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"The Architecture of Mass Housing in Kathmandu": Shifting Values and Housing Demand Trends

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Abstract
The evolution of mass housing architecture mainly aimed to convey two points: a social dwelling, based on the technologies as well as theories and an ideal environment for family togetherness and growth. This study aimed to identify the role of group housing in land development, physical as well as social life in the community, comparison of perspective of users in traditional settlement and group housing. In the case of mass housing market, efficiency in its production, good responses of customers, project sustainability are the major issue to be considered. In this research, the current scenario of mass housing projects in Kathmandu is studied and attempts to dismantle the current tension between the implication of housing projects, process of providing amenities including cost benefits. The mass luxury housing architecture is taking blooming market in the context of Kathmandu and limited research has been done in this context it is hence important to understand the ongoing situation. The research will tries to find out why people are attracted towards these developer-based housing, user satisfaction in different housing communities i.e. traditional and group housing.

Keywords
Mass housing, shifting values, housing demand trends, traditional-modern, luxury, housing heterogeneity

1. Introduction

1.1 Background

Kathmandu faces serious challenges in urban planning and affordable housing. Most of the development is occurring in informal pattern beyond the legal bylaws and building construction regulations in response to housing deficiency. As soon as settlements started to densify haphazardly in the valley, affordable housing options goes on increasing but living-conditions, infrastructure, settlement quality are degrading. The huge change in urban land-use, housing evolution and differences in the valley was majorly seen soon after construction of ring road in the 1970s, which accelerated the built-up areas inside and outside it. The centralized development of the Kathmandu valley has resulted in a migration of rural citizens and conversions of agricultural areas to residential areas. The Nepalese constitution has guaranteed the right to adequate housing as one of the fundamental rights for all yet the lack of proper housing distribution and planning has created a dense haphazardly planned settlement that somehow fails to provide affordable living conditions to each and all. Road construction without appropriate urban planning, as well as a real estate boom, exacerbated the sprawl.

The choice of Housing is definitely not straightforward to make, it is vital for people as it's their home where they bring up their children [1]. Decision of choosing the residential location isn't simply restricted to outlook as it impacts entire family everyday life, their action, prosperity, public activity, work, and instruction. Although housing choice could depend on the characteristics of the built form- its location, neighborhood have a major role in decision making for choosing process which has been important factor in housing satisfaction.

1.2 Rationale Of The Study

Housing improvement is the most important sector to ensure development and sustainability. Homes in today's situations are material assets and psycho-social symbols of achieved status, affecting how people see themselves, how they want people to see them, and how they are seen by others in a

community [2]. Housing is a basic need, an investment object and a social good. With changing urban form and growth in built forms, a variety of several identifiable housing trends has emerged in the valley. These patterns reflect failing land-use control, building guidelines leading to declining living environment within the city. They are [3]:

- Gated communities for people of a certain social class, including high-rise flats aimed for those with a greater income.
- Rapid deterioration of the historic centre, accompanied by an inflow of low-income migrant tenants and locals' migration to the suburbs.
- Urban sprawl & rapid informal development of suburban areas,
- Initiation of land-pooling projects to adjust land to provide infrastructures before building,
- Undocumented rise in squatter along river banks-public land.

These patterns reflect failing land-use control and building guidelines, declining every day environments among specific portions of the urban poor.

1.3 Statement Of Problems

Home has always been a frequent object of debate-experimentation among planners. For those connected to modernist architecture movement-the subject often fostered attempts at creating new spatial arrangements allowing for new domestic practices ensuring a healthier effective life. Meanwhile for those associated with traditional architecture movement-the current trend has been a critical issues to protect culture and viewpoint of mark Nepali style.

The efficient urban planning to fulfill housing demand of each individual has become an important factor. People are living in a compact urban area where buildings barely get direct sunlight. Many noted writers have commented on negative aspects of the mass housing project trends prevalent in the Valley, but no one has delved into the other side of the story-is it possible that what is typically considered bad, might just be possible suited way out for Kathmandu?

1.4 Objectives

Main objectives

- To provide qualitative as well as quantitative assessment of formal mass housing projects in Kathmandu valley and its role in land development.

