensively big organic farming

Mr. H (Case 3) says "*Our main goal is to lead an energy-efficient lifestyle and also live in a nature friendly way without any exploitation or human intervention in nature. We follow the Gandhian principle of self-sufficiency and live a simple life as much as possible. Thus, we also wanted to have our own food garden and produce most of all the required vegetables, rice, cereals and fruits for us."*

✓ **Sub Theme 3: Expectation regarding the Location of the House**

Two among the three shared their expectation regarding the location where they want to build their house. And one of them wanted to construct their mud home **inside the**

forest they build which later left untouched by any other human invasion and presence. While the other one landed up building an earthern cob house **inside a monsoon forest.**

Mr. A (Case 1) stated **"***We wanted to live in a light-weight **earthern home** made by our own hands **inside or close by** the wilderness and the beauty of **a forest** away from all the disturbances of city life."*

Mrs. H shared*, "From my childhood onwards, it was my dream to **create a forest and build an eco-friendly small mud house in it**. The right way to live or build a house is similar to how birds make their own nests. That's why, we made a house of clay, which is natural."*

✓ Sub Theme 4: Expectation regarding the Social Commitment

One of the expectations shared by two among the three were the social commitments they wanted to deliver to the community and the people they belong to. Two of them shared their desire to provide **support to the local economy through giving employment opportunity to the native and local masons and artisans.** The other commitment to the society was to **support the local farmers** of the community **to follow natural or organic farming method**.

- **Support Local Economy**

Mr. B (Case 2) says, "*When you realise the amount of carbon dioxide that can emit from the cement manufacturing and the environmental and health problems that can happen due to air pollutants released from paints, we will quit the use, so did I… I was decided to give a job opportunity to the local workers. Thus, we can support the local economy. They got one-year full stretch work from here."*

Mr. H (Case 3) stated *"The profit-oriented attitude of the mainstream community and exploitation of nature in the name of progress is what we could not agree with. We also wanted to support our local economy through giving one-year full term job here with our project."*

The findings are congruent with the study, when it found that mud (a mixture of earth and water) is the most available building material on the planet, and it can be used by everyone regardless their social status, potentially giving earthern buildings

environmental and social value. Cob may be considered an appropriate construction technique in under developing countries where conventional building material is expensive and labour is abundant, and it doesn't need high technology. Thus, reducing costs in machinery implementation and in teaching people on how to build with cob along with giving the rural people employment opportunity (Weismann & Bryce, 2006).

- **Workshops on Natural Farming**

Mr. H (Case 3) *"We had a long-term preparation and plan to promote and take practical classes to our local farmers on how to do natural farming."*

5.4.3 RESEARCH QUESTION 3

*"Describe the **transition process** led to Alternative Housing Practice?"*

- **Theme Three: Transition Process to Alternative Housing Practice**

Here the researcher tries to explore the major process involved in the transition from the moment they decided to shift from conventional house during construction and till the day when they shifted to the alternative home. The transition process begins from the time when they started **consulting from different sources regarding the construction** procedure of alternative home. The next phase of the transition process was the **mobilization of resources for the construction.** Most of the **natural raw material** were collected from the **locality** and from the **construction site** itself. The last phase involved after the mobilisation of resources was the **construction process of the alternative home**. The other aspect in the construction process was the **involvement of the owners in the construction process**. One of them wanted to follow the '**Owner's Build' method** and other two families were also **actively involved in the construction** with an intention to be part of hand sculpting their home.

These findings go parallel to the discussions in the book review of *"Low Impact Development- Planning and People in a Sustainable Countryside"* of Fairlie. The book points out that Cob house can be considered such a low-impact building, since it is temporary (in nature´s time scale), small-scale (cob houses are mostly small and compact), made with local materials (the proportions of the materials needed can be changed according to the quality of the local materials), protects wildlife and human

wellbeing (no toxic materials are used and no aggressive processes are needed), it requires small amounts of non-renewable resources (Gilg, 1997).

Based on the third theme, three sub themes are generated:

- ✓ **Sub Theme 1: Consultation Process**

All the three families had somehow depended the **help and guidance of professionals** in the area in the whole time or once in a time during the construction process. One of the family referred **online resource materials and hand books** for the construction.

- **Professional Consultation**

When the decision was made to build a sustainable and eco-friendly house **Mr. B (Case 2)** was confused about whom he should ask for professional support. Finally, after few searches they came to know about COSTFORD- Centre for Science and Technology for Rural Development, Trivandrum who follows a low-cost eco-friendly construction method using burnt clay bricks, bamboo, cob, mud etc. They met Ar. P. B Sajan, Joint Director, COSTFORD Trivandrum and Member Secretary, Lauri Baker Construction. The team of professionals and engineers from COSTFORD had a discussion with Mr. B and they drafted a blueprint of their desired mud home.

Mr. H and Mrs. H (Case 3) met one of their friends who was a mason and had an experience in working under Architect Shankar from Habitat Group of Technology from Trivandrum. But this friend had exposure only to Brick model of construction. Then he went for an experience and exposure to learn the construction technique of Earthern Cob or Mud construction from masons in Trivandrum who had a great experience in the field. He returned back to Kannur along with masons from Venjaramood, Trivandrum for the construction. The construction prolonged for one and half year and all of the workers stayed near to the construction site

- **Hand-On experience and other Reference Material**

Mr. A (Case 1) says *But I was unaware of how to build an earthern cob house until I met those* ***native masons and artisans from Gujarat and Maharashtra****. We stayed there for a few more days and* ***learned the tricks on how to make mud mortar*** *and some major techniques to construct earthern cob house using mud or clay, straw,*

*lime and water. Later we referred some online pdf named '**A Handbook to Cob Builders'**."*

- ✓ **Sub Theme 2: Mobilisation of Material Resources**

Mobilizing the major resources for the construction was one of the main process during this transition. The **natural raw material** for the major part of the construction was **mud** and all of them got it from there construction site itself. The other materials like **straw, lime, wood for the furniture, roof tiles** were all collected from the cheap and easy sources availed locally. Thus, the total cost for the raw materials were saved. The major chunk of the cost of construction went for labour force.

Th above findings were supported by the discussions in the book on 'Building with Cob: A step-by-step Guide. He suggested in the book, with cob, the owner can build furniture, such as benches and beds or even niches or bookshelves that may help reduce costs since there is no need to buy them elsewhere, and they can be made even after the house is finished (Weismann & Bryce, 2006).

