



## **Analysis of the Distribution of Kindergarten and Primary Schools Buildings in Neighborhood Scale Based on Spatial Planning Regulation and Planning Technique: An Example of Urban Protection Area Yozgat**

**Yaşar Bahri ERGEN**

*University of Aksaray, Faculty of Architecture and Design  
yasarbahriergen@gmail.com*

### **ABSTRACT**

Planning and arrangement of urban social urban equipment is very important for the development of urban spaces. Such an arrangement indicates that population of that city can only use the necessary social equipment through planning. The access distance to social equipment such as kindergarten and primary schools within the Spatial Plans Building Codes for the arrangements in Turkey is arranged as 500 meters. It is known that the population-based approach is as important as the distance criterion in neighborhoods inhabited by the population in terms of social equipment. This article underlined the importance of population-based social infrastructure development. Analyses were made selecting 20 neighborhoods out of 27 in Yozgat province. The results have shown that a kindergarten or primary school to be established in Develik neighborhood of Yozgat will not reach the desired occupancy since the population is not dense. Therefore, selection of the social equipment spaces that are founded on population basis in planning is important. Primarily, it is necessary to make plan in consideration of the distance rule and the population criteria together in the spatial distribution in the neighborhoods that host the residential areas.

**Keywords:** Social equipment, population criterion, travel distance, social equipment standards, education facilities

### **INTRODUCTION**

It has become obligatory to access social facilities in the cities and plan their use since there is a rapid increase in the development of cities. This obligation has had an impact on populations living in cities to prefer housing settlements and has become a necessity for living spaces. It becomes an obligation to do an adequate planning of social equipment, an important part of urban life quality, in the city. Arrangement and planning of social equipment in the development of cities according to the structure of population are important in terms of usage and sustainability. How the use of social equipment should be is of importance so that urban spaces can be habitable. The adequacy analysis of the number of kindergartens and primary schools, which is necessary as per the distribution of population to the urban area and the social infrastructure standards of the population, is a necessity of planning. It is the Spatial Planning Regulation that guides the construction of the development plan and application of the development plan law. Therefore, the necessity of an urban development plan was determined by analyzing the adequacy of kindergarten and primary schools in the neighborhood with the population structure. As known, kindergarten and primary school consist of 5-year age groups and 11-year age groups, respectively. Arrangements have been made to set forth a sustainable and planned urban development through various approaches regarding availability and population-based planning in social equipment that has become very important for urban development. The kindergarten and primary school that are regulated in the 12th article of the spatial plans building codes in Turkey, an arrangement based on the 500 meter distance rule is used. The biggest problem here is that there will be no an adequate number of students to fill this distance of 500 meters



designed. Considering on the basis of the population, it is clear that arrangement of by reaching the space at a certain distance will result in a more efficient planning approach. Certain social equipment in an urban settlement is obligatory according to population criterion (MERT, YILMAZ, 2009). Today, there are mistakes arising from planning of and lacks in social equipment that an urban space should possess (MERT, YILMAZ, 2009). In general, most of the studies conducted have made analyses on environmental planning of schools besides how the population should be used in the planning of primary schools and kindergartens. First of all, it is necessary to determine how many schools in which region of the city are needed. Accordingly, location of the schools should be planned. The schools should have necessary space and equipment and be designed big enough for children to grow healthily (ÖNDER, AKAY, 2018). Kelkit and Özel, in their study conducted in 2003, found that the schools in Çanakkale city center were inadequate in terms of planning criteria and standards (ÖNDER, AKAY, 2018). Türk et al. (2018) stated that determining the size of the area of educational institutions is very important. The present study, unlike other studies, shows how primary schools and kindergartens should be planned according to population criterion. This study suggests that the school areas in the neighborhoods should be determined and should not be restricted to distances. It is important that schools are set forth together with other population-based approaches among development plans. In this regard, the study will show the approaches that can bring a solution to this problem as well as the necessity of planning the problem in physical space with a population-based approach in the Yozgat sample. The population criterion will ensure usability of the nursery or kindergarten. Very small populations in certain neighborhoods indicate that even if the school or nursery to be established is at a distance of 500 meters, it will not be used. In this regard, a planning approach based on population seems to be more useful. As known, The Ministry of National Education provides mobile teaching based on the school age population and in line with the number of students and the capacity of the school. Of course, this model is important for rural settlements out of the city.

