

THE ENVIRONMENTAL IMPACT OF MIXED- USE BUILDINGS -IN THE CASE OF KABUL, AFGHANISTAN-

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Abstract— Kabul City is a fast-growing city, and the city is changed enormously due to the social and physical fabric. As a result, the city faced many urban challenges in both formal and informal settlement. This paper analyses and evaluate the Mixed –use building in Kabul city from environmental aspects. The study indicates that lack of governmental regulations and expert architects, caused these buildings to be built with enormous problems such as lack of parking place and corridor access.

Index Terms—Mixed-use Building, Kabul, Environmental Impact, Architect, Regulation.

I. INTRODUCTION

Kabul is the capital and the largest city of Afghanistan, with a history of over 3,500 years. The city underwent a series of political and social turmoil for almost more than three decades. As a result, today different sectors throughout the city suffer from significant urban problems such as shortage of housing, the rapid development of informal settlement and lack of building code and regulation for formal settlements.

The development of the process of the city from its origin to the present has taken place in two different ways (Nabizada and Kita, 2012)*1:

1. Unplanned development: some areas of the city have been developed without any plan or developmental program, in advanced.

2. Planned Development: Some areas in the city have been developed based on Master Plan by government.*2.

Over the last decade, thousands of commercial and residential mixed-use buildings have been built in urban areas of Afghanistan, and there is potential and need for having more such buildings in the future; but due to lack of expertise and educated architects and governmental regulation in this field, these buildings were built by local investors for their private interest without considering the needs of the users. In order to elucidate the challenges and problems which are engendered due to lack of governmental regulation and codes, thus the paper analysis and assesses the

Mixed-use Building (MUB) challenges and problems in Kabul city.

II. LITERATURE REVIEW

Several studies have been investigated in different issues in Kabul. For instance, Nabizada and Kita (2012), conducted research on the process and mechanism of transformation in settlements in the Kabul city and relationship between the typology and resident's demands. This study focused on the types of transformation which have taken place in urban areas

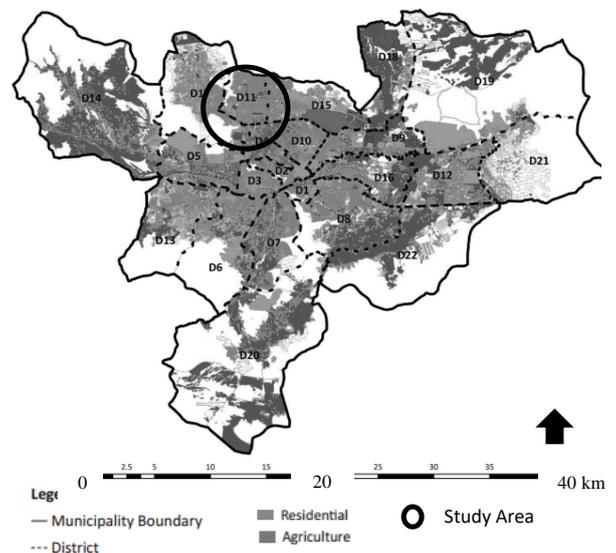


Fig.1. Kabul city map and district 11

of Kabul and also it emphasized that the transformed houses accommodate majority of the population. Although he focused on the planned area of the city, he did not consider the Mixed-use buildings in Kabul.

