A Visionary Study on Urban Neighbourhood Models in Kabul City Based on Actual Surveys

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1   ABSTRACT

This paper explores a new neighbourhood model with the primary school district. This scale is well known as Perry's neighbourhood unit theory all over the world. So, this paper deals with (1) the spread and familiarity of Perry's theory especially in Islamic planning context; (2) spatial analysis of current urban neighbourhoods in Kabul City through a survey in district nine; (3) measurement of densities on population, dwelling unit, household, and pupils in the case study area, and (4) visionary proposals on urban neighbourhood models based on several scenarios in the near future and its implications.

The findings are: (1) Gozar is an institutionalized fundamental element of the city governance body in Kabul City; (2) there are wide ranges of spatial sizes and divisions of Gozars; (3) 'Urban Gozar' as an elemental neighbourhood organization in the modern sense is forming through transformation; (4) the neighbourhood unit of Perry can be an appropriate urban concept for urban neighbourhoods in Islamic cities and towns specially Kabul City.

2   RESEARCH BACKGROUND AND OBJECTIVES

Kabul City, the capital and the largest city of Afghanistan is facing a chaotic urban expansion, which is caused by the migration of refugees from the outside area of the city during and after the civil war and destruction. This is slightly different from the typical urbanization process in developing countries. The city that was planned for two million population in 1978, has recently estimated around five million. As for visioning of the reconstruction of Kabul in a Least Developed Country (LDC), not only the physical aspects such as housing supply, infrastructure development and so on are to be examined, the social aspects such as compulsory education, social solidarity establishment and so on are also to be examined sufficiently. Both issues, especially the latter issue closely concerns to the urban lifestyle of Afghan citizens on their own ways.

From such a perspective, our research interest is on community design in an Afghan way. We focused firstly on 'Gozar' as a neighbourhood organization. Gozar is a traditional district unit organized around mosques, which take important placement/ locations, and is so popular in surrounding Islamic cities and towns. However, findings from our survey in Kabul show that (1) it is institutionalized as a fundamental element of the city governance body; but (2) its activity itself does not fully depend to the religion; and (3) there are wide ranges of spatial sizes and divisions. These suggest that 'Urban Gozar' as an elemental neighbourhood organization in the modern sense is forming through transformation. However, the community design for urban Afghan requires a comprehensive spatial standard.

Concerning the requirement for a comprehensive spatial standard and the social requirement of compulsory education, this paper aims to explore a new spatial standard as the primary school district.

For this purpose, this paper addresses: (1) spatial analysis of current Gozars through a case study survey in district nine of Kabul City; (2) estimation of densities on population, dwelling unit, household, and pupils in the case study area and; (3) visionary proposals on urban neighbourhood models based on several scenarios for the ultimate urban growth in district nine of Kabul City.

The visionary proposals are based on scenarios for the possible ultimate urban growth. For this purpose: firstly, the density (dwelling units per hectare) is measured through sampling within the entire city by using aerial maps. Secondly, the measured density is applied to the potential land for development (vacant land, agricultural land) in the cases of well-planned with appropriate density and unplanned as current urban growth. Thirdly, the schools required for the pupils are found in the cases of pupils' full enrolment ratio and the pupils' enrolment ratio as current. Finally, the neighbourhood models are proposed for the well planned and unplanned growth, in both cases of pupils' enrolment ratio.

3   THE SPREAD AND FAMILIARITY OF PERRY'S THEORY IN ISLAMIC PLANNING CONTEXT

The concept of neighbourhood has existed since centuries ago in different continents of the world (Farah, 2013). The planned residential neighbourhood probably finds its most complete description in Clarence A. Perry's monograph, 'The Neighbourhood Unit, a Scheme of Arrangement for the Family-Life Community', found in volume 7 of 'The Regional Survey of New York and Its Environs' (Dahir, 1947).

Perry's theory came in the first half of the 20th century to give some standards and unified features to the neighbourhood concept. As dimensions, number of inhabitants, services and facilities included etc.

Perry's neighbourhood unit dealt with matters such as transportation, open space, housing, and commerce. The ideal neighbourhood unit was centred on an elementary school and community centre, and bounded by arterial streets. It is an effort to create a residential neighbourhood to meet the needs of family life in a unit related to the larger whole, but possessing a district entity characterized by the strictly local factors (Dahir, 1947).