## **MATERIALS AND METHODS**

### **Materials**

Yozgat city is located in the Central Anatolia region of Turkey. It is surrounded by Çorum, Amasya and Tokat in the north, Sivas in the east, Nevşehir and Kayseri in the south, and Kırşehir and Kırıkkale in the west (Figure-1). Yozgat was chosen representatively to test the applicability of the legal legislation and to solve the problems. Because there are 27 neighborhoods in the residential area in the planning area of the Municipality of Yozgat and some of the schools are located in the neighborhoods in the center, the number of students is inadequate and there is sufficient area for a school. Besides this problem, even there is no kindergarten or primary school in some neighborhoods, they were included in the study as they had adequate materials.

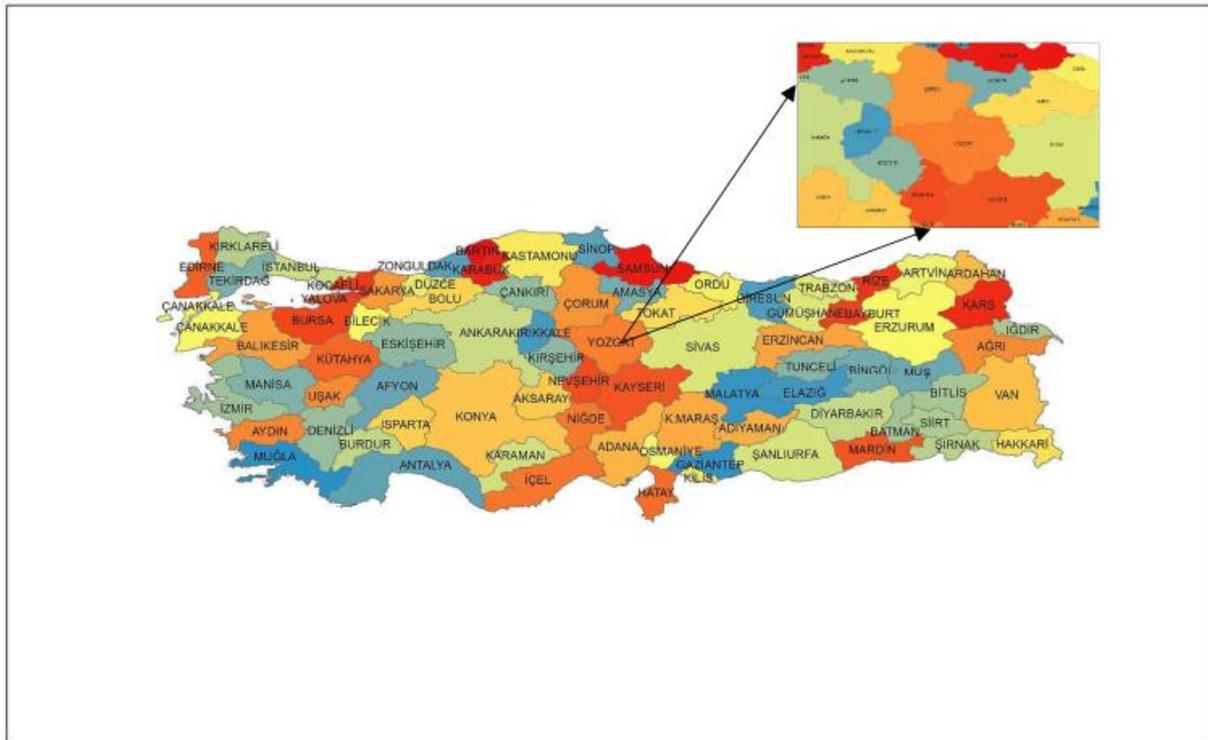


Figure-1: Location of the study area

For Yozgat, the analyses were made on 1/5000 development plans obtained from the municipality. The data obtained as Netcad were converted to ArcGIS and analyzed. The analyses were obtained from Yozgat city selecting 20 neighborhoods out of 27 (Figure-2). Some neighborhoods out of those 20 draw attention with their very few populations. Some neighborhoods did not have any kindergarten or primary school.

