*Full Length Research Paper*

# Distribution and spatial arrangement of rural population in Shaqlawa district, Kurdistan region-Iraq

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Rural population distribution has a very significant influence over socio-economic characteristics of world rural communities. It gives a reflection of the burden to the land resources of public services available in an area and also reflects the environmental implications of population to specific area. Regional distribution of rural population in Shaqlawa district reveals considerable inequality in an area of varied types of geographical environment. A relationship of the various indices of physical and agricultural densities in the different sub regions of the area under study reveals that physical condition shows mature adjustments to landforms, and rural population distribution follows suitable area. Between two extreme types of grouping for rural settlements, the isolated farmstead and the nucleated village, there are numerous degrees which depend upon the interplay of physical and non-physical factors. An analysis of the trends of population distribution and density in Shaqlawa district indicates that the already densely populated areas have a greater potential for population increase than the sparsely settled areas, because it inevitably increase the spacing between settlements, the ratio of clustered to dispersed population, the distance inputs per capita required providing the remaining settlements with services, social functions and human companionship.

**Key words:** Population distribution, population density, rural settlement, spatial arrangement, rural development, Mountain area.

## INTRODUCTION

Population distribution refers to the proportional distribution of the population over available land area. It gives a reflection of the burden to the land resources of public services available in an area. Population distribution also reflects the environmental implications of population to specific areas (Cohen, 1997). Population density is commonly used to refer to the number of people per land area (square kilometer). It is the ratio of the population to the land area. Population density gives the average number of people who occupy certain piece of land.

It also shows the concentration of the population over a land area (Haupt, 2000). Though population density is a good indicator of aerial population distribution, it conceals many of the internal disparities in population concentration and its spatial distribution. People are normally very selective with regards to the settlements locations. Similarly, certain human activities are selective in nature in terms of location and suitability.

The spatial analysis is typically separated into two phases (Can, 1998). The first is the exploratory spatial data analysis which concerns description rather than explanation. The second phase is called confirmatory data analysis, which involves modeling the impact of spatial structure on behavior. In this study, we followed the first method.

Analysis of population distribution and density requires periodic and systematic information on population size and its spatial distribution over time. However, this work is not easy to achieve due to it require of reliable data other from the census data. Census data are often used to estimate the population growth and its distribution over the inter censual periods. In order to show the extent of change

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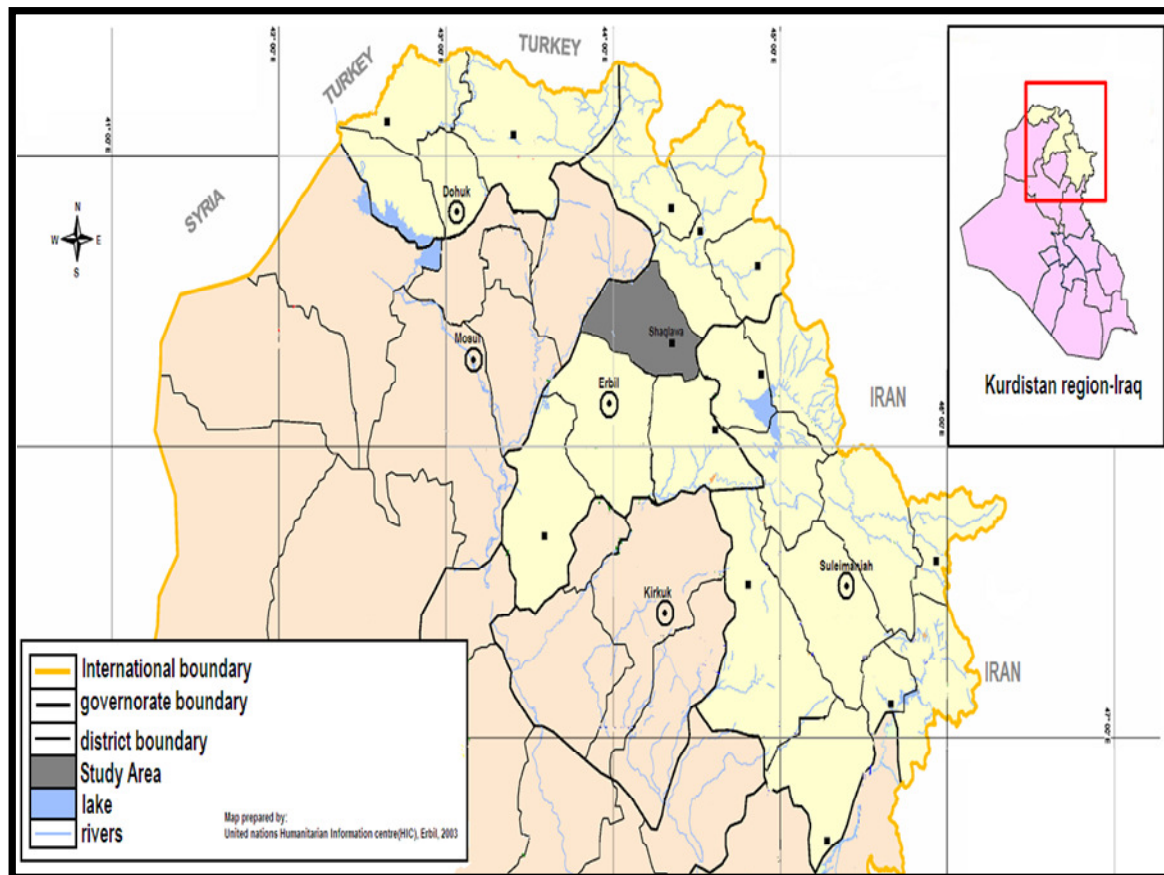
**Figure 1.** Geographical location of Shaqlawa.