Mr. A (Case1) says "*Many parts of our house are decorated with a variety of **locally available raw materials such as colored bear bottles, cans,** ornaments that many people leave behind during our travels. We want to live a simple and minimal life with using minimum natural resources."*

Mr. B says "*We tried our maximum to **use locally available raw materials** for cost-effectiveness. We collected all the windows, rails, roof tiles and other required materials by ourselves from our locality itself. So, transportation fee for that was reduced. Mud was taken from the site itself and clay roof tile from a school … all with free of cost. This helped us a lot to keep our work within in the budget limit."*

Mrs. H (Case 3) added "***Mud** was taken from **here** itself, wood from old trees, mostly coconut tree wood from our site was used for the construction of doors and windows."*

- ✓ **Sub Theme 3: Construction Process**

All of them followed the **Earthern Cob House method of construction** and one of them used **bamboo for piling and roofing**. The other aspect related was the

involvement they wanted to have in the construction process. One of them learned the earthern cob house construction prior before the construction and **hand sculpted their home without any involvement of professionals** in the construction phase. The other two of them spend their major time in the construction site along with the masons and **actively participated in making the mud mortar, mud paint and mud balls etc**. These findings are in congruence with the suggestions in the book 'Building with Cob: A step-by-step Guide'. It is found that with cob, the owner can build furniture, such as benches and beds or even niches or bookshelves that may help reduce costs since there is no need to buy them elsewhere, and they can be made even after the house is finished. It is possible to add cob furniture to the building or to create niches or bookshelves after the wall has been built. Earth building techniques are labour intensive and time consuming, but mud (a mixture of earth and water) is the most available building material on the planet, and it can be used by everyone regardless their social status, potentially giving earthern buildings environmental and social value (Weismann & Bryce, 2006).

- **Earthern Cob House Construction Method**

All of them wanted to use mud as the major constituent of the construction raw material and the best method for constructing a home using mud was 'Earthern Cob house' construction.

Mr. H (Case 3) He says "*The mud should be dug out from at least 2.5 feet below the topsoil. If you take 2-3 feet soil from the foundation of your house you get enough mud for the construction. The construction method for the mud house is very simple. Because mud is mashed manually 5-6 times and is allowed to ferment for 10 days to destroy the termite eggs in the soil. One bucket of shell lime powder is added to the mashed mud for that. The mixture is again mashed and kept for 10 days. Once the mud is ready, mud balls are made out of it and stacked one on top of the other. Once the side wall reaches at a height of 75 c.m the stacking is stopped, so that the wall gets dried. This process is repeated until the walls are fully constructed".*

- **Owner's Involvement**

Mr. A (Case 1) said "*Then we started our construction by ourselves. My wife and brothers are good at sculpture and wall designing. So, they made the interiors of*

our house beautiful. There is nothing happier than living in a home built with our own hands under the sky."

Mr. B (Case 2) says "*Every evening after my work and in the weekends, I came here during construction and become a part of the work. I was happy to look at each stage of my work how it progresses and how it evolves*

Mr. H (Case 3) and his wife stayed near to the construction site and actively involved along with their friend who is a mason and other masons from Trivandrum. The construction prolonged for one and half year and all of the workers stayed near to the construction site

5.4.4 RESEARCH QUESTION 4

*"How do you view the **life before and after** the transition to Alternative house?"*

- **Theme Four: Life Before choosing Alternative Housing Practice**

Here the researcher attempts to understand the life of the respondents before choosing alternative housing practice. The respondents shared about their **physical conditions of life** in terms of **food consumption, medication and other lifestyle practices** they were practicing in the life in conventional house. Two of them had **social involvements in nature clubs** and **associations** which **works for environment protection** and preservation.

Based on theme four, two sub themes were generated:

- ✓ **Sub Theme 1: Physical Life**

The physical life before choosing alternative housing practice for all of them had different experiences and aspects. The physical conditions of life like the **spacing in the house, waste management, food pattern** was all unhealthy and against what actually they wanted was the case for one of the family. While other two had a **minimalist lifestyle, pattern** followed in terms **consumption and utilization of material resources and energy**. One of them had already following the **Gandhian philosophy of self-sufficiency in food through natural organic farming.**

- **Lifestyle Practices**

Mr. A (Case 1) recollected "*We were following a lifestyle of **minimalist living** long before we started our home project. We always tried to be careful enough to **reduce the use of plastic at any cost**. Thus, we always carried a big steel water bottle, spoon, plate and yes paper pens, cloth or jute bag etc. We were also using very minimal purchase of clothes, accessories and other materials."*

Mr. B (Case 2) says "*We were living in the ground floor of a four-story apartment and the **life was there difficult.** The **drainage system was not working properly** all the time. The **air was polluted** as we were living near to the main road. Even in the mid night we could hear the loud noise of Ambulance airhorn. We had to run the AC for almost all the time otherwise we couldn't sit inside the room. The building was just burning… in the summer you just can't switch off the fans for a second."*

Mrs. B (Case 2) added "*The rooms were tightly packed and you cannot even breath. It was difficult for me to manage the kitchen waste and plastic as there was no proper waste management facility working then. We just had the option to burn the plastic near to the apartment. Those days were so exhausting."*

- **Food and Medication**

Since 1999 **Mr. H (Case 3)** never used any modern medicines. He always taken care of having a food style including vegetables, fruits, grains. Their diet includes raw food at night mostly a fruit item and cooked meal in day time. The food grains and vegetables for cooking were produced from their farm through Natural Vegetation Method. They don't prefer to have sugar contents in their food and completely ignored coffee and tea from their diet pack. There is no cosmetics or luxury perfumes or scents used in the house. All these lifestyles were part of the life of this couples even before they stepped into their Mud house.

Mr. A (Case 3) *Since 2002 we have switched to the **method of natural farming.** I have not taken any medicine since 1999. The intake of the diet is varied according to the severity of the disease. If the illness is severe, I will switch to fasting for a day and give my digestive system a complete rest.*

- ✓ **Sub Theme 2: Social Life**

Out of the three **two of the respondents** has an earlier **experience in** working and member of **socially committed organisations for the protection of the environment** and for the preservation of the right of forest and life of the natural world through environmental activism. It has given them **opportunities to participate in different conferences, protests** and other related activities in the light of **protecting nature and preserve the natural diversity and resources** as a need of the era.

Mr. H (Case 3) said he was not leading an eco-friendly life before 1996 but it took a great change after involved in the environmental protection strikes happened across the state as part of an active member of District Environment Protection Samithi in Kannur. But Asha, his wife, from college days itself started to dream of leading an eco-friendly lifestyle. It paved a strong vision to lead a life close to nature. So, before building 'Nanavu' he already started to follow a lifestyle which is close to nature so as his wife.