In Islamic countries like in any part of the world, there were traditional neighbourhood concepts to organize the people's settlement spatially, socially, administratively and sometimes politically and economically (Farah, 2013 and Secil, 2005).

In Uzbekistan it is known as Mahallah, in Iran as Mahalleh, in Turkey as Mahalle, in Afghanistan as Gozar and in part of the Gulf region as Fareej.

Despite their different names, these neighbourhoods were all organized around a religious building: the mosque and sometimes the church (Secil, 2005) and included a school, retail/shops/market, open space and spaces for the community, where not only the representative of the neighbourhood to the upper administration often met with the community to discuss their daily matters and problems (Farah, 2013), but it played a political/juridical role as a decision-making place. It also represented a cultural/spatial and educational place, where women community was also meeting.

Planning these traditional neighbourhoods and setting up the optimal size and population, according to institutions such as community centres or primary schools, not only helped better performance of existing functions, but also reinforced much wider neighbourhood functions such as social relation, education and so on.

Furthermore, with Perry's theory the school represented the centre of the whole neighbourhood and all the houses were built within a walking distance. Perry's neighbourhood unit theory has been followed all over the world, in particular with the advancement of technology, the economic development and the modernization of lifestyle. The advantages of this theory are: the reduction of vehicles' use, hence air pollution and fuel consumption, encouragement of walkability, increase of the pedestrian's safety during the trips between houses and school, increase of the sociability among the inhabitants and for sure ease of control and management of the urban development.

The 2030 master plan of Abu Dhabi in the United Arab Emirates, for example, proposed a model inspired from Perry's concept but based on the traditional Emirati neighbourhood. The new model includes a variety of ethnic groups representing 30% of the inhabitants (called expatriates) and 70% of the original inhabitants of the country (called locals) (Abu Dhabi Urban Planning Council, 2007).

Therfore, one of the significant challenges of the neighbourhood unit is to integrate different socio-economic groups of the society and many ethnic groups together, since they will be sharing the same spaces, facilities, using the same routes, etc.

In our opinion, the neighbourhood model based on Perry's theory can successfully play the role of an urban development tool in Kabul city, facing the uncontrolled urbanization and the absence of an effective master plan. Going back to the traditional neighbourhoods and developing it according to the needs of the Afghan people, their culture, their history and identity can be an efficient tool to control the urban development of the city and organize its urbanization.

Hence, this research comes to study and stimulate the best scenario for the neighbourhood model to be followed in the case of Kabul city; this represents the uniqueness and strength of this research.

So, let us start by defining Gozar as the case study of this research. The term Gozar that literally means pass or passage traditionally referred to areas or divisions where homogenous guilds or people with a common interest were lived. Referring to the literal meaning and common beliefs, Gozar might have been the residences along a main pathway served by a mosque and local shops.

Gradually these homogenous vocational Gozars transformed into heterogeneous Gozars of having diverse vocational groups. Besides, three factors caused the urban transformation of Gozars go through a faster and different way; (1) the expansion of the city in European style in the 20th century that resulted social class segregations; (2) the expansion, according to the master plan of 1978 which resulted planned and unplanned segregations, (3) The recent three decades of war that resulted ethnicity and religious segregations (HABIB and AKTC, 2011).

Gozars now are divisions of social classes, ethnicities and settlement types. However, they are institutionalized as sub-districts of municipal governance, represented by a representative who is elected by residents, approved by district municipality and screened by police department (Kabul City Current Status Report for Urban Development, 2011).

The boundaries are changed according to the extension of urban land, migration of people, and upgrading or widening of roads that sub-divide the Gozars. The changes take place by negotiations of representatives with the residents and adjacent representatives.

To determine the current functions of Gozars, one of the authors, had conducted a survey within four districts of Kabul city. The survey results show that the activeness of Gozar functions (governance, social, physical and safety functions) does not depend on urbanization age or population size, but settlement type (planned or unplanned).

4 CASE STUDY (DISTRICT NINE)

In this section we try to devise the primary school district and adopt it in some scenarios, although the primary school district is not yet set in Kabul.

