

ACCESSIBILITY ANALYSIS OF THE URBAN FACILITIES IN KABUL CITY BASED ON CITY PLANNING STANDARD

PART 4 (MEDICAL FACILITIES AND TYPES OF HOUSING)

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Abstract—In this study we focused on the relationship between the type of housing and accessibility to the medical facilities in Kabul city. The aim as same as our previous effort was to find how much do the type of housing in the Kabul city can affect the level of access to the facilities. In this study we checked this fact through finding and analyzing the accessibility rate of different types of housing to the existing medical facilities in the city.

We did it again based on the manipulation and analysis of the geospatial collected data in ArcGIS software.

The result once more has revealed that the apartments are the type of housing that are advantaging from being located in the very best location of the city where their accessibility rate to the existing facilities is more than the others. In case of the medical facilities we calculated that their respective accessibility rate to the medical services is about 58%. Next type of housing with the maximum accessibility rate was the regular houses. This was the same in our last study as well when we tried to analyze the relationship between the type of housing and access to the education facilities.

What happened in case of the other two types of housing in the city was a little bit unexpected and surprising. The result of this study has revealed that the hillside houses are currently have access to more medical facilities than the irregular houses.

Index Terms—Apartment, Medical Facilities, Kabul city, Type of Housing

I. INTRODUCTION

Kabul is the capital and the most important city in Afghanistan. [1]-[2]-[3] The city holds a population of around 4.7 million people and is urbanizing with a fast pace. [1] This fast urbanization has led to the mass creation of the informal settlements in last two decades. The areas which commonly believed that are severely lacking the basic facilities and urban services. Thus, in our previous study (Ansari and Ono, 2019) we tried to investigate this fact and not surprisingly could recognize the bias in the existing pattern of distribution of the medical facilities.[4] More importantly we could also find a way to scale the difference. [4] Based on our previous study we can claim that the accessibility to the medical facilities in the formal residential areas of the city is about 2.6 times more than

the accessibility to the same type of facilities in the informal residential areas. [4]

In our past studies we could also find, that in case of the education facilities not only the existing pattern has created inequal access in the formal and informal residential areas of the city but in the different type of housing of the city too. [5]-[6] Thus, similarly in this study we are going to investigate how well do the existing medical facilities are distributing in the city of Kabul by analyzing the accessibility rate to these facilities in different types of housing in the city.

II. AIM AND PURPOSE

In this paper we are going to find the relationship between the type of housing and the accessibility rate to the existing medical facilities in Kabul city. Our aim is to find how much do the type of housing has affected the accessibility rate to the medical facilities in the city.

III. RESEARCH METHODOLOGY

This study is again done based on a 3-stage methodology as same as our previous study on the issue. These three stages are as following: 1-Data collection, 2-Analysis, and 3- Presentation of the result.

A. Stage 1: Data Collection

Through the first stage of the study we again started to collect the necessary data and information regarding the type of housing and the existing medical facilities in Kabul city. The acquired data and information in this regard again can be presented as the three geodatabases or GIS layers which are prepared by the help of ArcGIS software respectively. These three layers are:

1) Housing Data

Housing data that hereinafter in this study will be refers by the term ‘Kabul Housing’ were subsequently those that provide information regarding the type of housing in Kabul city. For this study, we could successfully collect one comprehensive geodatabases from the Ministry of Urban Development and Land of Afghanistan (MUDL). Within this specific important

geodatabase, the residential areas of the city were divided by type of housing into four different categories. [7]

This precious important geodatabase which is prepared by the help of ArcGIS software is the result of cooperative study that took place among the MUDL, Kabul Municipality, Independent Directorate of Local Governance of Afghanistan (IDLG) and the GIS-team of UN-Habitat altogether. [7] The layer has been prepared on top of the 50-cm spatial-resolution 2014 Kabul's satellite images and covers the whole municipality area (1,040 sq.km).