Specific objectives

- To provide qualitative as well as quantitative assessment of formal mass housing projects in Kathmandu valley and its role in land development.
- To find out the benefits of construction of formal mass housing over a single own unit housing and its architecture features.
- To analyze and compare the socio culture trend of sense of community and belonging in social mass housing settlement and traditional settlement.

1.5 Research Questions

- What are the various factors that lead to the rising demand of mass housing projects for dwellers/ users?
  - What are the factors that differs the communal, physical, social life and preference in housing and traditional settlement?
  - Do the family adapt the house to various ways of living?
  - How people appropriate a housing to make it a house and then a home?

2. Literature review

2.1 Shelter, house and home

A **shelter** is a basic architectural structure or building that provides protection from the local environment and harsh weather. **House** is a permanent structure, a building. It basically refers to a building where someone lives. House remains still a house even if nobody lives there. House is basically refer to the more convenient form of just being shelter. It is a structure with walls, doors, roof and windows which basically is a built form. **Home** is a place where you live also where you feel you belong to. In addition, home is an abstract idea though house is a concrete idea. Home is a place where a house is poured with numerous relations of individuals.

2.2 Importance of housing

Housing is a human right that is costly and requires fixed money, investment, and location, and it has become one of the most difficult challenges in the developing world in recent years. Housing concerns must be addressed since a house is more than simply a physical building with walls and a roof; it is a place where people raise and care for their children, where a family lives together, and thus plays a critical part in a man's life and professional development. Home is a place where people spend most of their time; a person's choice of residence also reflects the choice of the surrounding community, where you have the opportunity to create incredible memories with your family, which has significant impact on a person's happiness and quality of life.

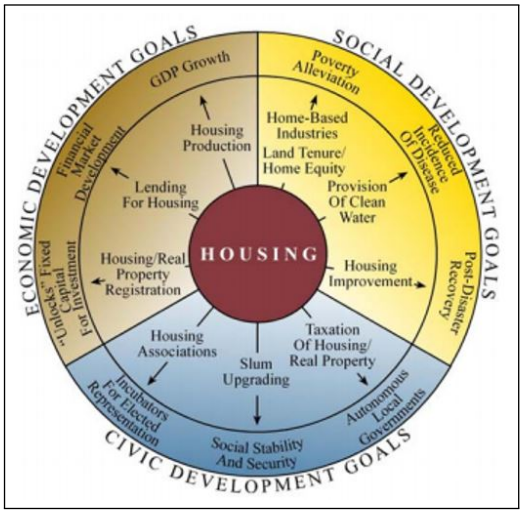

Figure 1: Importance of Housing (Source:[4])

2.3 Social Sustainability and the Built Environment

The challenge of social sustainability is to build neighborhoods which last not for twenty or even hundred year but which are immortal. - David Rudlin and Nicholas Falk Building the 21st Century Home.

Among the various concepts of social sustainability one of the most important is: building lasting long in living environments. Thus, the relationship between social sustainability and built environment refers to the creation of sustainable living environments that take into account people's present requirements as well as their future needs to work, live, and maintain their quality of life without compromising future demands. As Rudlin and Falk (1999: 196) state: Towns and cities are first and foremost places where people live and work, not just as individuals but as group of communities. Even whether it be a urban areas that do not provide civilized places for people to live and for communities to prosper then it will not matter how 'green' they are, they will not be sustainable.

Housing is critical to a community's and society's social development. In Sustainable Housing for Sustainable Cities (2012) social sustainability in housing is described as; *"Social sustainability in housing is about creating affordable, good quality, inclusive and diverse, healthy dwellings, residential areas and communities, which are well- integrated into the wider socio spatial systems of which housing is part[5]."*