Mr. B (Case) says "*We were later become part of environment protection tribunal and related clubs where we met some of these people again and reignited our spirit."*

➢ 5.4.5 Theme Five: Life After choosing Alternative House

Here the researcher tries to explain the life of the respondents after choosing and living in their alternative homes. All of them shared different changes happened or those changes they bring out as per their expectations. All of them had a **self-sufficient lifestyle** followed in **daily food consumption** through building a **natural kitchen garden or organic farming**. Two of them had **solar energy system** to meet their electricity requirements and tries to follow a **minimum consumption of energy** and use the electricity energy judiciously. All of them have **Biogas plant** which handles the matter of efficient **waste management system** in the house and the **slurry is used as a natural fertilizer** for the kitchen garden and farming. The **mud walls** construction is a better way to **cool the air and balance the environment** in and out the house which gives all of them a **peaceful and rejuvenating experience** when they came after a tiresome work. One of them had a great experience of watching and spending most of the time by **taking care the garden, natural food forest and engage in bird – watching** and organic farming lessons which is a **stress-free and blissful life.**

Based on theme five, two sub themes were generated:

- ✓ **Sub Theme 1: Physical Life**

One of the areas where the major changes happened or brought in the life of the respondents after started living in their alternative mud house was in Physical aspects of life. all of the three become self-sufficient in their food production through cultivating necessary vegetables and cereals from the kitchen garden. Two of them had solar energy system to save the electricity and power consumption. All of them had a well-managed waste management system by implanting Biogas plant. These findings go in parallel with the study of Eco-Villages. The study revealed that the choice of more sustainable technologies appears to be the most important and direct advantage of co-housing. Thus, this case study examined and find out that co-housing communities are more motivated to and capable of installing and experimenting with technologies like solar power or composting toilets. From the data it was found that co-housing, to some degree, furthers sustainable routines and practices among residents (Marckmann, Gram-Hanssen, & Christensen, 2012).

- **Food Self-Sufficiency**

Mr. A (Case 1) says "*We started to realise living in harmony with nature is not just about living in a mud house but should be more than that. Later as part of this life, we grew vegetables organically at home and planted a variety of fertile trees like Nagpur and Chinese Orange, Mangosteen, Jack fruit tree of different kinds. I was accustomed to farming from an early age itself so this was not difficult for me."*

Mrs. B (Case 2) says "*We follow natural vegetation to grow necessary vegetable like Potato, tapioca, beans, bitter guard, brinjal, ladies' finger, papaya etc."*

The couple **Mr. & Mrs. H (Case 3)** were following the Gandhian principle to become Self-sufficient where the made into reality by growing their own food in their **natural food forest** since 2002. Now it provides more than **15 edible fruits and more than 20 herbal species for medicinal purpose** and also, they have a **surplus production of vegetables, rice and cereals** needed for their kitchen.

- **Solar Energy Production**

Mr. H (Case 3) says *"It is better if we can produce energy ourselves. We are having solar energy here. This is enough to run all our electronic devices such as laptops, television, camera, mixing grinder. But we always keep a check on our consumption and try to use electricity judiciously."*

They actually **do not use any fan or cooler**. Mud walls serves this purpose. Because of that the energy consumption is very low. The energy frugality can be catch by the fact that this **house does not have a refrigerator**. Instead, food is preserved using an **earthern container "Matka" acts as a natural refrigerator** build in the floor of the kitchen. This is a **natural cooler.**

Mr. B (Case 2) and his family have a roof top solar system which helps them save their electricity consumption and it is providing the enough amount of energy to run the electricity consumption of the house.

- **Waste Management**

Mr. A (Case 1) has a small biogas-plant from which the cooking gas requirement is met. The slurry left is also used as a natural fertilizer.

Mrs. B (Case 2) shared "*We have a biogas at the basement and our toilet has a connection to it. So, waste management is better now. The slurry from the biogas is used as a natural fertilizer in our kitchen garden. Kudumbashree workers came here thrice in a month and they collect back all the plastic to the recycling centre. So that problem is also solved. And now we consciously make effort to reduce the use of plastic and reuse what we left. We encourage our children to be plastic-free."*

Mr. H (Case 3) has two 'Biogas' plant to serve the energy requirement in the kitchen. All organic waste along with the human excreta is converted into biogas fuel which is used for cooking and the slurry is rich in nutrients is used as soil fertilizer. Thus, the waste management is fully efficient.

✓ Sub Theme 2: Psychological Aspects of Life

When the life started in alternative mud homes all of them started experiencing a change in their psychological health or mental health aspects. All of the three felt that there is more **happiness and peace** in living inside a home-made with mud walls which is

giving them a **soothing and rejuvenating** cool air and experience. And two of them even had opportunity to **watch birds taking bath** and have a **walk in to the forest** which is helping them to **relieve** their **stress**es. One of them had also **trained their children** to be **environment-friendly** through practical change in the **behaviour pattern** by using alternative materials instead of plastic. The findings support the study that found that the participants living in the sustainable earthern houses giving them comfort. The response from the inhabitants reinstated that mud is an excellent thermal regulator. It keeps the house warm in winter and cool in summer. In addition to this, the positive energy which they feel while residing in these houses makes them energetic and enthusiastic in their day-to-day activities. The inhabitants of the second case from 'ANPU' home of P.K Sreenivasan in Thrissur feel great thermal comfort within the building. The smooth plastered walls give a soothing pleasant earthy smell refreshing the air within the building (Lekshmi, Vishnudas, & Nair, 2017).

- **Stress-Free Life**

Mr. A (Case 1) They also watched how beautiful their life become after they started to live in the woods along with beautiful sight of southern red muntjac or Barking Deer, herd of wild swine or wild pig visit to the plantation, elephants, the singing voice of birds. They even spend time to take a bear walk in to the forest and watch the beauty and hear the symphony of the nature.

Mr. B (Case 2) *"Actually, we can say our walls are breathing! We feel so comfortable, cosy and relaxed when we live here. So, I always feel like our physical and mental health has also improved."*

Mrs. H (Case 3) says "*We are feeling always that we are living a blissful life here. We feel blessed and energetic by hearing a quail song, watching birds taking bath and butterflies flying around us. We are just leading a relaxed and healthy life every day. We have enough time to spent on our farm land, take a sunbath near our pond, observe and study birds and plants and engage in environmental activism as well."*

- **Behavioral Change**

Mrs. B (Case 2) states *"now we consciously make effort to reduce the use of plastic and reuse what we left. We encourage our children to be plastic-free in their*

usages. They are carrying steel bottle and tiffin as well as refilled pen or paper pen. We are happy now."

5.4.6 RESEARCH QUESTION 5

"*What were the **challenges** you came across while opting Alternative Housing Practice?"*

- **Theme Six: Challenges faced in the journey towards Alternative Housing Practice**

Here the researcher tries to explain the different challenges encountered by the respondents from the time of decision-making, during the construction or transition to the alternative home until now. All of them had different challenges during the beginning of the transition till the end and even now. All of them had to face the **troubles** due to the **stigma** prevalent in the **general society** regarding the **strength, bonding capacity and durability of mud** as a major construction material. The **lifestyle** as well as the location they choose further led **difficulty in socializing** and get **accepted** among the native villages. One of them had difficulty in the **mobility and transportation** in the land due to its **steep topography**. There were **faults in the construction** style using **bamboo piling for roof**. One of them realized there were **alterations and imbalance** happened in the **eco-system and natural biodiversity in the forest** when they started to live near to it. They had to **alter the vegetation style and the habitat of other animals** and plant species in order to construct home and start a vegetable garden there. There is great congruence for these findings with the study where it found that big obstacle for the diffusion of cob technique is the wrong perceptions and lack of awareness and acceptance in social system. People are likely to understand that earth is an option for building houses but not many people because they lack the know how to build with cob technique. The other challenge was the lack of familiarity. Thus, there is lack of awareness. The researcher also noted, since cob is not a widely spread technique and there is only one house built with cob in the area, the observability is limited (Estrada, 2014).