In this important geodatabase the residential areas of the city as previously stated are categorized by the type of housing into four categories of:

- 1- Apartment: which are the blocks of apartments;
- 2- Regular Houses: Are usually the detached houses constructed on the flat areas of the city with the regular street pattern;
- 3- Irregular Houses: are usually the detached houses constructed on the flat areas of the city with the irregular street pattern. They are usually the unplanned areas of the city;
- 4- Hillside Houses: are the houses constructed on the hill areas of the city. (Fig.1)

These categorizations subsequently made it possible to precisely scale the differences between the different types of housing in the city and their access to the medical facilities respectively.

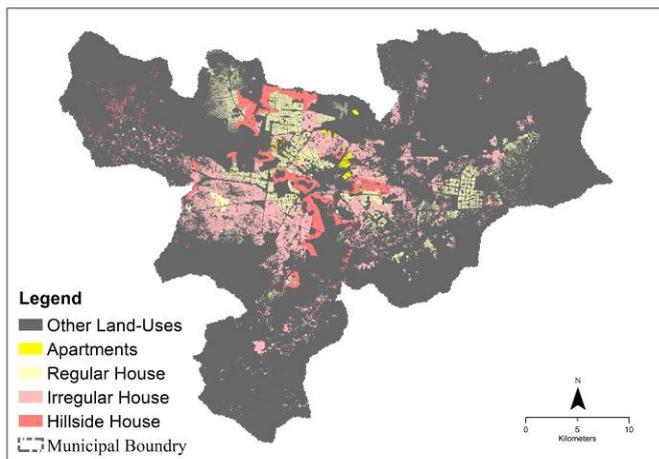


Fig. 1. Kabul Housing Layer

2) The Facility Data

The facility data for this study is extracted from our previous study on the issue which took place under the title of "Accessibility Analysis of the Urban Facilities in Kabul City Based on City Planning Standard: Part 3 (Medical Facilities and Residential Areas)". [4] (Fig.2)

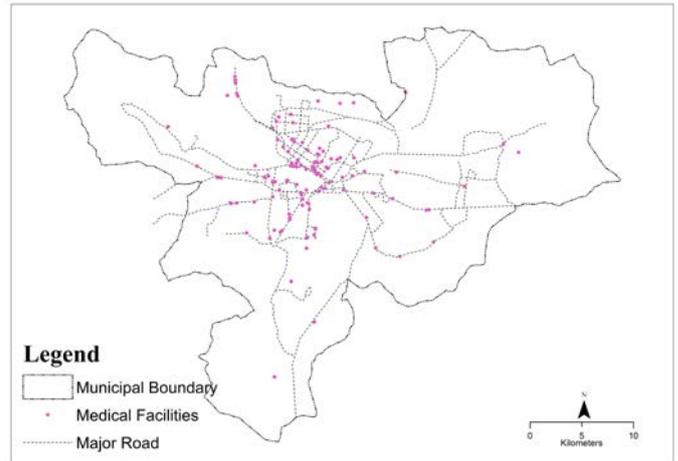


Fig. 2. Study Area and Specified Medical Facilities

3) Medical Facility Accessibility

Medical facility layer is the result of combination of the existing medical facilities and the city planning standards [8]. For this purpose, the accessibility range for each particular existing medical facility in the city is defined by taking into consideration of the city planning standard of Islamic Republic of Afghanistan. (Fig.3) This specific important layer is extracted for the study again from our previous study on the issue. [4]

It is noteworthy to mention access or accessibility in this study as same as our previous studies means to be located within the geographical location away from the facility to the extent that is defined by the city planning standard. In other words, it is simply defined as to be located within the radius of accessibility of each particular medical facility. [4]