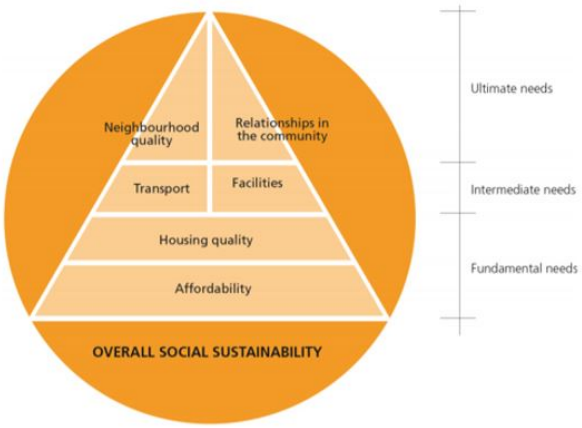

Figure 2: Social Sustainability (Source:[5])

As cited in [6], Golkar (2001) have done a translation of the human needs, based on Maslow's hierarchy of needs, to spatial qualities in design in owns built structure and environment. Depicts Maslow's hierarchical pyramid of needs, whereby the needs were shown, in ascending order as shown in Figure 3.

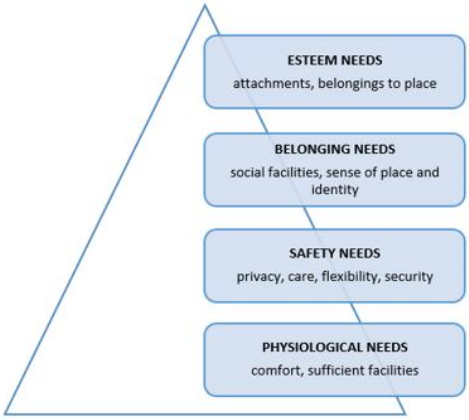

Figure 3: Human needs-spatial design quality

2.4 Housing heterogeneity

Although some orthodox economist would disagree, recent research shows that preference for housing and demand for housing are not homogeneous. Heterogeneous consumers can be grouped according to their shared similarities, basic characteristics, needs, preferences, and attitudes. In terms of housing demand, the market segment must meet three basic criteria [7]:

- Being different from other groups,
- Being common within the segment;
- Being responsive to market demand and shift.

There are basically four demand segmentation approaches that can also be adopted to housing market. These can be based on [7];

- behavioral,
- demographic,
- psycho graphic/lifestyle, and
- geographical differences

3. Methodology

With the ontological claim that in regarding to congested settlements in Kathmandu, housing projects provides superior infrastructure facilities, offers an elegant outlook and owners can enjoy appreciated property value within short period from the purchase of the property, compared to that of individual property where investments are much higher. The research required detail study of housing projects in the valley also the identification of factors that motivated for housing choice shift. For contextual study, site visits to various housing colonies in kathmandu were done, detail study was done in karyavinayak housing, current market costing trend was analyzed and bill of quantity in general was prepared, weightage expenditure for various elements in housing project was calculated and shifting demand including resident's satisfaction in traditional and mass housing was analyzed. Data collection was done by site visits, interviews, questionnaire, stakeholder meeting and participant observation.

4. Findings

4.1 The Architecture of Mass housing

The individual house is a part of larger group, a villa community which consisted of houses built in rows. The total of 50-150 housing units are planned in certain amount of land. The planning is basically done in row pattern. Each row has 20-30 houses arranged as per the plan by professionals. All housing units are generally 2.5 -3 storied and usually housed a single family of parents and their children, newly wed or retired living in search of security and quiet environment. These modern contemporary house are constructed on rectangular style facing the street or road.

The design are contemporary approach in some cases while slope roof and a touch of traditional look is given in exterior taking the layout process into a new degree with open spaces making homes which are convenient and enjoyable. These areas are basically targeted to middle and higher income group people. As per the site visits and interview with the developer team among other working groups the residents here are basically involved in business activities, doctors, engineers, government officials by profession. These areas are located at the outskirt of the city with easily accessible health, education facilities.

Figure 4: Planned settlement

All the basic facilities in the community are taken care by the management team hence resident's need to worry less about all the hustle. People with different caste and religion resides together in what matches is the lifestyle and work category. The legal process of organized group housing follows following pattern:

- **Planning Permit**- proposal to be submitted to KVTDC in case of kathmandu valley,
- **Construction permit**- to be taken from local authority,

- **Site development**- Site boundary and road layouts
- **Project execution**- Landscaping Design— mock up house — booking open - other houses construction— infrastructure and services
- **Monitoring and confirmation**,
- **Project Handover**.