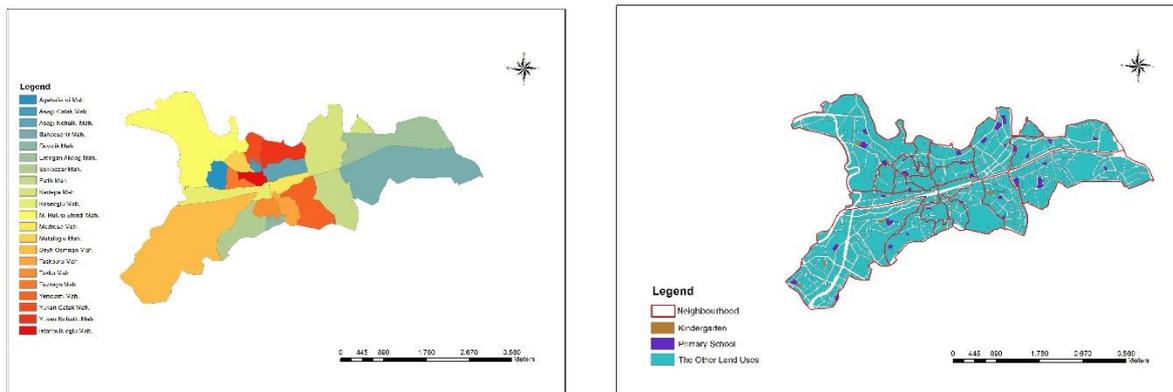


Figure-2: Neighborhood around Yozgat city and the kindergartens and primary schools in these areas

Source: The map was obtained from Tokat Municipality with NetCAD program. The map was converted to ArcGIS and prepared by the author for description of analyzing areas in Yozgat)

There is neither kindergarten nor primary school in 4 neighborhoods among others shown in the following map (Figure-3). It is necessary to plan schools in these areas within 500-meter criterion, but this need is met by the neighboring kindergartens and primary schools. Thus, there will be no problem as to how students can be assured to the

schools. Otherwise, in case of using the distance rule, there may be a lack of students in the schools.

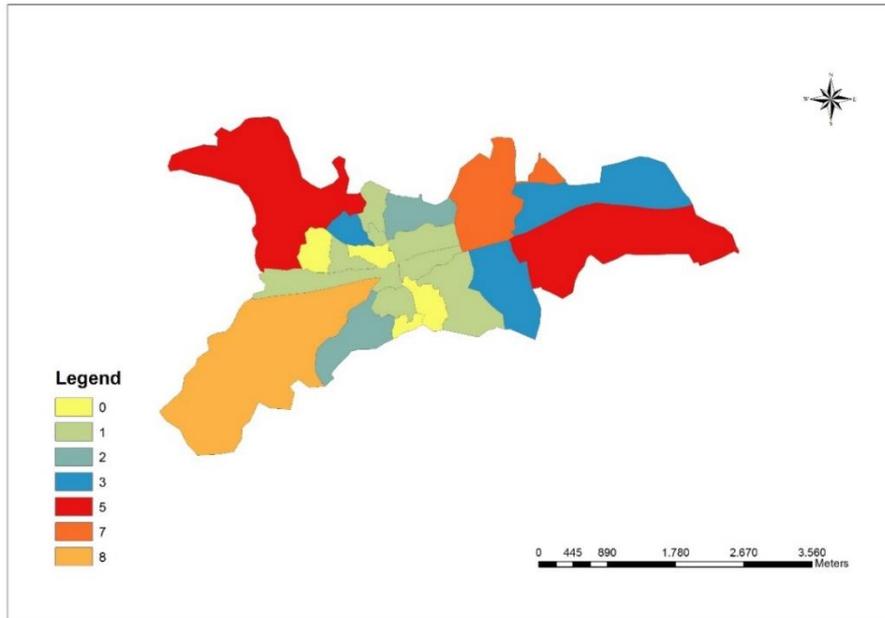


Figure-3: The number of kindergartens and primary schools in the neighborhoods  
 Source: The map was obtained from Tokat Municipality with NetCAD program. The map was converted to ArcGIS and prepared by the author for description of analyzing areas in Yozgat)

