

**REPUBLIC OF TURKEY
BİNGÖL UNIVERSITY INSTITUTE OF SCIENCE**

**SPATIAL ANALYSIS OF LAND USE AND EDUCATIONAL
SERVICE OF THE RANYA CITY BY USING GEOGRAPHIC
INFORMATION SYSTEMS (GIS)**

MASTER THESIS

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SOIL SCIENCE AND PLANT NUTRITION

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This dissertation, created by Hoshang Hamad AMEEN AZEEZ under supervision of Prof. Dr. Alaaddin YÜKSEL was accepted as a Master thesis in department SOIL SCIENCE AND PLANT NUTRITION by the following committee on 19/04/2019 with the vote unity.

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PREFACE

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Hoshang Hammed Ameen AZIZ
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LIST OF SYMBOLS AND ABBREVIATIONS

km	: Kilometer
m	: Meter
E	: East
W	: West
N	: North
S	: South
NE	: Northeast
NW	: Northwest
SE	: Southeast
SW	: Southwest
GIS	: Geographic Information Systems

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COĞRAFI BİLGİ SİSTEMLERİ (CBS) KULLANARAK RANYA ŞEHİRİ EĞİTİM HİZMETİ'NİN MESAFEYE BAĞLI ANALİZİ

ÖZET

Bu çalışmada, Irak'ın Süleymaniye bölgesindeki Ranya kentinde yer alan çeşitli düzeylerdeki eğitim kurumlarının alansal dağılımları Coğrafi Bilgi Sistemleri (CBS) kullanılarak belirlenmiş ve bölgenin toprak ve su kaynakları ile eğitim kurumlarının dağılımları arasındaki ilişkiler irdelenmiştir. Verimli toprak ve zengin su kaynaklarına sahip olan Ranya şehri, bölgenin tarımsal üretim potansiyeli en yüksek arazilerine sahiptir. Eğitim kurumlarının sayısı ve nitelikleri nüfusun artışı ve şehrin genişlemesi yönünden de değerlendirilmiştir. Eğitim hizmetlerine erişilebilirlik, toplumun gelişmesi ve ülkenin refah seviyesinin artmasının vazgeçilmez bir unsurudur. Eğitim kurumların bir şehirdeki dağılımlarının, yerleşim yerlerinin nüfusu ile orantılı olması bireylerin hizmetlerden yeterince faydalanabilmesi adına son derece önemlidir. Eğitim kurumlarının yetersizliği ilerlemenin ve az gelişmişliğin standart ölçüsü olarak kabul edilmektedir. Çalışma, şehirde yer alan her düzeyden okul ve kreşleri kapsamaktadır. Öğrenci, öğretmen ve bina sayıları ve nitelikleri çalışmanın verileri arasındadır. Ranya şehrinde eğitim kurumları nitelik ve nicelik olarak sürekli gelişme göstermektedir. Ancak eğitim kurumlarının kurulacağı yerlerin tercihinde toprak ve su kaynaklarının korunması ilkesine kesinlikle dikkat edilmediği tespit edilmiştir. Kurumlar çoğunlukla tarımsal potansiyeli yüksek olan araziler üzerine kurulmuştur. Bunun en önemli nedeni ise, şehrin tarım arazilerine doğru genişliyor olmasıdır. Henüz 2010 yılında kurulan şehrin ilk üniversitesi olan Raparian 130 ha genişliğindeki birinci ve ikinci sınıf tarım arazileri üzerine kurulmuştur. Üniversitenin cazibe merkezi olması, diğer yerleşim unsurlarının da yakın zamanda çevre tarım arazilerini işgal etmeye teşvik edecektir. Eğitim kurumlarının gerekliliği bölgenin gelişmesi için ne kadar önemli ise, yaşayan ve yaşayacak nesillerin gıda ve lif gereksinimlerinin karşılanacağı tarım arazilerinin korunup, iyileştirilmesi de o kadar önemlidir. Yerleşim ve eğitim kurumları için tarımsal potansiyeli düşük olan alternatif alanlar tercih edilmelidir. Bu nedenle, başta Ranya şehrinin genişlemesinde tercih edilecek alanlar olmak üzere, eğitim kurumları gibi devlet kurumlarının tarımsal vasfı daha düşük olan kuzey-doğu ve kuzey-batıdaki arazilere doğru olması gerekmektedir. İlgili kurumlar ile şehir planlamacıları ve politikacıların şehrin genişleyeceği bölgelerin seçiminde daha duyarlı olmaları gerekmektedir. Bu konuda,

Anahtar Kelimeler: Eğitim, Mekânsal dağılım, CBS, Arazi kullanımı, Toprak ve su kaynakları, Kuzey Irak.

SPATIAL ANALYSIS OF LAND USE AND EDUCATIONAL SERVICE OF THE RANIA CITY BY USING GEOGRAPHIC INFORMATION SYSTEMS (GIS)

ABSTRACT

In this study, the spatial distributions of educational institutions at various levels in Ranya city of Sulaymaniyah region, Iraq were determined by using Geographical Information Systems (GIS) and the relations between the distribution of soil and water resources and educational institutions of the region were examined. Ranya city has lands with the highest agricultural potential of the region due to fertile soil and rich water resources. The number and qualifications of educational institutions were also evaluated in terms of population growth and expansion of the city. Accessibility to educational services is an indispensable element of the society development and the increase in welfare level of a country. The distribution of educational institutions in a city should be proportional to the population of the neighborhoods. This is extremely important for individuals to benefit from the services adequately. The inadequacy of educational institutions is accepted as the standard measure of insufficient progress and underdevelopment. The study includes schools at all levels and kindergartens in the city. The number of students, teachers and buildings and their characteristics are among the data of the study. The educational institutions in Ranya city are continuously developing in terms of quality and quantity. However, conservation of soil and water resources have not been taken into consideration while establishing or choosing the location of the educational institutions. Institutions have been founded mostly on agricultural areas with high agricultural productivity potentials. The most important reason of inappropriate land use is the expanding of city towards agricultural lands. The first university of the city, founded in 2010, has been established on the first and second-class agricultural lands of 130 ha. The university is a center of attraction which will also encourage other settlements to occupy nearby agricultural lands. The educational institutions are needed for the development of the region, however the protecting and improving the agricultural lands where the food and fiber demands of current and future generations will be met is much more important. Alternative areas with low agricultural potential should be preferred for settlement and educational institutions. Therefore, public services such as educational institutions in Ranya city should be located in the north-east and north-west areas with lower agricultural qualifications. Relevant institutions and city planners and politicians have to be more sensitive in the selection of the regions where the city will further expand.

Keywords: Education, Spatial distribution, GIS, Land use, Soil and water resources, Northern Iraq.

1. INTRODUCTION

Education is the central pillar for achieving and also sustaining the economic and social developments. Therefore, educational and training services are the most important public services that must be provided to every citizen. They are the main principles for developing and improving any society where the progressive and digressive societies are measured by the availability of these services. Land use, distance to the residents and population density have significant influences on the distribution of training facilities in a city (Lagrab and Akinin 2017).

Majority of (more than half) of population on earth lives in urban areas (Dye 2008) and United Nation has predicted that more than two thirds will live in urban by 2050 (UN United Nations 2010). Expanding urban settlement raises infrastructure problem and most of the time infrastructure is not adequate for the residents (Cohen 2006). Unplanned growth of urban areas brings many problems and spatial inadequacy in distribution of educational services is one of the major consequences (Lagrab and Akinin, 2017). Proper planning of land use and distributing the public services in a scientific and systematic manner are very crucial due to their priority for development of societies. Cities in developing and underdeveloped countries suffer from promiscuous distribution of public services including educational (Moghayer et al. 2018). Educational facilities in activity should be carried out on the basis of population size and spatial availabilities (Setyono and Cahyono, 2018). Insufficient allocation of public lands, lack of financial support to buy new lands to build schools and local or governmental politic issues are the major causes in lack of proper placement of public services in a city (Shaheen, 2013).

Ranya region has been inhabited since ancient times, and Ranya city is the capital of the region. Urban growth in Ranya city as in elsewhere in developing cities of the world is an important issue to be considered due to the fast rate of urbanization. Unorganized expansion of Ranya city is the results of increased immigration and rapidly increasing population. Rapid population growth and area expansion in Ranya raised randomness

problem in the distribution of educational service. Therefore, achieving balance of educational services according to their categories and levels should be taken care of on the city level, and it should be implemented to reach a coordination between educational services and population density. This can be reached by selecting the best locations for educational services so that individuals can have and reach them easily and effortlessly.

This study was concentrated on finding the weakness in distribution of educational services and propose solutions to help decision markers to prevent from the same pitfalls in the future. Therefore, the main purpose of the study is to analyze present situation of educational service distribution in Ranya city for the purpose of suggesting new locations as alternative for the existing services considering the population density of neighborhood, ease of transposration and conserving the fertilize agricultural lands.

2. LITERATURE REVIEW

2.1. Effects of Land Use Change on Natural Resources

Land use and cover changes in developing countries due to the rapid population increase are often described by uncontrolled sprawling of urban, degradation of land, and the transformation of agricultural production fields to various farming activities proceeding vast expense to the environment (Sankhala and Singh, 2014). Major impact of land use change due to the urban growth is the loss of agricultural lands. Hegazi and Kaloop (2015) reported that the loss of agricultural land in Nile Delta during the period 1980–2010 approximately more than 25% of 650 thousand acres.

Conservation and mending ecosystem services in cities enhance resilience, well-being, and standard of living conditions for the people living in urban areas (Gomez-Baggethun and Barton, 2013). An urban ecosystem is defined as the place that is mainly composed of buildings and infrastructures and inhabited by people (Pickett et al., 2001). The urban ecosystem also includes parks, gardens, graveyards, small forests for recreation, manmade wetlands and ponds ad river or lakes. Urban areas depend on ecosystems and components of ecosystems to maintain long-term provisions for life, well-being, reliability, decent interrelation in society and additional facets of human welfare (TEEB 2011). The valuation of ecosystem services in urban areas can help decision-makers in urban planning by raising awareness, setting the priorities, designing incentives and litigating (Barton et al. 2012). Valuation of ecosystem services in cities for a specific decision-support situation is important. Gomez-Baghartum and Barton (2013) reported an airport example for a valuation study due to the damage compensation occurring from nuisances. Similar valuation studies can be carried out for all public and private investments.

Potential impacts of constructing schools, hospitals and other governmental offices to ecosystem services should be taken into consideration. More than one factor should

carefully be examined in determining the location of these investments. Geographical information systems (GIS) can handle multifactor in analyzing the potential damage to environmental services. The GIS is widely used for decision making purposes, are used as decision support system to determine the location of schools in educational planning of cities (Maguire et al 1991; Hite 2006; Al-Rasheed and El-Gamily 2013).

2.2. The Use of Geographic Information System in City Planning

The accessibility and flexibility of information can be enhanced by using geographic information systems (GIS) which improves the connections and the appreciation of the linkage between various information (Baniya 2008). Maps, aerial photos, satellite images and etc. are treated as spatial data and names and tables are treated as descriptive data. The errors can be reexamined and statistical and spatial analysis can be performed in GIS software. The data are displayed on a monitor as maps, reports, and graphics (Jamassi 2013). The use of GIS helps planners to better land use, health care, and transportation planning in settlements (Al-Enazi 2016).

Mapping and analysis of land use suitability is one of the most common applications of GIS for planning and management (Malczewski, 2004; Yu et al. 2016; Halder, 2018; Russo et al. 2018). Land-use suitability refers to defining the most suitable spatial pattern for land uses based on particular necessities, choices of some activities (Collins et al. 2001). Urban growth and land use change detection in Mansoura and Talkha cities, Egypt from 1985 to 2010 have been monitored by GIS and remote sensing techniques (Hegazy and Kaloop 2015). They pointed out that the constructed area increased from 28 to 255 km² and unfortunately the construction occupied 33% of the fertile agricultural lands. Elhag et al. (2017) used GIS to analyze the site suitability of mosque locations in Khartoum State of Sudan. They concluded that distances between mosques from each other should be taken into consideration for planning new mosques and the number of mosques should be compatible with the number of houses in the neighborhood. Similarly, Bulti et al (2018) studied the spatial distribution and accessibility of primary schools in Bishoftu Town, Ethiopia to the residents using Geographic Information System (GIS). The road network distance and population density, the spatial accessibility of educational services have been used to compute service areas. Service provision was considered unequal between neighboring areas and spatial distribution analysis showed a clustered

spatial pattern. Moreover, 23.9% of the students have to travel more than twice of the maximum standard distance, indicates the current service provision is inadequate.

The urban planning requires a comprehensive study of factors influencing the all components of the urban environment (Yaakup and Sulaiman, 2007), and helps to provide public services such as education and health services, (Scholten and Stillwell, 2013). Provision of educational facilities should be done based on demographical and physical characteristics of a city. Identifying the necessity of new facilities based on existed ratios or scales of educational facilities requires comprehensive and adaptive plan considering the all social and environmental factors (Setyono and Cahyono, 2018).

Studies on spatial distribution and accessibility of educational services in Ranya district is missing. Particularly, in Ranya town, capital of Ranya district, despite the fast population growth and expansion of city, no detailed study has been carried out investigation the distribution of educational services in relation to suitability of land use, population density, size of neighborhood. Therefore, this study aimed to analyze the relationship between the location, spatial distribution of educational services and soil water resources, land use suitability, population density and some other important factors.

3. MATERIAL AND METHODS

3.1. Material

3.1.1. Location of Study Area

Ranya city is placed in the center of Ranya district in the southern Kurdistan region. The city is located on 36.28-36.5 N longitudes and 44.60-44.33 E latitudes. The city is located 145 km north of the Sulaymaniyah city (Figure 3.1). Ranya shares border with Serkepkan in the north west and with Sengeser in the north east. The range of Kewarsh mountain separates Ranya from Pshdr. Dukan dam is placed in the south part of Ranya. Chwarkurna and Hajiawa cities are the neighbors located on the west. Ranya covers 65.65 km² area which is estimated as 72% of all the Ranya district (Anonymous, 2019).

3.1.2. Geographical Characteristics of the Study Area

Geographical characteristics including geographical location, coverage area and the site of the Ranya city were introduced under this section. Geological structure, climate characteristics, water sources, residential properties, transportation links were also given under this section. The concepts of situation and site are of very importance in geographical studies due to the impacts on the formation or construction of the cities. The situation is regarded as the most important element even the heart of geography. The term situation refers to the place of existence in comparison to other areas or places surrounding or neighboring it. City situation has a tremendous effect on delivering educational services for the city residents and also for its regions. This becomes particularly important in cities which are characterized by having open flat plains. Ranya city has an appropriate and fitting situation-related and site-related trait as it is located in the Betoin Plain. Two kinds of situations can be differentiated with regard to the place of the study namely geographical situation and aerial location.