District nine is chosen as the case area for this spatial analysis, for its location in the inner city zone of Kabul, and having a variety of settlement types, i.e. Planned apartment houses, planned courtyard houses, and un-planned courtyard houses.

As for collecting the data, a site survey was done in 2013. In addition, land use maps of JICA (Kabul City Current Status Report for Urban Development, 2011) and other web based maps were used.
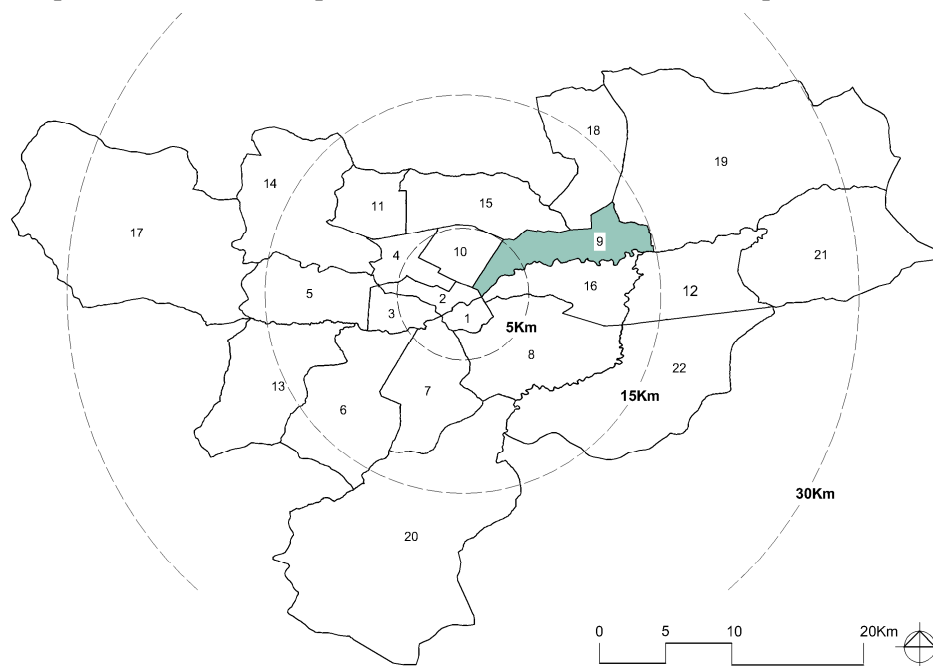

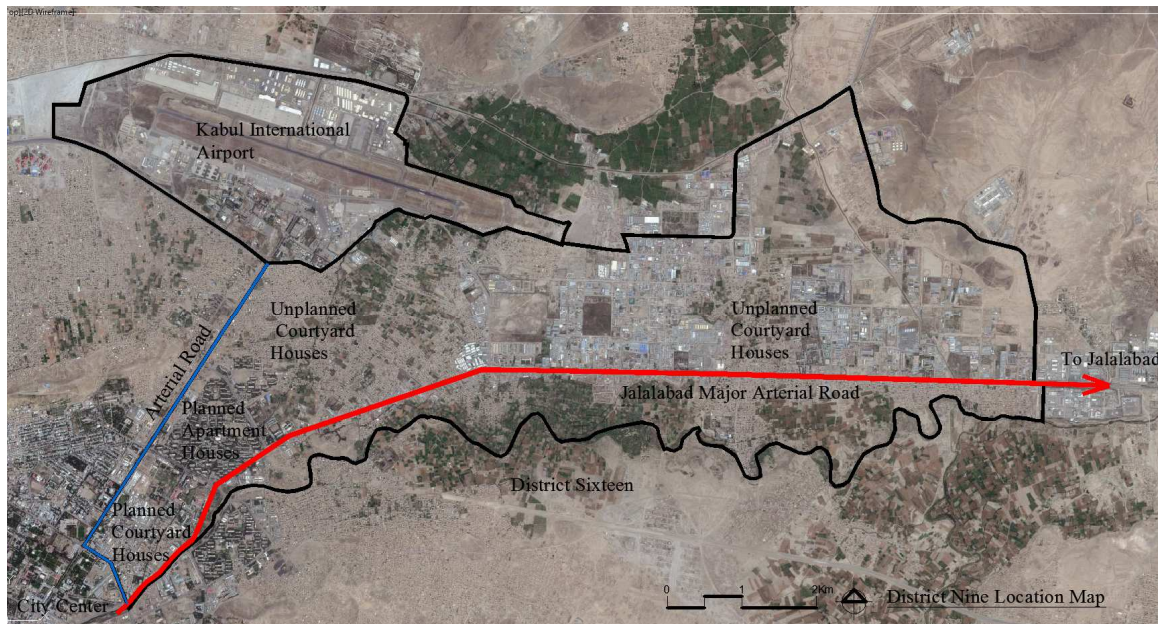Fig. 1: The District map of Kabul City showing the case study area

