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Demographic Analysis of Socioeconomic Status and Agricultural Activities in Sugh El-Chmis Alkhums 1973-2014

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Abstract: Population growth is directly related to agricultural activities and socioeconomic status of the population. The aim of this study gives a general description of the demographic situation in the study area to show how the population affects water resources. Two hundred farmers were randomly selected to elicit pertinent demographic and socio-economic data through questionnaires between two different areas from the sea. Statistical package for the social sciences (spss) version 20 was used to analyze descriptive and inferential statistics. the result of this study showed the states that farmer's socio-economic status is not homogeneous with regard to agriculture activities between two different areas from distance to the sea in "sughel-chmis is found not true. the t-test output supported the findings from group statistics, where a very small size of difference (0.0307) in mean values between northern and southern is found.

Keywords: agricultural activities, population growth, demographic and socio-economic, sughel-chmis.

1- Introduction:

We are living in an era of increasing population growth. According to a United Nations population growth report in 2022, the world population reached almost to 8 billion in 2022 and it is expected to increase more in the coming decades. Rapid population growth around the world is the result of many factors: improvements in the health care, decline of mortality, early marriage, high fertility rates and migration (Wilmoth et al. 2022).

Many studies have concentrated on the impact of population size on the environment (Weber & Sciubba 2019). Natural resources have been heavily impacted by increases of population over the time. Increased population requires food and quantity and quality of water availability that depends (Sophocleous 2004).

Libya is one of these countries that has witnessed increase in its population especially in the end of the twentieth century (Hamad et al. 2017). Based on United Nations Data, the total population of Libya reached 6.871 million in 2020. With a population growth rate of more than 2% annually,



Libya is one of the 26 countries in the developing world whose population could conceivably double in the next 25 years. This will require a sharp increase in water drawing over time, in response to the continuous population growth and water requirements for the domestic, industrial, and agricultural demand.

However, Libya has been identified by the United Nations as limited water resource country, impacts of water availability has been observed in many parts of Libya (Abdudayem&Scott 2014).

2- MATERIAL AND METHODS:

2.1 Study area:

The area geographically lies between north latitudes $32^{\circ}25'N$ and $32^{\circ}40'N$, and between east longitudes $14^{\circ} 10'E$ and $14^{\circ} 25'E$ with an estimated land mass of about 456.96 km². In fact, this region is one of the oldest agricultural areas in Libya with the best arable soils for agricultural activities. However, the region has experience remarkable changes in the various living areas very quickly.(Abunnour et al. 2016).

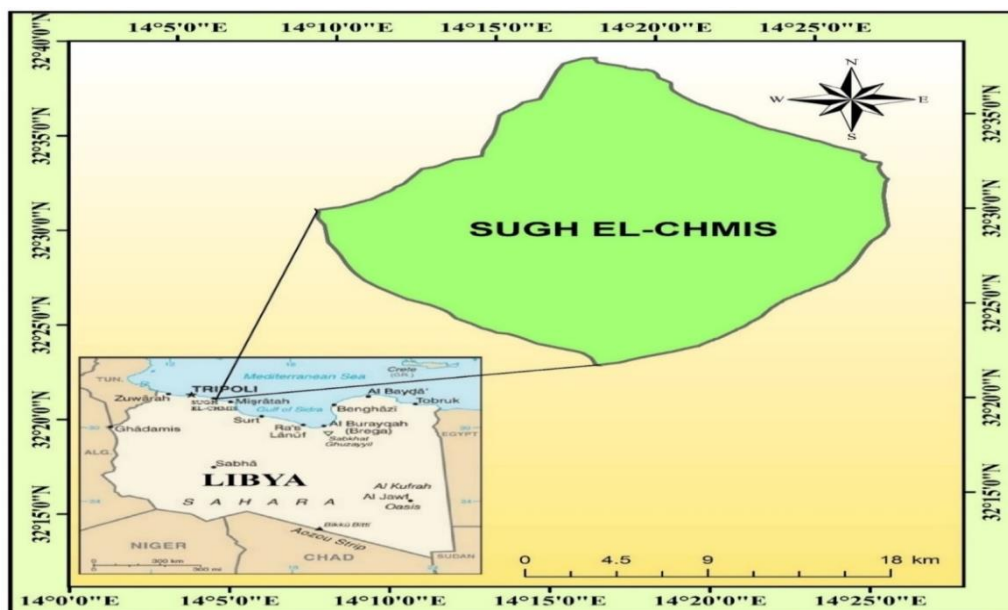


Figure 1 location of the study area

2.2 Population Growth:

As with other parts of the country, the study area has witnessing a marked increase in population. This increase was the result of various factors, most notably the improvement in the economy of the state after the discovery of oil (Mansor 2016). Table 1 shows the population growth in the study area between 1973 and 2014.