Based on theme six three sub themes were generated:

➢ Sub Theme 1: Physical and Geographical Challenges

The challenges encountered in the physical aspects of the life by the respondents vary from the nature of the land to the defects in the construction style of the house. The forest land which has a **steep slope** caused **difficulty in the transportation and mobility** in the land. The **wild animals** who pay visits near to the home and to the garden cause **loss of crops and vegetables** as well as **destruction** of some parts of the **construction of the fences**. There was **difficulty** in **availing the food waste** needed **for the biogas plant** to produce enough gas **during monsoon season**. This was because of the special food-diet they follow during monsoon season as part of their **natural food-habit lifestyle** in which there is **not much left-over for the plant as food waste**.

- **Topography and geography of the land (forest)**

Mr. A (Case 1) the place where they live is a very steep slope with no level. Therefore, it is very difficult to carry heavy items home. So, the easy mobility and transportation is difficult in this hilly place.

He says "*If you need to bring rice or wheat sacks of 50 kg. or timber or any kind of heavy items, you have to climb a number of steps. My back hurts a lot when I bring such a heavy load."*

Mr. A (Case 1) says "*Sometimes large herds of wild pigs and elephant come to the backyard and plow and destroy the crops we have grown and tear down the fences. When it comes to barking deer, it first eats the green stalks of plants that have started to germinate. So, it is most often difficult to keep the plantations and crops to grow. We twice catch King Cobra of 14 feet near from our wood shed."*

- **Technical error in the Construction**

Mr. B (Case 2) *The other issues with the house are that relate to the construction. The ground and first roof were sealed using bamboo and mud in between. In order to make it strong they filled the vertical space between the bamboo piling with concrete too. Now when the children play on the first floor the pieces of concrete falls below. It is not a big deal now like in the beginning. In those time, COSTFORD had no other technology to rectify it but now they have developed it. The paint of the wall is made using the sedimented mud from the site and it is unique. The mixture won't get the same*

colour for a second time how hard we try. When children play, they may hit the wall and paint got peel off. Then you can't paint it again with that same colour and texture."

- **Waste requirement for Biogas**

Mr. H (Case 3) They also face difficulties during monsoon season to grab enough biowaste or food waste for Biogas since they follow a minimal consumption of food during those times. They prepare food less than what requires to make sure they don't waste any left over.

✓ **Sub Theme 2: Psychological Challenges**

All of the respondents had to gone through different psychological challenges like **mental stress and isolation, calling names** mainly due to the **societal belief** exist about the **strength and durability of mud as a house construction raw material**. And one of them had to face this stigmatization because they **choose forest to build their home** that would let the natives to think that they are doing **something illegal like cultivating Ganja** plant or something like that. This led **friends** in the workplace, **family members** and from the inhabitants or the **local residents** in the land to **discourage** and sometimes **bully and pass comments** on them. Two of them had to face the worse when they have to **visit the police station** to prove that they are just building a mud house near or in the forest because of the **complaints given by the neighbours** or native residents.

- **Stress**

Mr. A (Case 1) *In the beginning **people** were closely watching us like what we are doing here in the forest. They were not ready to accept us in the beginning. They **thought** we are **doing something illegal** in the forest and as a result we even **called to police station** once That was **mentally quite disturbing** for us in those times."*

Mr. B (case 2) says "*My brothers and other cousins always tried to **discourage** me to quit this dream of having a mud house. They could **not agree or believe** that **mud house is strong and safe**. In the beginning it was quite **mentally difficult** to address these comments and questions."*

Mr. H (Case 3) said" *We faced these physical struggles and **mental torture** in the beginning. All this happened because they are afraid of the right and positive change that can influence people and move them out of their hand. The government and corporates are profit oriented and we are against their law of business profit. In the beginning it was **difficult for us to manage the situation**. Because my mother and sister are living nearby. They were **afraid. It affected us also**."*

- **Bullying and Isolation**

Mr. A (Case 1) *In the beginning **people** were closely watching us like what we are doing here in the forest. They were **not ready to accept us** in the beginning. They **thought** we are **doing something illegal in the forest** and as a result we even called to police station once That was mentally quite disturbing for us in those times. We took a great effort to convince the authorities regarding our intention."*

Mr. B (case 2) says "*When my wife saw the land we chose, she was dissatisfied with the slope of this hill and full of stones. Some of my **friends told** me this **is not a good idea**; you should quit this plan. Neighbours here definitely **didn't believe** that we are building a house here. Friends in my work place even **commented** like "there is **two insane police men with a crazy architect running behind some foolish idea**".*

Mrs. H (Case 3) says" *People become so offended if we don't drink the sugar loaded bakery items or caffeine. This is now become a common ritual like and it's so **suffocating**. We consume food as medicines where it is a serious matter."*

- ✓ **Sub Theme 3: Social and Environmental Challenges**

All of them had to face different levels of challenges in their social life begins with the **difficulty to get socialize** in the community because of the societal stigma prevalent about the alternative lifestyle people choose out of the perceived to be conservative lifestyle. The other reason is using mud as a construction material. The **lifestyle pattern** of one of the respondents regards to their **food consumption** were **difficult** in the beginning **to accept by their friends and family** whenever they pay visit to them. One of them had **to face questions from the authorities** because of the **wrong information telecasted by a YouTube channel** who documented their lifestyle. The challenge faced by one of the respondents was the **alteration** that happened **in the natural habitat and**

balance of the ecological biodiversity in the forest area because of the **human intervention** to build the house and start the vegetation. It later **changed the habitation of small animals like rabbit, squirrels, rare species of ants, butterflies** and some wild plants. This finding was in congruence by the findings of the qualitative research where the study points out some important facts as the reasons towards the decline of mud constructions in Kerala. They are grouped under socio cultural factors and technological factors where Socio cultural factors deals with the Acceptance, awareness and availability. Poor Acceptance of mud construction in Kerala is mainly due to the prolonged construction period and availability of skilled labour (Lekshmi, Vishnudas, & Nair, 2017).

- **Socialization**

Mr. A (Case 1) says "*the current issue we face is **the difficulty in socializing** with the native people in Kulamavu. They thought we are doing something illegal in the forest and as a result we even **called to police station** once. Still people do not get the idea of living in a mud house inside the forest. **Some of them still doubt us. Some of them said we are mad. Still, we face these issue**s"*

Mr. B (Case 2) shared that their children **didn't had friends here to play with**. **Socialization was difficult** during the initial stages for the **children** when they shifted here in this rural village. There are no children here at their age to play with. So, they are **feeling loneliness** often. Both parents are working and get back home late in the evening after the children back from home.