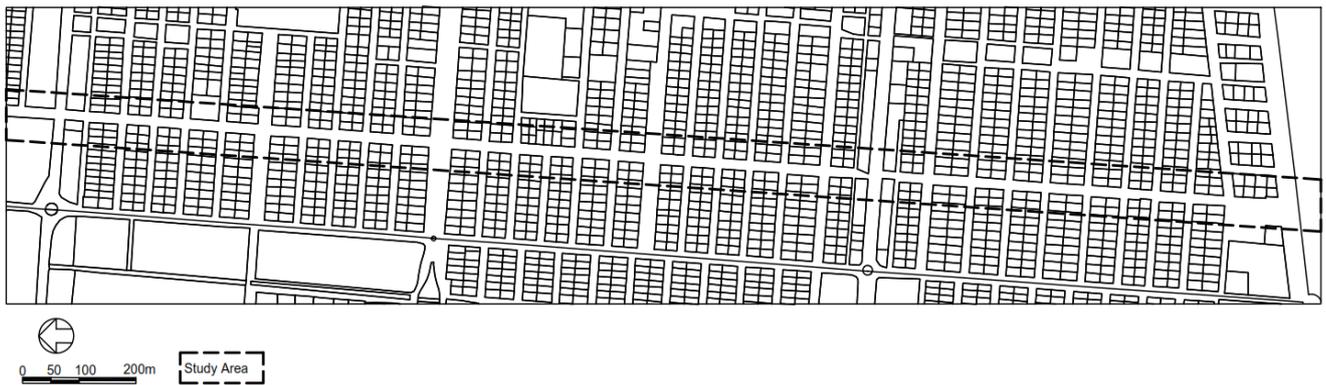


Fig.2. The plots in the study area.

Also many research conduct in informal settlements in Kabul. As an example, Nazire and Kita (2016) studied the character of informal settlements. Their research performed done characteristics of informal settlements from aspects of houses, land tenure and social factors. *3

JICA (2011), conduct a study on the promotion of Kabul metropolitan area development. This research explains an overview about 22 districts of Kabul city. It classifies the residential areas and finally to propose a strategy for the urban development of Kabul city. This study is significant that it explains the state of 22 districts of Kabul, but it did not specifically focus on the Mixed-use buildings. *4

Beyond the Kabul, other international research conducted in Mixed-use Buildings. Matsushita, Yoshida, and Munemoto (2005) conduct a research on Mixed-use building in Hong Kong. They studied multiethnic interactions of ethnic minorities in random Mixed-use Buildings

TABLE I. Study Mixed-Use Buildings

Types of MUB	Plot Size (sq.m)	Number of Plots
1	250-1000	84
2	300-450	48
3	300-500	30

III. AIM AND METHODOLOGY

Most of the infrastructures have been annihilated due to civil wars in Afghanistan, but after the new government established in 2001, the city faces the rapid development of formal and informal settlements. Most of the buildings have been constructed by private sectors with the absence of

governmental code and architects and engineers observations in this period. Thus the purposes of this research are:

- To point out the importance of the architect role in the development of a city and illustrate the development situation of Mixed-use Buildings in the case of developing countries particularly Afghanistan.
- To demonstrate, how the governmental building regulations and codes are necessary, to control the construction of Mixed-use buildings.

By achieving these purposes, we aim to provide the types of Mixed-use buildings with its trend in the case of Kabul city.

Base on objectives of this study and well understanding of the situation of the Mixed-use buildings a field survey was conducted in March of 2017 in Kabul and the date was collected for analyses of the Mixed-use buildings. Thus the methods which are applied to this paper are:

- Archival research; literature review which covers previous studies of Mixed-use buildings in Afghanistan and other countries.
- Post-occupancy evolution; during the survey which conducted in March 2017, interviews with the residence of Mixed-use buildings has done in order to ask the opinions about the buildings in use, from the view of people who use them.
- Physical measurement of Mixed-use building plots and buildings.
- Photography; taking photos of the Mixed-use buildings to capture the current state of the buildings.