with regards to population distribution and densities, an attempt has been made in this paper to analyze the regional and sub-district data in varies time. The influence of population on both the natural resources and socio-economic environments make it important to examine the trends in population distribution and density (Sachs, 1997; Gallup et al., 1999). This is particularly significant in the planning and implementation of rural development programs in the region. Previous discussion suggests that no assessment of resource potentials and prospects for sustainable development can be complete without proper understanding of the aerial distribution and concentration of the population.

The purpose of this paper, therefore, is to discuss the population distribution and population density as observed in population census. In the course of discussion, an attempt has been made to show the implications of the observed population distribution and density features. The data used in this analytical paper were obtained from the 2009 population survey. Additional data were obtained from the secondary source for analysis purposes. The data on land areas for district and sub-districts were also used to compute the population densities at different levels.

## METHODOLOGY

### Study area

Shaqlawa district is part of the Erbil Governorate of Iraq in the Kurdistan region. It is located in the central part of Erbil state, and is sub-divided into five sub-districts, namely; Salahaddin, Harir, Hiran, Balisn and Basirmah. Shaqlawa share borders with Swran districts to the north, Suleimaniah governorate and Koey district to the east, and Dohuk governorate to the west, Dashty hawler district to the south as shown in Figure 1. Shaqlawa district has a total land area of 1787 km$^2$ covering about 12% of the former Erbil governorate total land area which is about 14471 km$^2$. Farming activities take up about 52% of the total district land, while other uses are grazing 32% and forests 16% (Swzan, 1999).

### Data source

The study is mostly based on the secondary sources of information obtained from censuse data, statistical office of Kurdistan region. In the present paper, most appropriate statistical and cartographic techniques have been applied for the categorization of rural population distrubtion. The settlement has been considered as the smallest unit of study.

**Table 1.** Rural population distribution by sub-districts 2009.

| Sub-district | Rural population | Percent (%) |
|---|---|---|
| Salahaddin | 10618 | 27 |
| Harir | 9047 | 24 |
| Hiran | 2994 | 9 |
| Balisan | 3267 | 8 |
| Basirmah | 12252 | 32 |
| Total | 38178 | 100 |