Table 1 The population growth of the study area

The year of Census	Population	The amount of the population increases	Percentage of the population increase	The population growth rate
1973	28647			
1984	46570	17923	61.5%	4.41%
1995	64321	17751	44.5%	2.93%
2005	80557	16236	35.5%	2.25%
2014*	99685	19128	28.73%	2.36%

*: The population data sources for this year (2014), are crude data from the Sughel-Chmis Office of the Civil Register.

Table 1 shows the evolution of population growth in study area from 1973 census and the 2014 population statistics. It shows that the population growth rates were different from one census to another. The growth has reached to 4.41 % in the period between 1973 to 1984, which was the largest growth rate in the region thus far. However, the rate declined to 2.93% during the period between 1984-1995. The declined continues up to the year 2005 up to recorded 2.25%. A slight rise of 2.36% was recorded in 2014, which can be attributed to the delay in age of marriage and the women joining the work force. The population growth in the region and the lower rate of growth during these periods is summarised in Figure 1 and Figure 2.

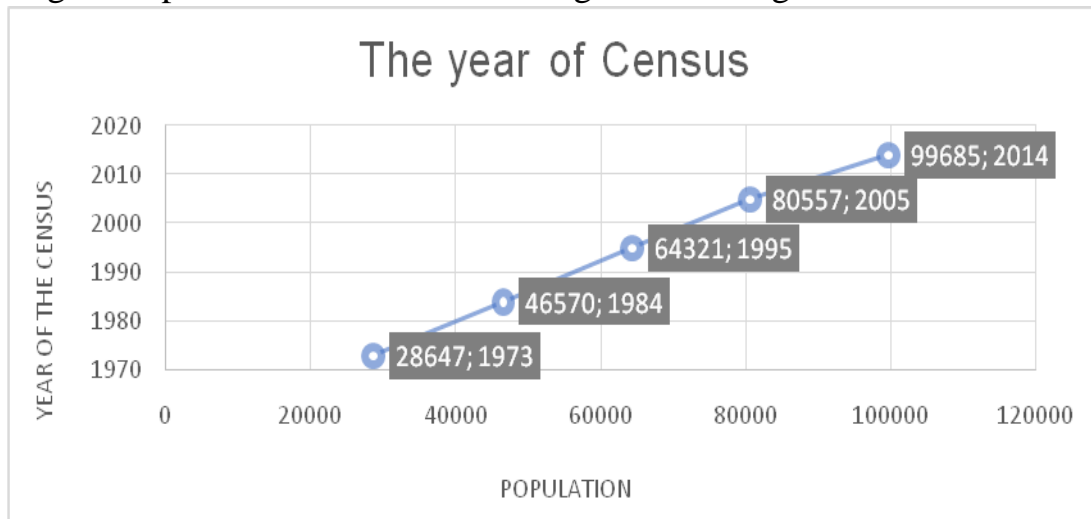


Figure 2 Population increase during the period 1973-2014in Sughel-Chmis

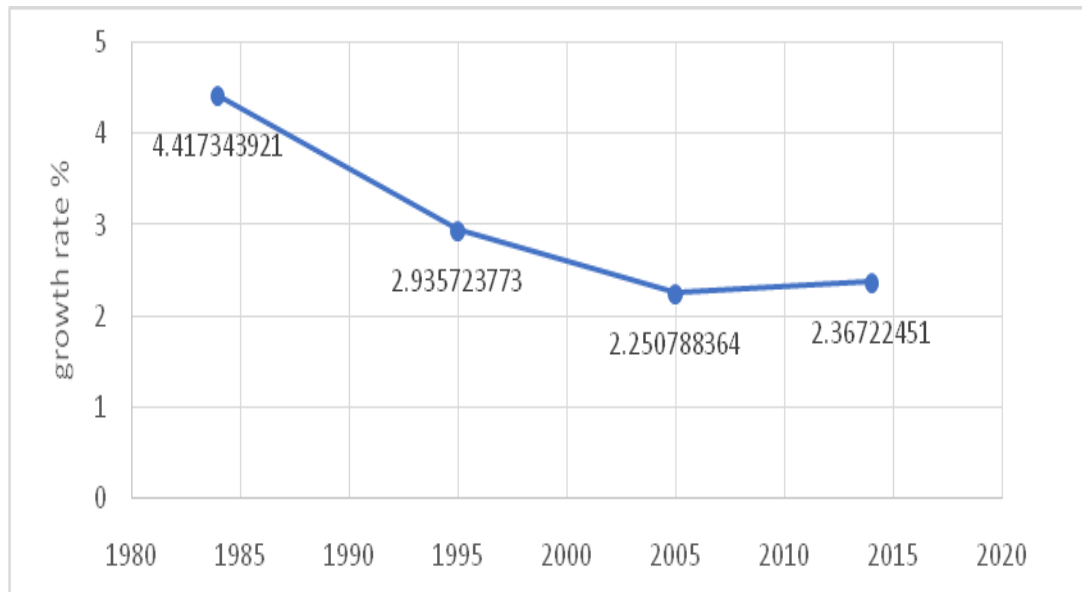


Figure 3 Population growth rate during the period 1973-2014 in Sughel-Chmis

The population density has varied from are section to another in the study area; it has reached (494.62 inhabitants / km²) in the section of Al-Wadi in 1973, to (7.44 inhabitants / km²) in the section of Kokas, as the highest and lowest level in the same year. Table 2 shows that.



