

SUSTAINABILITY BY DESIGN: COMPARISON OF COURTYARD, DETACHED AND APARTMENT MIXED-USE HOUSING -IN THE CASE OF KABUL, AFGHANISTAN-

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Abstract— Mixed-use housing is one of the important types of housing in Kabul city. As the rapid growth of population in the last three decades, Kabul city faces many urban problems, for instance, the construction of mixed-use housing insufficiently, is one huge problem. This paper studies mixed-use housing development in Kabul city and factors which caused for construction of different types of such housing. It focuses on sustainability comparison of three existing mixed-use housing in Kabul with analyzes of space interrelation of the commercial with residential and construction material. Generally, in this paper, the mixed-use housing is categorized into three types; courtyard, old detached and contemporary mixed-use housing in order to comparison sustainability. In this paper, the effort has been made to present the historical trend of these types and also the challenges which are caused by contemporary mixed-use housing. For these purposes, two different areas; old city and Khair-Khana are selected.

Index Terms—Mixed-use Housing, Kabul, Sustainability, Material, space

I. INTRODUCTION

Like many other developing countries, Afghanistan is also facing a huge urban undesired issue, and the government is still unable to have a good answer for it. The unstable condition in suburbs of the country caused people to move to the cities. The city has faced unexpected growth rate of population. In 1950, only one out of every twenty lived in cities but, in 2014, one out of every four lives in cities and it is predicted that by 2060, one out of every two will live in cities (MUDA, 2015). It is common in the world that the people move to the cities. The governments are responsible for having a responsive answer for it. Although after 2001, the new government took power and it was a turnover in the history of Afghanistan, but still, the urban issues are one of the big concerns. Specifically, the housing has faced challenges not only in quantitative but also in qualitative aspects. One of the most prevalent types of housing is commercial and residential mixed-use housing which usually

the two commercial spaces are functioning in the same residential building. From the chronological development aspects the mixed-use housing can be categorized into three main types; courtyard mixed-use housing, detached mixed-use housing and apartment mixed-use housing. The Kabul city with an Islamic background has common elements of an Islamic city. Like many other Islamic cities, it had the main elements such as a grand mosque or Masjid Jami, bazaar and courtyard houses. But after growth of modern architecture, new cities had planned in Kabul. The growth of population in cities like many Islamic cities, the new architectural style and urban development in Kabul is pursuing the modernist style of architecture that does not provide the charm of traditional Afghan places and lacks much regional fit (Kazimee and Najimi, 2017). The detached mixed-use housing is another prevalent which had built after the new architecture styles have built in the city. The detached followed the same concept of the courtyard like it has the space for family gathering in outside of the main building in the courtyard called *Hawilli*. The most recent type is the apartment mixed-use housing, which has different commercial activities inside one apartment including the residential units.

II. RESEARCH OBJECTIVE

In order to have a good environment, housing planning should be considered very well. A good design is a solution that has responsive answers to all needs of the users including cultural and religious beliefs. Furthermore, it should be sustainable from the aspects of construction materials. For this purpose, this paper will study the mixed-use housing from respect of commercial and residential space correlation and construction materials. The correlation of the two different functions in an Islamic city is one of a most important issue which should be considered well in designs of mixed-use housing. The most common unwelcomed issues are caused by not considering this issue

very well. Usually, the commercial spaces conflicted with residential spaces and caused these problems, such as privacy, accessibility, and security. As a significant matter, this paper researched types of mixed-use housing in three different periods and the reasons that necessitated their construction. Courtyard, Detached and Contemporary mixed-use housing will be analyzed respectively in this paper. Thus the aims of this paper are:

- Defining the importance of correlation of commercial with residential spaces in a mixed-use building
- Clarifying problems generated by contemporary mixed-use housing in the city.
- Explaining the construction material of each type

Shor-Bazaar from the old city of Kabul (Fig. 1) and the second part of Khair-khana from the planned city are selected for this study purpose. Contradiction to the defined land use of the master plan.