Source: KRSO (2009).
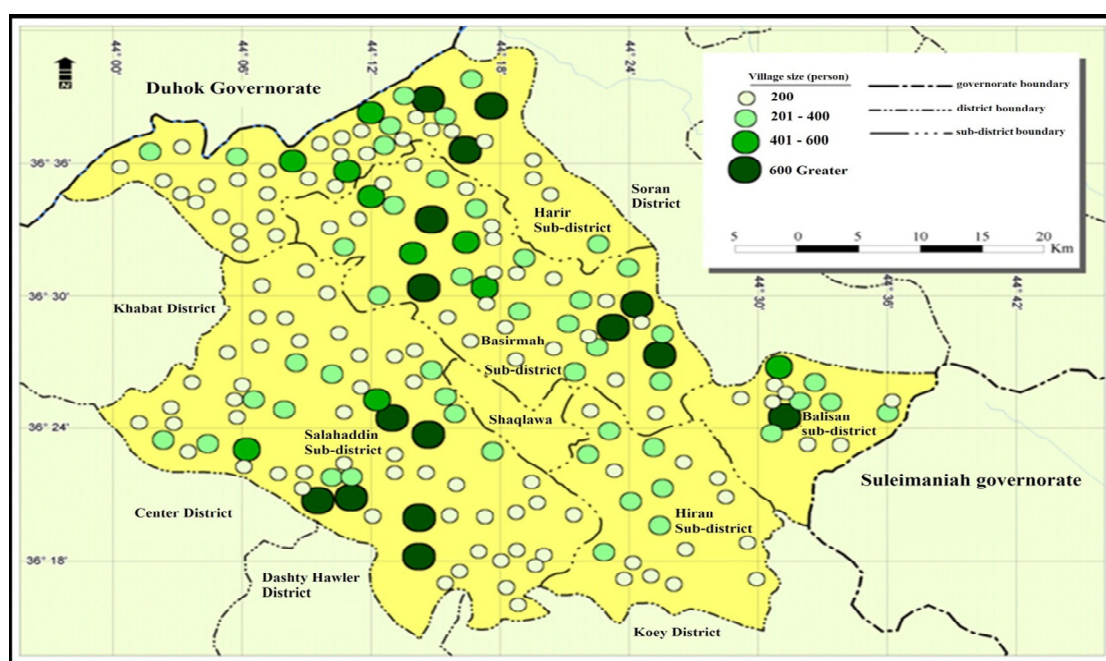


**Figure 2.** The size distribution of settlements, 2009.

The study is based on 2009 census data.

## RURAL POPULATION DISTRIBUTION

Population distribution displays the spatial spread of people within the area available. Concerns over spatial distribution of the population have great importance in the spatial planning at national, regional and district levels (Theodoropoulou and Kaldis, 2008). The population of Shaqlawa is unevenly distributed. The uneven distribution of the population is reflected in the percent contribution and populations of the different regions as demonstrated in Table 1. Even at the regional level, the uneven distribution feature is reflected between sub-districts, wards and villages. Table 1 explains rural population distribution in Shaqlawa district and the contribution of each sub-district to the total rural population in the district. The rank order distribution of population for the area indicates that Basirmah has maintained his leading positions with (32%) as far as population size is concerned. This region is followed by Salahaddin (27%), Harir (24%), Hiran (9%) and Balisan (8%).