4.2 Physical Infrastructure Within Housing

4.2.1 Road

Unlike the narrow alleys of the valley with lots of traffic, pollution and problem in four wheel access; these area provides a combination of well-graded black top and block-paved roads of sufficient width and engineered construction.

An enquiry regarding the sufficiency of road width shows satisfaction with road width in recently built housing community whereas people in traditional settlement are concerned about emergency vehicular access like ambulance, firefighting, etc.

4.2.2 Water supply sources and management:

Basically 3 forms of water supply systems is observed in colonies in valley as shown in Figure 5:

S.N.	Water supply sources and management	
i.	Source	Boring
		River
		NWSC
ii.	Supply system	Gravity system
		Pressure flow
iii.	Distribution system	Continuous
		Intermittent

Figure 5: Water supply sources

The sourced water from boring have water treatment plants for potable water. The water is stored in water tank and capacity is calculated as per the number of built forms and population assumed for the housing community. Gravity supply system and pressure supply system for water distribution is observed as the water supply system. Generally, 2" pipe is laid through the 20' wide road all over the site where as the individual housing unit has ½" dia pipe for water distribution.

As per the survey done, almost all the residents living in housing colonies are very satisfied with the water supply system of the community where as in traditional settlement major dissatisfaction is observed in terms of water supply and management system. The colonies which have taken water from (KUKL) have severe shortage of water.

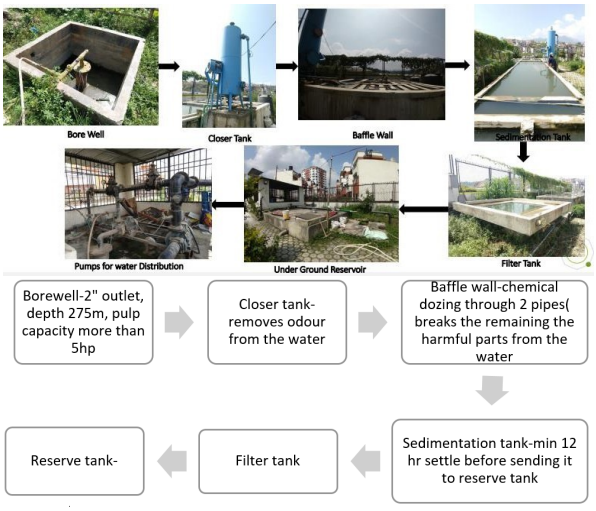

Figure 6: Boring process Civil homes-IV

4.2.3 Electricity, telephone, television cable wiring system

Two types of cable wiring system in the colonies are observed:

- Overhead: The cable is stretched on the pole.
- Underground: The cable is laid after excavation of soil and back filled by sand and soil or the cable is laid through duct at underground.

The housing colonies that are recently developed seems to have underground wiring system which further helps to reduce the unnecessary visual obstruction whereas the colonies developed earlier seems to adapt overhead wiring.

4.2.4 Sewerage system- garbage disposal

All the housing colonies dispose their household garbage to local garbage collection committees and for sewerage system generally two system of disposal is observed that is combined system and separate system.

S.N.	Description	
i.	Type of sewerage	Combined
		Separate
ii.	Sewerage and garbage disposal	
iii.	Sewerage disposal	Municipality sewer
		River through STP
		River through Septic tank & Soak pit
	Garbage disposal	Re use
		Dispose to local authority

Figure 7: System of disposal

The developers have choice as regarding the selection of sewerage treatment plant or septic tank. The colonies which have used combined system are using sewer line in the colonies and the colonies which have used separate system are using septic tank and soak pit in the individual plots. The colonies have adopted sewage treatment plant. After treatment, the effluent from sewage treatment plant is disposed to nearby river. The main line of generally 250 mm him pipe (NP4) is run through the roads to collect the sludge.