- **Acceptance**

Mrs. H (Case 3) says" ***People become so offended and sad** if we don't drink the sugar loaded bakery items or caffeine. This is now become a common ritual like and it's so suffocating. We consume food as medicines where it is a serious matter. If we intake food without having appetite and within proper time interval for digestion then we will end up in consuming medicine as food for survival."*

Mr. A (Case 1) says "*In the beginning people were closely watching us like what we are doing here in the forest. They were not **ready to accept us in the beginning**. Still people do not get the idea of living in a mud house inside the forest. **Some of them still doubt us**. Some of them said we are mad. Still, we face these issues."*

- **Wrong information through social media**

Mr. H and Mrs. H (Case 3) were questioned by the local police twice at their home doubting whether they are spreading wrong messages to people or doing illegal activities over there. And one reason behind this questioning was due to the wrong number of land possession information passed by a YouTube channel who documented their life story. The couple said this will happen when people came here with some fascination to see what they have done so different and not because they want to know how they can preserve nature.

- **Imbalance in the forest due to Human Invasion**

Mr. A (Case 1) says "*No matter how hard we try, as **man moves into the forest** to live, various impacts will take place in the forest. We try to keep as much plastic as possible out of the woods, but the **bread cover and milk comes in plastic**. The actions of our human beings affect the **balance of the forest**, even in a small way it does matter a lot. We had to put **a lot of conscious effort to lessen the impact** of our invasion and it was **difficult in the beginning**."*

On the other hand, it was also difficult and challenging to convert the forest land suitable for vegetation and agriculture which again altered the natural balance and biodiversity of the land and changed the habitat of some plant and animal species.

5.4.7 RESEARCH QUESTION 6

"*What were the **ways of overcoming** the challenges in this transition process?"*

- **<u>Theme Seven: Ways of Overcoming the Challenges</u>**

Here the researcher tries to explore the different ways adopted by each of the respondents to overcome the challenges they faced during this journey towards alternative housing practice. All of the respondents had a **strong and firm support from the family members** which was a strong enough to overcome most of the challenges. The **previous life experience and exploration and skills learned** were helpful for two of the respondents to overcome physical and social challenges. The **networks and friends from the environment protection organizations and nature**

clubs were helpful in mitigating with the impact of many challenges. The environmental challenges due to the human intervention in the forest were reduced by the **practice of environment-sensitive behaviour**. Most importantly, the **values and ethics** upheld by each of them were a strong driving force to not give up on the face of challenges but to move ahead with the dream. The **self-confidence and self-determination** of the respondents was vital source of energy to face the societal stigma, comments and discouragement. This **strong attitude of optimism** led them to not quit in the face of challenges but to find resources available and live their dream.

Based on theme seven five sub themes were generated:

✓ **Sub Theme 1: Ways though Physical Dimension**

One of the respondents overcome their challenge in the steep topography of the land by altering the land structure using their practical learning from the previous experience and skills in architecture. Another one mobilized the locally available resources to fill the need for the required amount of food waste for the biogas plant in monsoon season to produce gas.

- **Alteration of the Topography of Land**

Mr. A (Case 1) says "The issue with the steep slope and long steps were managing by changing the heights between one step to the other. Because of the practical lessons from his experience as a mason and creative artisans work, he constructed and renovated a natural mud and wooden steps into home.

- **Mobilizing locally available raw material**

Mr. B (Case 2) During the monsoon season the family depend upon the nearby 'Tharavadu' and other two neighbouring homes for the adequate amount of biowaste to be collected for the biogas plant to run properly. This helps them meet the required amount of biowaste to be needed for the plant to produce gas."

✓ **Sub Theme 2: Ways through Psychological Dimension**

All of them had a **strong stand and values** with regard to the eco-friendly lifestyle they want to follow. And none f them are not ready to compromise with the values they uphold at any cost. The three of them had a very **affirm and strong belief in**

themselves. Thus, they were **very determined enough** to carry forward their dream of following an alternative housing practice despite of all the physical and psychological or any other challenges and struggles they had to face in this journey.

- **Optimistic Attitude and Strong Value System**

Mr. A recollected "*We were following a lifestyle of minimalist living long before we started our home project. We always tried to be careful enough to reduce the use of plastic at any cost.*

Mr. H has a strong will power and dedication to follow his instincts and perspectives in regard to Eco-friendly and minimal living lifestyle. He is stubborn in his stand and never ready to compromise with his values at any cost.

- **Self-Confidence and Self-Determination**

Mr. B (Case 2) says "*When you are decided to step into an action plan to pursue your dream, you should also be confident and courageous enough to face any challenges that can came in your way. I was determined and thus I let everyone to call me insane if they want to. I don't bother, because I was determined to not give up my vision. I enquired and collected the details from trustful source and saw houses built with mud and bamboo with my own eyes. Thus, I was confident to start my work ahead."*

Mr. H (Case 3) added *"There is a purity to live in harmony with nature. But in this world, you will face lot of challenges to follow. But one with strong determination and clarity in what they actually want in life and how they want to live their life will never fall before this lies. They will never be influenced by money, power, politics, status and affected by modern diseases as well.'*

- ✓ **Sub Theme 3: Ways through Social Dimension**

One of the challenges for two of the respondents was the difficulty in socialize with the residents in the community because of their stigma regards to the different lifestyle practice deviating out of the conservative normality of living patterns. The issue pertaining with the **socialisation** is addressed through **strategies** like **engaging in common events** with them and **working for their landscape designing and interior, photography** during any important occasion. Other one found **socializing space** for his

children at karate and dance class who were lonely in the home now are playing and enjoying with their friends. One of the respondents used **gifts or presents as a strategy** which can **convey the message** about their **food-consumption pattern and style** to the hosts so that they can **keep the relationship well without compromising on their value**s. These strategies helped them to build rapport and trust within the community. The findings are supported by the study which it has suggested some strategies to tackle down the challenges with the slowing attribute, 'trialability' and 'observability'. She recommended by starting with small projects like small ovens and benches in order to understand and become familiar with the techniques. The cob building technique is easy to "try" since small things such ovens or benches can be built easily and relatively fast, giving the user the opportunity to get familiar with this technique. So, socializing with people and reaching to them could help in raising community awareness (Estrada, 2014).

- **Socialization**

One of them took creative initiative and conscious effort to participate in the ceremonials, rituals and celebrations of their neighbours and community while they would offer free service of small decorations and landscaping, photography and videography of the events at a very low cost. while the other one joined his children in karate and dance classes to help them socialize with other children of their age group.

Mr. A (Case 1) said "*Later we figure out how to socialize with the native residence of Kulamavu. They are village people. So, we took* ***conscious effort to find out time for them…visiting their home, participating in their small gatherings and functions like birthday or wedding party, taking photographs and video editing of the event at free of cost or for a small amount, helping them to renovate or landscape their home and land****…and later they are convinced…not everybody but some of them. And we invited them to have a visit around our cob house."*

Mr. B (Case 2) says "*The* ***children were so happy*** *when they got the* ***space to mingle with other children*** *and the dance class also went well. Whenever I got any chance to leave early from my office I would love to join with my children. We also had our cultural space in our home. That beautiful evening makes our memories to the best."*

- **Relationship Management**

Mr. H (Case 3) They also take a stand in conveying their position and concern regarding the food pattern and diet they follow whenever someone visit their home or they become guest to others. They will **convey their stand** in the beginning of the conversation itself or prior before the visit through **phone call** to avoid confusions and any kind of embarrassment to the host. And also, they will also **give some practical tips** to the family **to stay healthy using natural sugars like honey, sugarcane juice** instead of white sugar. They would also **take effort to carry some organic fruits, honey and vegetables from their farm and food forest along with them to gift the host family**. This also helped them maintain the social relationship very well without compromising to their values and lifestyle.