The most striking feature is that Basirmah sub-district contributes alone with about 32% of Shaqlawa total rural populations though it comprises only 24 of its total land area. The reason behind this belongs to the fact that in Basirmah sub-district, there is the plain of Harir or Dashty Harir, which is a fertilize agriculture area and located north of Shaqlawa in a large flat bottomed valley where a small tributary of the Great Zab river flows north westwards. For more understanding, the situation of rural population distribution in Shaqlawa district Figure 2 shows that settlement are concentrated in Basirmah and Salahaddin
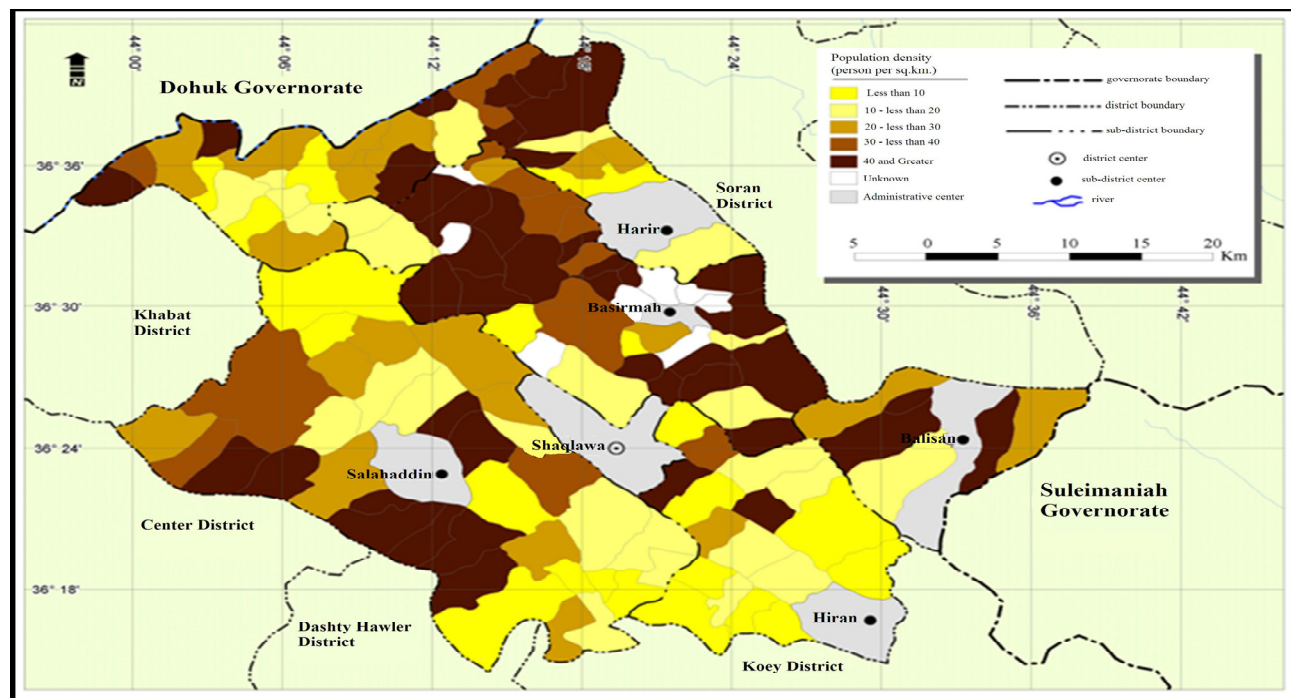
**Figure 3.** Rural population density in Shaqlawa (2009).

sub-district mainly.

In addition, it can be noticed from Figure 1 that proportion of rural settlement by population size in Shaqlawa ranged from 55% for 200 person group to only 1.7% for greater than 1000 group. The most notable features here are the high proportion of rural settlement with a population size of less than 500 persons which occupied 91% of the total settlement in Shaqlawa. The justification for the situation is that a large part of the region are covered by hilly and rocky area, which in turn affect the size of the rural settlements and the number of population in which, as the capacity of the land in those area does not support a large numbers of population to gather, so the small rural settlement category is common thing here.

## RURAL POPULATION DENSITY

Population density usually refers to the number of people per land area (square kilometer). It also shows the concentration of the population over a land area. The density of human population has long been a fundamental and key integrative concept in geography and forms a crucial link between human populations and their physical envi-ronments, acting as a principal factor mediating the extent and intensity of their mutual impact (Argent et al., 2005). Although population density conceals many of the internal disparities in population

concentration and its spatial distribution, it is a good indicator of aerial population distribution, because people are normally very selective with regards to the location of settlements (Madulu, 2002). Similarly, certain human activities are selective in nature in terms of location and suitability. Other factors that influence population concentration include accessibility to reliable social services like transport, health and water services, climatic conditions, availability of land and reliable economic activities. In Shaqlawa, population density varies from one re-gion to another and from one sub-district to another within the regions. The main causes of these varia-tions include availability of social services, suitability of land for agricultural activities, opportunities for employment and emergence of new economic enterprises like industry and service activities. Nor-mally, people are very selective when it comes to establish settlements and other economic activities. In most cases, the most potential areas are utilized first before expanding to the marginal areas.

The 2009 pattern of local rural densities revealed for the 120 rural communities in Shaqlawa district, has an extreme range from 294 persons/ km$^2$ in Amokan, to only less than 1 persons/ km$^2$ in Mandir village in Hiran, in the east of Shaqlawa district, shown in Figure 3.