Table 2 Distribution of the population and population density

SECTIONS	Arek m ²	The census 1973		The census 1984		The census 1995		The census 2005		The census 2014	
		populatio n number	populatio n density	populatio n number	populatio n density	populatio n number	population density	populatio n number	population density	population number	population density
Alhamam	45	4053	90.06*(6)	5316	118.13(6)	6526	145.02(6)	9653	214.51(6)	12919	287.08(6)
Almakola	20	4050	202.5(4)	7305	365.25(3)	9797	489.85(4)	10468	523.4(4)	11803	590.15(5)
Al-wadi	8	3957	494.62(1)	6980	872.5(1)	10477	1309.62(1)	10469	1308.62(1)	11490	1436.25(1)
Bandar	22	4989	226.77(2)	8028	364.90(4)	10889	494.95(3)	12921	587.31(3)	15087	685.77(3)
Kaam	29	5578	192.34(5)	9132	314.89(5)	12476	430.20(5)	14252	491.44(5)	18458	636.48(4)
Kokas	369	2747	7.44(7)	4117	11.15(7)	6231	16.88(7)	11154	30.22(7)	14959	40.53(7)
Sidi Khalifa	15	3273	218.2(3)	5692	379.46(2)	7925	528.33(2)	11640	776(2)	14969	997.93(2)
Total	508	28647	56.39	46570	91.67	64321	126.61	80557	158.57	99685	196.23

Source: Prepared by the student based on:

- i. Final Results of the General Population Census in Misurata Region, National Information and Documentation Authority.
- ii. Civil register in the popular watch.

* The numbers in the brackets indicate the rank of the sections.



Additionally, the Bandar section is the second most densely populated with 226.7 people /km², while Sidi Khalifa, Almakola, kaam and Alhamam, the population density of 218.2, 202.5, 192.34,90.06 people / km², respectively for the 1973 census.

In the next period (1984 to 2014), Al-wadi still has the higher population density: (1984- 872.5 people / km²), (1995- 1309.62 people / km²), (2005- 1308.62 people / km²) and (2014- 1436.25 people / km²). This can be attributed to its small area of the Al-wadi and possibly to its location in the center of Sughel-Chmis.

On the other hand, Kaam has a large area and remain in the seventh palce with 11.15 people / km²) in 19984, 16.88people / km² in 1995, 30.22 people / km² in 2005 and 40.53 people / km² in 2014.

Furthermore, it should also be noted that the Alhamam section has not changed its rank since (sixth). Figure 3 and the fingers of the maps (1), (2), (3), (4) (5) below show the population density.

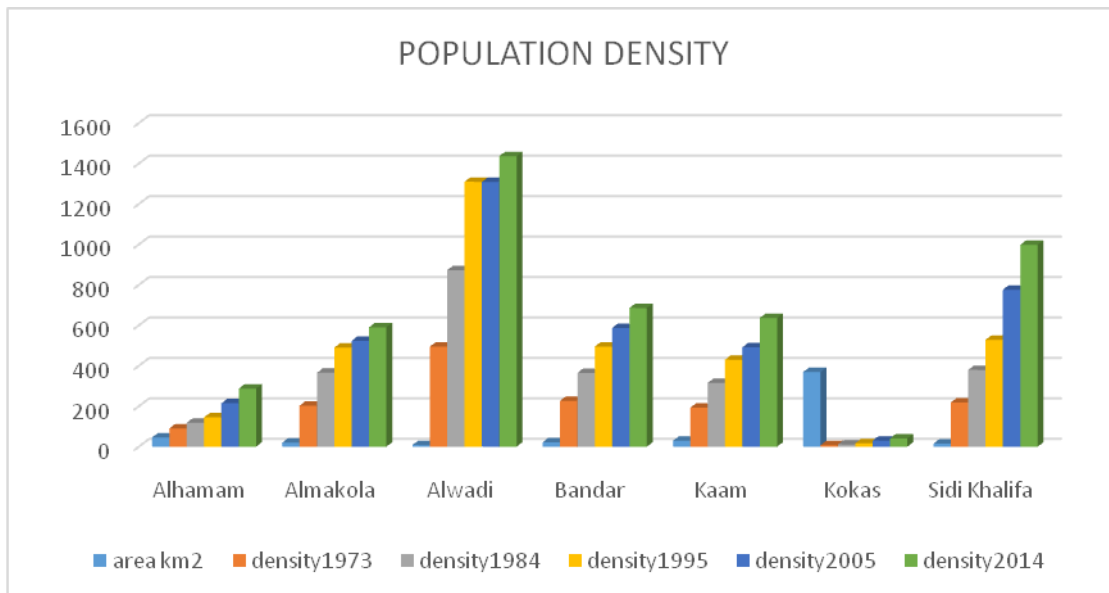


Figure 4 The population density of Sughel-Chmis -Libya in 1973,1984,1995,2005 and 2014