Fig. 2: The location map of District nine

4.1 Current status of district nine

District nine was originally all agricultural land, except the western end that were developed into apartment building settlements according to the 1978 master plan. The agricultural lands still remain in various locations of the district, which are rapidly and illegally changing to residential settlements.

About 36% of the district land is residential land. Agricultural land occupies 20 %, vacant or bare land occupies 12% and industrial land occupies 24% of the district land. The remaining 8% of the land is occupied by some commercial or public facilities that are located outside Gozar boundaries. [Estimations are made according to measurements on Bing aerial maps (2013 Nokia, 2012 Digital Globe)]

4.2 Features of spatial elements, in this case study

4.2.1 Gozar size and boundaries:

District nine is consist of 39 Gozars. The boundaries are mainly the main alleys, streets and roads. The sizes vary from a minimum of 11.8 ha to a maximum of 111.2 ha, but the average size is 43.1 ha. (Table 1)

Basic Statistics	Area (Gross ha)	Area (Net ha)	No. of Households	Population (Net)	Density (Net)	No. of Mosques
Average	43.07	32.63	571.00	5,938.40	181.99	2.26
Max	111.24	82.36	4,500.00	46,800.00	568.22	6.00
Min	11.84	11.22	77.00	800.80	71.35	1.00

Notes: Gross Area includes potential land for urbanization (vacant and agricultural land)

Net Area is the residential area, including the streets and open spaces

Table 1: Sizes of current Gozars in district nine

4.2.2 Primary schools

There are 12 high schools and three primary schools in this district. Since higher-level schools operate also lower level schools in Afghanistan, it can be said that there are 15 primary schools in this district.

The results of the measurements show that pupils' maximum travel distance to primary school is 500m in planned areas, while, in unplanned areas, this distance exceeds 2000m.

For easier transportation, the schools are located near main roads. Thus, the pupils must cross dangerous streets and roads to reach schools.

Basic Statistics	Total Enrolment (Pupils)	Area (Planned ha)	Area (Unplanned ha)	Population	No. of Households
Average	2,319.53	135.08	79.95	15,464	1,487
Max	4,326	251.93	149.10	28,840	2,773
Min	347	20.21	11.96	2,313	222

Area excludes vacant and agricultural Land, includes the streets and open spaces

Table 2: Sizes of estimated primary school districts in district nine

4.2.3 Mosques

We cannot find the difference in the distributions of mosques over planned and unplanned areas. According to the site survey, there are 88 mosques in this district.

4.2.4 Other public services

Similar to schools, the other urban services are also concentrated in planned areas.

Unplanned areas lack proper open spaces for parks and playgrounds. Children often play in the alleys, near the main roads or at the vacant lands.