III. RESEARCH METHODOLOGY

For this research three different sites; old city of Kabul (Shara Kona), Part one of Khair Khana and Part two of Khair Khana has been selected. The old city is rich of courtyard housing including mixed-use. Khair Khana which is a modern district has a different typology of housing including detached and apartment mixed-use housing. The criteria for site selection is as follow:

- The site should have at least one targeted typology of mixed-use housing.
- For apartment mixed-use housing or detached; the site has types of housing which present a typical state of contemporary development

To understand the challenges and problems of commercial and residential spaces and also to analyze the sustainability of construction materials the following methodology has applied:

- Literature review; the previous researches have been studied.
- The physical measurement of houses
- The on-site observation of houses condition
- Taking photos in the spot
- Post-occupancy evaluation; the questionnaire has been distributed in targeted areas
- Interview with all stakeholders

The interviews with all stakeholders results were documented through written notes and voice recording which were later summarized and synchronized.

Furthermore, the interviews and data form questionnaires have analyzed based on the typology of mixed-use houses.

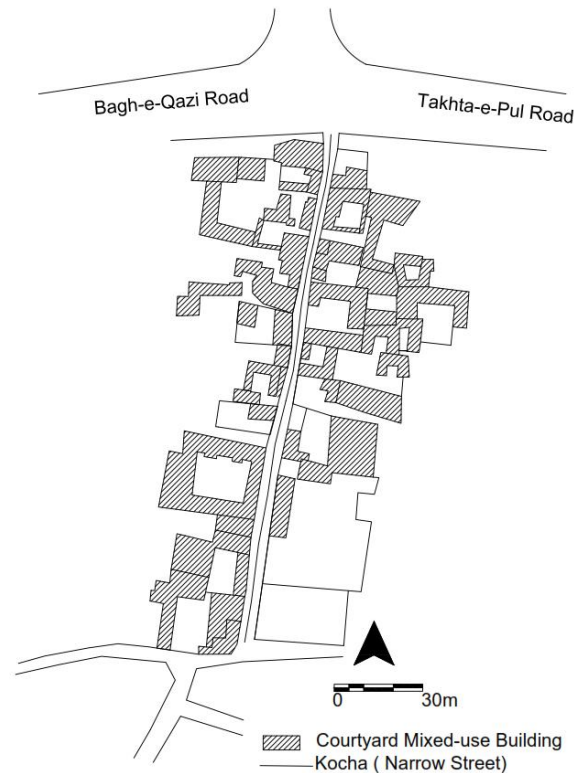


Fig.1. The old city, a part of study area

On the spot observation and sketches were carried out to identify the space conflict between commercial and residential spaces. The drawings made to scale as precise measurements of the plots in the site.

IV. COURTYARD MIXED-USE HOUSING

A. History

Kabul as an Islamic city has its characteristics, and in general, it has similarities with other Islamic cities, Friday Mosque (Masjid Jami), public bath, courtyard houses and Bazaar which usually are located near the Friday Mosque are traditionally the indicators and the main elements of the Islamic cities. Kabul with Islamic background has bazaar which is located inside the city, it has courtyard houses, and the shops are located on the first floor, and the upper floors are used as residential as shown in Fig. 2. The shopkeepers lived on the outskirts of the city, and the first floor is used by the landlord. The history of these houses is referred to the changing the religion of Kabul residents to Islam in the eighth century. See Fig.1.