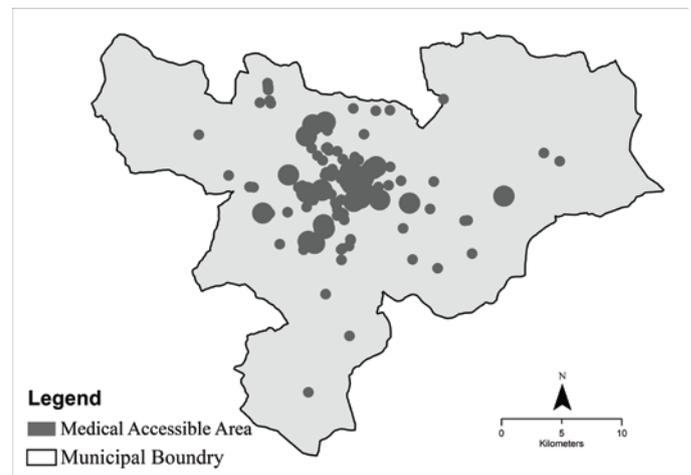


Fig. 3. Medical Facility Layer

B. Stage 2: Analysis

Analysis in this study again as same as our previous study is the process of the manipulation of the geospatial collected data through ArcGIS software. Or in other words, it is the

result of the manipulation of the three previously explained collected layer for the study.

C. Stage 3: Presentation of The Result

The results in this study are again the direct outcome of the analysis and they will be later presented either in case of the maps, or tables and charts. Actually, again, as same as our last study those results that need to be graphically presented were sent back to the ArcGIS software for the mapping and graphical presentation, others are organized and presented in case of the tables or charts, by the help of Microsoft Excel software.

IV. EXISTING SITUATION

A. Existing Residential Situation

Based on the Kabul Housing Layer we can claim that Kabul is a city that is mostly occupied by the low and middle-rise buildings wherein the apartments only accounts for two percent of the total residential areas respectively. On the other end of the spectrum the irregular houses are the most common type of housing in the city which account for 53 percent of the total residential share. (Table-1)

TABLE I. TABLE-1 TYPE OF RESIDENTIAL (KABUL HOUSING LAYER)

Kabul Housing Layer		
Residential Type	Area (ha)	Percentage
Apartment	356	2%
Regular House	4,583	27%
Irregular House	9,193	53%
Hillside House	3,154	18%
Total	17,286	100%

B. Existing Situation Regarding Medical Facilities

As what we found in our last study currently most of the medical facilities are concentrating in the central areas of the city. We could clearly show this fact through preparing the density map by the help of ArcGIS software in our last study. [4] In this particular map which is shown in Figure-4 one-kilometer radius was assigned to each specific individual medical facility in the city regardless of its type, importance level or any other criteria. (Fig.4)

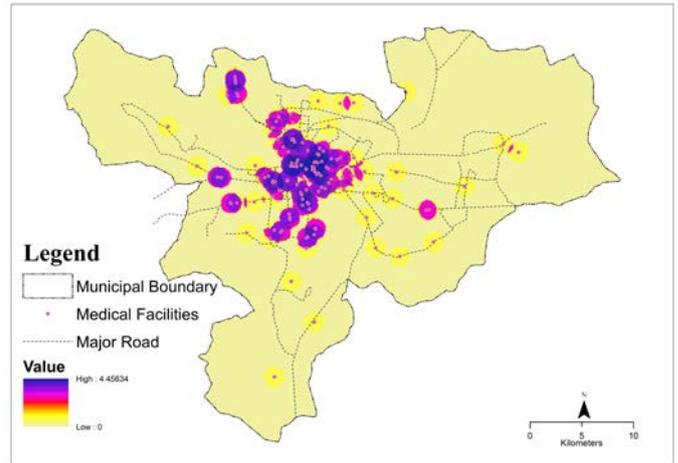


Fig. 4. Density Map of Medical Facilities

V. MEDICAL ACCESSIBILITY RATE AND TYPE OF HOUSING

An intersection between the Kabul housing layer and the medical facility layer made it possible for us to show how the type of housing in Kabul city can influence your access to the medical facilities accordingly.