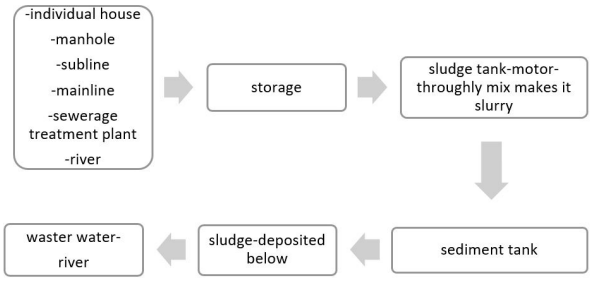

Figure 8: Sewerage System

4.2.5 Parking

The space for accommodation of car has been one of the concern of many residents in this motorization era. Since parking has always been a problem in informal planned settlement. Basically 1 car park is seen in all houses in colonies. There is separate guest parking areas in some cases whereas the extra cars are also parked in roads. As per site observations, the buildings in colonies designed earlier seems to have insufficient parking to accommodate SUVs. The need of 2 car park in a single home has became a necessary issue hence the provision of number of parking is also increasing as per the developing trends in new planning.

4.3 Social Infrastructure Within Housing

4.3.1 Open Space

The dedicated green area as per by-laws is provided yet these spaces area not seen to be used wisely by the residents.

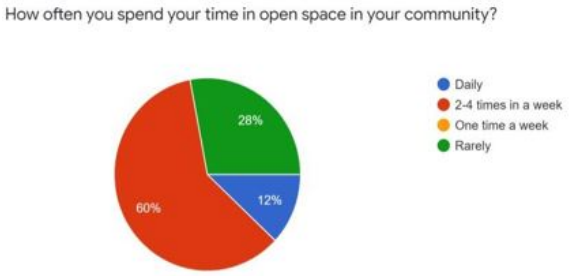

Figure 9: Open Space Survey

As per the survey done, 60% of the residents use the open space 2-4 times a week and 28% residents tend to use open spaces rarely only 12% seems to visit daily. KVTDC Standard (Chapter 1, clause 3) has set standard for planned housing colonies. As per Standards common space is presented in table.

Clause	Category of housing complexes by size	Open land space area required
3.2	5 Ropani up to 10 Ropani	5% of land area
	From 10 Ropani up to 25 Ropani	4% of land area
	From 25 Ropani up to 100 Ropani	3.5% of land area
	Above 100 Ropani	2.5% of land area
3.3	Minimum open space area at one place (except road)	380 sq. m
3.4	Shape of open space may be irregular but Width of one side of open space should be	8.0 m

Figure 10: Standards for Open Space

4.3.2 Club house, gym, departmental stores and swimming pool

Club house, gym, departmental stores and swimming pools are the additional new trend developed in these days that contributed in socializing of the residents and utilization of the leisure time. As per the observation, almost all the housing communities has these facilities provided. And one of the interviewee claims that these facilities especially groceries inside had made them easier to run the daily life during lockdown period (covid-19) as everything they require can be found inside single gate.

4.3.3 Temple Structure

Temple structures and palace structures are major part of the traditional community which shows richness of architecture of its time whereas a small dedicated structure pagoda with placement of idol is kept as per vastu basically at the north east corner of the site.

These structure hold the religious and cultural values.

4.4 Costing Trends and comparison

For the analysis, the detail study of cost sheets of two housing projects were done, the overall expenditure in each sector is analyzed, Average mean data is studied, cost is then converted to weightage% shown in 11. It shows that the major expenditure that is about 70% of the total investment is occupied by the buildings itself whereas infrastructural and other services covers the remaining portion. These data generally applies to the site with less complications and contours difference.