✓ Sub Theme 4: Ways through Environmental Dimension

The troubles caused by the human presence and habitation in the forest led to a gradual imbalance and alteration of the natural habitat of different animal and plant species of the biodiversity of the outskirts of the forest region of Kulamavu. So, the respondent took **conscious effort** to do not disturb the by **maximum minimizing the intake of non-degradable substances, re-use or re-cycle the left-overs**. They also let some of the **wild animals, trees and plants to have their habitual space** close to them. They designed their **home** in such a way that it **allows three small trees to grow inside** the house rather than cutting them down for building their nest.

- **Reduce, Re-Use and Recycle**

They all together tried to address the impact of their invasion into the forest by being more careful in handling the biowaste and reducing the maximum intake of non-bio degradable objects.

Mr. A (Case 1) says "*We always tried to **reduce maximum intake of plastic into the woods** and into our home. Thus, if any come, we reuse it rather than throwing it away or burn it. To reduce the intake of bread cover and milk cover we started recently cooking bread at home and using standard milk powder often. We reused our old plastic and glass bottles for designing the walls and bottle art work. My wife is interested in bottle hang gardening."*

- **Co-Habitual Pattern**

Even though they often had to face the visits of their wild friends and destroying their crops, still they let them freely roam around here and there.

Mr. A (Case 1) said "*It is actually their home and we trespassed there. So, in my view point we don't have any rights to sweep them away.* ***We are happy to let them have some of our food crops and our space.*** *After few years since we have been lived there, they become acquaintance with us."*

✓ **Sub Theme 5: Ways through Support Structures**

All of the respondents had a strong support structure from the family members which was a strong driving force for them to face all challenges. The close friends were also supportive to them also. The support from the professionals were also helping the respondents to clarify their doubts during the construction process. It has also given them a lot of backbone strength to peel off the stigma of their friends and co-workers regarding the strength and durability of the mud as a major construction material.

- **Family and Friends**

Mr. A had the full support of his family and friends with him throughout this journey. **Mr. A (Case 1)** says "*My parents were given full support when they were convinced about the project. My wife stood by my side and had given her ideas to it. She is a very intelligent and smart women. My brothers were also played an integral part during the construction of our home."*

Mr. B (Case 2) The friend from the workplace of Mr. B who had the same interest to build an eco-friendly home was the main source of support for him from the beginning till the end and during all the struggles. The support of his wife was with him since when she realised this is a better choice to live.

Mr. H (Case 3) His wife and his close relatives stood with him all the time to preserve mother nature.

- **Professionals**

Mr. B (Case 2) The friend from the workplace of Mr. B who had the same interest to build an eco-friendly home was the main source of support for him from the beginning till the end and during all the struggles. The support of his wife was with him since when she realised this is a better choice to live. Ar. Sajan along with his team of professionals from COSTFORD also stood with him during the construction process.

Mr. H (Case 3) had a friend who was a mason and had an experience in working under Architect Shankar from Habitat Group of Technology from Trivandrum. He went for an experience and exposure to learn the construction technique of Earthern Cob or Mud construction from masons in Trivandrum who had a great experience in the field. He returned back to Kannur along with masons from Venjaramood, Trivandrum for the construction.

CHAPTER VI: FINDINGS, SUGGESTIONS AND CONCLUSION

6.1 INTRODUCTION

The potential negative impacts of human intervention and domination in the biosphere are so evident now with all the indications of global climatic changes, species extinction and destruction of the total balance of the ecology. So, this qualitative study titled "An Exploration into the Lived Experience of Alternative Housing Practice" was carried out among three families who are living or practicing the alternative housing lifestyle for the past six years and more across the state. The respondents were selected using snowball sampling and data were collected using a semi-structured self-prepared interview guide. The study is trying to explore the inspirations behind, expectations hold, transition process involved, changes happened, challenges faced and ways of overcoming experienced in the journey of Alternative Housing Practice of those families who are following an alternative housing method leaving behind their conventional housing practice. This chapter presents the discussions and findings of the study, based on the research questions raised.

The data generated were subjected to thematic analysis and the following were the findings arrived at.

6.2 FINDINGS

A. RESEARCH QUESTION 1**: What was the inspiration for choosing Alternative Home?**

- Alternative Housing Practice for most people is considered as a sustainable solution to conservative home build using cement and other harmful materials to earth and human as well. The inspirations or motivation can be from varied sources like it can be people, values or childhood experiences or exposure from travelling or from academics.
- The inspiration for choosing a sustainable alternative for housing in the life of most people are drawn from mainly two sources. The one is the inspiration from the light of encounter with people who are following the alternative lifestyle and who lives in an alternative sustainable home. When meeting these people has laid an inspiration in those who want to follow the housing practice.

- The other strong source of inspiration is rooted in the value system or the philosophical stand people choose regard to the lifestyle they want to live. For most of the people who followed an alternative housing practice, the strong value system had a strong influence on them to lead an eco-friendly lifestyle and building a sustainable home with a desire to live close to nature and do not harm it anyway.
- The childhood experience of working in different craft and building industries as well as the insights and exposure from travelling different parts of the country and meeting native artisans who follow a sustainable construction pattern has also a role in inspiring people when they are having a desire to live a life close to nature.
- The academic background and exposure in the field which has provided a space to think about the advantages of living a life closure to nature and experience in working with the socially committed organizations and associations from the workplace which promotes the protection and preservation of the environment have an influence in choosing a sustainable housing practice in people.

B. RESAERCH QUESTION 2: **What were the expectations you had while shifting to Alternative Home?**

- The main expectation most of people hold while shifting to alternative housing practice is the type of material used for the construction of the house. The most preferred material for the construction is mud or clay and the style of construction people choose is Earthern Cob House method or Bamboo construction. It was found that all of them are aware and convinced about the medicinal and cooling properties of mud as well as its binding capacity for construction.
- The involvement of the house owners in the construction process with or without the assistance of the professionals in the construction site was found to be an expectation for them. People who would like to

experiment and learn the technique and construction and also with an intention to 'hand sculpt' their dream home would follow the method of 'Owner's Construction' style. But most of them want to be involved in the construction process along with the professionals.