Generally very low densities stand out clearly in the Shaqlawa district map and it is the overall basic pattern of rural density in the area, especially in the high area in the east and west. While even in the
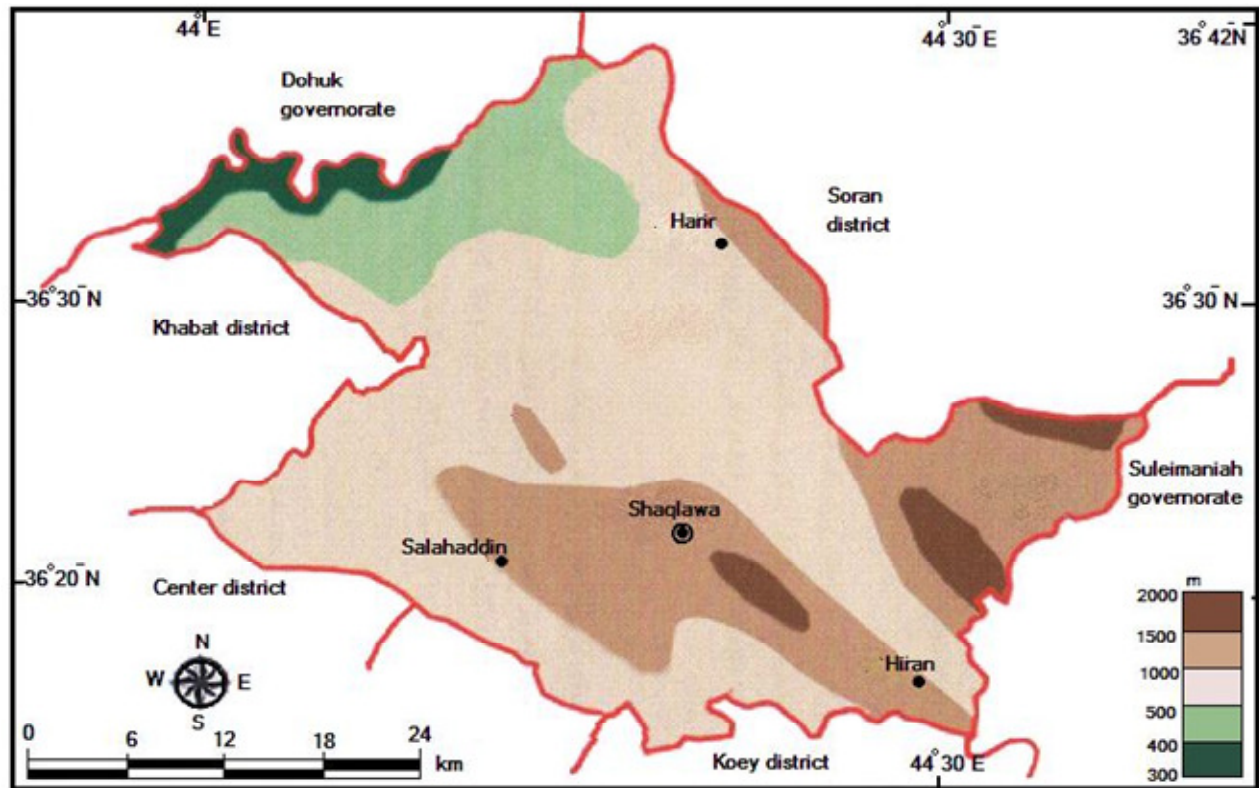
**Figure 4.** Physical map of Shaqlawa.

**Table 2.** Type of soil and population density.

| Soil type | Area (%) | Density (Person/km$^2$) |
|---|---|---|
| Brown soils | 58.3 | 81.4 |
| Mountain soils | 40.4 | 91.3 |
| Lithosol soils | 1.3 | 0.6 |

most closely settled core zone, only a very small area of Shaqlawa district has a rural density of more than twenty five person in every square kilometer. Furthermore the small spreader area of higher density along the south and north part of Shaqlawa district is due to the small size of arable area in each villages from these pattern.

## FACTORS AFFECTING DISTRIBUTION AND DENSITY

Even a fleeting look at the population maps of Shaqlawa would show that the population is distributed very unevenly. This unequal distribution is the result of a number of physical and human factors which are interrelated. Since the rural economy is intimately connected with the cultivation of the soil; the physiography of the regions is naturally a factor of prime importance (Figure 4).

In the rocky or hilly areas, continuous cultivation is not possible and consequently population densities are very low. As for example, Hiran sub district, which is the hilliest part of east Shaqlawa, has a very low rural density of twenty-one persons per square kilometer. On the other hand, in the Bastora and Greater Zab basins and the Harir Plain, where continuous and intensive cultivation is possible, rural densities of more than 100 persons/ km$^2$ are found. Equally important is the factor of soil, especially in the valley and plain area, so that there is a marked correspondence between the density of population and the fertility of the soil. This can be seen in the contrasts between the highest rural densities (294) in the Harir Plain and the lowest densities (0.6) in Hiran. Table 2 shows the relation between the type of soil and population density.