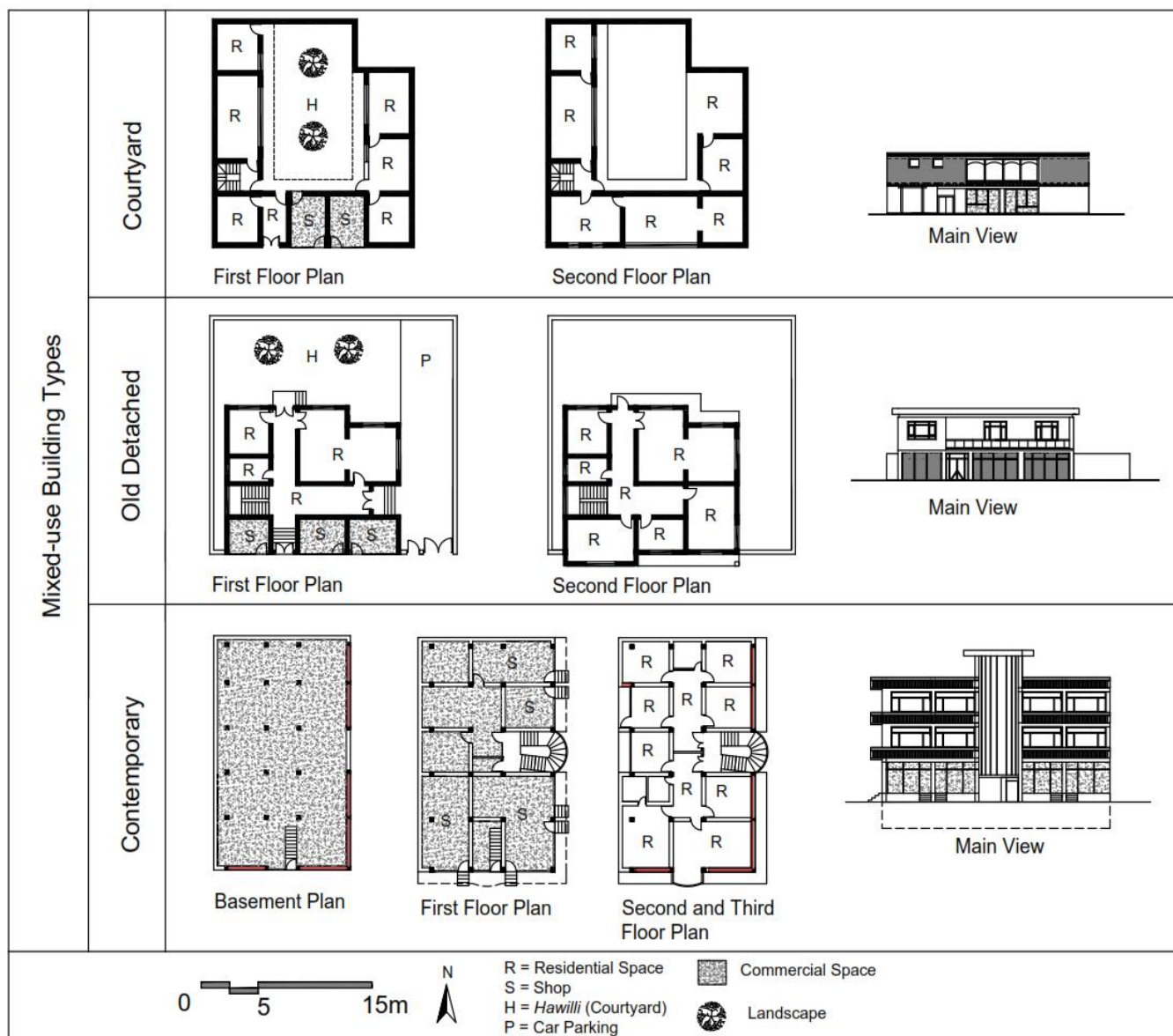


Fig.2. Comparison of three type of mixed-use housing in Kabul city according the drawing.

B. Structure and Materials

The mixed-use houses in the old city of Kabul were built traditionally. Bearing walls were used as the main walls of the building while traditional shear walls (Senj) were used for bracing purposes. The common materials were; sun-dried bricks, Kagil (a common traditional way of making a soil That has higher cohesive properties and can efficiently be used as plastering layer on wall and roof finishing), natural rubble stone and wood. Usually, these houses were built by the owners with the help of neighbors, and this way of building construction carried generation to generation, and there was not any specific professional course or builders' expertise.

C. The Interrelationship of Commercial with Residential

These houses were previously used by the merchants who came from different places to the bazaar for exchanging materials and lived in the upper floors of these mixed-use houses. However; in the case of landlord utilizing the first floor as shops and upper floors for living purposes, specific doors were interconnecting the residential and commercial spaces. The latter case with interconnecting doors is in use up to this date. The women were rarely in the public areas such as bazaar, as it is Islamic culture, that is why the courtyard was the best place for women gathering in a house, and they had their discussions between each other during the day when the men were out of the door. Courtyards with adequate privacy for women gatherings are meeting the

cultural requirements of Islamic society to an acceptable extent.