### Method

Preparation of development plan in cities, population and area relationship is important. The Spatial Planning Regulation is known to describe the distance relationship. However, the main setup in planning includes how many nurseries, kindergartens, primary schools, secondary schools and high schools are necessary as a standard based on the size of the population in the social infrastructure and particularly in the educational structures. This research has determined the necessity for planning by analyzing the adequacy of kindergartens and primary schools on the population basis within the neighborhood boundaries of the Yozgat urban planning area. As known, "the primary and secondary school buildings are established based on certain standards and sizes in urban planning. The most important criterion is population, and the type of education and number of schools are determined in the sizes by population (Table 1)" (ERGEN, 1993).

Table - 1 Population-based School Grouping and Numbers in the Neighborhood Unit

Unit Description	Family or Number of Houses	Population	Educational Structures Population Needs
1-Neighborhood	300-400	1500-2000	Nursery School or Kindergarten
2-Primary School Settlement	700-1000	3500-5000	Primary School
3-District (LITTLE TOWN) (2-3 Primary School Settlement)	2000-3000	10000-15000	1-Secondary School 1-Vocational High School
4-Urban Unit	4000-9000	20000-50000	High School

Source: ERGEN, 1993, p.49



The number, ratio and size of population are formed within the framework of the calculation of the social and technical infrastructure needed by population according to the main rule of development plan. In this consideration, social infrastructure units, especially kindergarten and primary school site selection is done based on the population in the district, neighborhood and neighborhood units in the planning area. The number of age groups in the age pyramid units of the population is subtracted and a school location is selected for the neighborhood units in line with the total number of school students based on the number of students in a class determined by the Ministry of National Education. According to the world standards, the total number of primary school students is calculated by multiplying the number of students in a class by the number of classes (the number of schools and the size of a school area are obtained on condition that the number of students in a school is 120 minimum since the standard number of students in a class is deemed 24).

According to the method above, the calculation of a population, main rule of planning, is made and the total number of students in classes and schools as per the World and Turkish standards, kindergarten and primary school distribution is made on the neighborhood units basis. According to Article 12 of the Spatial Planning Regulation (Official Gazette dated 14/06/2014 No. 29030);

### ***Walking Distance***

*Article 12 (1).....  
(2) In Development Plan; .....kindergarten and primary school functions around 500 meters.....  
therefore, it can be planned in the service impact area that should be covered by walking.*

Considering this regulation, the population-based number of kindergarten and primary school students are distributed to the neighborhoods and selection of area is made at site as per the accessible distance rule.

The area size is considered while planning in the calculation of the area per student projected in the regulation, which is a requirement of the school area size. Therefore, methodologically, analyzes are made first according to the needs of the population and the area within the framework of the Planning Technique based on the size of the population planning area. In line with the calculations made, the number of schools determined as per the Development Plan Law No. 3194, Spatial Planning Regulation and planning standards are distributed spatially according to standards by population in the neighborhood units and within the framework of the regulation. While making the distribution, not only the distance rule should be considered, but the population structure should also be considered; the number of students should be analyzed with those in the neighborhood and adjacent neighborhoods; and the rule of approximately 500 meters should be observed.

With this method, a primary school with at least 120 students and an additional kindergarten unit, and a kindergarten and primary school complex are formed, which forms the number of students.

The area size is decided as per the Spatial Planning Regulation (Official Gazette dated 14.06.2014 No. 29030) (Table 2).