S.N.	LOCATION	% WEIGHTAGE
1	**BUILDINGS (>80)**	**73.35**
2	**ADDITIONAL AND CHANGED WORKS (BY CLIENTS)**	**7.06**
3	**NON-CHARGEABLE AMOUNTS**	**3.20**
4	**COMMUNITY BLOCK**	**3.59**
5	**SWIMMING POOL**	**0.74**
6	**TEMPLE**	**0.16**
7	**RETAINING STRUCTURE**	**4.10**
7.1	R.C.C. Shear Wall	1.47
7.2	Stone Masonry Works	2.45
7.3	Gabion Wall	0.18
8	**INFRASTRUCTURE WORKS**	**4.92**
8.1	***Sewerage Works***	*1.40*
8.1.1	Soil Line Works	0.50
8.1.2	Waste and Rain Water Drainage Works	0.46
8.1.3	Other Drainage Works	0.16
8.1.4	Main Sewer Line (Outlet from TCH)	0.00
8.1.5	Septic Tank _I	0.17
8.1.6	Septic Tank _II	0.08
8.1.7	Soak Pit	0.02
8.2	***Electricity and Communication***	*0.90*
8.2.1	TV/Telephone Works	0.35
8.2.2	Electrical Works (Excluding works done by NEA)	0.13
8.2.3	Electrical Works Done by N.E.A.	0.41
8.3	***Water Supply***	*0.90*
8.3.1	Water Supply and Fire Protection Works	0.40
8.3.2	Water Boring Works	0.18
8.3.3	Water Treatment Plant	0.13
8.3.4	Reservoir Water Tank	0.20
8.4	***Road Works***	*1.72*
9	**INTERPLOT SANITARY WORKS**	**0.99**
10	**INTERPLOT ELECTRICAL WORKS**	**0.18**
11	**GUARD HOUSE**	**0.15**
12	**ENTRANCE GATE**	**0.20**
13	**HOUSING BOUNDARY WALL**	**0.84**
14	**LAND DEVELOPMENT NEAR SEPTIC TANKS**	**0.08**
15	**REHABILITATION WORKS**	**0.45**
	TOTAL	**100 %**

Figure 11: Cost weightage expenditure

The following figure 12 shows the current trend of BOQ preparation done by the consultancies in Kathmandu for the different housing groups. The project estimation and costing sheets were collected. The construction rate was taken from "CLASS A" contractors of the city and further checking was by the professionals' working on same field. The comparison was done for the building with same house plan in two cases; one was individual built and the other was mass built then tentative cost difference was analyzed.

	Description	*Mass built*	*Single Built*
a	Sub Total	7,384,082.60	8,709,104.31
b	Sanitary work (5% of civil total cost)	369,204.13	435,455.22
c	Electrical (8% of total civil cost)	590,726.61	696,728.35
d	G Total Amount	8,344,013.34	9,841,287.87
e	Total Area	3,003.73	3,003.73
f	Amt /Sq.ft (NRs)	2,777.88	3, 276.36

Figure 12: Comparision BOQ

* the BOQ summary shown above only includes civil cost along with sanitary and electrical work completed with the same construction material for both cases. The cost might vary as per the contractors.

Specification of a building taken as sample for study:

- **Total built up area**- 3003.73 square ft. / Site area= 1605 sq.ft,
- **Ground floor plan**- 2 car park, living room, bar, kitchen, dining, toilet
- **First floor plan**- 2 bed each with attach toilet and walk in closet, family room
- **Second floor plan**-1 master bed with attach toilet and walk in closet, 1 multipurpose room, semi covered terrace with pool provision,
- **Top floor**-laundry, puja, maid room.

The result shows the difference of about Rs 498 per sq. ft that is about Rs.14,90,000 saving in a single home. House is the most expensive investment for a family. The decision should hence be taken very wisely and after certain market survey.

4.5 Shifting values-housing demand trends

The changing architecture of the Kathmandu Valley is not a sudden one. It is slow and everlasting which may be due to various reasons. The success of any project or the area depend on satisfaction of the end user and its impact on the surrounding. Various dimensions and variables were identified regarding shifting of housing preference and choice of neighborhood from traditional to modern. They are:

1. **Social and cultural dimension**
    - Family structure
    - Adaptation and motivation
    - Social life
    - Festivals and culture

2. **Technical dimension**
    - Built form condition
    - Disaster safety
    - Comfort and convenience
    - Housing energy efficiency
3. **Economic dimension**
    - Ownership
    - Future security
4. **Environmental dimension**
    - Land design and services
    - Infrastructure and amenities
5. **Housing unit satisfaction and preferences**

The resident's satisfaction survey is done through the questionnaire which was collected in the form of Google forms. Equal number of questionnaire were collected in both settlement that was 25 for each i.e total of 50.