- People expect to make changes in other aspects of life including a sustainable solution for waste management by using Biogas plant or having self-sufficiency in daily edible food production to the kitchen through kitchen garden or organic farming.
- It was found that most people who choose alternative housing practices select the location of their house near a forest or village region making sure they are at a decent distance from the hustle and bustle of city life and its polluting environment. People want to have a stress-free and healthy environment close to nature without much air or noise pollution for their families.
- People mostly hold a social commitment to support the local economy rather than promoting corporates or MNCs by buying bulk orders of cement and steel. From the analysis, it was found that alternative house owners had an expectation to deliver their social commitment through giving one-year employment opportunities to the local artisans and masons in their construction site. The other expectation is to use eco-friendly sustainable materials for the construction to keep the commitment to protect nature.

C. RESEARCH QUESTION 3**: <u>Describe the transition process that led to Alternative Housing Practice.</u>**

- The findings revealed that the transition process led to the Alternative Housing Practice has three phases. The first phase starts with the time when they decided to shift from a conventional house to an alternative house as a sustainable solution. The second phase involves the mobilisation of the raw materials and resources for house construction. The third and last phase begins when the construction of the house is on the site and ends when the construction is over.

- The transition for most the people starts with the decision making and consultation process regarding which natural construction material should be used and which method and type of construction should be followed. In this phase, people seek professional help or assistance. Some of them may go for self-study using online materials or attending workshops to become 'owner's builders'. The experience and skills in the construction field as a mason or architect can be confident to try the Owner's build method.
- It was found that the mobilisation of resources is one of the tasks in the transition process which uses the creativity, networking, resource building capacity of the house owners. Most people would like to use locally available cheap and re-usable raw materials for the doors, windows, roof thatching and piling and decorating the walls using beer bottles.
- The major chunk of resource needed for the construction is the availability of mud which can be easily dug out from the construction site itself and the rest of the natural material like straw, the lime powder can also be availed easily. So, the cost of the construction material can be saved to a great extent.
- The last and longest phase in this transition process is found to be the construction of the house. The construction using the mud balls in the earthern cob house method is time-consuming and labour intensive. And this phase involves the involvement of the house owners to the nook and corner every part of the house to be moulded by them.

D. RESEARCH QUESTION 4**: <u>How do you view the life before and after the transition to Alternative House?</u>**

- It was found from the findings that the life before choosing the alternative housing practice had two patterns. The one pattern is that people were leading a lifestyle that was not eco-friendly and they were dissatisfied in that life. The busy life which is in the city in a completely

polluted environment causing disturbances, imbalance and malfunctioning in the physical, psychological and social life. They desperately wanted to shift to a sustainable and eco-friendly lifestyle. The other pattern is where people had a lifestyle that is helping them take small baby steps to lead a life closer to nature growing a natural food forest, upholding and practicing the culture of minimalism in consumption, sustainable food and medicine consumption practices and self-sufficiency in food production through the natural farming system.

- In the earlier life before shifting to the alternative housing practice people are most likely to be actively participating and involving in any of the organizations, associations or clubs which promote environmental activism for protecting the nature and earth.
- The life after started to practice alternative housing practice had a drastic change in the physical, psychological and social health and well-being aspects of the people. The shift to such a sustainable housing practice made people bring conscious and even subconscious changes in life. The findings revealed that the major changes people like to bring out were finding out a sustainable solution for waste management using Biogas plant and installation of solar-energy system for sustainable energy production and consumption.
- It is found that most people follow the small organic kitchen garden or sometimes a big natural farming to become self-sufficient in food production as part of the alternative housing practice.
- The findings shown that the thermal-cooling capacity of the mud wall was helping the entire atmosphere in the house all the time cool and warm at any climatic conditions. This provides the residents an experience of a rejuvenating and soothing leisure times inside the house.
- The houses which are located near or inside the forest gives the opportunity of the people to have a stress-free life watching the wild beauty of the forest and giving physical and psychological health while looking after the garden, bird taking bath, organic farming etc.
- The physical and psychological well-being of the people is positively influenced and changed after they choose alternative housing practice.

E. RESEARCH QUESTION 5: **What were the challenges you came across while opting for Alternative Housing Practice?**

- The findings revealed that people who followed the alternative housing practice come across with a lot of challenges in their way right from the beginning of their initial steps till the end of the transition. It is found that they are possibly encountered challenges in the physical, psychological, social and environmental dimensions of life.
- The major area of challenge is from two dimensions: Psychological and social dimensions. The common notion that is prevalent in society about the durability and strength in using mud as a resource material for building purposes is that it is inappropriate, weak in binding capacity and unsuitable. This leads people in the social circle to discourage, comment and isolate those who follow the method of alternative housing strategy which cause stress and anxiety in them.
- The location of the house and the alternative lifestyle people choose like building a home near or inside a forest region or growing a large food forest and bird species as part of their shift to alternative housing practice make government and other corporates tensed and drag them to false illegal cases and questioning by police.
- The social challenges can be the difficulty in socializing with the local residents because people are not yet ready to accept an alternative lifestyle which is far and against the concept of conservative living patterns.
- The environmental challenge is something that is most often neglected is the imbalance that can happen when people invade to live in the ecological system of a forest or a natural habitat of a certain region, a home for many species.
- The physical challenges are depending upon the geography and land structure in which the home is built, the technology used for the construction and the availability of the raw material and efficiency of the labours in the construction.

F. RESEARCH QUESTION 6: **What were the ways of overcoming the challenges in this transition process?**

- It was found that people have adopted and chosen different ways for overcoming the obstacles and challenges in their way to follow an alternative housing practice. The ways range from the dimension of physical, psychological, social and environmental.
- The presence of a strong support system like the family and close friends were also played a major role in defending the challenges for them. The support of the architecture of the professional team also has a role in helping them clear their doubts and focus on the work.
- The major source of strength for the people to follow this different path and live a life away from the conventional schema of the society was their own self-confidence, optimism and strong self-determination to not give up their dream.
- The values system and ethics with respect to nature and consumption behaviour has a strong influence on them to stick on to their stand in protecting and preserving the nature and at any cost do not compromise for it. This has also helped to bounce back from the mental stress and isolation.
- The previous experience, knowledge and skill learned in life can also be helpful in the construction as well as in modifying and upgrading the small defects in the construction and face physical challenges like the structure of the land or availing resources or raw materials.
- The issues regard to socialization in the community is addressed by people to build trust and acceptance in the community through effective strategies like involving in the community celebrations, rituals and events, giving free aids and services, using gifting strategy.
- The negative environmental impact of human invasion into a forest is mitigated by the strategy of Reduce, Re-Use and Recycle and allowing the nature to grow with them rather than cutting it down and making spaces to build the human nest.