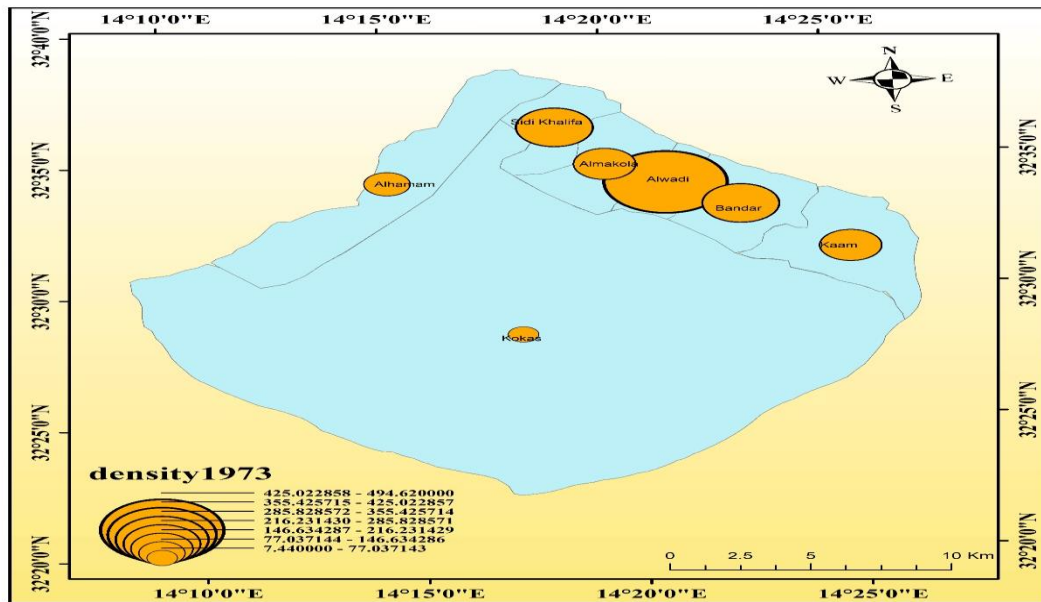


Figure 5 The population density of Sughel-Chmis -Libya in 1973

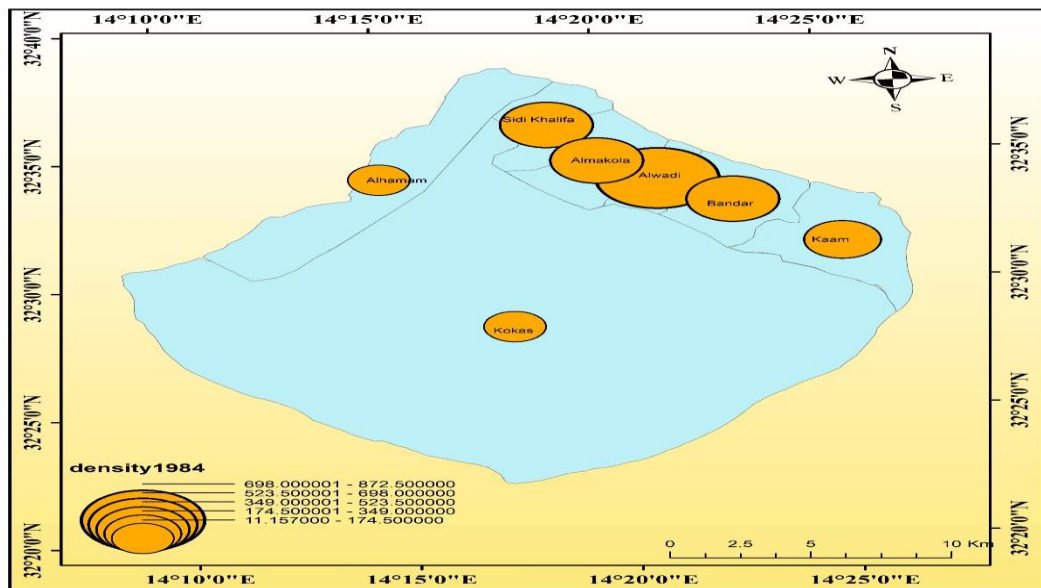


Figure 6 The population density of Sughel-Chmis -Libya in 1984

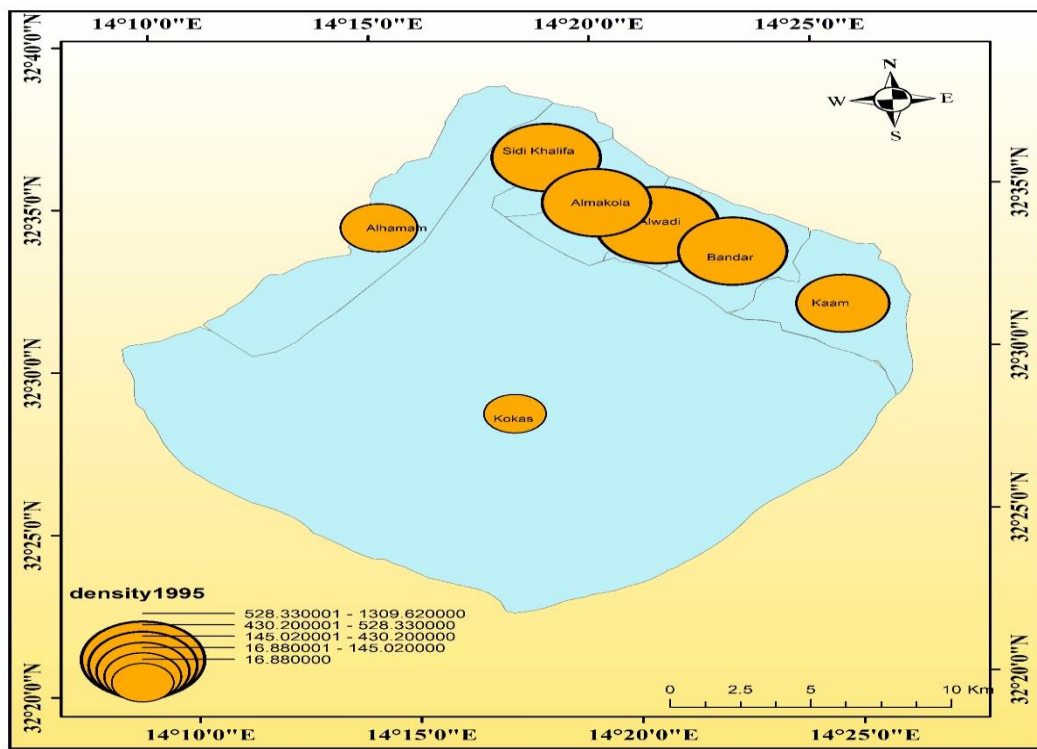


Figure 7 The population density of Sughel-Chmis -Libya in 1995

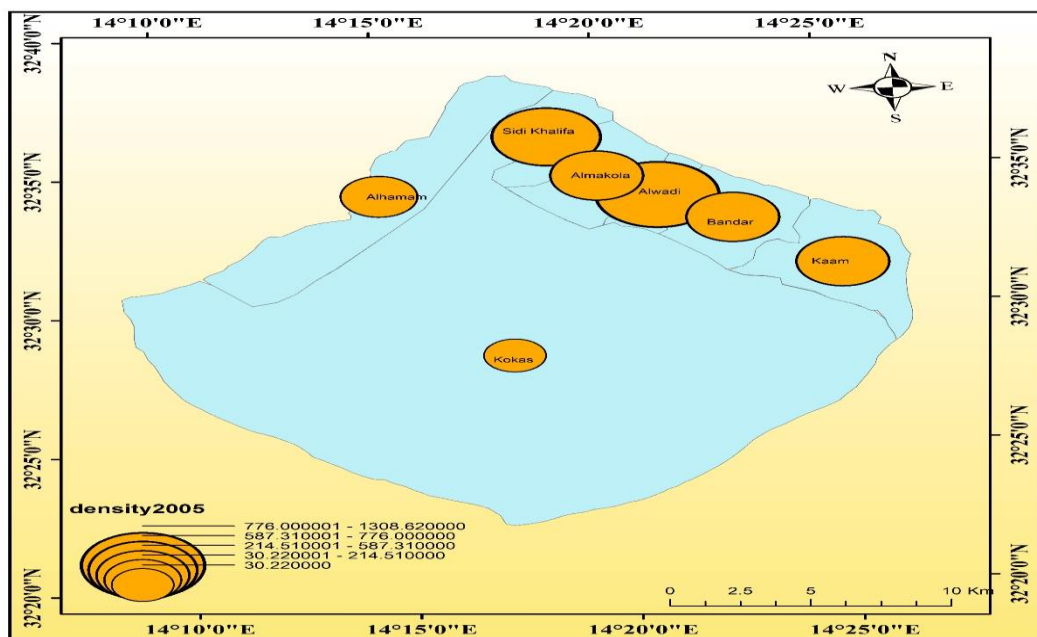


Figure 8 The population density of Sughel-Chmis -Libya in 2005

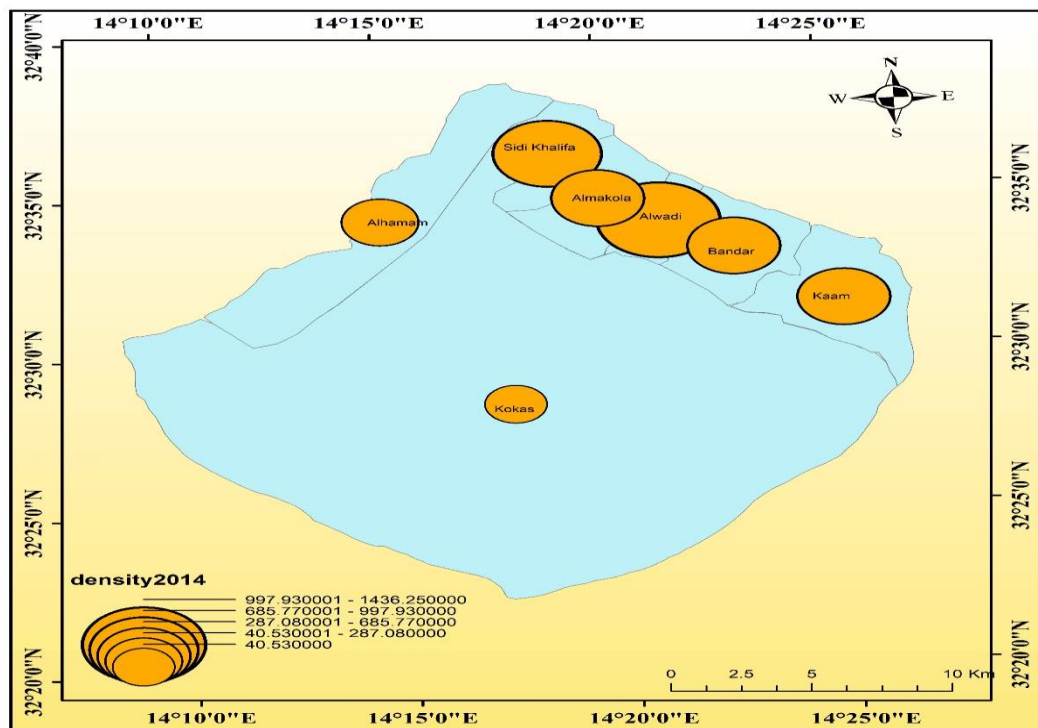


Figure 9 The population density of Sughel-Chmis -Libya in 2014

3- Results and discussion

THE DEMOGRAPHIC ANALYSIS

Demographic analysis in this study included 200 farmers, where a descriptive analysis was done for the demographic characteristics, and socio-economic profile in relation to characteristics of 'farmers in Sughel-Chmis area'. The variables of this analysis are: age, marital status, major and secondary of occupation.

Table 3 Frequencies of Age, Marital status, Major and Secondary of occupation

AGE	Frequency	Percent (100%)
26-40	68	34
41-60	82	41