Iraqi cities in general occupy variant places due to effects of natural factors and interrelated social, economic and historical factors. Ranya, city is the center of Ranya district which is one of the districts of “Al Sulaymaniyah” governorate located 146 km away from the center of the governorate. The city is located on the north western part of Al Sulaymaniyah governorate (Figure 3.1 and 3.2). Ranya has borders with Serkepkan in the north and the north west, with Chwarkurna district in the south and the west south, with Sengeser which is related to Pshdr district in the north and the north east and finally with Dukan lake in the south (Figure 3.3).

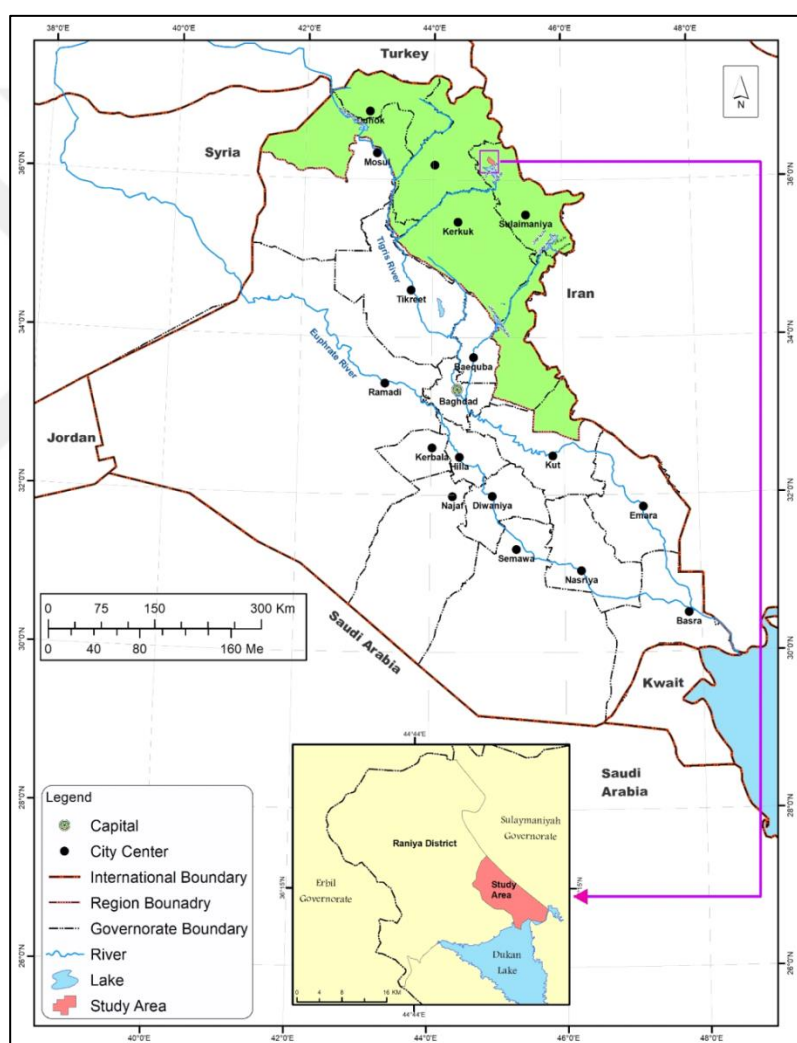


Figure 3.1. The geographical situation of Ranya city in Al Sulaymaniyah governorate (Anonymous 2019a)



Figure 3.2. Satellite Image of Ranya City and surrounding area (Anonymous, 2019c)

The city spans aerially between (36.2909 – 36.1507) degrees in latitude in the north and between 44.5315 and 44.150 degrees in longitude in the east (Figure 3.3). The total coverage area of Ranya city is 74.47 km² which constitutes 8.7% of the total area of Ranya district (852.78 km²). The constructed coverage area of Ranya city in 2014 was 18.67 km² distributed on 39 neighborhoods (Figure 3.3).

Table 3.1. Ranya district coverage area according to the administrative units (Anonymous 2019a)

Administrative units	Area in km ²	Percent Area in the district
Ranya city	74.47	7.8
Chwarqurna	227.06	26.6
Hajiawa	75.91	9
Bitwata	271.28	31.8
Sarkapkan	204.06	23.9
Sum	852.78	100

Ranya city is located in a somehow oval-shaped plain where the little (30 km²) Zab river flows from east to west through the plain. The plain covers about 20 to 30 km², and west and east parts of the plain are divided by mount Kiweresh (203 4m). Eastern part of the

plain is called Pshdr and western part is known as Bitoin. Ranya city lies on the north eastern part of Bitoin plain (altitude 500-600 m).

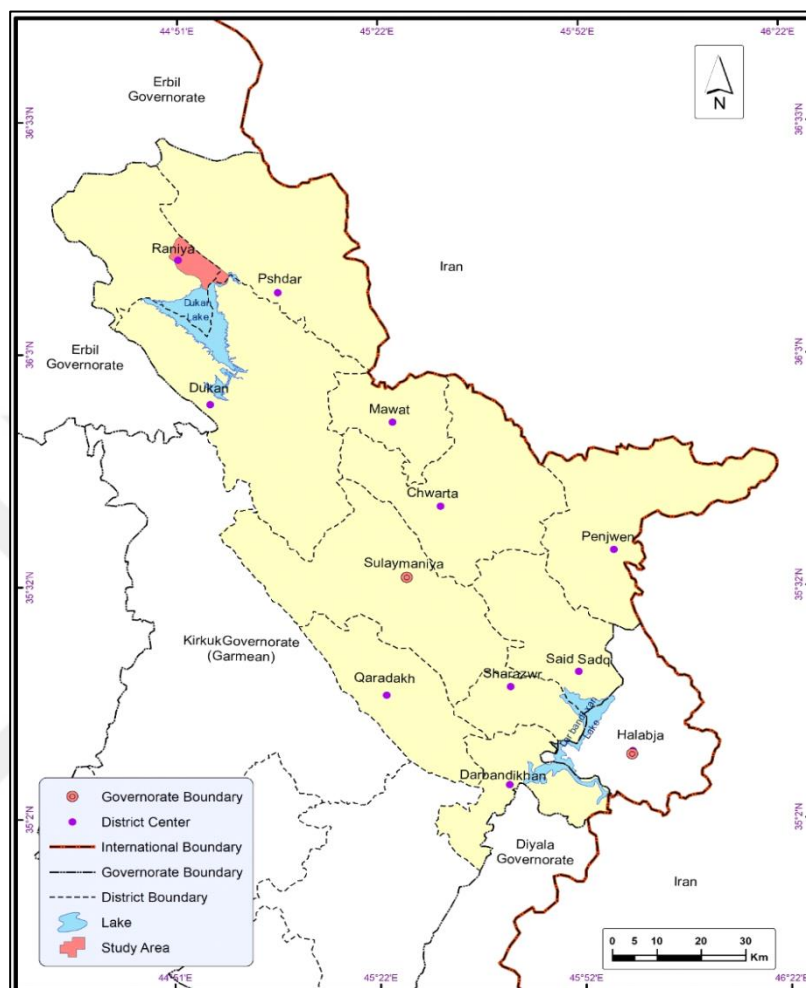


Figure 3.3. Geographical situation (location) of Ranya city in Ranya district (Sissakian 2000)

The borders of the city lie between Kiweresh (north to the south eastern part) and Kwlain (north western) mount. Ranya from Chwarkurna district. The geographical situation of Ranya city had significant impact on the developmental and constructional growth of the city.

3.1.3. Geological Formation of The Study Area

The geology of Iraq can be categorized in two different components. The first one is the result of the third epoch represented by ‘Taurus’ mountain ranges (i.e. Zagros is on east

and north eastern side). The second type is very old which is a part of “Gondwana” continent and is represented by the hill of the Arab on west and west southern parts. The second typed resembles a pond extending vertically between the north western and south eastern side. Both Ranya district and Al Sulaymaniyah governorate divaricate according to the physio-graphical division, and are located in the high fold area which includes high and sharp folds and reach an altitude between 2000 and 3600 m.

The fourth geological epoch is the newest formation which appears in most of the rock excavation findings surrounding the north western part of the study area (Figure 3.4). These formations are dated back to the Pleistocene and the Holocene epochs, and they are made from new floods sediments, river sediments, sand, mud, and peddle and alluvial materials with slopes sediments which were made from clay, rough peddles, alluvia and sand. The formation of the fourth geological epoch is around 152 m thick. The river sediments and the geological formations contain water and some calcareous formation. They are permeable and have ability to absorb rain water and let it out back to the surface in the forms of ponds and fountains. Therefore, the existence of such rocks greatly controls the pattern and distribution of the population in an area.

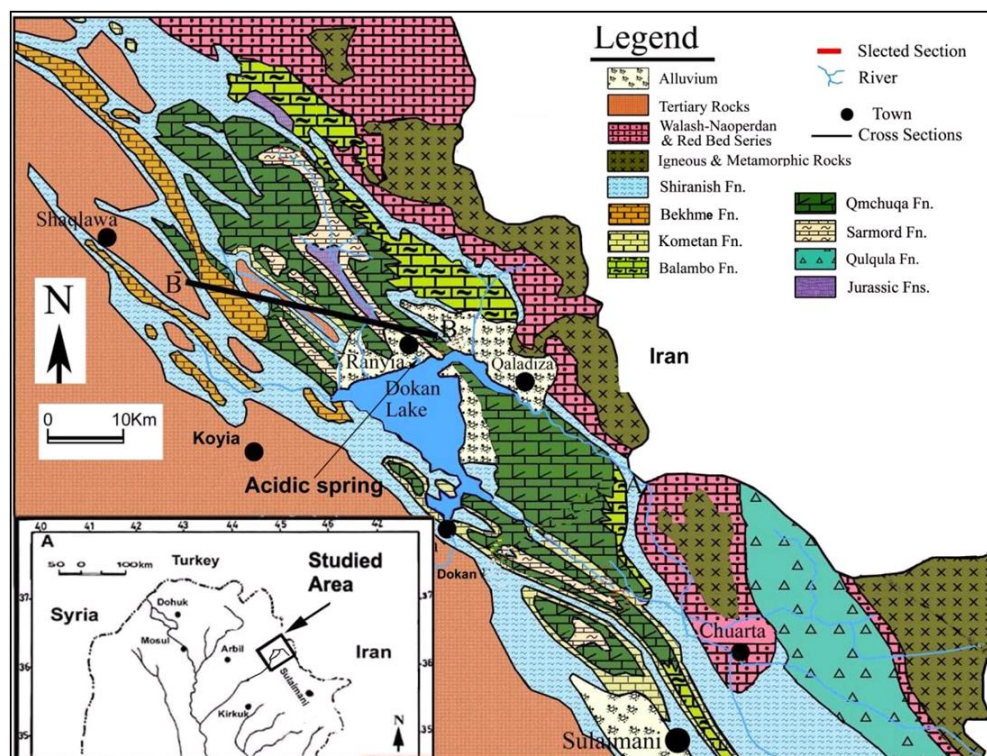


Figure 3.4. Geological formations in Ranya region (Sissakian 2000)

Cretaceous epoch formation is old appear in the complicated mountain area with the folds of the igneous rocks. This formation extends on a large space on the eastern and north eastern borders of the study area. Moreover, it also covers mount Kewarash and includes the formation of Saramrad, Kamchuka, Okr, and Bekhma. The rocks of Kamchuka made up from dolomite limestone and in the form of a thick pile. The upper part is mostly made up from dolomite limestone and marl limestone with metallic limestone. This formation is 500 m thick.

The geological formation of Rani city is of paramount importance providing ground water and knowing the effects in the urban land uses. The geology of a region is also important to understand the characteristics of soils which withhold the pressure of buildings and public services including the education services.

3.1.4. Surface Characteristics of The Study Area

Surface characteristics of a region is important due to the restrictions they impose on land uses in the urban areas. The surface affects the growth and development of the city. Ranya city is surrounded by swamps and salty marshes and is different from other cities located on the shoulders of rivers. Similarly, the cities located in a mountain area differ from those found in a plain especially with regard to the cost and development of transportation links and sewerage infrastructure. Furthermore, the shape of a land (mountain, valleys, plains, hills) and sliding degree control the nature of cities i.e. the properties of land forms dictate the shape of the building and the nature of expansion (vertical or horizontal) in the correct directions.

In addition, surface characteristics affect the distribution of activities and land uses in a city. Ranya city is located in the north eastern part of the (800 km²) oval-shaped Bitoin plain, one of the most spacious plains in the mountain area (altitude ranges between 480 and 600 m). Ranya city is bordered by Dukan lake in the south, by mount Kiweresh in the east, and the little river of Zab flows in the south eastern side. The water of the Zab river is used for irrigation only in some of part of the plain. The river covers 296.7 km² and the plain is located between the 36.0632-36.1904° north latitudes and 44.3857-44.5919° east longitudes. The plain is surrounded by Kewarash mountain ranges on the east and north

eastern. The mountain ranges divide the plain into eastern borders known as Pshdr. The plain extends from Ranya Strait to the west side of the district to reach the extension of mount Karokh (2023 m altitude). In general, the altitude in Ranya district increases when heading from the south to the north and to the north eastern side. The city is surrounded by the mountain ranges of Makok and Hajilah in the west and the north western side as its height reaches 1857m. The altitude of Ranya city varies between 500 m in the far west side of the city and 600 m in the far north side (Figure 3.5).