District 11 (Khair Khana) as the typical site was selected

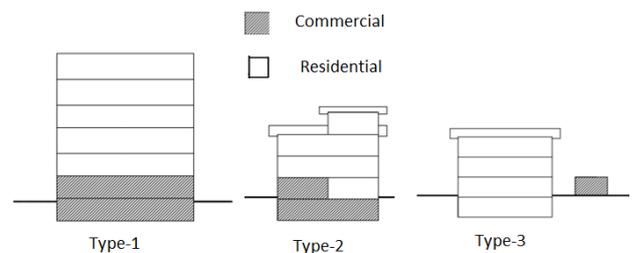


Fig.3. Three typical mixed-use building

TABLE.2. Analysis of Space Conflict

Mixed-use Building types	Commercial shops and Residential Unit Interactions (Plot numbers)		
	ICSF*	IMG**	NISC***
Type-1	1,3,5,6,7,9,10,12,13,14,15,17,18,20,21,22,24,28,29,32,33,36,39,41,47,50,51,54,57,58,60,75,76,77,78,81,82,83,84	2,4,8,11,16,19,23,25,26,27,30,31,34,35,37,38,40,42,43,44,45,46,48,49,52,53,55,56,59,61,62,72,73,74,79,80	63,64,65,66,67,68,69,70,71
Type-2	5,6,11,16,17,34,35,48	1,2,3,4,7,8,9,10,13,14,15,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,39,42,43,44	12,36,37,38,40,41,45,46,47
Type-3			1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30

* Interaction on Corridor in Same Floor (ICSF) ** Interaction on Main Gate (IMG) *** No Interaction with Separate Corridor (NISC)

(Fig.1), and the Mixed-use buildings divided into three general categories to sort the challenges and problem of each these are:

Type 1: Apartment Mixed-use buildings, which contain five or more than five stories.

Type 2: Detached Mixed-use building which has two or more than two stories.

Type 3: Detached Building with a commercial annex in the same plot (Table.1).

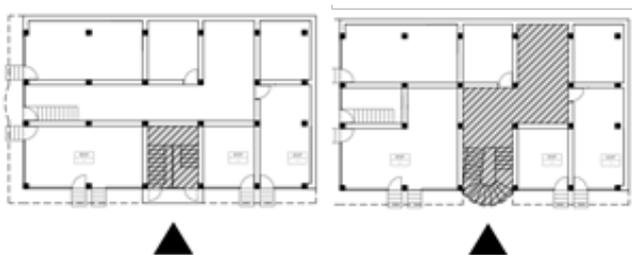


Fig.4. Typical Space Interaction ICSF and IMG

IV. TYPOLOGY OF MIXED-USE BUILDING

These three main types were identified during the survey in Kabul city, and Kabul district 11 (Khair-e-khana) was selected for this paper as it has these three main type of MUB.

The district population estimated in 2008, was 280,000 with a population density of 221/ha (JICA, 2009). The land area in Khair Khana was owned by the government and distributed to those who did not have a private house (Nabizada and Kita, 2013).

A. Type 1(Apartment Mixed-use Building)

In this research the 84 Apartment Mixed-use buildings selected in the first part of Khair Khana. Most of these apartments are more than five stories, and 90% of them have a basement. The first floor and basement are used as commercial.

B. Type 2(Detached Mixed-use Building)

Detached Mixed-use buildings are one of the most rapid development buildings among the mixed-use buildings in Kabul city. In this paper 48 these type of Mixed-use buildings selected in the second part of Khair Khana.

C. Type 3(Detached Building with Commercial Annex)

Type of Mixed-use building is the historical type of mixed-use building in Kabul city. 30 plots in the 2nd part of Khair Khana selected. This type of Mixed-use usually has one annex building which is often not connected to the main building of the plot. The main building is used as residential and the annex is commercial.

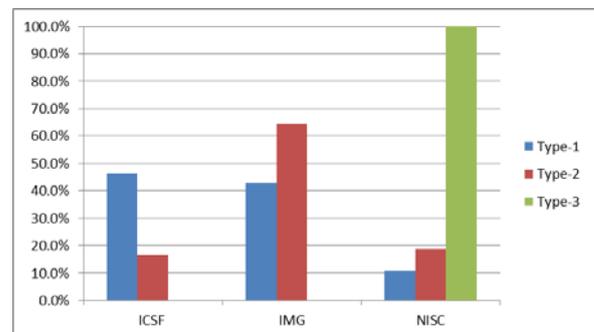


Fig.5. Comparison of Three Types of Mixed-use According to ICSF, IMG and NISC

TABLE.3. Analysis of Mixed-use Building

Mixed-use Types	Mixed-use Building Environmental challenges (Plot numbers)		
	Pedestrian-Friendly Environment		Car Parking
	BAS	BASC	SCP
Type-1	6,10,33,41,55,56,57,58,59,60,61,83		
Type-2	3,4,5,7,8,10,13,14,15,16,17,18,19,20,21,22,23,30,31,32,33,34,35,36,37,40,41,42,43,44,45,46,47,48	12,23,24	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,25,29,30,31,32,33,34,45,36,37,38,39,40,41,42,43,44,45,46,47,48
Type-3	26,27,29	1,2,4,5,6,9,10,11,20,21,22,24,25,26,27,28,30	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,19,30