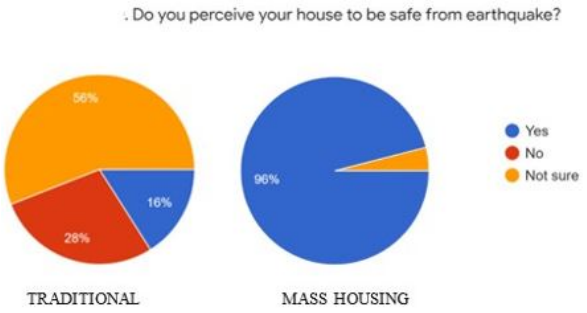

Figure 13: Perception regarding built structure

The chart 13 shows the condition of both settlement during the disaster time and gives the hint of degeneration of traditional settlement due to disaster. 56% of respondents living in traditional settlement says they are not sure about their house to be safe from earthquake whereas 26% feels it is not safe yet they had to stay. The response differs in mass housing area as 96% of residents claims and perceive their house to be safe from earthquake.

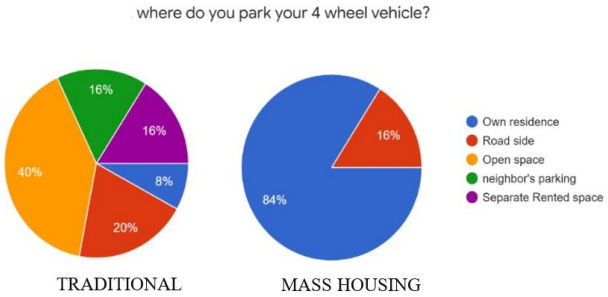

Figure 14: Provision of Parking

The survey regarding ownership of 4 wheel and parking provision as shown in chart 14 shows that 72% respondents living in the traditional settlement do not own a 4 wheel vehicle whereas 92% respondents living in the mass housing owns a four wheel vehicle. The results are distributed in regarding car parking area in traditional settlement where 40% park their four wheels at open spaces, 20% at road side and 16% at neighbors parking remaining at separate rented space and residence. 84% respondents in mass housing park their 4 wheels at their own home.

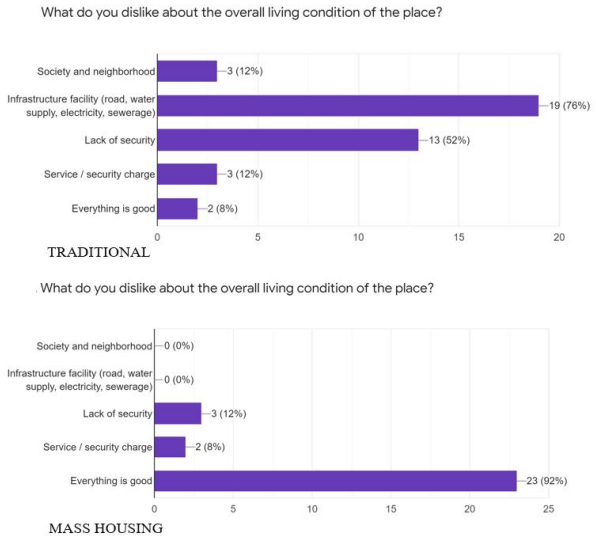

Figure 15: Comfort and convenience

The chart 15 shows clear dissatisfaction of the people residing in traditional settlement; 76% of the respondents feels they are not liking the infrastructure facilities in traditional settlement and 53% feels the lack of security and only 8% thinks everything is good whereas in mass housing 92% feels everything is good in mass housing area. Hence the reason for shifting and relocation can be seen distinctly.

Some of the elements that affects the different dimensions for housing colony choices are:

Social and cultural dimension	Technical dimension	Economic dimension	Environmental dimension	Housing unit satisfaction and preferences
– demographic and ethnic composition of the occupants of a residential building; – Participation of the occupants of a residential building in self-organized cultural and entertainment events, as well as other elements.	– location of a community; – building area and the adjacent area of a colony; – architectural form and structural element, the conformity of performance with the technical requirements and depreciation rate; – energy and water consumption of a residential building divided into the types of resources – disaster safety and performance of structure	– economic interests, manifestation in building operation and management ; – conformity of internal and external resources required for management ; – Prices of all the resources consumed for running and management of residential building.	-proper management of waste by the management team. - Voluntary participation of residents in the flora and fauna conservation and propagation in the adjoining green space and/or neighborhood. -quiet and clean environment setting.	-life style of people, changing values and demands -preference of community and social life. -tradition vs. modernity -caste based to class based housing community satisfaction.