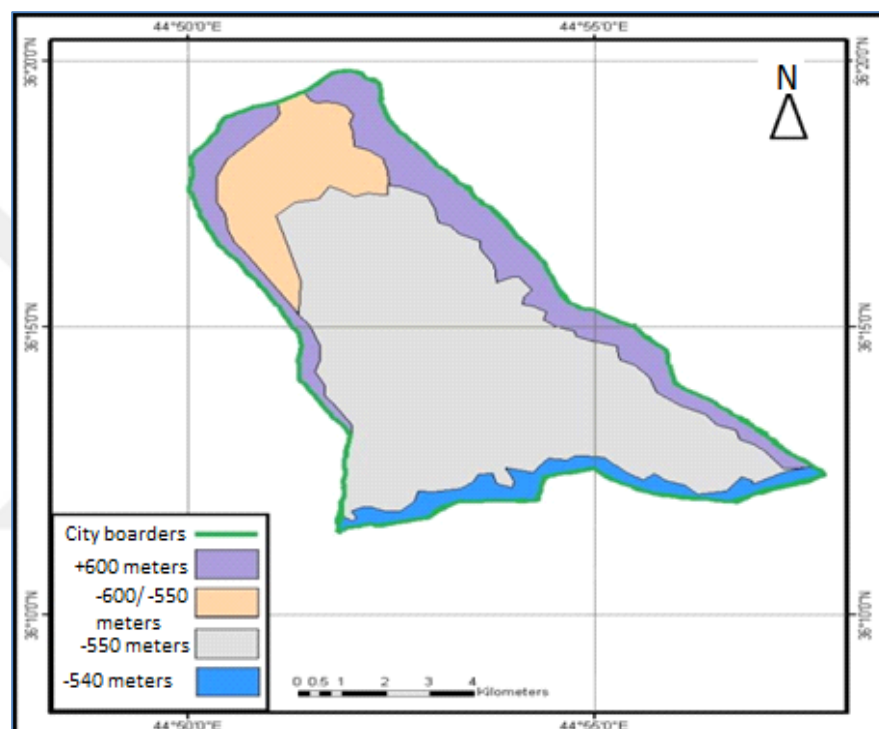


Figure 3.5. Land forms of the study area (Sissakian 2000)

3.2. Methods

Data collection includes the descriptive and spatial data depending on the formality statics, reports, interviews and observations. Data preparation stage includes data processing, coding and data entry and dropping data collected on digital maps and tables to carry out an analysis this data by using (orange 2.7, WEKA 3.6) data mining and ArcGIS 10 software.

The current reality of the educational service distribution was analyzed in spatial and quantitative analysis stage. The problems were identified and vulnerabilities faced with

developing appropriate solutions and perceptions of the future were presented. Data collected during the study were evaluated to propose recommendations to overcome the problems of the educational services, view the conclusion and ambitious of the study.



4. RESULTS AND DISCUSSION

This study attempted to provide a detailed picture for the distribution of kindergarten, basic education, preparatory and college education services in Ranya city on the neighborhood level. The city of Ranya expands towards a fertile plain where soil and water resources are sufficient to produce agricultural products for the region (Figure 4.1). Therefore, land use of the locations where educational institutions is located is among the areas of interest of this study. The study also investigated the distribution of residents and students in each neighborhood to achieve a balance between the distribution of residents and educational institutions in the city. This in consequence would lead to the ratio of the availability of the educational services and the efficiency of such distribution when compared with population density in terms of age and quality. The location of educational services was evaluated based on the appropriateness of the land use.

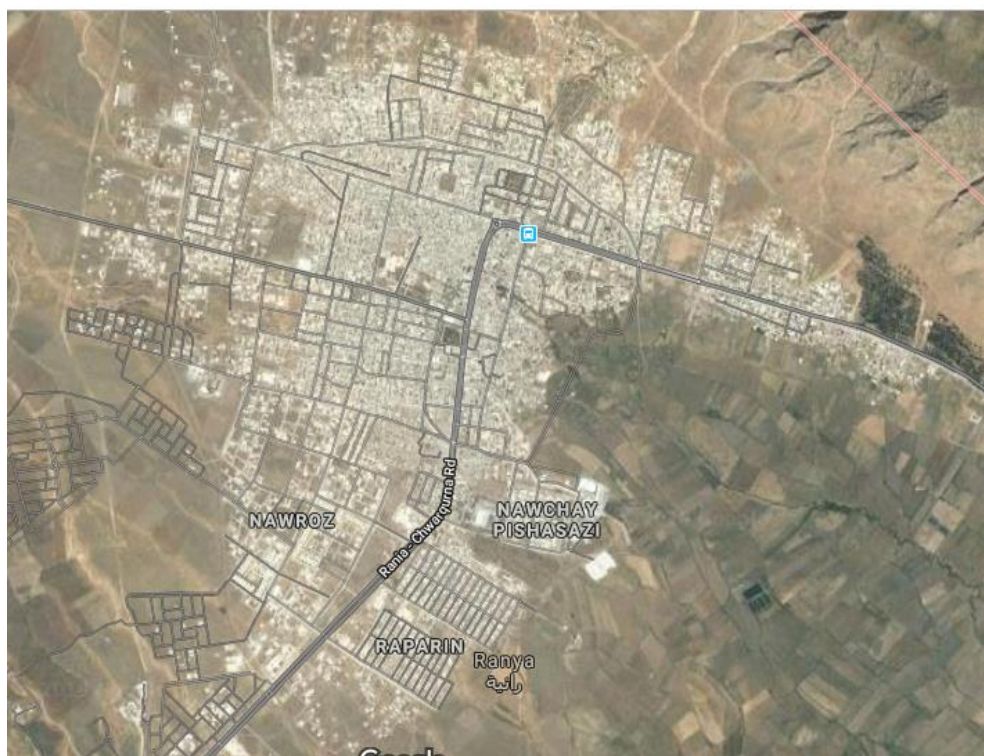


Figure 4.1. Close look of Ranya city (Anonymous, 2019d)

4.1. Quantitative and Qualitative Evaluation of Educational Institutions in Ranya

Constructing modern schools in Iraq dates back to the ruling period of the Ottoman Medhat Pasha (1869-1872), and the first schools were *Al-Rushdie* schools which were established in 1870. Educational services in Ranya city started to appear in the beginning of the last century. In order to delineate the natural pace of the development of educational services in Ranya city, the researcher divided that development into consecutive chronological periods, and the separation between one period and another was determined based on the availability of data concerning the number of educational institutions, students, staff, and finally the number of classes.

4.1.1. The First Period of Education Services in Ranya City

Education in Ranya city appeared after the establishment of the Ministry of Endowments (Awkaf) in the 1922 after the opening of the first school which was Ranya Basic School. That school was located in the center of Ranya city in the neighborhood of Qalat. At that time, there were 13 students at that school with 3 teachers, but it did not have its own building until the year 1952 when the school was given its own building located in the neighborhood of Sara.

Table 4.1. and Figure 4.2. illustrate the situation of education sector in the city. After 36 years of the first Basic school establishment in the city, the administration in Ranya city decided to open the second school due to the increase in the number of students and the rising need of the population for education services. The second school, Ako Basic school is located in Sara neighborhood – the building of Makok school nowadays and which had its own special building with 6 classrooms.

The first secondary school, Ranya Secondary School for Boys, in Ranya city was established in the neighborhood of Azadi 1 in 1959. Ranya Secondary School for Boys was transformed into a high school in 1969. However, the city did not have any secondary schools for girls till 1973 when the Secondary school for girls was built with the name of Ranya Secondary School for Girls. The preparatory classrooms were built in 1979 and the school was transformed into a high school which was the first high school for girls in the city. Thirteen teachers used to teach 140-150 students at that school.

Ranya city went through a new developmental period in terms of education services with the opening of the first preparatory school in 1978 with the name of Ranya Evening Preparatory School. The first kindergarten was built in 1979 with the name of Ranya Kindergarten in the neighborhood of Qwla.

Table 4.1. Educational institutions in Ranya city in the first period before 1987 (Anonymous 2019b)

Institution name	Education Type	Year of establishment	Place of the institution
Ranya Coeducational School	Basic	1922	Qwla
Ako Coeducational School	Basic	1958	Rashamerg
Ranya School for Boys	Secondary	1959	Azadi 2
Between Coeducational School	Basic	1968	Kiwresh
Ranya School for Girls	Secondary	1973	Kwla
Ranya Evening School	Preparatory	1978	Sara
Ranya School for Boys	High	1979	Azadi 2
Boti Coeducational School	Basic	1979	Rabarin
Makok Coeducational School	Basic	1979	Sara
Ranya School	Kindergarten	1979	Kwla
Shawre Coeducational School	Basic	1981	Sara
Ranya Vocational School	Preparatory	1984	Mamostayan
Kewarash Coeducational School	Basic	1985	Rashamerg
Kewarash Coeducational School	Secondary	1986	Qalat2

The first vocational school was established in 1984 with the name of Ranya Preparatory Vocational School. Seven Basic schools, 3 Secondary schools, 3 preparatory and high schools, one preparatory vocational school, and one kindergarten were active in Ranya by the end of 1987 which is the end of the first period (Table 4.2). Nonetheless, no institutes or universities have been established in the city which is attributed basically for the low number of students, the difficulty in preparing a qualified staff and appropriate buildings, the small size of the city.

Ranya Coeducational Secondary School was transformed to a high Coeducational school in 1969 which is considered the first high school in the city. Ranya Secondary School for Girls, established in 1973-1974, was changed to Ranya High School for Girls in 1979 which meant opening preparatory education for girls for the first time in the history of the city. One school for boys was divided into two separate schools; one of them is “Ranya Secondary School” and the other one is “Ranya Preparatory School for Boys” in 1981.

Table 4.2. Changes in the names and ranks of secondary and high schools in Ranya city during the first period before 1987 (Anonymous 2019b)

School before the changes	School after changes
Ranya Coeducational Secondary School	“Ranya Coeducational High School” in 1969
Ranya Secondary School for Girls	“Ranya High School for Girls” in 1979
Ranya Coeducational High School	“Ranya Preparatory School for Boys”, in 1981 “Ranya Coeducational Secondary School”, in 1981

As far as the efficiency of educational services in Ranya city at that time, it will be induced relying on indicators related to the number of the population due to the unavailability of the data of educational indicators or that related to variations in the number of students, classes and teachers during that period.

The numbers given in Table 4.3 indicate that the number of educational institutions was insufficient, and the share of city inhabitants from educational institutions greatly exceeded the residential standard in all of the educational levels in addition to the institutes and universities. The shortage in the number of educational institutions (Kindergarten, Basic and Secondary schools) was approximately (3.4, 4) educational institution respectively according to the mentioned standard. However, preparatory schools attained its efficiency level by the end of the period.

Table 4.3. Residents share from the schools according to the educational level in Ranya city at the end of the first period in 1987 (Anonymous 2019b)

Educational Level	Number of Educational institutions	Residents/ Institutions	Population number indicators/educational institutions	Number of shortages in educational institution
Kindergarten	1	27700	5000	4
Primary	7	3957	2500	4
Secondary	3	9233	5000	3
Preparatory and High	3	9233	10000	0

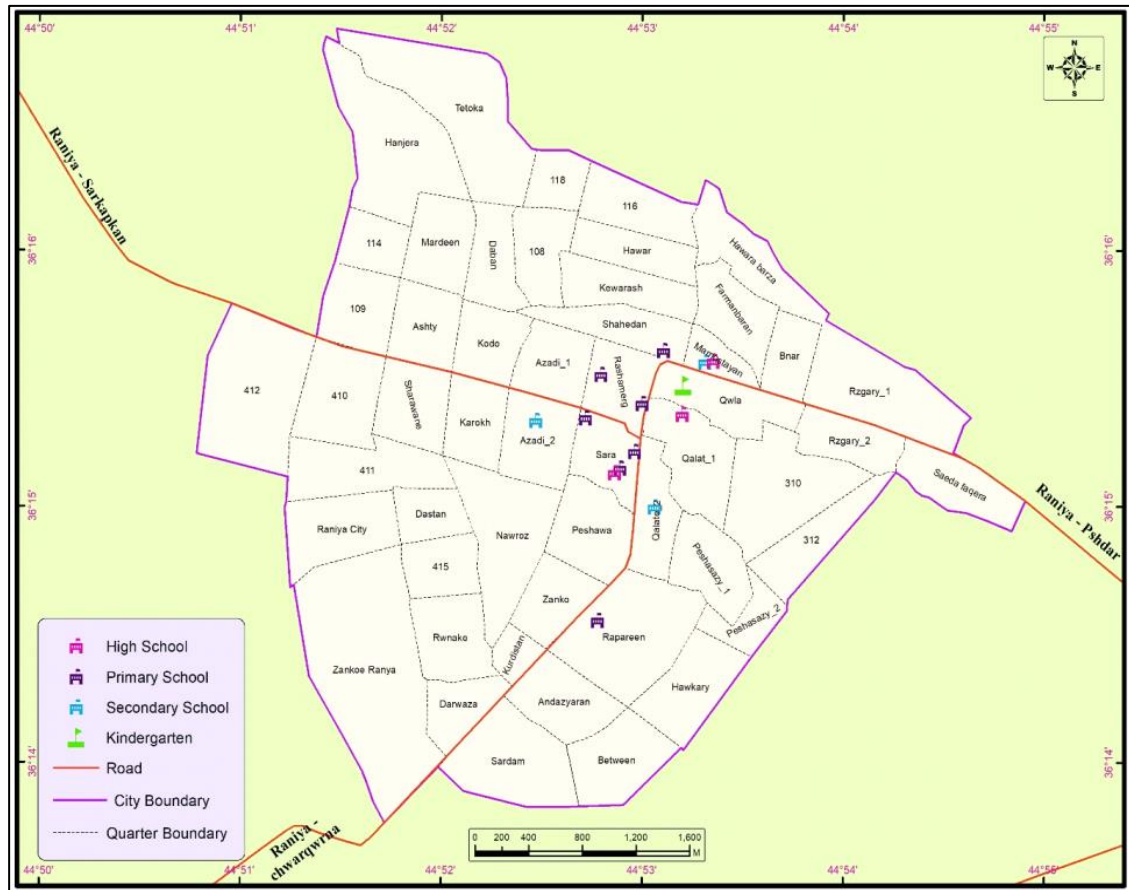


Figure 4.2. Numerical distribution of educational institutions in Ranya city by the end of the first period in 1987 (Sissakian 2000)

4.1.2. The Second Period of Education Services in Ranya City (1988 – 1999)

During this period, Ranya city had a great development in construction, population, services, and the expansion of the constructed area. New neighborhoods formed especially after 1991 the quantitative and qualitative development of Ranya in terms of education manifested in the number of schools with their different stages and types according to the gender factor (boys vs. girls). The number of Basic schools was 7 by the end of the first period i.e. it increased by 6.1% between 1988 and 1999. The share of Basic schools was 62% of educational institutions by the end of that period. The number of kindergartens in the beginning of the period was only one; however, that kindergarten was closed in the second period. The number of Secondary education schools reached 4 whereas that of high schools was 5 by the end of the period, and they were (the high schools) distributed on 8 neighborhoods in the city.

Table 4.4. Ranya city educational institutions in terms of the education stage and year of establishment in the second developmental period between the years 1988 – 1999 (Anonymous 2019a)

Institution name	Type of education	Year of establishment	Location
Yakety Coeducational school	Basic	1989	Shahidan
Saydawa Coeducational school	Basic	1990	Qula
Brusk Coeducational school	Basic	1990	Kiorash
Ranya school for girls	Preparatory	1995	Mamostaian
Kodo Coeducational school	Secondary	1997	Nowroz
Ranjbaran Coeducational school	Basic	1997	Azadi 2
Titoka Coeducational school	Basic	1997	Titwoka
Hanjira Coeducational school	Basic	1997	Hanjira
Hawarabarza Coeducational school	Basic	1998	Hawarabarza
Zhiar Coeducational school	Basic	1998	Rzgari 1
Gojar Coeducational school	Basic	1998	Raparin
Mashkhal Coeducational school	Secondary	1998	Rzgari 1

A new job opportunity appeared in the city which was the profession of the educational institute such as “Ranya Institute for Teachers” which opened in 1996. Students attended to this institute after completing their preparatory education where they study in that institute for two years to become teachers for the Basic educational stage.