61-85	50	25
Total	200	100
Marital status		
Single	30	15



Married	154	77
Widower	16	8
Total	200	100
Major occupation		
Farmer	64	32
Civil servant	104	52
Artisan	8	4
Business	10	5
Others	14	7
Total	200	100
Do you have secondary occupation?		
no answer	1	5
Yes	153	76
No	46	23
Total	200	100
If yes?		
no answer	49	24.5
Farmer	137	68.5
Artisan	6	3
Others	8	4
Total	200	100

Age may reflect a person's awareness of his or her issues. In this study, Table above shows the age of those working in agriculture in the region ranged from 26 to 85 years. The largest proportion 41% them age was between 41 and 60 years. While, 25% are between the ages of 61-85 years. Moreover, it is clear from the table above, most of the farmers were married, where the reaches of them were 77%. However, the widows were very few, with only 8%. also 15% of them were not married.

Table 3, also shows occupational status of respondents. From the total of 200 respondents, the largest group was ' government employees ' category comprising 52% (n= 104) of the respondents followed by 'Farmer' that accounts for 32% (n= 64) of the respondents. Although the major occupation was different between the responses where only 32% farmer, however, the other respondents also have their own agriculture land, this means that we have two categories of farmers, i.e full-time and part-time farmer. While, the 'Artisan, Business and Others' had the least percent of respondents where were 4 %, 5% and 7% of the respondents. However, some of those respondents answered 'yes' when asked



"Do you have a secondary occupation", but some of them answered 'No', and their percentages were as follows: 76% replied that they have a secondary occupation. While, 23% have only one profession. It should be noted here, that 5% (n=1) of respondents did not answer this question. Based on the 76% of respondents who answered 'Yes' their ratios were as follows, farmers 68.5%, artisan 3%, other occupations 4%. As well as, in this question, 24.5%, (n=49) respondents, declined to answer this part, for unknown reasons.