As for instance, the deep fertile brown soils of the

Shaqlawa in plain and river basins area are responsible for the high rural densities (Layla, 1998). The fertility of the soil, however, works in co-ordination with the availability of water.

Besides the physical factors mentioned so far, there are human factors to be considered with. As Vidal de la Blache pointed out, "the distribution of population in any region is not to be explained by advantages of location". Any skilled observer of climates and soils who tried to estimate there from the density of population would be liable to error. Certain rural communities such as amokan, Sisawa, and Mirawa of the Harir Plain and the greater zab Basin are famous for traditional skill and diligence as agriculturists. As a matter of fact, rural densities of more than 100 persons/ km$^2$ in the Salahaddin sub district are surprising, for few plain area support such high densities without irrigation facilities. These high densities are, in the main, owing to the selec-tion of a few summer crops which are best suited to the climate conditions of the region.

## RURAL POPULATION FROM DISEQUILIBRIUM TO SUSTAINABILITY

People are the most important and valuable resource that any nation possesses and It has been recognized that demographic factors are inten-tionnally important in human resources development because of their interrelationships with employment, education, skill and capability development, health and nutrition. Thus, It is significant that countries ensure that all persons be given the opportunity to make the most of their potential. Such a policy, as noted in various developed and developing countries will result in the enhancement of social and economic development of the community as a whole.

This paper presents detail explanation about the population distribution trend and density in Shaqlawa district. Through a combination of short takes, the observation reveals that population distri-bution is unevenly distributed between sub-districts in the region. For instance, Basirmah has main-tained his leading positions with (32%) as far as population size is concerned. This region is followed by Salahaddin (27%), Harir (24%), Hiran (9%) and Balisan (8%). In addition, very low density stand out clearly in the map of Shaqlawa district and it is the overall basic pattern of rural density in the area, especially in the high area covered east and west. The population element in Shaqlawa is the principal threats to sustainable rural development in rural areas of this district. Within a framework of ine-quality, it is difficult for rural residents to develop an attractive life project. Consequently, the future of

rural populations continues in uncertainty; because development can be harmonious if it manages to use available resources, if it makes use of rural regions and if it balances protection of the environ-ment with economic activity.

## Conclusion

The investigation in this paper has concentrated on the population distribution and density in Shaqlawa district. The analysis clearly indicates that there is a wide range of disparity and the population distri-bution is unevenly distributed between sub-districts in the region. This unequal distribution is the result of a number of physical and human factors which are interrelated. Since the rural economy is intimately connected with the cultivation of the soil, the physiography of the regions is naturally a factor of prime importance. Furthermore, the most notable features here are the high proportion of rural settlement with a population size of less than 500 persons which occupied 91% of the total settlement in Shaqlawa. The justification for the situation is that a large part of the region especially in Salahaddin and Hiran are covered by hilly and rocky area, which in turn affect the size of the rural settlements and the number of population in which, as the capacity of the land in those area does not support a large numbers of population to gather, so the small rural settlement category is common thing here. This fact become more clearly when we look at the population density in the region; the 2009 pattern of local rural densities revealed for the 120 rural com-munities in Shaqlawa district, has an extreme range from 294 persons /km$^2$ in Amokan, to only less than 1 persons/ km$^2$ in Mandir village in Hiran, in the east of Shaqlawa district. Generally very low densities stand out clearly in the Shaqlawa district map and it is the overall basic pattern of rural density in the area, especially in the high area covered east and west.

The consequence of unevenly distribution of rural population and the low density situation in the study area have unpleasant impact on the rural area, because it inevitably increase the spacing between settlements, the ratio of clustered to dispersed population, the distance inputs per capita required for providing the remaining settlements with ser-vices, social functions and human companionship. Ladd (1992) found in a study of 247 large US counties that the per capita cost of providing public services followed a J-curve with its lowest point at about 250 persons/mile$^2$ (98 persons/km$^2$), as density fell below this level (Smailes et al., 2002). So Shaqlawa district need an effective rural planning if there will be ambition to obtain sustainable develop-

ment in the area.

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