Table -2: Minimum Social and Technical Infrastructure Areas and Minimum Area Sizes in Different Population Groups

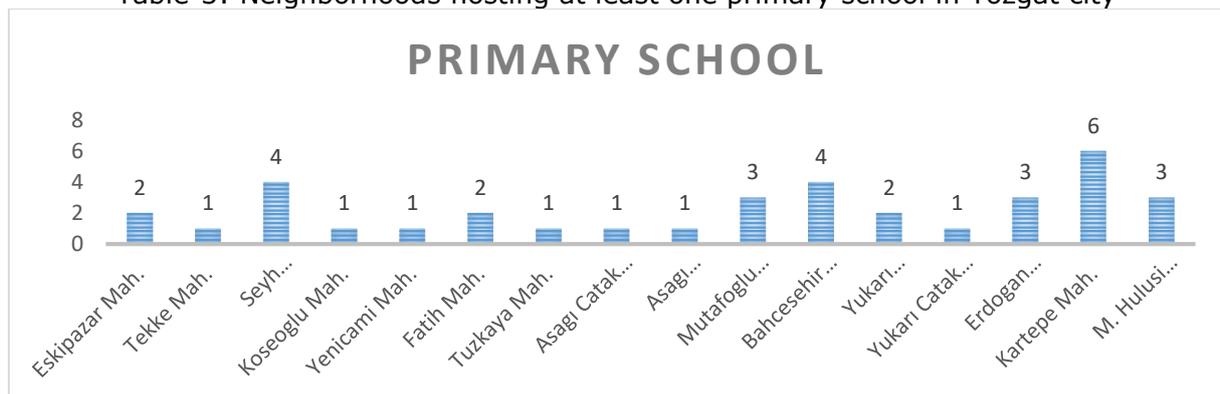
ANNEX 2 TABLE		1. MINIMUM SOCIAL AND TECHNICAL INFRASTRUCTURE AREAS AND MINIMUM AREA SIZES IN DIFFERENT POPULATION GROUPS							
POPULATION GROUPS		0 - 75.000		75.001- 150.000		150.001 - 500.000		501.000 +	
INFRASTRUCTURE AREAS		m <sup>2</sup> /pers on	Minimu m Area Unit (m <sup>2</sup> )	m <sup>2</sup> /pers on	Minimu m Area Unit (m <sup>2</sup> )	m <sup>2</sup> /pers on	Minimu m Area Unit (m <sup>2</sup> )	m <sup>2</sup> /pers on	Minimu m Area Unit (m <sup>2</sup> )
AREA OF EDUCATION FACILITIES	Kindergar ten	0.50	1.500-3.000	0.50	1.500-3.000	0.60	1.500-3.000	0.60	2.000-4.000
	Primary school	1,50	4.000-7.000	1,60	4.000-7.000	1,60	4.000-7.000	1,60	4.000-7.000

Source: Spatial Planning Regulation (Official Gazette dated 14.06.2014 No. 29030), Ministry of Environment and Urban Planning, Regulation Annex Table 2

## RESULTS

There are 35 primary schools in 20 neighborhoods (because one school is located between the neighborhoods of Aşağı Çatak and Mutafoğlu, the number has been determined as 36). There are no primary schools and kindergartens in Develik, İstanbulluoğlu, Medrese, Taşköprü, and Agahefendi among the 20 neighborhoods. According to the 500-meter rule, the presence of kindergartens and primary schools in these areas is necessary. However, there are 209 people aged older than 18 years and 80 people aged under 18 years in Develik neighborhood (TURKSTAT, 2021). These data show that a primary school or kindergarten to be built here will not reach the desired number of students, which is not functional. It is obvious that similar problems to that of the 500-meter rule will emerge in the other neighborhoods. In this sense, it is more reasonable to consider the population criterion instead of the distance rule while making a plan.