Initially, the number of departments in Ranya Central Institute for Teachers was 3 which were English, Mathematics and Sociology. The number of departments increased to 5 by the end of this period after opening the Kurdish Department in 1997 and the Sports Department in 1999. The number of students in the first year was 90 and increased to 218 by the end of the second period. The annual increase in the number of students in Ranya Central Institute for Teachers varied from year to year. For instance, in the academic year (1997-1998), the highest percentage (113.3%) was recorded because the annual increase percentage was 196.6% between the first year of opening the institute till the end of this period (Table 4.5 and Figure 4.3).

Table 4.5. Development indicators of Ranya Central Institute for Teachers between 1996–2000 (Anonymous 2019b)

Academic year	Departments		Students	
	Number	% of annual increase	Number	% of annual increase
1996 – 1997	3	-	90	-
1997 – 1998	4	33.3	192	113.3
1998 – 1999	4	0	210	9.37
1999 – 2000	5	25	267	27.14

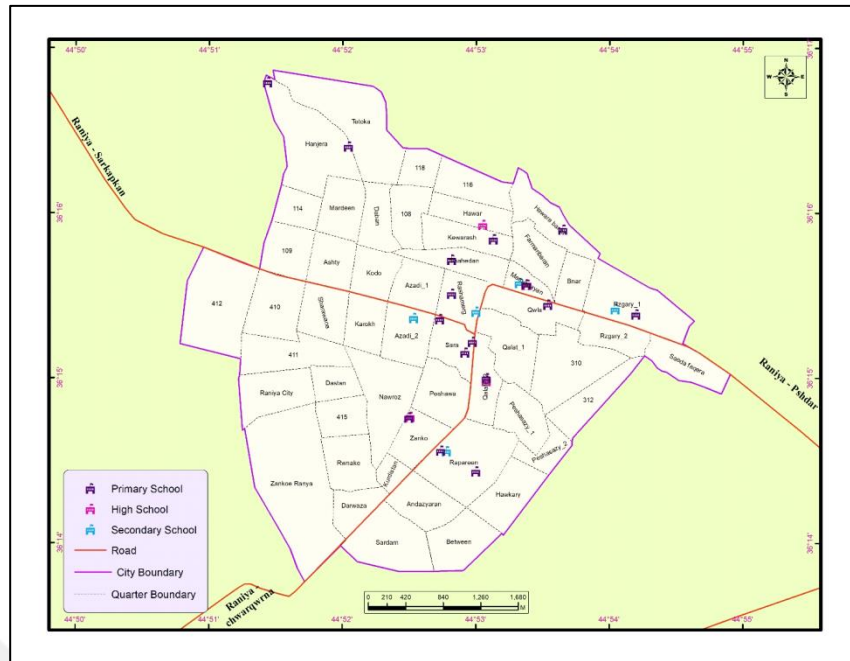


Figure 4.3. Numerical distribution of educational institutions in Ranya city at the end of the second period (Sissakian 2000)

There were not any kindergartens by the end of second period, after closing Ranya Kindergarten in 1991, even though the city needed 10 kindergartens for sufficiency. The share of the residents from Basic schools was approaching the approved standard as the Basic educational stage had appropriate number of schools because they constituted a percentage of 64% of the total number of schools in the city. As for the Secondary educational stage, the share of the inhabitants from each school exceeded the approved standard with two folds as the recorded number of schools was 4 and the amount of shortage of that educational stage was approximately 6 schools which indicates having a significant shortage in the number of Secondary schools by the end of this period. The secondary-preparatory level recorded a new phase of efficiency as residents' share from such school was close to the number of schools (Table 4.6).

Table 4.6. The share of the population from schools in terms of the educational stage in Ranya City till the end of the second period 1999 (Anonymous 2019b)

Educational stage	Number of Educational institutions	Residents/ institutions	Population index/ educational institutions	Shortage amount in the number of institutions
Kindergarten	0	52058	5000	10
Primary	16	3254	2500	5
Secondary	5	10412	5000	5
Preparatory and High	4	13014	10000	1

Increasing the number of schools did not correspond to the fast population growth (a yearly increase of 6.5%). The population share of every school in this period decreased in the Basic stage despite an increase in the number of schools. Since the schooling rate and rate of population increase were not the same, the number of schools remained insufficient during this period. There was a significant increase in the Secondary school and high-preparatory school.

4.1.3. The Third Period of Education Services in Ranya City (2000 – 2006)

In the third period, Ranya city expanded in a spatial, residential, constructional and service-related perspectives. The constructional area expanded to the east and north western part of the city. New neighborhoods started to appear, and the city witnessed a qualitative and quantitative development in its educational services represented in the number of institutions in the different educational stages.

Kindergarten as an educational institution appeared. The number of kindergartens increased to 4 by the end of this period after reopening of Ranya Kindergarten at the beginning of the third period. The kindergartens were distributed on the four neighborhoods of the city (Table 4.7). The number of school mistresses reached 28 in the kindergarten institutions by the end of the third period when it was only 5 at the beginning. The number of the staff increased by five folds. However, annual increase of the classes was less in comparison to that of the number of children which resulted in having an increase in the number of students in a single classroom.

Table 4.7. Indicators of development of educational services for the kindergarten stage in Ranya city during the third period (2000 – 2006) (Anonymous, 2019b)

Academic year	Kindergarten	Number of classes	Kindergarten children		Kindergarten teachers	
			Number	% of annual increase	Number	% of annual increase
2000-2001	1	4	108	-	5	-
2001-2002	1	4	281	160.3	8	60
2002-2003	2	8	425	51.2	10	25
2003-2004	2	8	446	4.9	16	60
2004-2005	2	8	485	8.7	15	6.25-
2005-2006	4	15	649	33.8	28	86.66
2006-2007	4	15	613	5.5-	28	0

On the other hand, the city experienced a significant qualitative development in educational services which was translated in the appearance of university education in the Faculty of Humanities at Koy University in 2004. New institutions also started to appear such as The Institute of Fine Arts. The number of classes in kindergartens increased and become 15 when they were only 4 in the beginning of the third period. The number of children in kindergartens reached 613 when the number was 108 in the beginning of the third period.

Status of Basic level education during the third period was presented in Table 4.8. The number of Basic schools increased during the third period which was 4 at the beginning and become 21 by the end of the period. The number of Basic schools increased by 23.5% along with an increase in the number of classes which was 182 at the beginning and become 226 by the end of the period. The increase proportion was 24.2% classes during the years of the third period. The number of students became 13.7 thousand that was 10.7 thousand at the beginning of the period. Annual increase in the number of students between the beginning and end of the third period was 28%. The number of staffs significantly increased and on a continuous pace during the third period. The annual increase was 20 teachers. Therefore, the annual increase in the number of the members of the staff for the Basic stage between the beginning and end of the third period was 61.65% which can be regarded as the highest amount of increase in comparison to increases in other variables (i.e. schools, classes, and students).

Table 4.8. Developmental indicators of the educational services for the Basic stage education in Ranya city during the third period (2000–2006) (Anonymous 2019b)

Academic year	Number of schools	Number of classes	Students		Teaching staff	
			number	% of annual increase	number	% of annual increase
2000-2001	17	182	10770	-	333	-
2001-2002	17	182	11061	2.7	349	4.8
2002-2003	18	203	12098	9.37	357	2.29
2003-2004	19	214	12055	-0.35	368	3.1
2004-2005	19	214	12192	1.13	397	7.9
2005-2006	20	220	12240	0.39	448	12.8
2006-2007	21	226	13786	12.6	538	20

The number of Secondary schools in Ranya city increased from 4 to 6 in the third period and schools distributed on five neighborhoods of the city (Table 4.9). The number of classrooms was also increased from 58 to 71. The annual increase rate was 3.2%. Despite having a fluctuation in the annual increase in the number of students in the Secondary educational level, the number of students was not reduced during the third period. The highest increase rate was observed in 2001-2002 school year.

Table 4.9. Developmental indicators of the educational services for the Basic stage education in Ranya city during the third period (2000–2006) (Anonymous 2019b)

Academic year	Number of schools	Number of classes	Students		Teaching staff	
			number	% of annual increase	number	% of annual increase
2000-2001	4	58	2624	-	89	-
2001-2002	5	60	3213	22.4	97	8.89
2002-2003	6	71	3492	7.8	101	4.12
2003-2004	6	71	3708	6.2	114	12.87
2004-2005	6	71	4258	14.8	125	9.6
2005-2006	6	71	4486	5.4	76	39.2-
2006-2007	6	71	4517	0.7	76	0

The increase in the number of staff members did not coincide with the increase in the number of schools, students and classes, contrary the rate of staff members reduced by the end of this period. The highest decrease in staff members was observed in 2005-2006 at a rate of 39.2%. The staff/student ratio in this period was 1/59 which reduced the efficiency of teaching. Moreover, this case also had a negative effect on the pedagogic process. The number of high-preparatory schools increased from 4 and increased to 6 by the end of the third period (Table 4.10; Figure 4.4). The increase rate was 50% and

schools were distributed on four neighborhoods in the city. There was a fluctuation in the number of students. The annual increase percentage was 26.9% which is a very similar ratio to the annual increase ratio of the academic year 2002-2003 (i.e. 26.7%).

Table 4.10. Indicators of the development of the educational services for the high or preparatory educational stage in Ranya city during the third period (2000 – 2006) (Anonymous 2019b)

Academic year	Number of schools	Number of classes	Students		Teaching staff	
			number	% of annual increase	number	% of annual increase
2000-2001	4	62	1047	-	36	-
2001-2002	5	73	1267	21	39	8.3
2002-2003	5	73	1605	26.7	44	12.8
2003-2004	5	73	1862	16	52	18.2
2004-2005	5	73	2268	21.8	61	17.3
2005-2006	6	85	2411	6.3	61	0
2006-2007	6	85	3018	25.2	63	3.27

The number of high schools increased from 62 to 85 at a ratio of 37% (Table 4.10). The teaching staff in high schools increased from 36 to 63 with an increase ratio of 75%. The increase rate of the teaching staff fluctuated; for instance, in the academic year 2003 – 2004 the increase rate was at the highest level (18.2%) while become stable in 2004-2005 and 2005-2006 school years.

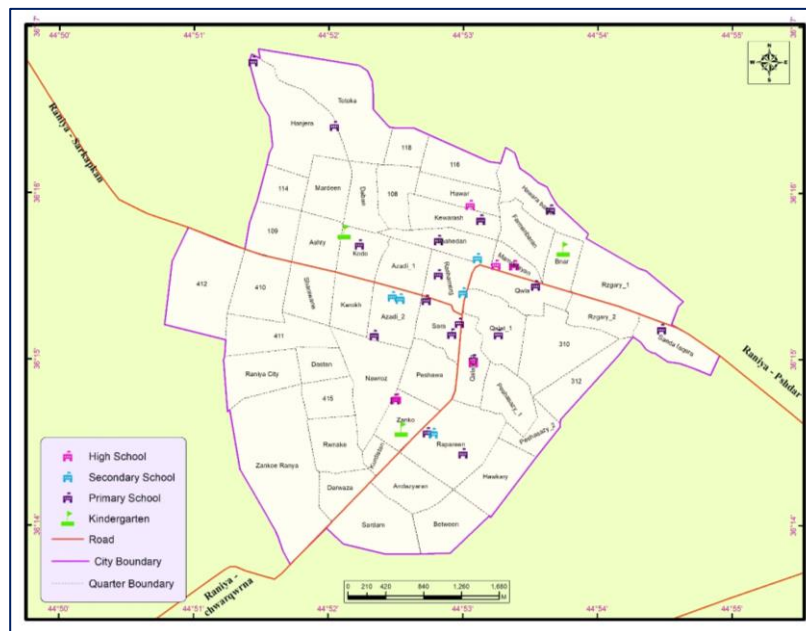


Figure 4.4. Numerical distribution of educational institutions in Ranya city by the end of the second period in 2006.

University education in Ranya started with the establishment of Humanities Faculty in 2004 which was a department of Koya university. Evening Faculty of Law was inaugurated in 2006 and new institutes such as the Institute of Fine Arts started to take place at the beginning of the fourth period. Quantitative explanation of Ranya Central Institute for Teachers and Ranya Institute of Fine Arts during the third period was given in Table 4.11 and Figure 4.4.

Table 4.11. Indicators of the development of the educational services on the level of the institute in Ranya city during the third period (2000–2006) (Anonymous 2019b)

Academic Year	Teachers Institute			Institute of Fine Arts	
	Number of sections	students		students	
		Number	% of annual increase	Number	% of annual increase
2000-2001	6	338	-	32	-
2001-2002	6	456	34.9	64	100
2002-2003	6	594	30.26	103	60.9
2003-2004	6	677	13.97	142	37.86
2004-2005	6	666	1.62-	185	30.28
2005-2006	8	862	29.42	209	12.97
2006-2007	8	1184	37.35	210	0.47

The number of departments in Ranya Central Institutes for teachers was 8 corresponding to an increase of 33.3% (Table 4.11). The number of students in 2004-2005 academic year decreased by 1.62% despite the annual increase ratio during the 3rd period was 75.35%. The highest increase in Institute of Fine Arts was recorded in 2001-2002 and the annual increase rate was 79.4%. The ideal number of students in each classroom based on Iraqi standards should be between 25 and 30.

The effectiveness of educational services in Ranya city was presented in Table 4.12. A good efficiency indicator was recorded for the kindergarten stage in the academic year 2000-2001 since all educational and pedagogic standards coincided with one another. The number of kindergartens increased in the third period recording an annual increase by 42.8%. Although the number of kindergartens increased, they did not match any pedagogic indicators; for example, the share of teaching staff for the number of children was lower than the agreed standards. Nonetheless, the rest of indicators exceed the approved standards which indicates that the increase in the number of kindergarten institutions in the city did not correspond to the increase in the number of residents.