Fig. 3: An example of unplanned area, left: children are playing in the alley near their houses, right: pupils walking back to home
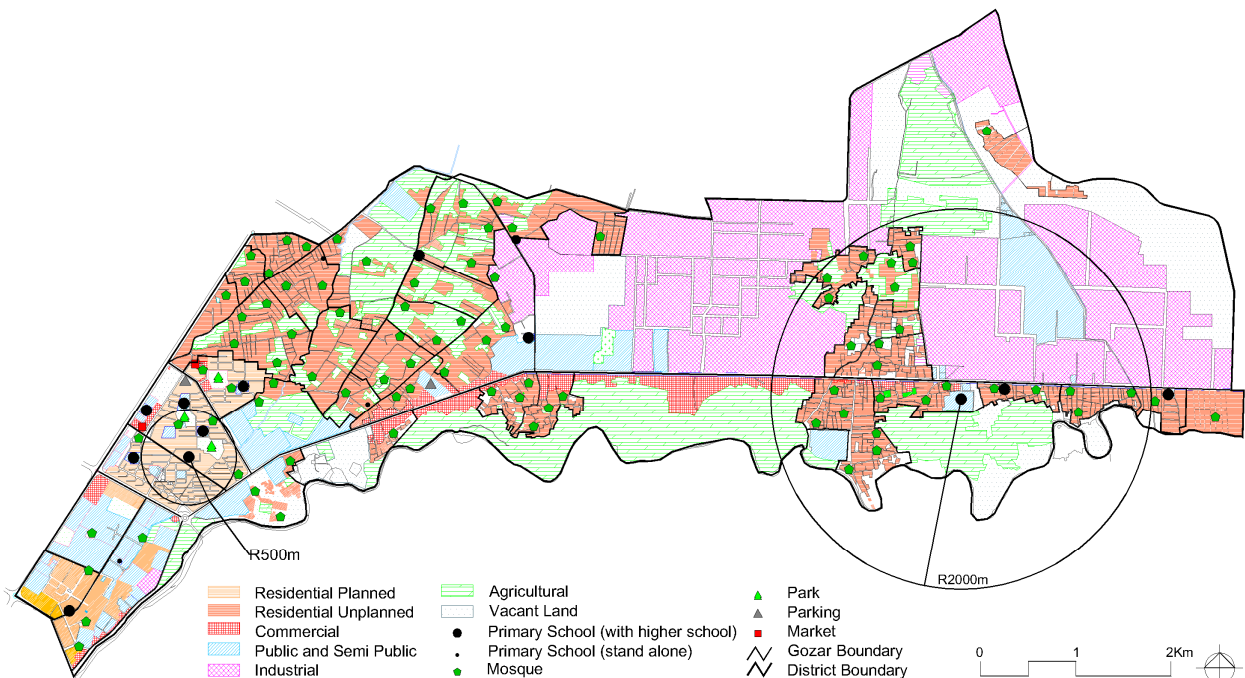

Fig. 4: Land use map of district nine

Commercial areas are mainly taking place along the main roads, streets and alleys in both planned and unplanned areas. They are part of Gozars, and the representative acts as the commercial area's representative, as well.

For better access, it can be seen that some daily necessity shops are located in the vicinity of the houses, or even they are part of some houses.

5   DEMOGRAPHIC ESTIMATIONS BASED FOR PLURAL SCENARIO

5.1 Estimating the ultimate population

To measure the population for the ultimate urban growth in district nine, the following steps took place.

(1) Measuring the current number of dwellings: The total number of dwelling units was measured by direct counting on the map (Bing maps: 2013 Nokia, 2012 Digital Globe). The result is multiplied by the number of persons per dwelling unit that is taken from the figures by JICA (Draft Kabul City Master Plan, 2011). (Table 3)

The population estimated in this step is used as the current population for district nine in all further calculations.

(2) Measuring the vacant and agricultural land areas (rapidly urbanizing lands): By using the Geolocation function of AutoCAD software application, the areas were measured on Bing maps.

Demographic Indicators	JICA 2011	CSO	Measurements on Map
Area (Km2)	25.5	-	*35.8
Number of dwelling units	-	-	22,271
Number of households per dwelling unit	1.56	-	-
Household size (persons/household)	6.69	6.33	-
No. of persons per dwelling unit	10.4	-	-
Population (persons)	-	250,100	-

* The gross area within district boundaries

Table 3: Demographic estimations for district nine

(3) Measuring the gross and net density: For measuring the number of dwelling units per hectare, 35 samples having different locations were selected across the city. Those locations were sought that represent various densities.

(4) Calculating the number of dwellings for ultimate urbanized case: The average density found for each type of housing is multiplied by the vacant and agricultural land.

(5) Estimating the ultimate population: The result of step four is multiplied by the number of persons per housing or dwelling unit.

5.2 Measurement of school enrolment ratio

(1) To measure the current primary school enrolment ratio, a school survey was done in district nine during 2013 survey, from which the accurate number of pupils currently attending school was received.