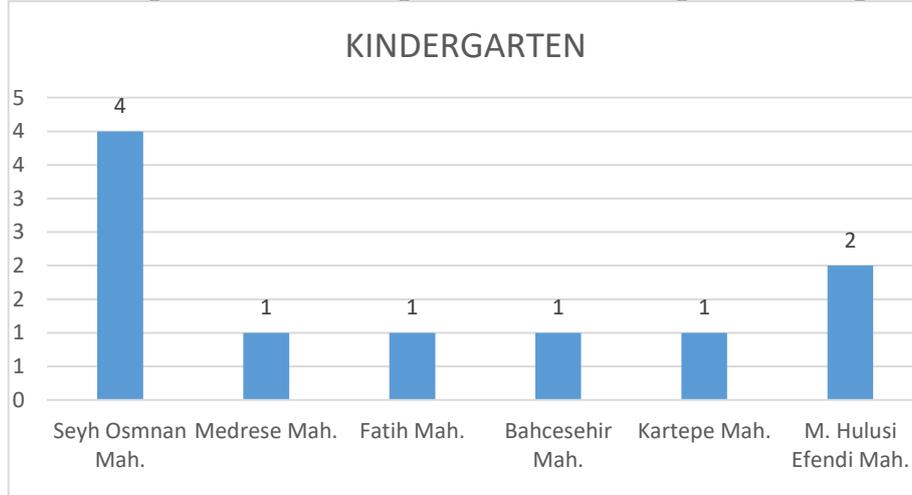
Table-3: Neighborhoods hosting at least one primary school in Yozgat city



Also, the analyses showed that there are nursery schools in Şeyh Osman, Medrese, Fatih, Bahçesehir, Kartepe, and M. Hulusi Efendi neighborhoods (Table-3). In these neighborhoods, more options of kindergartens have been offered. Considering in terms of population, these neighborhoods have populations of at least 2000 people. Although there is no primary school in Medrese neighborhood, there is kindergarten (Table-4). Considering its population of 2253 people, 593 are under 18 years old (TURKSTAT, 2021), which is a planning mistake that there is no primary school in this area.



Table-4: Neighborhoods hosting at least one kindergarten in Yozgat city



The more important accessibility is in terms of urban development, the more the potential of use of areas stands out in terms of sustainability. It is necessary to reconsider regulations determined within the scope of Spatial Planning Regulation, which should be taken into consideration while making development plan in Turkey.

#### DISCUSSION AND SUGGESTIONS

Today, development plan is defined as implementation and approval of the Master Development and Implementary Development Plans that integrate the regional plans, if any, in subparagraph a of Article 8 of the Development Law No. 3194 and the zoning plan in subparagraph b. Based on this definition, the Master Development Plan includes selection of area and calculation of population as well as standard requirements (Development Law No. 3194). Although population-based infrastructure is calculated in city development plan, it is not possible to form a unity regarding selection of settlement for population because the site selections in the 1/5000 and 1/1000 scale Development Plan are not analyzed in the physical plan according to the neighborhoods.

The above discussion is important in terms of the necessity that location is selected for the school and the population-based number of students is determined whether it is adequate or not, and a common place for school in the neighborhood or between neighborhoods is determined. The criteria to be considered in the selection of school in the planned areas in the Spatial Planning Regulation are shown in Table 6. These are narrow-scoped criteria compared to those determined by the Ministry of National Education (BAŞEĞMEZ-TAŞDEMİR-GÜL, 2017).

Table 5: Selection of school area in regard to Spatial Planning Regulation

Classification	Description
1	Gross population density
2	Walking distance to housings
3	Surface area size

The neighborhood population and selection of school area based on this population will be added to criteria shown in the above table to achieve eligibility.

In the light of the data obtained from Yozgat city, limitation of the primary school and kindergarten planning criterion with only 500 meters poses another planning problem.



Establishing schools without students may come into question. In this regard, the issues to be considered for city planning are as follows;

- Neighborhoods should be considered while planning.
- Making arrangements on the basis of distance rule only is not always feasible for all areas.
- In these areas, making arrangements in consideration of population and similar approaches besides distance would be more meaningful.
- Population-based area selection in the neighborhoods in planning kindergarten and primary school areas should be included in Spatial Planning.

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