Table 4.12. Indicators of the efficiency of educational services in Ranya city during the third period (Anonymous 2019b)

Academic year	Educational stage	Residents/school	Students/school	Student/classroom	Student/member of the staff
Beginning of 2000-2001	Kindergarten	54869	108	27	22
	Basic	3228	634	59	32
	Secondary	13717	656	45	29
	Preparatory	13717	262	17	29
End of 2006-2007	Kindergarten	15792	153	41	22
	Basic	3008	656	61	26
	Secondary	10528	753	64	59
	Preparatory	10528	503	36	48

All indicators were negative at the beginning of the third period due inadequate number of schools, classrooms and teaching staffs according to the agreed standards. Despite the increase in the number of schools, all indicators remained below the standard norm. This is primarily attributed to the increase in the number of teachers especially after having a large number of graduates from Ranya Central Institute for Teaches during the years of the third period who were employed in the Basic schools in Ranya district. The share of the teaching staff was similar in terms of their share in the number of students in Secondary schools in the beginning of the third period. However, the values of all indicators exceeded the agreed standard, and at the end of the third period, the schools were recorded negative values in all indicators in the sense that the values of all educational indicators for this educational stage exceeded the approved standards. High and preparatory educational stages had good efficiency values as the average share student in each school was 262. The capacity of the school regarding the share of the staff from the students and the share of the students from the classroom exceeded the responsive standards in the beginning of the academic year 2000-2001.

The number of teachers, classes and the members of the staff significantly increased by the end of the third period, however the educational indicators were all negative in all aspects and they exceeded the agreed standards. The number students in schools increased due to the economic, educational, and administrative development in the Kurdistan region, particularly in Ranya city, in 2003.

The share of residents in one school exceeded the approved standard in all educational stages despite positive increase in the number of schools for all educational stages (Table

4.12). The share of residents for the Basic and kindergarten levels experienced a decrease especially for the kindergarten level which had a significant development in the share of residents in this period. Although the aforementioned educational stages did exceed the local standard by the end the period, it was positive comparing with the previous period.

The residents share for secondary and preparatory school education at the end of the period was negative. This indicates that the increase in the number of secondary and preparatory schools was not at the same level with the fast population increase occurred. The shortage in basic, secondary and preparatory schools and kindergartens mounted to (9, 4, 7, 4) institution respectively replying on the residential criterion. Educational services went through observable changes in terms of building new schools for all educational stages and in increase in the number of students and the teaching staff. The highest average of the number of students was recorded in Secondary schools with 753 students for one school in 2006-2007 academic year.

4.1.4. The Fourth Period of Education Services in Ranya City (2007 – 2014)

The fourth period is regarded a special period regarding educational services in Ranya city due to the developments in construction, services and also demographic and social developments. The number of educational facilities increased to 62 institutions as the consequences of qualitative and quantitative developments. Moreover, the city went through a qualitative expansion and two new institutes i.e. Ranya Sports Institute, and Ranya Computer Institute were established in 2007-2008 academic year. Furthermore, the Institute of Islamic Studies was founded in 2009.

After 89 years of the first school in the city, Ranya city started experiencing a new phase of educational services in 2010 represented in university education in Raparin University (Figures 3.5 and 3.6). Establishment of Raparin University was the result of the crucial need of the city and existence of the Faculty of Humanities and the Faculty of Basic Pedagogy of Koya University. This can be seen from the overall functional, demographic and constructional composition of the University. Furthermore, Raparin University had an effect on the spatial expansion of the city in the sense that the coverage area of university was 130 ha constituting 9.6% of the constructed area of the city in 2014.



Figure 4.5. Location of Raparin University in Ranya City (Anonymous, 2019d)

Although the establishment of the University contributed significantly to the development of the city, the university, like the general settlement of the Ranya city, was founded over the fertile agricultural lands (Figure 4.6). Non-agricultural use of the fertile lands that which are already very limited in the region and offering great opportunities for plant and animal production in terms of climate and water resources is not appropriate. The preference of land with low agricultural qualifications for state investments, such as educational services is absolutely necessary for the protection of soil and water resources.



Figure 4.6. General view of Raparin University (Anonymous, 2019e)

Educational stages in the Kurdistan Region of Iraq has been reduced to 3 which used to be 4. The basic and secondary stages were merged in one stage which started to be called basic education. Education starts with the kindergarten and followed by the basic education stage, the preparatory stage and ends with the institute stage.

The number of kindergartens reached 7 by the end of the period, it was 3 in the beginning. Seven kindergartens were distributed on 7 different neighborhoods (Table 4.13). The increase in the number of kindergartens was accompanied by an increase in the number classes since the number of classes reached 28 by the end of the fourth period constituting an increase by 9.25%. The number of children increased to 987 from 742. The number school mistresses in kindergartens rose to 79 with an annual increase rate of 19.9%.

Table 4.13. Indicators of the development in educational services for the kindergarten stage in Ranya city during the fourth period (2007-2012) (Anonymous 2019b)

Academic year	Number of kindergarten institutions	Number of school classes	Children		Female teaching staff	
			number	% of annual increase	number	% of annual increase
2007-2008	5	18	742	-	36	-
2008-2009	7	28	981	32.2	51	41.6
2009-2010	7	28	1145	16.7	56	9.8
2010-2011	7	28	1086	-5.2	62	10.7
2011-2012	7	28	1022	-5.9	6	6.5
2012-2014	7	28	987	3.4	79	19.7

The largest number of schools in the city was basic education schools which was 32 by the end of the fourth period (Table 4.14). Basic education schools were distributed on 17 neighborhoods. Basic education schools comprised 62.7% of the all schools and an annual increase rate in the fourth period was 4.7%. The number of classes was 378 by the end of the period with an increase of 99 classes. The increase rate of teaching staff during fourth period varied and the number of teaching staff was 399 with an annual increase rate of 11.5%. This is basically attributed for the merging of the basic and secondary stages. The graduates from Humanities and the Education Faculties also contributed to the increase in teaching staff.

Although the number of basic education schools rose by 32, the annual increase in the number of students did not exceed 1.1%. That annual rate is much less when compared with those of the kindergarten stage and the preparatory; moreover, it is possible to see a difference concerning the increase pace during the years of this period. For example, the highest percentage was recorded for the academic year of 2010-2011 by 3.88% which dropped again in the academic year of 2011-2012 recording the highest negative percentage (i.e. -0.22%) during the years of the fourth period.

Table 4.14. Indicators of the development in educational services for the basic education stage in Ranya city during the fourth period (2007-2012) (Anonymous 2019b)

Academic year	Number of schools	Number of school classes	Students		Teaching staff	
			number	% of annual increase	number	% of annual increase
2007-2008	25	279	17342	-	580	-
2008-2009	27	299	17815	2.27	582	0.34
2009-2010	28	314	17793	- 0.12	612	5.15
2010-2011	31	361	18484	3.88	806	31.7
2011-2012	32	378	18443	- 0.22	939	16.5
2012-2014	32	378	18479	0.19	979	4.25

The number of schools for preparatory education stage increased from 6 to 12 constituting an increase of 100% (Table 4.15). These schools were distributed on 7 neighborhoods (Figure 4.7). Opening many new schools and transforming a number of high schools to preparatory schools caused to the increase in the number of schools.

Table 4.15. Indicators of the development of educational services for the preparatory education stage in Ranya city during the years of the fourth period (2007-2012) (Anonymous 2019b)

Academic year	Number of schools	Number of school classes	Students		Teaching staff	
			number	% of annual increase	number	% of annual increase
2007-2008	6	85	2966	-	117	-
2008-2009	6	85	3436	15.84	134	14.52
2009-2010	9	142	4521	31.57	161	20.14
2010-2011	11	186	5181	14.59	179	11.18
2011-2012	11	186	5687	9.76	217	21.22
2012-2014	12	198	6175	8.58	242	11.52



Figure 4.7 Distribution of high schools in Ranya city (Anonymous, 2019d)

The increase in the number of schools was accompanied by an increase in other dimensions such as the number of classes which increased to 198 classes constituting an increase rate of 22.2% during this period. This indicates that the schools which were built during 4th period were large with 18 to 27 classrooms. The number of students also increased the highest increase rate (31.57%) was recorded in 2009-2010 but the rate of increase dropped by two folds reaching 8.58% by the end of 4th period (Figure 4.8).

In a similar fashion, the number of the teaching staff also increased during the fourth period and the number reached 242 with an increase by 179 members. The annual increase rate was 17.8% between 2007 and 2012 the main reason of which was relocating a number of teachers from the Secondary schools to the preparatory schools after merging the Basic and Secondary education stages. Another reason was employing a large number of graduates from the Faculty of Humanities and the Faculty of Education and in particular in the last two years of the fourth period.

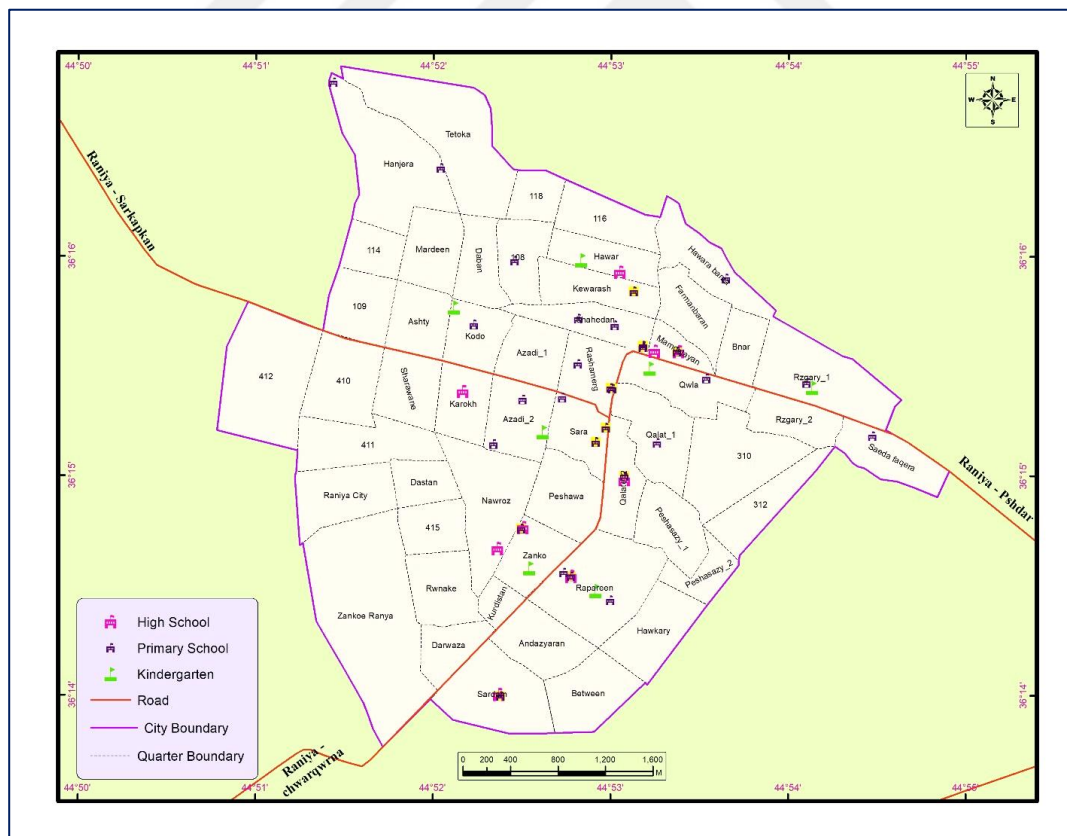


Figure 4.8. The numerical distribution of educational institutions in Ranya city by the end of the second period in 2014 (Sissakian 2000)

Basic and the Secondary stages were merged under the name of basic education with the implementation of the new education system in 2008. The merging of schools took place in 2008, the number of schools in Ranya city reduced in the sense that the city had short of 4 schools from the number of the schools. This change was ended with high schools and the schools were divided into basic schools and preparatory schools. Kewarash High Coeducational School was divided into two separate schools as Kosrat School for Basic Education and Kewarash Preparatory Coeducational School (Table 4.16).

Table 4.16. Changes in names and ranks of schools after implementing the new education system during the fourth period (2007-2017) (Anonymous 2019b)

Schools before changing the education system 2008		Schools after changing the education system 2008
School	Year of establishment	
Bote Coeducational Basic School	1979	Bote School for Basic Education
Roshnibir Coeducational Secondary School	2005	
Blesa Coeducational Basic School	2007	Blesa School for Basic Education
Alla Coeducational Secondary School	2007	
Zhiar Coeducational Basic School	1998	Zhiar School for Basic Education
Mashkhal Coeducational Secondary School	1998	
Ranya Coeducational Secondary School	1959	Mydia School for Basic Education
Darwazi Rapareen Secondary School for Girls	1973	
Ranjedaran Coeducational Basic School	1998	Ranjedaran School for Basic Education
Mydia Coeducational Secondary School	1981	
Kewarash Coeducational Preparatory School	1986	Kosrat School for Basic Education
		Kewarash Preparatory Coeducational School

Due to the increase in the number of educational institutions, the share of the school from the students decreased and this is applicable on all educational stages in comparison to the previous period (Table 4.17). However, such share remained above the agreed standard in kindergartens and basic education in contrast to preparatory school education where the share the agreed standard matches each other. This indicates that there was a shortage in the number of kindergartens and basic education schools during the fourth period. The highest percentage of the increase in students' numbers was achieved in the kindergarten level in the academic year 2008-2009 followed by the preparatory level in the academic year 2009-2010 as the average increase of students' numbers was equal to that found in the basic education level.

The indicator of staff/students achieved a very good efficiency value in all the educational levels even though there were some values less than the standard criterion since the share of the staff from the students oscillated between 25-30 students/staff

which was the result of the dramatic increase in the number of staff in all the three educational levels during the years of the fourth period. The kindergarten level comes in the first place in terms of the increase of the staff with an increase percentage of 119.4% between the beginning and end of the period. In the second position came the preparatory level with an increase percentage of 106.8%, and as for the kindergarten level, the percentage was 68.8% thus occupying the last position between the beginning and end of the period.

In all educational levels, the number of students dropped in one single class and this was particularly observable in schools of basic education. This in contrast to the fact that the schools exceeded the capacity standard greatly in the beginning years of the fourth period. Even though there is a drop in the share of the staff from the students, there was still a standard excellence in the levels of the kindergarten and basic education. When it comes to the preparatory level, and taking into account that the standard was excellent in this level during the years of the fourth period, the standard criterion got close to the minimum limit regarding the share of staff/student. This is indicative of having a development in that educational level in the number of schools, classes and the number of the members of the staff.