(2) The urban population of the age six to twelve is found from the Afghanistan Statistical Yearbook 2012-13.

Pupils' Enrolment Indicators	Current enrolment ratio according to school survey of 2013 (a) case	Full enrolment ratio according to CSO (b) case
Percentage of pupil's population	15.0%	19.2%
Pupils' enrolment percentage	78%	100%
Pupil's number	34,793	44,471
Pupils' no. in each grade	5,799	7,412
Number of classes for each grade	145	185

Table 4: Estimation of pupils' current and full enrolment ratio

5.3 Scenario assumptions

Considering the urban growth as planned and unplanned, and pupils' enrolment ratio as full enrolled (100% enrolled) and enrolment similar to current state (78% enrolled), four scenarios are assumed. (Table 5)

Population growth in full-built-up state	Pupils' enrolment percentage
A. Estimated population in well-planned case [current population + planned density x (vacant land + agricultural land)]	a. All the primary school aged children are to be enrolled in primary schools (100% enrolment)
B. Estimated population in unplanned case [current population + unplanned density x (vacant land + agricultural land)]	b. Pupils' enrolment percentage to be the same as current enrolment percentage (78% enrolment)

Aa: Scenario 1, Ab: Scenario 2, Ba: Scenario 3, Bb Scenario 4

Table 5: Scenario assumptions

Specifications		Current State	(A) Full built-up state (Planned)	(B) Full built-up state (Unplanned)
Area		1,272.56	2,416.27	2,416.27
Number of dwelling units		22,271	34,863	43,544
Population		231,618	362,578	452,858
(a)	100 % Pupil enrolment ratio	44,471	69,615	86,949
	Classes required	1,112	1,740	2,174
	Classes required for each grade layer	185	290	362
(b)	Current pupil enrolment ratio (78%)	34,793	54,465	68,027
	Classes required	870	1,362	1,701
	Classes required for each grade layer	145	227	283

* According to the Education Law of Afghanistan, the number of pupils per class is taken 40

Table 6: Comparisons between the scenarios and the current state

5.4 Vision proposals

To analyse the school coverage for the number of classes, three variations of schools are analysed for each scenario.

5.4.1 Scenario 1

Scenario one, is assumed for the ultimate urbanization in a planned manner of development and full enrolment ratio of pupils.

The primary school district for each size of the school is found by the population, the number of houses and the area that can be covered. The density used for the measurements is taken as the current gross density, which includes the roads and the open spaces.

The population varies by the primary school size. A school size, having 24 classrooms, covers 5000 population. While it reaches 7500 for a school size of having 36 classrooms.

The maximum travel distance is around 350m for the school size of 12 classrooms, 500m for the school size of 24 classrooms, and 600 for the school size of 36 classrooms.

Which travel distance can be the optimum travel distance for the pupils, and is it possible that each Gozar cover a primary school district? To answer these questions, first the current average distance between main roads, is measured by using aerial maps, and then the current Gozar sizes are analysed.

The current distance between most of the main roads in Kabul City is from 500 to 700 meters. Thus, if the school district area is considered as a rectangle of greater than 700m x700m, there is the possibility of interring through traffic in the neighbourhood. So, for the current road system of Kabul city, the safest option for the primary school size in this scenario is the primary school of having 12 classrooms.

Scenario 1	12 classes primary school	24 classes primary school	36 classes primary school
Total number of classes	1,740	1,740	1,740
Number of primary schools	145	73	48
Primary school district population	2,500	5,000	7,500
Number of households	240	481	721
Primary school district area (gross ha)	22	44	65
Scenario model ● Primary School ⬠ Mosque ▲ Open Space ■ Shops — Main Road			

Fig. 5: Vision models of school district Gozars (full-day school program) full-built-up state for full enrolment of pupils

On the other hand, if we compare the school district size to the average size of Gozar (43.07 ha with an estimated population of 4932), the 24 classroom school district size is the most appropriate size.

Furthermore, Kabul Municipality tries to standardize the Gozar size to 500 houses or dwelling units (Kabul City Current Status Report for Urban Development, 2011). It can be seen that the Kabul Municipality's standard unit size for the Gozar also fits the school district size of having 24 classrooms.