Table.1.Comparison of three type of mixed-use housing in Kabul city.

| Types | Location and Origin | No. of Stories | Main Structure Materials |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------|
| Courtyard Mixed-use Housing | Mostly it is located in old city of Kabul, rarely it can be find in the unplanned area of Kabul urban areas, most of house dated back to more than 150 years ago. | 2 | raw bricks ,Gagil (saturated mud), Wood timber, rumble stone, |
| Old Detached Mixed-use Housing | Originally it can be find in planned urban areas of Kabul, for instance Khair-Khana which was built in the north part of Kabul city, these houses date back to 1960 and 1970 | 2 | Bricks, reinforcement concrete, plaster |
| Contemporary Mixed-use Housing | There is no specific location for this type of mixed-use housing, and it is located in all parts of the city. Mostly these house dates back to start of new regime in Kabul after civil wars in 2002. | ≥ 3 | Bricks, reinforcement concrete, plaster |

V. OLD DETACHED MIXED-USE HOUSING

A. History

In the early 1930s, when the population growth was more rapid, 120,000 populations (Samizay, 1974) and almost it was doubled comparing to 1916, the government for the first time implemented residential projects outside of the old city. Shahr-e-Naw meaning the new city was formed as a result of these projects. In Shahr-e-Naw, the plots were allocated in spacious sizes, and the city was used for residential and commercial activities. Mixed-use houses were usually allocated in the corner. The open view of the two free sides was the main reason behind this concept. After Shahe-e-Naw some other projects such as Khair-Khana, Kart-e-Panj, Kart-e-Say, and Kart-e-Char were planned by the government. One of the significant changes in planned area houses built the 1970s was frequent use of concrete as main construction materials. The design of the concrete house was typical, and design drawing packages were given to the landlords by the government, among the people it was known as Germany style House type. The people said that at that time design of these houses were made by German Architects.

B. Structure and Materials

The reinforced concrete with industrial bricks was the primary material for the construction. The brick walls were used as bearing, with reinforced columns. Reinforced concrete houses were known as modern houses. The brick walls with a width of thirty-five centimeters used as bearing in the system to decrease the number of steel bars which directly decreased the project cost.

C. The Interrelationship of Commercial with Residential

The land use of this type of neighborhoods was residential and partly commercial. The commercial parts of these areas were different. In some parts there were only commercial houses while in the rest, inside the residential plots there some mixed-use houses, which were mainly used as small shops, selling vegetables and fruits and other daily necessities of neighborhood residents as shown in Fig. 1. In most cases, the shops were rented by shopkeepers who lived near their stores.

VI. CONTEMPORARY MIXED-USE HOUSING

A. History

During the civil wars in Afghanistan, people migrated to many countries mostly to neighbor countries such as Pakistan and Iran, where they worked as labors in construction industries and were equipped with construction skills. After the new regime took over and the people return to their homeland, they used their learned construction skills to construct houses in the same way as they learned in the host countries while Afghanistan has its own culture and these types of houses lack much regional fit. Even they copied some typical houses from these countries to build in Kabul. These houses were constructed in many parts of the city, while the government with its poor management in this sector could not control the construction of these houses. In most of the cases, these houses were built with no observation of architects and engineers. These phenomena influenced majorly residential housing and also the mixed-use housing in the neighborhood.

B. Structure and Material

These houses have no specific or standard design, as the builders who called Tikadar (the person who is in charged to construct the house from commencement to end. He is often ordinary labor who experienced similar projects and hire other labors) is not a professional. Payment is made per

square meters of the floor area. The most common material in these houses is enormously concrete with nonuse decorative structure elements. These houses are usually more than three stories; the ground and basement levels are used as supermarkets and upper level for residential purposes.

C. *The Interrelationship of Commercial with Residential*

In this type of houses, the shops which are located in the basement and ground floor as shown in Fig. 2, makes obstacles for the resident's users in upper levels, and residential units are built in a manner that lacks sufficient sunlight and ventilation. In some cases the houses which are not defined as mixed-use in the master plan, the landlord in order to get benefits from the rent of shops, he built it as mixed-use houses, as a result, there is no parking for the customers and shops blocks the pedestrian walkways.