BAS= Block the Access by Stair, BASC=Block the Access by shop Cabinet, SCP= Street Car Parking

V. ANALYSIS OF INDIVIDUAL MIXED-USE BUILDINGS

A. Residential and Commercial Space Usage Conflict

Among all the study Mixed-use buildings in the study area, there is conflict between two spaces in the semi-private and public space. The analysis of the study area shows that 46.4 % of the total plots of Type-1 of Mixed-use buildings have interaction on corridor in the same floor (ICSF) and it huge risk for the privacy of residence, and it has 42.8% with Interaction on Main Gate (IMG) with 10.7% of No Interaction with Separate Corridor (NISC). In Type-2 among the total surveyed plots 16.6% have ICSF, but the IMG has 64.5% with 18.75% of NISC. All the studied plots of Type-3 have not ICSF and IMG. This data shows that Type-1 has more privacy challenges than two other types (Fig.5).

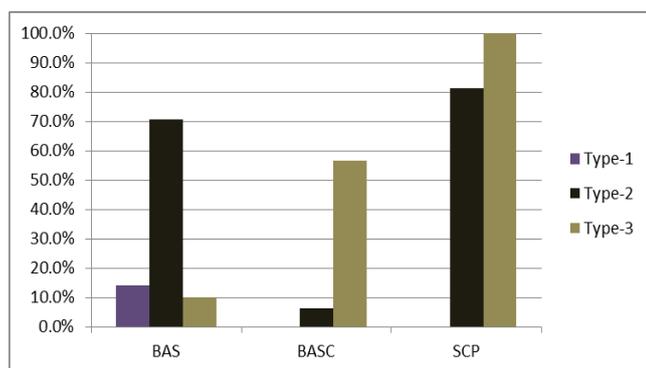


Fig.6. Comparison of Three Types of Mixed-Use According To BAS, BASC and SCP

B. Environmental Challenges of Mixed-Use Buildings

The survey findings show that the Mixed-use building has a negative impact on the environment, for instance, the blocking of the pedestrian walkways and parking of cars on the streets. The shops are usually designed one or more than one meter above the ground level, the stair which is used to connect ground level to shop finishing level built on the pedestrian walkway, so it blocks the walkway. Car parking is another issue that usually, these buildings have no sufficient parking space, and the shop customers usually park on the traffic street.

This study shows that the pedestrian walkways are blocked by constructing of shops stair to the public space by 70.8% of detached Mixed-use buildings, 14.2% of Apartment Mixed-use buildings and 10% of Type 3 among types of Mixed-use building. The walkways are not only blocked by shop stairs but also some interim cabinet of shops, among three types, type three has more plots that blocked the pedestrian walkways by this item.

The public traffic streets usually use as parking space for customers, especially for Detached Mixed-use buildings and Annex, which 100% of type-3 and 81.25% of type-2 of study plots has this problem. Among all three types of Mixed-use buildings, type-1 has designated space for car parking in the study area.

VI. CONCLUSION

Based on the analysis of survey data, which conducted in Kabul city, and the typical site was selected, it is concluded that the Kabul city is suffering from different urban problems. It is not only the unplanned area but also the planned area.

This paper is summarized that Mixed-use buildings faced huge challenges and urban problems due to lack of governmental regulation and codes to control the formal settlements. Beyond this, the buildings are built by private

sectors without observations of professional architects and engineers.

This research clarified that: The Mixed-use buildings suffering from different problems such as; space usage conflict between residential and commercial, and environmental impact of such houses. This paper shows that the apartment Mixed-use buildings have fewer problems compared to two other types of Detached and Annex Mixed-use buildings.

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