Figure 16: Elements that affect different dimension

5. Conclusion

From the research and data analysis, positive aspects and the process of running of these housing colonies and negative aspects are found out; positive aspects which must be sustained and the negative areas which should be improved were identified. The main goal of this research was to identify sites and landscapes which are fulfilling modern housing needs, saturated with concept of modern ideal home, or appropriate setting for social well-being and while doing so identified modern services, people perception towards their environment and community.

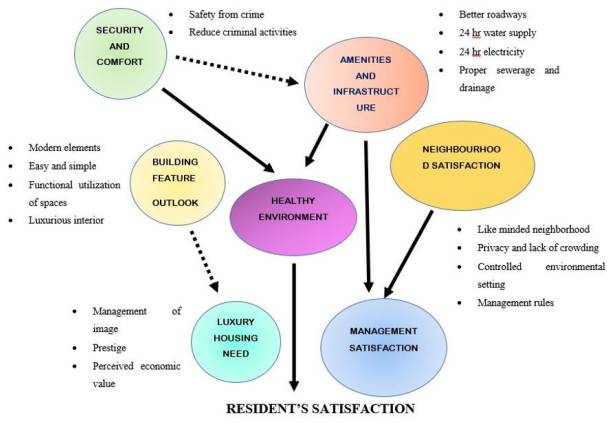

Figure 17: Factors leading to Mass Housing Satisfaction

From the case study and survey, it is clear that the status of infrastructure and trend of housing colonies is leading to better service and satisfaction of the housing environment leading to community development. But it still stands behind to meet the identity architecture style of the valley resulting and reflecting modern needs. On the other hand the degeneration of the traditional form is observed in valley as it is lacking to provide the basic infrastructure to resident residing in it resulting in influx of low income renters. Hence the contradiction in architecture form and urban pattern in housing settlement has evolved in the valley.

6. Recommendation

The following recommendations are made to the concerned authority.

1. Survey of lifestyle should be carried out and catering facilities in both settlement providing a civilized place for people to fulfill their needs, live prosper which leads to the sustainable community development.
    - Proper survey to be done to understand the basic needs of residents in traditional area to reduce relocation of locals.
    - Planners can think in between to cater both area with similar facility motivating the people to stay and care traditional house.
2. Making mechanisms to both rehabilitate the townscape, modern needs and conserve the heritage in parallel:
    - It is necessary to preserve the traditional settlement adapting the modern needs which is tightly linked to the preservation of identity.
    - Opinions with urban planners, architects, conservationist, local bodies and authorities to develop a plan for the city which has been in haphazard way today.
3. For traditional settlement, at primary place, traditional architecture preservation approach and policy should start from questions like
    - 'whose heritage',
    - 'for whom it to be conserved and why',
    - 'how and who should be responsible for conservation'

    In order to restructure the existing housing development and shifting trends these are to be address accordingly. The need is to recognize

appropriately the values, planning housing forms should be seriously taken by the concerned local stakeholders. The organization of settlement should be looked through different approaches:

- fire safety, better infrastructure;
- Consistent bylaws need to be developed regarding traditional settlement; earthquake safety; and
- buildings reconstructed should adapt conserving the facade, scale and texture;

4. For housing colonies
    - Bylaws should make specific provisions regarding sewerage system in housing colonies.
    - House ends within closed door for some cases, planner should think a way out to make the community livelier.
    - Consistent bylaws need to be developed regarding housing colonies.
    - Mixed-class settlement, with smaller plots so as to increase the affordability by all rather than targeting high income groups only.
    - Since housing colonies are controlled areas, it can explore new energy efficient plans for the residential units which can further guide the nation to adapt new technique for sustainable energy mediums as housing sectors occupies large percentage of energy demand.

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