Table 4.17. Indicators of the development of educational services in Ranya city during the years of the fourth period (2007-2012) (Anonymous 2019b)

Academic year	Kindergarten			Basic education			Preparatory education		
	Child/School	Child/Classroom	Child/Staff	Student School	Student/Classroom	Student/Staff	Student / School	Student/ Classroom	Student / Staff
2007-2008	148	41.2	20.6	693.7	62.2	29.9	494.3	34.9	25.4
2008-2009	140	35	19.2	659.8	59.6	30.6	572.6	40.4	25.6
2009-2010	164	40.9	20.4	635.5	56.7	29	502.3	31.8	28
2010-2011	155	38.8	17.5	596.3	51.3	22.9	471	27.9	28.9
2011-2012	146	36.5	15.5	576.3	48.8	19.6	517	30.6	26.2
2012-2014	141	35.3	12.5	577.5	48.9	18.9	514.6	31.2	25.5

Regarding the level of basic education, it remained way behind in this aspect in the sense that the number of students exceeded the allocated classes and in all of the years of the fourth period by 48 students/classroom. In the first of the fourth period, the equation was 62.15 students/classroom which indicates that the number of basic education schools in Ranya city is enough for the need of the population. However, as for the number of

classes, the city did suffer from a shortage in the number of classes. In other words, 32 schools for that stage included 6 schools with only 6 classes and 4 others with 7 classes and one school with 8 classes. This is in contrast to the standard norm which states that the school should contain 12 classes. The bottom of the line is that the overall number of classes found in the schools of basic education in the city was 66 whereas it should have been 120 according to the local standard.

The study through the second chapter reached the conclusion that Ranya city started having educational services from the beginning of the twentieth century in 1922 when the first Basic school was opened. As for the Secondary educational level, the city was without such service till 1959 in addition to not having any kindergartens till the end of the nineties in the last century in 1979. Moreover, the city experience vocational education for the first time in 1984 when the first vocational school was opened and by the end of the first period in 1987, the number of the schools was 14. Nonetheless, the city was without any institutes or universities.

In the second period between the years 1988-1999, the city went through a lot of developments in construction, services, the spatial expansion of constructed area and it also witnessed residential-related developments. However, the increase in the number of schools was not going on the same footing with the fast growth in population which the city went through during the years of the second period. The shortage amount in the kindergartens and in the Basic, Secondary and high schools was about (10, 5, 5, 1) institution respectively according to the standard. And by the end of the period, a new profession appeared in the city which was the Institute of Teachers in 1996.

During the third period, educational services went through observable changes manifested in the building of new schools for all educational levels which in turn resulted in having an increase in the number of students. Moreover, the number of the staff also rose and the educational services in that period went through a qualitative development because of the appearance of a new educational dimension in the city which was university learning. University learning took place after the opening of the faculty of humanities in 2004 which was one of the sections of Koya University. After that, the Evening Faculty of Law was opened in 2006. In addition, new institutes started to appear such as the Institute of Fine Arts in the beginning of the fourth period.

As far as the fourth period is concerned, during that time the city experienced a dramatic increase in the number of educational institutions as they reached 59 facilities by the end of the fourth period. Furthermore, the Institute of Islamic Studies was constructed for the first time in the city in 2009 after opening Ranya Evening Institute for Islamic Studies. In 2010, the city started to make use of a new educational service which was the opening of Raparin University. All in all, in the fourth period there were some significant changes represented in constructing new schools for all educational levels and one of the most prominent changes in this period was the introduction of a new educational system in 2007-2008.

4.2. Geographic Distribution of Education Services in the Study Area

The geographical distribution of educational services is related to analyzing the spatial differences of educational services. For instance, the distribution pattern of schools might be scattered or condensed. The factors affecting the distribution are size and density of the population, economic, cultural and administrative agents, demands of the residents in a neighborhood for educational services and other equal importance. The geographical situation (location) of the educational institution in relation to where the students live and the availability of transportation are also important factors in distribution of educational services in a region. Distribution of educational services in Ranya city on neighborhood level has been evaluated based on information and data issued by official authorities.

4.2.1. Distribution of Kindergartens in Ranya City

Kindergarten is the first level of education and it is not obligatory in Iraq and the Kurdistan Region. Kindergarten level is an observed, organized and controlled environment which the child experience outside his/her home or family life environment. This educational level is a preliminary step for the 4 to 5 years old children's basic education. In the kindergarten, the basic or fundamental building blocks are laid down which act as the foundation on which the child's later personality physical, mental and behavior traits are going to be constructed on. Therefore, kindergartens aim at strengthening and building the child physically, mentally, linguistically, socially and spiritually. Furthermore, they also ease the gradual process of moving the child from the

home environment to the kindergarten and to have proper construction of his/her developmental train

In contrast to what is mentioned above regarding the importance of kindergartens, the reality of this educational service in Ranya city does not meet such importance. This contrastive reality is manifested in the low number of kindergartens in comparison to Ranya district and Al Sulaymaniyah Governorate (Figure 4.9). The low number of kindergartens mean that a large number of children enroll to a kindergarten which affects the efficiency of the institution.

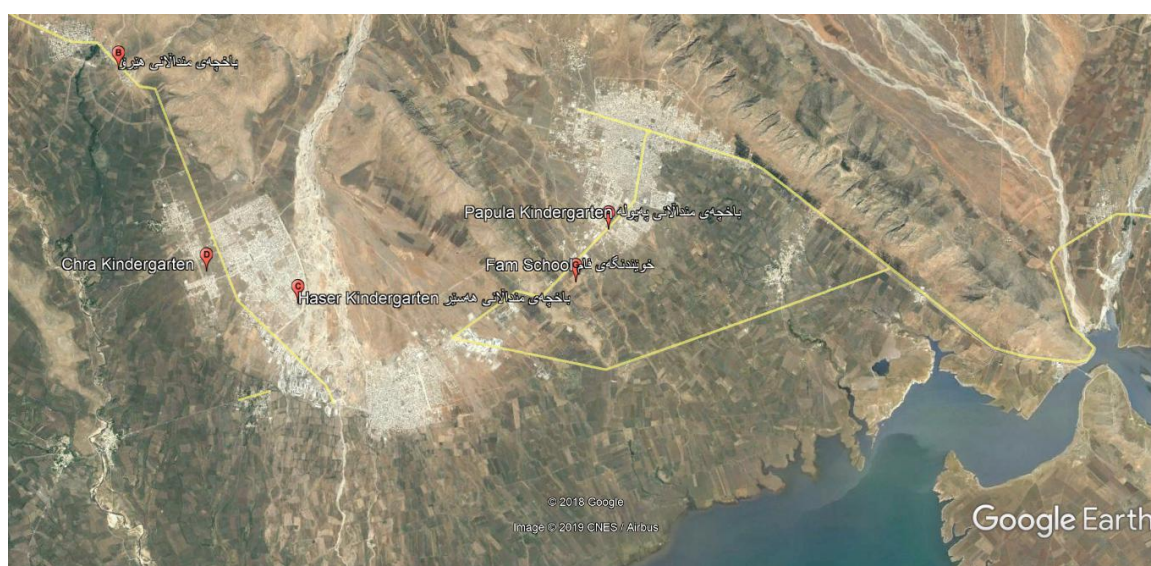


Figure 4.9. Distribution of kindergartens in Ranya City (Anonymous, 2019d)

Ranya city currently had 7 kindergartens in 2013-2014 and the number of kindergartens did not increase in that period. Such low number of kindergartens does not match the number of the population in the city.

The distribution of kindergartens on neighborhoods is not equal. The kindergartens are distributed on seven different neighborhoods of the city which only constitute 17.9% of the percentage of neighborhoods in the city (Table 4.18). The low number of kindergartens in the city is attributed to inappropriate planning. Planning authorities does not allocate enough kindergartens to be distributed on neighborhoods particularly the big ones which constitute 22% of the overall number of the population such as the neighborhoods of Qalat, Grjan, Sara, and Shahidan. Private sector does not have any

kindergartens in the Ranya. The neighborhoods which have such service suffer from not having fully competent kindergartens which need to be expanded and developed in a sense which matches the population.

Table 4.18. The relative distribution of kindergarten education in Ranya city in 2013-2014 (Anonymous 2019b)

Neighborhoods	Kindergartens	Children		School mistresses		Classrooms	
		Number	%	Number	%	Number	%
Qula	Ranya	211	19	13	14.6	4	14.3
Azadi 2	Shna	125	11	13	14.6	4	14.6
Daban	Khanda	217	19.3	17	19.2	4	14.6
Nawroz	Papula	201	18	13	14.6	6	21.4
Raparin	Shayi	106	9.4	13	14.6	3	10.7
Kewarash	Raz	150	13.3	10	11.2	4	14.3
Razgari 1	Azhi	115	10	10	11.2	3	10.7
Sum	7	1125	100	89	100	28	100

The number of children attending the kindergarten in Ranya city reached 1.1 thousand which represent 4.5% of students in the different educational institutions. The percentage of male children is 51.3% and the females is 48.7%. Kindergarten children represent 37.5% of the children in Ranya city and they constitute 1.34% of the population all together.

The distribution of kindergarten children on the neighborhoods of the city varies from one to another (Table 4.18). For example, Khanda Kindergarten in Daban neighborhood has the highest percentage (19.3%) from the total number of kindergarten children. However, the distribution of children does not correspond to the size of the population. Shayi Kindergarten in Raparin Neighborhood occupies the last position regarding the number of kindergarten children even though the population percentage in the neighborhood is 8.5% from the total population in the city. The number of female kindergarten teachers reached 89 in Ranya city constituting a percentage of 6% from the total number of teachers before the university level in the city. The distribution of school mistresses varies according to different kindergartens (Table 4.18). Khanda Kindergarten in Daban Neighborhood has the highest school mistresses (18) constituting a percentage of 19.2% from the total number of female kindergarten teachers in the city. The reason for that high number of teachers in Khanda Kindergarten can be attributed to the high number of children.



Figure 4.10. Neighborhoods in Ranya City (Anonymous, 2019d)

The number of classrooms in kindergartens in Ranya city reached 28 (Table 4.18). The distribution of classrooms on the neighborhoods is not equal since Papula Kindergarten in Nawroz Neighborhood comes in the first place marking the highest percentage 21.4% from the total number of classrooms in the city. On the other hand, Shayi Kindergarten and Azhi Kindergarten recorded the lowest percentage of approximately 10.7%, and the rest of the kindergartens (Khanda, Ranya, Shna, and Raz) make up 14.3% for each one of them.

Kindergartens are available in only seven of 39 neighborhoods in Ranya city. The number of kindergartens in Ranya city is less in comparison to the number of kindergartens in Ranya District and in Al Sulaymaniyah Governorate (Table 4.19). The reason of which is attributed for the imbalanced distribution of kindergartens on population units on the level of district or the governorate. The number of kindergarten mistresses in the city was 89 and most of them are in Ranya district (44.9%) and in Al Sulaymaniyah governorate (4.7%). The average of kindergarten mistresses in each kindergarten was 12.7 mistress/kindergarten in contrast to the average of the governorate (11) and the district (7.3) (Table 4.19).

Table 4.19. Kindergartens in Ranya city in comparison to kindergartens in Ranya district and in Al Sulaymaniyah Governorate for the year 2013-2014 (Anonymous 2019)

Administrative units	Number of children	Number of children	Average number of children in every kindergarten	Number of kindergarten mistresses	Average number of kindergarten mistresses in each kindergarten
Ranya city	7	1125	161	89	12.7
Ranya district	27	2960	110	198	7.3
% city from district	25.9	38	-	44.9	-
Al Sulaymaniyah Governorate	172	23463	136	1911	11
% from the Governorate	4	4.8	-	4.7	-

There is a great difference in the number of children who go to the kindergarten on the level of the neighborhood as it is the case in Khanda Kindergarten in Daban Neighborhood which has the highest percentage (19.3%) from the total number of the children who go the kindergarten. On the other hand, the percentage of children number in Shayi Kindergarten in Raparin Neighborhood is (9.4%) taking into account that the neighborhood of the kindergarten has the highest percentage of the population of the city. The low percentage in Shayi Kindergarten is attributed for not having enough classrooms which deprives a large number of children from going to the kindergarten in Raparin Neighborhood in the year. For instance, the kindergarten under discussion did not admit 50 children from registering in the academic year of 2013-2014 due to the small size and the low number of classrooms there.

Table 4.20. Average and numerical distribution of residents, kindergarten, and kindergarten mistresses' numbers in relation to the administrative units in Ranya district for the academic year of (2013-2014) (Anonymous 2019b)

Administrative units	Residents		Kindergartens		Kindergarten children		Kindergarten mistresses		Classrooms	
	Number	%	Number	%	Number	%	Number	%	Number	%
Ranya city	83392	38.5	7	25.9	1125	38	88	43.1	28	29.1
Chwarqurna	53974	24.9	11	40.8	942	31.8	63	30.9	39	40.6
Hajiawa	53718	24.8	5	18.5	617	20.8	31	15.2	17	17.7
Bitwata	18358	8.5	2	7.4	217	2.1	11	5.4	6	6.3
Sarkapkan	7283	3.3	2	7.4	62	2.1	11	5.4	6	6.3
Sum	216725	100	27	100	2963	100	204	100	96	100

4.2.2. Distribution of Basic Education Schools in Ranya City

New education system defines basic education as the main and broad foundation for the teaching of all beginners from the age of 6 till 14. The aim of basic education is to provide learners with the necessary values, conduct patterns, knowledge, experiences and scientific skills. Consequently, the Ministry of Education pays the greatest attention to basic education to expand and improve. Due to the limited capacity of some schools for admitting new students and low number of teachers of eight and nine grades, educational authorities separated the seventh first grades from the last two ones. Therefore, there are schools only for grades eight and nine so that when the student finishes the first seventh grades, he/she would go to schools with only eight and nine grades.

The number of basic education schools was about 32 in 2013-2014 including the two schools for girls which constitute a percentage of 6.3% from the total number of schools in the city (Table 4.21). On the other hand, there are three basic education schools for boys which constitute a percentage of 9.4%. The others (84.3%) are in Coeducational schools.

Table 4.21. Basic education schools in Ranya city according to the gender of the students (Anonymous 2019b)

School type	Schools		Students	
	Number	%	Number	%
Boys	3	9.4	656	3.7
Girls	2	6.2	370	2
Coeducational	27	84.4	17035	94.3
Sum	32	100	18061	100

The distribution of basic schools is not equal among the neighborhoods of the city. Furthermore, the distribution is also not equal regarding the distribution of the population in the neighborhoods. Furthermore, the distribution is not equal with the educational standards; as an illustration about that the total number of distributed schools on the neighborhoods is 17 out of 39. In other words, 43.6% of the neighborhoods has the service, while 56.4% of the neighborhoods lacks this service (Table 4.22).

What is noticeable is that the spatial distribution of basic education schools in Ranya city varies among the neighborhoods. The neighborhood of Sara comes in the first position regarding the number of basic education schools since it has 5 schools; two for boys and

three Coeducational schools. The schools in the neighborhood under discussion constitute 15.6% of the total number of schools in the city. After Sara neighborhood comes Shahidan neighborhood which has four schools; one for boys and three Coeducational schools and the schools in that neighborhood makes up 12.5% from the total number of schools. Based on what has been presented, it becomes obvious that the distribution of basic education schools on the neighborhoods of Ranya city has a major flaw since 8.68% of the schools are distributed on approximately 18% from the total number of neighborhoods in the city. This is particularly observable in the neighborhoods of Sara and Shahidan which together have 28.1% from the total number of schools in the city but whose population only constitute 11% from the total population of the city (Table 4.22).