Thus, it can be concluded that the all-day-program primary school size of 24 classrooms or half-day-program primary school size of 12 classrooms is the most appropriate size for the primary school district. This is the most appropriate size for the ultimate urbanization with full pupil's enrolment ratio, according to pupil's walking distance, the current road pattern of the city, the current Gozar size and the standard Gozar size recommended by Kabul Municipality.

5.4.2 Scenario 2

In scenario two (78% pupil's enrolment ratio), the school district size increases for each school size. In a school of having 24 classrooms, the population reaches 6,400 and the number of households becomes 615. The maximum travel distance becomes 500m. In this scenario, the most appropriate size is the school of having 24 classrooms. Thus, one or two Gozars can be combined to make the school district Gozar centred with a primary school of having 24 classrooms.

Scenario 2	12 classes primary school	24 classes primary school	36 classes primary school
Total number of classes	1,362	1,362	1,362
Number of primary schools	113	57	38
Primary school district population	3,200	6,400	9,600
Number of households	308	615	923
Primary school district area (gross ha)	28	56	84
Scenario model ● Primary School ⬠ Mosque ▲ Open Space ■ Shops — Main Road			

Fig. 6: Vision models of school district Gozars (full-day school program) in full-built-up state for current percentage of pupils' enrolment

5.4.3 Scenario 3

Scenario three is assumed for the ultimate urbanization in an unplanned manner of development and full enrolment ratio of pupils. In this scenario, the school size of having 36 classrooms makes an appropriate school district Gozar.

Scenario 3	24 classes primary school	36 classes primary school	48 classes primary school
Total number of classes	2,174	2,174	2,174
Number of primary schools	91	60	45
Primary school district population	5,000	7,500	10,000
Number of households	481	721	962
Primary school district area (gross ha)	26	39	52
Scenario model ● Primary School ⬠ Mosque ▲ Open Space ■ Shops ▬ Main Road			

Fig. 7: Vision models of school district Gozars (full-day school program) in unplanned full-built-up state for full enrolment of pupils

5.4.4 Scenario 4

Scenario four, is assumed for the ultimate urbanization in an unplanned manner of development, and for the enrolment ratio of pupils same as the current. In this scenario, the school size of having 24 or 36 classrooms makes an appropriate school district Gozar.

Scenario 4	24 classes primary school	36 classes primary school	48 classes primary school
Total number of classes	1,701	1,701	1,701
Number of primary schools	71	47	35
Primary school district population	6,400	9,600	12,800
Number of households	615	923	1,231
Primary school district area (gross ha)	33	50	66
Scenario model ● Primary School ⬠ Mosque ▲ Open Space ■ Shops ▬ Main Road			

Fig. 8: Vision models of school district Gozars (full-day school program) in full-built-up state for current percentage of pupils' enrolment

According to the four scenarios shown in figures 5, 6, 7 and 8, proposals for school district Gozar could be: (i) centred with a primary school of having 24 classrooms for a population of 5,000 to 6,400 in planned areas; (ii) centred with a primary school of having 24 to 36 classrooms for a population of 5,000 to 9,600; (iii) having one or two Mosques located at the centre or each half of the Gozar; (iv) the boundaries to be determined by the main roads, and the main roads should not go through the primary school districts.

6 CONCLUSION

The results of the survey show a wide variety of sizes of Gozars in Kabul. These suggested that 'Urban Gozar' as an elemental neighbourhood organization in the modern sense is transforming through urbanization. This urbanization requires a comprehensive spatial standard on urban neighbourhood.

Therefore, a new spatial standard is explored as primary school district and also adopted in scenarios under assumptions of planned and unplanned development for full enrolment ratio of pupils and current enrolment ratio.

For this purpose, density, number of dwelling units, population and number of pupils are estimated for the ultimate urbanization (the current agricultural and vacant land transforms to residential settlements).

For each scenario, three options of school districts are assumed. Among them, the most appropriate school district size is recommended by considering (i) the pupils' minimum walking distance; (ii) the current road pattern of Kabul City, (iii) the majority Gozar sizes, and; (iv) municipality's recommended Gozar size.

It is finally concluded that one or two of the current Gozars can be combined to make an appropriate school district Gozar.

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