A. Apartments and Access to Medical Facilities

After the analysis it was revealed that as same as our last study again the apartments are the type of housing that are currently advantaging from being located closer to the facilities than any other types of housings in the city. Our calculation revealed that from the all areas where the apartments are located in the city (356 hectares) about 206 hectares of them have currently access to the medical facilities. This means that the accessibility rate in case of apartments to the medical facilities is at about 58% respectively which is again quite less than the education facilities. In our last study we could successfully found that the accessibility rate to education facilities in the areas holding as apartment is as high as 85%. [6]

Even though our study finds out that the accessibility rate to the medical facilities is less than the education facilities but it was still enough to put them again at top of the list with the highest accessibility rate to the medical facilities in the city.

Meanwhile about 150 hectares of the apartment are currently located outside the accessibility range of the medical facilities in Kabul city. These areas are clearly shown by the dark pink color in Figure-5. (Fig.5)

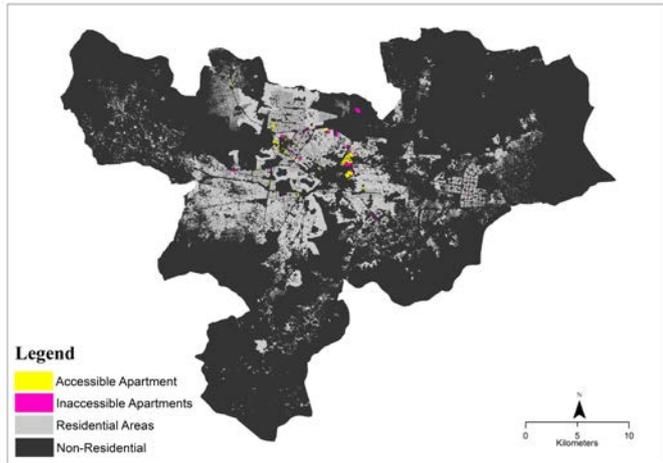


Fig. 5. Apartment and Access to Medical Facilities in Kabul City

B. Regular Houses and Access to Medical Facilities

Our calculation also made it clear that from all the regular houses in the city (4,583 hectares) about 1,836 hectares of them have access to medical facilities. (Fig.6) This again means that the accessibility rate to the medical facilities in these areas is about 40%. These results again put the regular houses as the second housing type with the maximum access to the medical facilities in the city. A flashback to our last study revealed that this was the same position they owned for the accessibility analysis of the education facilities too. [6]

If to want to compare this result with the education accessibility rate in the same areas we can say that the regular houses in the Kabul city have currently 31% less access to the medical facilities in their areas than the education facilities.

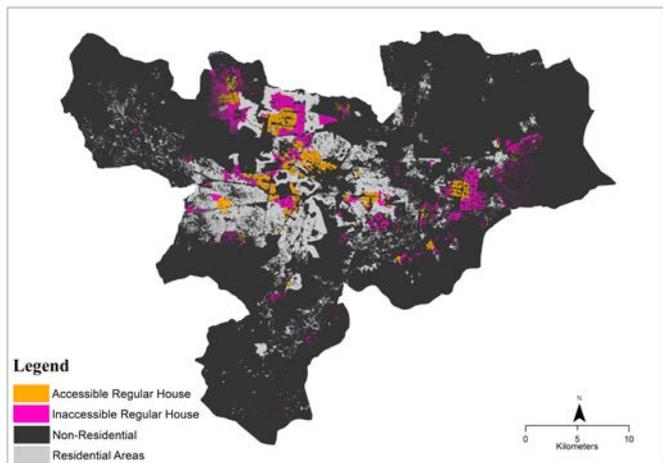


Fig. 6. Regular Houses and Access to Medical Facilities in Kabul City

C. Irregular Houses and Access to Medical Facilities

Our calculation subsequently revealed that the irregular houses are currently creating the worst scenario in case of access to the medical facilities. Based on the calculation we can state that from all the areas that currently hold as the irregular houses (9,193 hectares) only about 1,637 hectares of

them have access to the medical facilities. This means that the accessibility rate in these areas drop to as less as 18% which is not only insufficient but to the great extent is not even close to the acceptable ranges as well.