Table 4.22. Numerical and average distribution for basic education schools in Ranya city for the academic year (2013-2014) (Anonymous 2019b)

Neighborhoods	Schools					Students		Teachers		Classes		Buildings	
	Boys	Girls	Mixed	Sum	%	Number	%	Number	%	Number	%	Number	%
Raparin	-	-	3	3	9.4	1888	10.5	141	13.2	52	13.8	3*	12
Sara	2	-	3	5	15.6	1609	9	107	10	44	11.6	3**	12
Azadi 2	-	-	2	2	6.25	1774	9.8	95	9	38	10	2	8
Shahdan	1	-	3	4	12.5	2713	15	155	14.5	48	12.7	3**	12
Qula	-	-	1	1	3.12	504	2.8	29	2.7	8	2.1	1	4
Nawroz	-	-	1	1	3.12	1251	6.9	60	5.6	24	6.3	1	4
Glingan	-	1	2	3	9.4	933	5.2	83	7.7	24	6.3	2**	8
Kewarash	-	1	2	3	9.4	2421	13.4	199	11.1	38	10	2**	8
Qalat	-	-	2	2	6.25	718	4	49	4.6	18	4.8	1	4
Titoka	-	-	1	1	3.12	455	2.5	28	2.6	6	1.6	1	4
Sardam	-	-	1	1	3.12	472	2.6	34	3.1	18	4.8	1	4
Hanjera	-	-	1	1	3.12	99	0.55	15	1.4	6	1.6	1	4
Kodo	-	-	1	1	3.12	1327	7.3	54	5	18	4.8	1	4
Hawarabarza	-	-	1	1	3.12	216	1.2	12	1.1	6	1.6	1	4
Rzgary 1	-	-	1	1	3.12	1184	6.5	57	5.3	12	3.2	1	4
Rzgary 2	-	-	1	1	3.12	154	0.85	12	1.1	6	1.6	1	4
Mamostayan	-	-	1**	1	3.12	343	1.9	22	2	12	3.2	0	0
Sum	3	2	27	32	100	18061	100	1072	100	378	100	250	100

(*) = one of them is in a rented building, (**) = the school does not have its own building and it is a guest school in other schools except for Sara neighborhood which has one school building and two other guest schools.

The total number of basic education students according to table (44) reached 18061 students in the academic year of (2013-2014). 52.1% of the students were males whereas the other 47.9% were females (see appendix 3). What is noticeable is that the distribution of students does not match the distribution of schools on the neighborhoods as it is the case in Sara neighborhood which has 9% from the total number of students in the city but

which only has a number of teachers which constitutes 15.6% which is the highest percentage for the schools of the city (Table 4.22). Nonetheless, schools in the Kodo neighborhood makes up only 3.1% of the schools of the city even though the percentage of the students in that neighborhood is more than 7.3%. The aforementioned variations are attributed for several reasons among f them are the capacity of the schools, the population size of the neighborhood and its educational level, and also not having other schools in the neighborhood which has the educational service. The city has 1072 teaching staff for basic education in the academic year of 2013-2014. The percentage of male teachers was 46.3% and that of females was 53.7%.

The distribution of the teaching staff on the neighborhoods of the city is not even (Table 4.22). The highest distribution value is in Shahidan neighborhood which has 14% from the teaching staff in the city and the lowest percentage is in the neighborhoods of Hawarabarza and Rzgary 2 which have 1.1% in each one from the teaching staff in the city. The difference can be attributed to several factors such as the variation found in the size and number of schools between the neighborhoods of the city, the geographical situation of the school since the teaching staff will be making decisions about working in a school if the school was close to where they live. Another reason is the type of the basic education school. All of the mentioned reasons have a very big role to play in the distribution of educational services on the level of the neighborhood in the city and even inside the same neighborhood.

The number of classrooms for the basic education stage reached a number of 220. According to (Table 4.22) there is a variation regarding the distribution of classrooms on the neighborhoods of the city. More than half of the classrooms in the city (58.2%) are distributed on five neighborhoods whereas 41.8% of classrooms are distributed on 12 neighborhoods in the city. This variation in the number of classrooms is attributed to the number and size of schools; whereas the reduction in the number of schools engendered less numbers of classrooms. In other words, the larger number of classrooms are found in schools with 6 classrooms as it is the case in the neighborhoods of (Rzgary 2, Hawarabarza, Hanjera, Titoka, and Qula) which make up a proportion of 12.8% from the total number of neighborhoods. When it comes to the number of school hours, 40% of basic education schools had one shift and the remaining 5.6% of schools had a double shift schedule with the exception to Zhiar School in Rzgary 1 which had three shifts

regarding school hours, and this basically attributed to the large number of students in that school (Table 4.22).

4.2.3. Distribution of Preparatory (High) Schools in Ranya City

The preparatory educational stage is three-year training and represents the last stage before university education. The preparatory stage starts with grade ten and ends with grade twelve according to the new system, and it includes students whose ages are between 15-17 years old and it aims at preparing students for the university or the institutes (higher education). The stage under discussion contributes in developing the students' physical, mental, scientific and spiritual personalities. Two sections are found in this stage: the literary section and the scientific section; moreover, there are the vocational high schools with their different sections (agricultural, economic or industrial). The aforementioned sections are available for the two genders of students.

Spatial variables of high schools are characterized as being concentrated rather distributed in comparison to schools in different educational stages. These schools transcend their areas of influence to reach other neighborhoods situated far away from the location of the school. The main reason of that is the peculiar nature in providing the requirements of high schools; moreover, high school students are characterized as being capable of moving easily (highly mobile) in particular male students.

The number of high or preparatory schools in Ranya city in the year 2013-2014 was about 11 either when talking about girl schools or those of males. However, the seven Coeducational preparatory schools recorded the highest percentage (63.6%) from the total number of preparatory schools in the city (Table 4.23). Coeducational preparatory schools contain 59.7% of the students and 67.7% of the classrooms. On the other hand, the percentages are equal between girls' schools and boys' schools as each type of school constitute what is 18.2% from the total number of schools. The total number of female students in preparatory schools is 27.5% (Table 4.24). However, the total number of male students in boys' schools constitutes 12.8% from the total number of students in this educational stage. As for the percentage of classrooms in girls' schools, it is 19.4% in

comparison to 12.9% from the total number of classrooms of preparatory schools in the city for the academic year 2013-2014.

Table 4.23. The distribution of schools in Ranya city according to gender for the academic year 2013-2014 (Anonymous 2019b)

School kind	Schools		Students		Classrooms	
	Number	%	Number	%	Number	%
Boys	2	18.2	725	12.8	24	12.9
Girls	2	18.2	1552	27.5	36	19.4
Coeducational	7	63.6	3370	59.7	126	67.7
Sum	11	100	5647	100	186	100

Table 4.24. Relative distribution preparatory school educational services in Ranya city for the year 2013-2014 (Anonymous 2019b)

Neighborhoods	Schools					Students		Teachers		Classes		Buildings	
Nawroz		1	2	3	27.6	1334	23.6	63	22.3	48	25.8	1	20
Qalat			2	2	18.2	693	12.3	36	12.7	24	13	1	20
Karokh			2	2	18.2	1354	24	71	25	54	29	1	20
Kewarash	1			1	9	491	8.7	29	102	12	6.4	1	20
Mamostayan		1		1	9	960	17	48	17	18	9.7	1	20
Raparin	1			1	9	234	4.1	5	1.8	12	6.4	0	0
Sardam			1	1	9	581	10.3	31	11	18	9.7	0	0
Sum	7	2	2	7	11	100	5647	100	283	100	186	100	100

There are few numbers of neighborhoods without preparatory schools as these schools are distributed on 7 neighborhoods (18% from the total number of neighborhoods in the city) (Table 4.24). In Nawroz neighborhood, there are three schools (27.3% from the total number of preparatory schools). Two schools are found in Qalat and two schools are found in Karokh which makes up a percentage of 20% of the total number of schools in each neighborhood. 10% of the total number of schools are found in each neighborhood of Mamostayan, Kewarash, Sardam, and Raparin; however, this distribution does not correspond to the population distribution in the city. In other words, most of the schools are located in Nawroz neighborhood when this neighborhood only has what is 6% from the total number of the population.

The number of preparatory school students in the city in the year 2013-2014 was 5.6 thousand. The distribution of students on the neighborhoods of the city is not equal. For example, there is 24% (the highest percentage in the city) of the students in Karokh neighborhood followed by Nawroz neighborhood (23.6%); after that comes the rest of the neighborhoods Mamostayan, Qalat, Sardam and Kewarash which together form up 48.3%

of the total number of schools. As far as Raparin neighborhood is concerned, there is 4.1% (the lowest percentage) from the total number of students there. Some of the reasons for the distribution of schools in the city as it have been illustrated include factors like the size of the school which has a drastic effect on the distribution as it is the case in Karokh neighborhood which has two schools (Rabarin and Safeen) in one building and when each school contains 27 classrooms.

The number of teachers in the academic year 2013-2014 was 283 (Table 4.24). The distribution of teachers on the neighborhoods of the city was carried out differently. Karokh neighborhood comes in the first position with a percentage of 25% from the total number of teachers in the city, and after it comes Nawroz neighborhood with a 22.3% percentage. Mamostayan neighborhood comes in the third position (17%) and after this neighborhood we have the neighborhoods of Qalat, Sardam, and Kewarash which constitute 12.7%, 11%, and 10.2% from the total number of teachers respectively. The neighborhood of Raparin occupies the last position (1.8%). The aforementioned distribution of teachers is equal to the distribution of preparatory school students in the city. What is worth noting in this regard is the fact that preparatory schools in the city suffer from a shortage in the number of teachers and in particular in evening schools.

The total number of preparatory schools' classrooms in the city according to table (48) is 186 which are differently distributed on the schools. Coeducational schools were recorded the highest percentage (67.7%) from the total number of classrooms in preparatory schools. In the second place comes the preparatory schools for females (19.4%) whereas those of males make up 12.6% which is the lowest percentage of the number of classrooms of preparatory schools in the city.

As for the distribution of the classrooms on the neighborhood scale, the neighborhood of Karokh comes in the first place (29%) followed by Nawroz (25.8%) and then the neighborhood of Qalat (13%). An equal percentage of 9.7% is found in the neighborhoods of Mamostayan and Sardam, and another equal percentage of 6.4% is found in the neighborhoods of Kewarash and Raparin and this is from the total number of classrooms for the preparatory school stage. However, this distribution does not correspond to the numerical distribution of preparatory schools in the city as it is the case in Karokh neighborhood which contains 18.2% from the total number of preparatory

schools in the city and it also contains the highest percentage of the number of classrooms in the city as well.

Because of the need of the study for evening preparatory schools, 4 schools were opened which constitute (36.4%) from the total number of preparatory diurnal schools in the city which are reused again as evening preparatory schools. However, the percentage of morning or diurnal preparatory schools is 63.6% from the total number of schools in the city (Table 4.25). Evening preparatory education aims to provide the opportunity for the students who cannot go to schools during the morning to do so in the evening even if the age of the student is more than the official one. Furthermore, students who are late for the morning schools can go to the evening ones. As for female students who got married, those cannot go to school in the morning, so they have the right to go to evening schools. Such schools include preparatory schools like Bnar Evening Preparatory School for Females which provided the opportunity for the students whether males or females to continue the stage of preparatory education whether in the scientific section or the literary one.

Table 4.25. Preparatory school distribution in Ranya city according to the type of the school and the gender of the student for the academic year 2013-2014 (Anonymous 2019b)

Schools	Number of schools		Number of students		Number of teachers	
	Number	%	Number	%	Number	%
Morning	7	63.6	4137	73.3	227	80.2
Evening	4	36.4	1510	26.7	56	19.8
Sum	11	100	5647	100	283	100

4.3. Problems and Future of Education Service in Ranya City

4.3.1. Unequal Geographical Distribution of Educational Services

Studying the distribution of educational services in cities is considered as one of the important things which planners and geographers investigate. It is important because via it one can know the properties of the distribution, its patterns and finally how effective it is. Moreover, such an analysis pinpoints the location of educational services and dictates the places where they should be; what is more, the distribution of educational services reflects the group of the underlying economic, social, and environmental factors

responsible of the picture of the distribution. In the final run, such an investigation can provide officials and planners with the necessary information to estimate the future requirements of the city of educational services.

As for the distribution of educational services on the neighborhoods in the city, it was observed that it was unequal and this is in terms of the distribution of kindergartens, basic education schools, and finally preparatory education schools on the neighborhoods of the city. As an illustration of that, the distribution of kindergartens on the level of the administrative units (districts) in Ranya district is unequal and different as it does not correspond to the number of residents. The number of kindergartens in Ranya city is 7 and it contains what is 25.9% from the total number of kindergartens in the district, and it has 38% from the total number of kindergarten children. This is in contrast to the fact that Ranya city has 38.5% from the total number of people living in Ranya district.

When talking about the level of the city, educational services are distributed on seven residential neighborhoods which make up 17.9% from the total number of neighborhoods in the city. What is surprising is that all of the kindergartens are restricted in 18 neighborhoods from a total number of 39. Those 18 serviced neighborhoods constitute 46% from the total number of neighborhoods in the city. However, the other 54% of the residential neighborhoods are not covered with the educational service of kindergartens.

Apart from kindergartens, basic educational schools were 32 schools (29.6% from the total number of schools in Ranya district) in the place of the study in the years 2013-2014. The number of basic education students mounted to 18 thousand in the same year (37% from the total number of students in the district). Even though basic education schools are widely distributed in the city, it was found that this distribution does not correspond to the distribution of residents on the neighborhoods. It was found that the total number of basic education schools were distributed on 17 neighborhoods out of a total number of 39 neighborhoods in the city implying that 43.6% from the total number of neighborhoods were covered with service in contrast to a percentage of 56.4% of the neighborhoods which were not covered with this service. The study shows that Shahidan neighborhood and Sara neighborhood contain 28% from the total number of basic education schools when the two neighborhoods only have 11% from the total number of the population.

The total number of preparatory schools in the city in 2013-2014 was 11 schools whether those of males or those of females. These 11 schools are distributed on 7 neighborhoods which constitutes approximately 18% from the total number of neighborhoods in the city. According to the study made, it was found that the distribution of basic education schools on neighborhoods in the city has a major flaw as it does not match the residential distribution of people in the neighborhoods. In other words, the largest proportion of basic education schools (27.3%) is located in Nawroz neighborhood which only has 6% from the total number of populations.