6.3 SUGGESTIONS

- The challenges faced by the people practicing the alternative housing practice is mainly from the society as the form isolation, lack of acceptance and support due to the wrong notion exist about the strength and durability of mud as a major source of construction material. This has to be changed by creating awareness and awakening the critical consciousness of the public about the advantages of Mud and the harmful impact of cement or steel on the environment.
- This Alternative Housing Practice in Kerala and India is an emerging movement towards more sustainable solutions which can be an excellent practical solution to the globe. So, documenting the lived experience of these people and their lives can be a model and inspiration to many.
- Government as well as NGOs and social work institutions should take steps to propagate the idea of Alternative housing practice as a sustainable solution to current environmental issues of the housing and building industry. The SDG goals of sustainable livelihood cities can have a look into the different ideas of Alternative Housing Practices like Eco-cities in Europe.
- There are only a few people who are following sustainable housing practice as an alternative to conservative housing. And if they along with masons and other professionals in the field from the state could come together and form an association or voluntary organization that can give a large explosion of experiences and practical knowledge in their journey towards this practice to the general public. Thus, they can act as a platform for those curious minds of builders, students, academicians and the public to approach and clarify their doubts, myths and seek practical solutions.
- The local masons, craftsmen, thatcher or artisans who are in the field of sustainable construction should be financially and socially supported and by giving incentives, social recognition for their traditional knowledge and skill to encourage this alternative housing practice.
- The professional organizations and institutions or non-governmental organizations which promote, teach and serve the community by

training people and building alternative eco-friendly homes or construction should be supported by the government rather than promoting large industrial corporates or MNCs.

- There should be strict vigilance and supervision in enforcing laws and its follow-up to prevent the excessive production, sale and use of toxic and non-degradable construction material to the public.
- The programs and awareness campaigns using IEC materials can be used further at the micro and mezzo level in the community to spread the advantage and importance of sustainable eco-friendly houses using mud and bamboo and constructions as an alternative method to cement and steel.
- At the community level it can be effectively implemented and evaluated by incorporating practical skills and lessons in the school syllabus for giving students a first-hand experience through workshops on organic and natural construction using locally available natural material. Nature clubs, ASAP or NSS can act as volunteer agents both in school as well as in colleges.
- The practise implications of the avenue of social work can be related to the field of 'Ecological Social Work'. There are social work interventions possible in all micro, mezzo and macro levels in the community as discussed above.
- Social workers can advocate and network for the promotion of sustainable alternatives for housing practices through effective utilization of CSR funds or United Nations or other NGOs project fellowship.
- At the academic level, social workers can intervene with ‘social work research’ into the different sustainable housing practices, their effectiveness, impact on the environment etc.
- The transition process and the changes in life before and after choosing alternative housing practice of individuals could be further investigated and explored in depth. But due to the time constraints placed by the academic schedule, the study could not take up to that level by the

researcher. A phenomenological approach to this study could better serve the details regarding this area.

6.4 CONCLUSION

The present study aimed at understanding and exploring the lived experiences of people who are following the phenomenon of Alternative Housing Practice. The findings of the study revealed that the respondents were influenced and inspired by different renowned people who are living such an eco-friendly lifestyle as well as the value system and ethics they uphold in their own life. The culture of 'Minimalism' in the consumption and utilization of energy and material resources, as well as self-sufficiency in food production, was followed. All of them expected to build a house that uses mad as its major construction material and they wanted to be actively part in hand sculpting their dream home. Two of them wanted to build their mud house inside a forest. The expectations show how these respondents/families wanted to live a life close to nature rather than a crafted and manufactured pond, bushes and forest-like in the city. The families wanted to support the local economy by giving one-year full term job opportunities to the local artisans, masons, thatcher etc. The transition processes had a three-phase growth starting from the consultation till the end of the construction and house warming. All of the respondents took a conscious effort to maximum use locally available natural and re-usable raw material for the construction to save the cost as well as to protect the environment. The life before and after choosing alternative housing practice can see a drastic change in the graph of physical, psychological, social and environmental well-being dimensions of the respondents. All of them brought sustainable changes to the solution of waste management and food production through Biogas plant and organic kitchen farming. The solar energy system was also a judicious choice two of them adopted as a sustainable solution for energy production and consumption. The challenges encountered while this journey in almost all the dimensions of life where the lack of acceptance and support from the society lead them to have difficulty in socialization. Living inside a forest region also harms the ecological biodiversity of the forest. The people had very strong support from the family members especially from spouses and professionals who helped in the construction. Most of the above, the strong value system and the self-confidence and self-determination of the respondents themselves within was the strong force to keep

self-motivated. The human resources and experiences in working with environmental protection organizations and NGOs have also helped to face the challenges.

The negative and potentially harmful changes caused by human intervention and dominance in the ecological biodiversity of the earth resulted in drastic transformation in the climatic conditions of the earth's atmosphere, rise in the global temperature in turn impacting the dangerous imbalance in the working of whole life forms threatening the existence of humans now. The construction industries are releasing a huge amount of non-degradable waste every year as well as contributing to the release of carbon dioxide into the air. All this has raised the need for focusing on a sustainable solution for using an alternative material for construction. From the present study, the answer is 'Mud' the natural material which has been used for thousands of years even long before the invention of cement. From the study, it is revealed that Alternative Housing Practices like 'Earthern Cob House' can be a cheaper and better sustainable solution for the conservative housing pattern using cement. So, as the need of the hour and as a practical solution to address the climatic changes and environmental pollution this sustainable housing practice should be promoted at the government policy level.

CHAPTER VII:

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APPENDIXES

TOOL FOR DATA COLLECTION

An interview schedule was prepared to collect the demographic profile of the people who are practicing Alternative Living. A semi structured interview guide was prepared based on the research questions set by the researcher was used for rest of the data collection.

Profile of the People who are practicing Alternative Living:

1. Name of the House:
2. Type of the House:
3. Year of Shifting:
4. Number of Family Members:
5. Relationship:
6. Age of Family Members:
7. Sex of Family Members:
8. Educational Qualification:
9. Economical Status:
10. Occupational Status:

INTERVIEW GUIDE

1. What was the **inspiration** for choosing Alternative Home?
    - Describe the influencing factors behind choosing this Alternative path?
        - Humans
        - Videos or Documentaries
        - Workshops etc.

2. What were the **expectations** you had while shifting into Alternative Homes?
    - Construction method or Architecture
    - Raw material
    - Other concerns for house and life etc.

3. Describe the **transition process** leading to alternative Housing practice?

- What was the decision-making process involved?
    - Who did you consult to build your home?
- Who were involved in the construction process?
    - Family: Owner's Itself
    - Professionalism: Construction Team
- How was the construction method?
- How did you mobilize the resources?
    - Internal Resources: From your Land
    - External Resources: From other sources
- Can you explain the **moving-in process**?

4. How do you view the **life before and after** this transition to Alternative Housing Practice?
    - What were the **changes** happened as **part of opting Alternative Housing**?
    - What were the **changes** happened in **other aspects of life** during this transition?

5. What were the **major challenges** you came across while opting Alternative Home?
    - What were the **crisis** you faced **during the decision-making process** in the beginning phase?
    - What were the **challenges** you came across while in the **implementation phase**?
    - What were the **challenges** you experienced while in the **Moving-in process**?
    - What were the **crisis or problems** you faced **after started living in Alternative Home**?

6. What were the **ways of overcoming** the challenges in this transition process?
    - 1. What was the **role of support systems** to overcome the challenges?

- Family and friends
- Work circle
- Natural Builders' Team: Professionals and Friends Circle

➢ What were the **measures or strategies** adopted to **overcome** the **challenges**?