If to compare this result with the education facilities in the same areas—as what we calculated in the last study—it will be clarified that the access to the medical facilities in the areas holding as the irregular houses is 3 times less than their access to education facilities which is a big difference. [6]

Thus, accordingly we can claim that a huge amount of the irregular houses—82% of them—are currently located outside the accessibility range of the medical services in the Kabul city. (Fig.7)

This result can be simply interpreted again as the important factor that could indicate the big bias in the existing pattern of distribution of the medical facilities in Kabul city. As it is explained not only earlier through the text but in our last study too, the regular houses and the irregular houses are mostly the two different categories of the detached houses in the city. In our last study we claimed that the irregular houses not only currently suffering from the lack of the proper accessibility rate but at the same time they own less amount of road with improper pattern that could again negatively affect their access to the existing facilities. Thus, now we can subsequently easily conclude that the medical facilities not only currently mostly concentrated in the regular houses—which are mostly constructed in compliance to the Kabul Master Plan and we can call them planned areas of the city—but their existing street pattern provide them with much more accessibility options to the existing education and medical facilities than the irregular houses respectively.

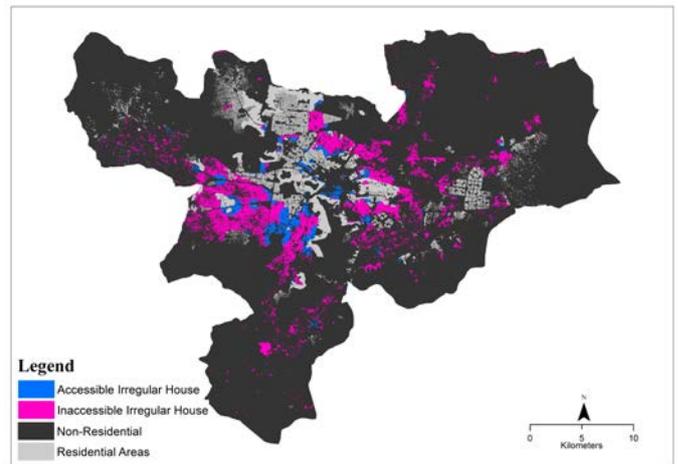


Fig. 7. Irregular Houses and Access to Medical Facilities in Kabul City

D. Hillside Houses and Access to Medical Facilities

What the result of our study has revealed in case of the hillside houses were quite interesting and surprising. Our calculation revealed that the situation of the hillside houses in accessing the medical facilities is better than the irregular houses. Something which was too unexpected. Based on the result of our study we can claim that from all the areas which

are currently holding as the hillside houses (3,154 hectares) in the city about 641 hectares of them have currently access to the medical facilities. (Fig.8) This means that the accessibility rate to the medical facilities in these areas is at around 20% which is 2% more than the amount that was previously calculated for the same facilities in case of the irregular houses.

If to compare this number with the accessibility to the education facilities in the same areas we can claim that the access to the medical services in the hillside areas is about 16% less than their access to the education facilities. [6]

As same as our last study we can claim again that this category of housing is not only suffering from the less education facilities—than the regular houses and apartments—but at the same time the difficulty of constructing road on the slope and hillside areas put them in the worst condition in regard of options to access the medical facilities in Kabul city.

VI. CONCLUSION

In this study we could again as same as our last study clearly show that the type of housing can positively or negatively affect the access to the facilities within the city of Kabul. We could conclude it not only based on the accessibility rate but from the information that the Housing Layer could directly or indirectly provide us for each type of housing respectively. Our calculation revealed that if you are currently living in the apartments your accessibility rate to the medical facilities would be at around 58% which could not be an ideal sufficient rate. Our result also indicates that if you are an irregular householder your accessibility rate to the medical facilities would be only 18% which could not be an acceptable range at all. This massive difference once more clearly stated how important the type of housing could be in the Kabul city in order to provide the residence with the proper chance of accessing the existing facilities.