Based on what has been presented thus far, it is clear that the distribution of educational services with their three different stages does not match the residential distribution in the neighborhoods in the city in the sense that educational institutions are not available in some neighborhoods. Schools were concentrated in 19 neighborhoods out of a total number of 39 neighborhoods in the city i.e. 48.7% of neighborhoods are covered with educational services with their three levels; however, the other 51.3% is not covered.

This is an indication of having a shortcoming and a flaw in how educational services are distributed in the city. This makes it necessary for official authorities in Ranya city to haste and open schools and to re-distribute some of the existing schools to reduce the pressure on other schools and finally to expand the service parameter of educational services.

4.3.2. Insufficient Number of School Buildings

Each educational institution should have its own building; however, Ranya city suffers from a shortage in school buildings. Therefore, the Ministry of Education has specified one building for two or more schools in order to reduce the pressure on schools and to provide the opportunity for everyone to continue their education. This procedure, however, gave birth to some negative aspects such as having to shorten the number of school hours, neglecting some lessons, and shortening the period of the class due to reducing the number of lessons from 6 to 4-5 lessons a day. All this contributed in having an institutional dysfunction in addition to having an overuse of the furniture of schools. In the final run, each student's share from the built space is reduced due to having a

reduction in the number of school buildings; this becomes particularly observable in basic education schools.

There are 7 kindergartens in the city which constitute 12.7% from the total number of educational institutions in the city (Table 4.26). Each kindergarten has its own building and the kindergartens have 7 buildings (17% from the total number of the buildings of educational institutions in the city). Therefore, it can be said the number of kindergartens and the number of kindergarten buildings match each other and that there is not a shortage in the number of kindergarten buildings. The number of basic education schools is 24 (75% from the total number of basic education schools in the city). It was found that every 1.33 schools are occupying the same building including five guest schools (15.6% from the total number of schools) found in the buildings of other basic education schools. There are 2 schools (6.3% from the total number of basic education schools) which are guests in other non-basic education school buildings such as school buildings for preparatory or vocational education.

Table 4.26. Categorization of educational services institutions in Ranya city according to whether they have their own buildings (Anonymous 2019b)

Educational stage	Schools with their own buildings		Schools included in other schools' buildings	
	Number	%	Number	%
Kindergarten	7	100	-	-
Basic education	24	75	8	25
Preparatory/High schools	6	50	6	50
Sum	37	73	14	27

There are 12 preparatory schools in the city and half of them (50% of the schools) have their own buildings which make up 14.6% from the total number of the buildings of educational services in the city. The other remaining six schools do not have their own buildings; three them (25%) are guest schools in other basic education school buildings and the other three are guest schools in school buildings of preparatory education. In other words, the building is occupied by two schools which indicates that the number of preparatory schools in the city does correspond to the criterion of the number of schools in each building. This engendered a dysfunction in the city and left a negative impact on the pace of the educational process.

There are 12 schools of basic education which make up a percentage of 37.5% of basic education schools which are double with itself due to the large number of students. Moreover, there are 7 basic education schools (21.8%) which are double with other schools and the last three remaining schools (9.45%) have one school hours shift with their own building.

4.3.3. Multiple School Hours

Ranya city suffers from a shortage in the number of educational institutions which resulted in having more than one school occupying the same building (Table 4.26). This in return results in having different school hours shifts; and when looking at those schools which have multiple school hours shifts, the unequal nature of the distribution of educational services in the place of the study becomes clear. This kind of observation would tell the correlation between the amount of educational services in terms of the number of classrooms, teachers and the ability of the school in meeting the demands of the residents who are in the eligible age to go the concomitant different educational stages.

Table 4.27. Categorization of schools according to the type of the shifts of school hours shift and their times in Ranya city in 2014 (Anonymous 2019b)

Educational stage	School hours type							Time of the school hour						
	One shift	%	Double with itself	%	Three shifts	%	Morning	%	Afternoon	%	Morning and afternoon	%	Evening	%
Kindergarten	6	85.7	1	14.3	-	-	6	85.7	-	-	1	14.3	-	-
Primary education	12	37.5	19	59.4	1	3.1	7	21.8	3	9.4	20	62.5	2	6.3
High and preparatory	10	83.3	2	16.7	-	-	1	8.1	1	8.1	7	58.3	3	25
Sum	28	56.6	22	41.5	1	1.9	14	27.5	4	7.8	28	54.9	5	9.8
Percent	100							100						

4.3.4. Poor Quality of School Buildings

Educational studies have attested that the learning environment and conditions surrounding the students in the school building play an important role in the healthy upbringing of that student. Moreover, such conditions create the motivation for the student to develop, and they provide him/her with the ability to come over any obstacles which confront him during his/her educational endeavor. These problems are engendered due to a number of interconnected and effective factors which help in making the students identify with the building which he/she had spent a considerable period of time in. Therefore, it becomes important to investigate the effective qualities of the quality of the school buildings. In this regard, the comprehensive survey which was carried out on school buildings in Ranya city provided all the necessary information which was gained from the construction division in the engineering department in the educational directorate in Ranya city. Such information made it possible to identify the level of school buildings (Table 4.28). In consequence to that, the buildings of educational services in the city were divided into three different kinds: good-quality buildings, buildings in need of maintenance, buildings in need of restoration).

Table 4.28. Validity of school buildings for educational service institutions in Ranya city for the academic year 2013-2014 (Anonymous 2019b)

Institution	Valid	In need of maintenance	In need of restoration
Kindergarten	6	-	1
Basic education	17	2	5
Preparatory schools	4	-	2
Sum	27	2	8

4.3.5. Daily Transportation Time of Students to School

The distance between the place of living and the construction site of the educational service is one of the important things which are kept in mind before the building up of the educational institution. In this regard, the blueprint design of educational services should keep in mind a specific site for schools which has to be appropriate so that it is reachable for a large number of students and that it would not make them take a long time to get to the school. Such an issue reflects how far the school is from the place of living of students. Consequently, the travel time of getting to school is regarded as an important

affective factor on academic achievement generally speaking and especially among students who go on foot to school. In other words, the ability of students to understand lessons gets decreased if the distance between the school and the place of living is long (Table 4.29).

Table 4.29. Average time of the journeys of going to and returning from the educational services in Ranya city 2013-2014.

Time	% of Students
Five minutes	30.2
Ten minutes	29.6
Fifteen minutes or more	40.2
Sum	100

4.3.6. Low Space Area of Educational Buildings

One of the main problems which educational services encounter in the place of the study is the small size of educational buildings which resulted in having classrooms of less numbers and of greater density. Moreover, this problem has resulted in having students receiving less space from the site and the classroom; in addition, it also engendered less administrative space which means that other places such as laboratories and libraries are resorted to fill that gap. In a similar fashion, some administrative rooms are used as classrooms in order to contain the number of students which is the result of the shortcoming of having less space. Furthermore, there is also a weakness in the number of other supplementary spaces such as sports hall, art education rooms, and computer laboratories. There is also a fault regarding the space of playgrounds and the green space as they do not meet the minimum requirements of the designing criteria. Having such small space resulted in having a duality in the school hours as it was noted earlier.

What is more, having classrooms condensed with a large number of students results in having an unhealthy and unnatural atmosphere which is not fitting for the educational process. Moreover, classrooms which are condensed with large numbers of students give birth to an unpleasant experience and they do not provide good conditions to receive knowledge due to noise and reduced ventilation especially in summer which have a negative effect on the performance of teachers or school mistresses. The aforementioned problems are basically and pivotally the reason of schools' spaces not meeting the minimum requirements which are supposed to be met. This incompetency is quite

observable in schools which have six classrooms as it is the case in schools like Titoka, Hangaw, Qalat, Hawarabarza, Ako, Ranya, and Saydawa which are characterized as having a reduced amount of educational services.

4.3.7 Other Problems

The educational process is more than classrooms in school buildings; rather, it needs a couple of necessary services which are crucial to be found in school buildings to make students more comfortable and active. However, schools in the place of the study have a lot of problems which stand as an obstacle in the way of promoting the effectiveness of educational services. In order to find out whether such services are found in Ranya city, the results of the questionnaires which were distributed on school managers and on the students will be used in addition to the results of the field studies which were carried out to stand at the effectiveness of such educational services

Table 4.30. Available educational services in Ranya city for 2013-2014

Service Stage	Biology laboratory	% for the school	Library	% for the school	Provided with sewer service	Not provided with sewer service	Provided with an emergency and firefighting service	Not Provided with an emergency and firefighting service
Basic education	4	12.5	3	9.4	26	6	25	7
Preparatory	4	33.3	4	33.3	11	1	8	4
Sum	8	18.2	7	15.9	37	7	33	11

4.3.7.1. Service of Scientific Laboratories

Scientific laboratories are one of the most important educational services which should be available nowadays in schools. Scientific laboratories serve the purpose of making students see scientific facts and apply what they take theoretically in the classroom. However, even though such services are very important, schools in the place of the study have few numbers of scientific laboratories with their various kinds: physical, computer, chemical, or biological. The data showed that only 24.2% of schools have scientific laboratories with their different kinds in contrast to a percentage of 75.8% of schools in Ranya city which do not have such services. This is an indication of having a major flaw

in the availability of this basic service with its different kinds for all educational levels in schools. What is noticeable is that schools which have big and spacious buildings have enough scientific laboratories, and vice versa for schools of small and old buildings which is particularly observable in schools which has 6 classrooms.

4.3.7.2. Service of Libraries

When the field study was varied out, it was found that libraries which have their own specific rooms were available in 21.2% from the total number of schools in the city. However, 78.8% of the schools do not have libraries and they are specifically not available in preparatory schools since from a total number of 12 schools, only 4 have libraries. This is not a good indication since libraries for preparatory school students are necessary for so that they get new information in addition to the information they attain from their curriculum books. Lack of libraries resulted in having a flaw and a scientific gap in all educational levels and in particular in the preparatory stage.

4.3.7.3. Services of Water and Sanitation Networks

Water and sanitation network (sewerage) are available in school buildings. In other words, 84.8% of schools have this service in contrast to 15.2% which do not have this service. According to the previous table, emergency and firefighting tools are available in 73.3% of schools in the city whereas 22.7% do not have such service. In addition to what has been mentioned, schools in the place of the study suffer from a lot of problems which hinder the promotion of the effectiveness of educational services there, and one of these problems is not paying a close attention to the needs of students with special needs. According to 88% of school managers, the design of schools does not take into account students with special needs in contrast to a percentage of 22% of school designs which tackled that problem in their blueprints. Heating and cooling systems are unavailable as the study indicated that such systems were available in only 24.2% of schools in contrast to a percentage of 75.8% without this service. This resulted in not having a quiet environment in the classroom and high temperature in summer.

Moreover, schools are located near market places, inside noisy areas, or next to streets with a very active traffic which make the classrooms noisy. Due to not having natural

barriers (trees) and having small distances between schools and streets in the sense that the entrances of schools are located immediately on the streets without any protection, the lives of students are in real danger when they enter or leave the school as it is the case in basic education schools such as Ranya School, Ako School, and Between School. Another problem worth mentioning is wasting a lot of the open space in not making use of it as it is the case in Ranya Preparatory School for Girls, Payam Preparatory School, Mydia Basic Education School, Babagurgur Basic Education School, and Sarkawtn Basic Education School. In addition, there is very little space of the green area in the city's schools and in particular in schools of basic education where students' share from the green area is less than one meter for every student in basic education schools like Zhyar, Hangaw, Rawand, Qalat, Saydawa, Blesa, Babagurgur, and Hawarabarza.

5. CONCLUSION AND RECOMMENDATIONS

Educational services are the most necessary services that need to be provided for each individual. They are the main pillar for the advancement and development of society and standards to measure the progress and underdevelopment. This study aims basically at studying the educational services in the Ranya city of Sulaymaniyah governate, Iraq in terms of their capability, distribution and suitability for the urban expansion, settlement growth in the city. Land use suitability of educational services has also been discussed in the study. This study includes a comprehensive survey of all schools and kindergartens in the city in order to provide a data base of these services, in addition to data about the number of students, teachers and the architectural characteristics of the buildings and their services.

The level of satisfaction about such public services was measured through the results of the questionnaire distributed to a random sample of students. The methodology of the study was based mainly on the descriptive and analytical research methods by using the tool of Geographic Information Systems (GIS) and certain geographic models like neighboring link and effect zone. The results of the study indicated the existence of randomness in the distribution of schools and kindergartens in Ranya City due to the absence of proper planning and reference to planning regulations. In addition, the study showed the lack of efficiency and capability of such services. The study recommended the necessity of identifying local planning regulations for the Educational services in the city.

The study went through several stages include data and information collection of office and institutional sources, and then a comprehensive field study. The information has been obtained in the tables, which was adopted by the student in inference and deduction through statistical analysis, and the use of visual representation of distributions and maps

illustrations and graphs. It was the motivation is to answer all questions and inquiries to get to the exact results and logical analysis.

The educational institutions in Ranya city are continuously developing in terms of quality and quantity. However, conservation of soil and water resources have not been taken into consideration while establishing or choosing the location of the educational institutions. Institutions have been founded mostly on agricultural areas with high agricultural productivity potentials. The most important reason of inappropriate land use is the expanding of city towards agricultural lands. The first university of the city, founded in 2010, has been established on the first and second-class agricultural lands of 130 ha. The university is a center of attraction which will also encourage other settlements to occupy nearby agricultural lands. The educational institutions are needed for the development of the region, however the protecting and improving the agricultural lands where the food and fiber demands of current and future generations will be met is much more important. Alternative areas with low agricultural potential should be preferred for settlement and educational institutions. Therefore, public services such as educational institutions in Ranya city should be located in the north-east and north-west areas with lower agricultural qualifications. Relevant institutions and city planners and politicians have to be more sensitive in the selection of the regions where the city will further expand.

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CURRICULUM VITAE



Hoshang Hama Amin Aziz RWANDZY was born in Rwandz at 07.12.1989. Iraqi/ Kurdish. Completed his primary and secondary education in Rwandz. In 2003, completed the Preparatory school stage at Rwandz Coeducational High School. In 2014, he received a Bachelor's degree in the Department of Geography College at the University of Koya. In 2019, he completed his thesis on mathematical analysis of educational services in Ranya city using GIS from the University of Bingöl, Faculty of Agriculture / Department of Soil Science and Plant Nutrition. Not married.

LANGUAGE and COMPUTER SKILL

S	Language	: (Listening, Speaking, Reading and Writing)
1-	Kurdish	: Native
2-	English	: Good
3-	Arabic	: Good
S	Program Name	State Using
1-	Information Technology	: Fair
2-	Microsoft Office	: Good
5-	Internet and Email	: Good

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