3.1 Place of Residence

In the Table below 4, we can see the difference between the places which has the largest ratio of people in the study area and the smallest ratio of the people. The previous maps above have clearly indicated the geographical distribution of the population living in the coastal area, where is due to flat land, good soil and low depth of groundwater, presently, the sections (Almakola and Al-wadi) are only the urban area, where the city services centre is located, in addition, they represent the Central Business District (C.B.D). The following table shows the place of residence of participants.

Table 4 Frequencies of place of residence

	Place of residence	Frequency	Percent	Valid Percent	Cumulative Percent
	rural	118	59.0	59.0	59.0
Valid	Semi-urban	52	26.0	26.0	85.0
	urban	30	15.0	15.0	100.0
	Total	200	100.0	100.0	

The following chart 4 shows that percentage of place of residence in the study sample.

3.2 Educational Attainment

Education is one of the most important socio-economic factors. However, education attainment of farmers may play a vital role of improved farming activities. In the study area, tertiary education (university and higher) has reached 50 per among farmers. The proportion of farmers having secondary education varied from 19 per. Furthermore, 12 per of farmers had an education Arabic/Quran school. Farmers having NO-schooling (11 per) are higher from farmers who they had an education up to primary school level (8 per). The following table 5 shows the distribution of Educational attainment between the participants.



Table 5 Table Educational attainment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no-schooling	22	11.0	11.0	11.0
	primary	16	8.0	8.0	19.0
	secondary	38	19.0	19.0	38.0
	tertiary education	100	50.0	50.0	88.0
	Arabic/Quran school	24	12.0	12.0	100.0
	Total	200	100.0	100.0	

3.4 Income

The following table 6 shows the distribution of income between the participants.

Table 6 Average income on occupation per month

		Frequency	Percent	Valid Percent	Cumulative Percent
	<LYD500	54	27.0	27.0	27.0
	LYD501-1000	92	46.0	46.0	73.0
	LYD 1001-1500	32	16.0	16.0	89.0
Valid	LYD 1501-2000	18	9.0	9.0	98.0
	>LYD2001	4	2.0	2.0	100.0
	Total	200	100.0	100.0	

The frequency table above shows that participant having income (501-1000) Libyan Dinar (middle income) are the majority (46%), the next percentage are those having income less the 500 Libyan Dinner. Where those who have high income (>2001 Libyan Dinar) represent the lowest percentage (2%). The following chart shows that percentage of income in the study sample.

The reliability test

The reliability is used to test the overall consistency of the questionnaire used in collecting the primary data from respondents (Neil 2009). Reliability coefficient is a measure of the amount of measurement error associated with a test score (Cronbach 1951) . Typically, reliability coefficient is a measure of internal consistency of all items, indicating how well items are correlated with one another in this study. Reliability coefficient alpha ranges from 0.00 to 1.00 , the



higher the value, the more reliable the test score. Reliability interpretation is based on the following values:

The output table from SPSS shows that the reliability coefficient Cronbach's Alpha of all variables equal to 0.867 as described in chapter 3.5.4. Based on the above classifications of alpha values, it is found that the current reliability of collected data associated with the items of three variables (Crops suitability, Perception of Water, and Agricultural activities) used in the survey is “good”, which is considered acceptable from statistical view.

T-Test analysis

A t-test's statistical significance indicates whether or not the difference between two groups' averages most likely reflects a “real” difference in the population from which the groups were sampled. There are three tests in the group of t-tests; each test examines the null-hypothesis on the mean of specific variable. For example, (One- sample t-test) is used to test the null- hypothesis of a sample from one population having a specific mean value, where (Dependent Sample t-test) is used to test the hypothesis of having different mean values of two levels (measures) of the same group (variable), and the third test (Independent t-test) is used to test that the mean value of two independent samples is different and not equal. The following table 7 summarizes the three types of t-tests.

Table 7 Summary of t-test types

One-Sample t-test	Dependent Sample (t-test)	Independent t-test
Test Hypothesis: Sample belong to one population having a specific mean value	Test Hypothesis: The mean value of two levels (measures) on same group is different	Test Hypothesis: The mean value of two independent groups (populations) is different
Number of groups: One	Number of groups: One	Number of groups: Two
Number of Variables: One	Number of Variables: Two	Number of Variables: One
		One independent variable (two levels) and on dependent variable

Finally, the t-test is used to test the null-hypothesis which indicates no statistical variance between two groups belong to the independent variables (i.e. the difference is by chance). The alternative hypothesis (opposite of the null-

hypothesis) states that the size of different in means of two groups of an independent variable is statistically significant and is not occurred by chance.

4- Agricultural Activities

The term "agricultural activities" in this study refers to a set of activities practiced by a farmer in his farm, such as use of agricultural pesticides to increase agricultural yield and the selection of the most useful agricultural crops.