The result of our study again clearly showed that the accessibility rate to the existing facilities in the regular houses and irregular houses of the city—which are almost the same type with the different street pattern—is too different. In this case we can claim that if you are currently living in the regular houses your accessibility rate to the medical facilities will be about 31% which is not a good range. But if you are living in the irregular houses of the city not only you will lack the proper street pattern to reach the medical facilities but at the same time your chance of accessing the medical facilities will be about 2 times less than those who are living in the regular houses.

The result of this study also surprisingly clarified that the accessibility rate to the medical facilities in the hillside houses are more than the accessibility rate of the irregular houses. Thus, as what we stated in our last study, they are the category of housing that are suffering from the lack of access to the road and street to the most. Thus, while their location can provide them with the more accessibility to the medical facilities than

the irregular houses but for sure lack of accessing the proper road and street pattern to the great extent negatively affected their access to the medical facilities at the moment.

This research again as same as our previous studies has thrown up many questions in need of further investigation too. Further work needs to be done to establish whether do the access to other types of facilities is the same as the education, and the medical facilities or in that case the type of housing cannot affect your access to the nearby facilities respectively.

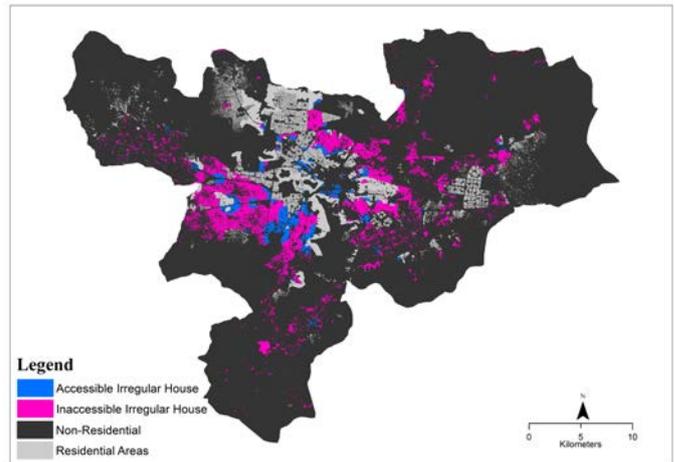


Fig. 8. Hillside Houses and Access to Medical Facilities in Kabul City

REFERENCES

- [1] Government of Islamic Republic of Afghanistan, State of Afghan Cities. Volume 1, 2015
- [2] RECS International Inc, Draft Kabul City Master Plan, product of technical cooperation project for promotion of Kabul Metropolitan Area Development, Sub project for revise the Kabul city Master Plan, 2011
- [3] RECS International Inc, Kabul City Current Status Report for Urban Development, 2011
- [4] Ansari M. Reza and Ono Hiroko, Accessibility Analysis of the Urban Facilities in Kabul City Based on City Planning Standards: Part 3 (Medical Facilities and Residential Areas), 2019
- [5] Ansari M. Reza and Ono Hiroko, Accessibility Analysis of the Urban Facilities in Kabul City Based on City Planning Standards: Part 1 (Education Facilities and Residential Areas), 2019
- [6] Ansari M. Reza and Ono Hiroko, Accessibility Analysis of the Urban Facilities in Kabul City Based on City Planning Standards: Part 2 (Education Facilities and Type of Housing), 2019
- [7] Ministry of Urban Development and Land of Afghanistan, <http://mudh.gov.af/>, Accessed on 16-Jan-2019
- [8] The draft of Ministry of Urban Development and Housing's guideline for the preparation of the detailed urban plans, Ministry of Urban Development and Land of Afghanistan