VII. SUSTAINABILITY: COMPARISON OF THREE TYPES

Stone, raw bricks, wood, and saturated mud; are the main materials for the building materials for the courtyard mixed-use house, which can easily be found in the city. Furthermore, the builders are almost indigenous and straightforward construction techniques are required to build these houses. The old detached mixed-use houses are built from a combination of reinforced structural frames and 35 centimeters thick walls which usually works as bearing walls to support the structure, and it is economical for the landlord to build with such a system. However the contemporary mixed-use house is built with a frame system which means the structure will stand alone, and the bearing walls are not required. Main and costly construction materials such as cement, steel bars, and glasses are imported from other countries. According to the study that was done in the old city and Khair-Khana district of Kabul found that the contemporary mixed-use houses are built almost in the full plot, without considering building area ratio from the municipality as shown in the figure there is no space for landscaping. This is not meeting the sustainable requirement of the environment.

VIII. CONCLUSION

The findings from a study of three types of mixed-use housing can be summed up as the following. First, the old city of Kabul includes the base of mixed-use housing which is courtyard mixed-use housing. These houses have a courtyard with green space, and its construction materials are locally accessible which can easily be found with low price. At the same time it is a fact that, it cannot be responsive to the demand of modern life but it would be wise to use the past experience. Second, the old detached mixed-use houses are located in the planned areas which are built with modern construction materials such as concrete, and typically this type of mixed-use have two stories. Third, the contemporary mixed-use houses are constructed recently. The contemporary ones usually built more than three stories.

Finally, from comparison of three types it can be concluded that, although the contemporary mixed-use houses have some deficiencies such as, lack of involvement of professional and also lack of government control but, at same time it have some potential such as, using of space for economic activities and it is somehow economic support to the owners.

REFERENCES

- [1] Hashemi and Ogura, Types of Commercial Activities and Their Impact on Mixed-use Housing: in the Case of Khair-Khana Kabul City, ISIAA 12th, Pages 510-513, 2018
- [2] Hashemi and Ogura, Development of Mixed-use Housing in Kabul City. AIJ, Kyushu Chapter Architectural Research Meeting. Vol. 57, 133-136, 2018
- [3] Nabizada and Kita, A study on The Process and Mechanism of Transformation in Settlements in Kabul city: The relationship between the typology of spatial structure and residents demands, AIJ Vol. 77 No. 681, Pages 2533-2543, 2012.
- [4] Nazire and Kita, Specifying Characteristics of Informal Settlements by Comparing Four Areas from the Aspects of Houses, Land Tenure and Social Factors in Kabul Afghanistan, AIJ Vol.81 No.728, Pages 2197-2205, 2016.
- [5] Nabizada and Kita, A Study on the Relationship between the Spatial Structure of Open Spaces and Outdoor Activities in the Typical Residential Areas in Kabul City, AIJ Vol. 78 No. 686, Pages 817-827, 2013.
- [6] Habib, J., Urban Cohesiveness in Kabul City: Challenges and Threats. International Journal of Environmental Studies, Vol. 68, No.3, 363-371, 2011
- [7] Japan International Cooperation Agency (JICA), Draft of Kabul City Master Plan, RECS., 2011
- [8] Ministry of Urban Development Affair. (2015), State of Afghan Cities. Vol-1, 1-156
- [9] Hashemi, N.A. and Ogura, N. (2018), Development of Mixed-use Housing in Kabul City. AIJ, Kyushu Chapter Architectural Research Meeting. Vol. 57, 133-136
- [10] Bashir.A.K. and Najimi, A.W. (2017), Analyses of Urban Regeneration and Architectural Heritage Saving in Kabul since 2001. International Journal of Heritage Architecture, Vol.1, No. 4, 671-682
- [11] Kabila Faris Hmood, "Traditional Markets in Islamic Architecture: Successful Past Experience", WIT Transactions on the Built Environment, Vol 171, pp. 263-272, 2017.