Agricultural productivity in Libya is hampered by scarce renewable water resources, harsh climate, and poor soil quality (Profile 2005). Despite of this, the agricultural activities have conducted to produce the food on farms which implement good farming practice or good agricultural activities (Kehrig 2002).

Farmers' experience in agricultural activities

Table 8 Farmers' experience in agricultural activities

Experience in agricultural activities	Frequency	Percent (100%)
Less than 5 years	28	14
6-10	64	32
11-15	34	17
16-20	24	12
More than 21 years	50	25
Total	200	100

As for the experience of these 200 respondents in the field of agriculture in the table above (8), 25% of them have more than 21 years of experience in agriculture, and the large rate of farmers 32% had their experience between 6 to 10 years. While, 14% less than five years of experience. Finally, the other respondents 12% had 16 to 20 years of experience, and 17% had between 11 to 15 years of experience in agriculture.

This study statically analyzed agricultural activities data to determine if there is homogeneity between the northern and southern region and to identify the difference between farming activities by geographical location of the farms. This analysis is necessary due to the difference in population density in the two regions.



5- Comparing the difference between agricultural practices based on distances from the sea.

Agricultural activities in Sugh- el-Chmisis not homogeneous with regard to agriculture activities between two different areas from the distance to the sea in “Sughel-Chmis. There are two groups of respondents to reflect the distance from the sea in Sughel-Chmis with regard their Agriculture Activities.

Group A: 1-4km (north area).

Group B: Greater than 4km (south region).

In this test, the study uses the independent t-test. The null-hypothesis stated that the variance of mean of two groups (A & B) was not statistically different (i.e. by chance) on Agricultural Activities and their variance is not statistically significant, in other words the difference between the mean values of group A & B has small.

The following tables show the result of this test:

Table 9 Group Statistics of North and South regions

Perception index	Distance from Sea	N	Mean	Std. Deviation	Std. Error Mean
	North	99	3.2205	.61622	.06193
X1_Agriculture_Ac					
	South	101	3.1898	.48707	.04847

Note: The perception index (i.e. X1_agriculture_act) was a combination of six items of agricultural activities (please refer to Questionnaire: section D)

As shown in the above table, the number of respondents in north region equal (99), and south region equal (101), the mean values of the two groups were very close (Mean= 3.22 for north, and Mean = 3.18 for south), the difference in mean values between mean values of north and south were equal (0.0307). The difference was very small from the empirical perspective.

The Standard deviation of each group (north/south) was small, which means that each group was close cluster to its mean value. The difference between the standard deviation of north and south was very small and equal (0.013).



The following table shows the result of independent t-test:

Table 10 Independent sample test of Distance from the Sea

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	9.400	.002	.392	198	.695	.03077	.07846
Equal variances not assumed			.391	186.309	.696	.03077	.07864

The Levene's Test that tests the homogeneity variance assumption between the two groups (north/south). This assumption states that the size of the difference of mean values of the first group was equal to the second group. To test this assumption, the Levene's Test, where the output of this test ($F = 9.40$) was statistically significant ($\text{Sig.} < 0.05$, $\text{Sig.} = 0.002$). This result shows that the variance between the two groups (north/south) with Agricultural Activities was not equal because the null-hypothesis was rejected, which means there was a statistical difference between the distance from the sea on the Agricultural Activities.

The value of ($t = 0.392$) and ($\rho = 0.002$, $\rho < 0.05$). Therefore, this test was statistically significant.

6- The Findings

- i. There was a practical (real) statistically significant difference between the two groups (north/south) on the Agricultural Activities. In other words, the distance from the sea affects the agricultural activities of farmers.
- ii. The t-test output supported the findings from group statistics, where a very small size of the difference (0.0307) in mean values between northern and southern is found.
- iii. The t-test's shows that the magnitude of the difference in mean values of the two groups of populations is statistically significant. Therefore, the difference in distance from the sea has a significant effect on agricultural activities.



iv. The hypothesis which states that Farmer's socio-economic status is not the homogeneous with regard to agriculture activities between two different areas from distance to the sea in "Sughel-Chmis is found not true.

7- Conclusion:

This study discussed the demographic and socio-economic status as well as the agricultural activity of farmers in Sughel-Chmis. Initially, the study discussed population growth, where a population of (99685 in 2014) and a growth rate of (2.36 %) in the same year. It should to be noted that the rate of population growth in the region between 1948 and 2014 is almost constant. The study found that population density in the region is higher in the northern area compared to the southern area.

The field study found that 59% of the population lives in rural area while the percentage living un-urban area did not exceed 15%. Fifty percent of the population has tertiary level education. The income of the population ranges between less than 500 LYD to more than 2,000 per month, with 46% of the respond rings making between 501-1000 LYD and only 2% of all farmer making more than 2000 LYD. This study also discusses the relationship between agricultural activities and demographic and social-economic status. Distance from the sea was found to influence agricultural activities and that the socio-economic conditions are not homogeneous in terms of agricultural activities in the northern and southern region.

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