International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Impact Factor (2012): 3.358

Structural Changes and Spatial Differentiation of Crop Production in Libya (1997-2007)

Ali Jarad

[1]Belgrade University, Faculty of Geography, Studentski trg 3/II, 11000 Beograd, Serbia

Email: aligrad1972@yahoo.com

Abstract: ***Structural change of crops in Libya has both naturally and anthropogenic influenced. The change has direct implications for human society as well as for the earth system. The processes that occurred in the structural changes of crop are tightly coupled to the processes occurring in other components of this system such as meteorological and hydrological. So, understanding the causes of vegetation variability and measurement of structural changes of crop to natural and anthropogenic influences are a great scientific importance. Libya as many countries had structural changes of planting, for example in Sabha direction of crops production had an inverse transformation in ratio to area, but due to the increased participation of sowing production and trefoil in total across all productions, by 92.4% compared to 1997 and increased area of 228.631 ha. Most of structural change of crop production are observed in the settlements of Libya and associated with an increase in vegetation activity due to prolongation of the growing season caused by temperature rise. Mathematical-statistical method of successive coefficients determines six basic directions of use of sowing areas, that making it possible to analyze qualitative changes in the structure of the crops.***

Keywords: Agriculture, crop production, Libya, structural changes

1. Introduction

The agriculture in Libya is very limited mainly because of rarely freshwater resources and low soil fertility. Production systemic characterized as a broad pastoral with low productivity and livestock often. The reasons for intensive deagrarization should be sought in the wrong development strategies, but consequences are significantly expressed in the socio-economic structure of the population (Boserup, E. 1965); (Antrop, M. and Van Eetvelde, B, 2000). Structural changes in the economy (Wehrwein. S, G. 1942); (Irwin. E, G. and Geoghegan J. 2001). land use changes (Antrop, M. 2000a); (Fezzi. C, and Bateman. I. J. 2009). and agricultural productivity (Wood. R. and Handley, J. 2001); (Ratkaj. I, and Sibinović, M. 2011). The impact of globalization has the effect as a catalyst for local change (Lowenthal. D, 1997); (Antrop, M. 2000b); (Vos. W, and Klijn, J. 2000); (Højrink, K. 2002). The characterized as relatively hot and dry in summer, and warm rainy in winter, according to the natural conditions and land use, ninety five percent of the 1.75 million km² of Libyan territory is desert or semi desert. In the northern Mediterranean strip reside about 75 % of the 5.7 million of total population, at a density of about 150 inhabitants per square kilometers. The density per km² of arable land is estimated to be around 300 inhabitants as it is shown in Table 1. The coastal strip also harbors most of the 2.15 million hectares of Libya's total estimated arable and permanent pasture land (FAO. 2005). There are 22 main settlements in Libya which can be divided into 4 sets of terrains: Coastal Plains along the Mediterranean Sea, Northern Mountains close to the coastal plains and include the areas called (Western Mountain) in the west, while the Jabal El Akhdar (Green Mountains) is settled in the east. Internal depressions covered the centre of the country and include several oases, and Scattered Mountains are located in southern and western parts of country. Factors leading to structural changes in general, can be divided into two categories as climatic variability and human activities.

Climatic variability: often happens in dry lands, which is characterized by limited supplies of water (annual rainfall is less than 100mm). Where rainfall varies greatly occur from year to year, even during the same year, while wider fluctuations occur over years and decades. This leads directly to a dehydration process which is often associated with land degradation and then a vital factor behind the structural changes for crop production.

Human activities: Almost definitions of the term structural changes agreed upon the human activities may the cause of desertification. The human activities that lead to structural changes in crop production can be outlined as follows:

- Poor Irrigation Practices: This would lead to soil salinity that can prevent plant growth that happened in all areas near to the cost in northern part of country, especially plain of Al-Jfarah.
- Deforestation: Destruction of vegetation in arid regions, mainly for fuel-wood.
- Over-exploitation of ground: this happens for different reasons but the main is the need for more crops.
- Natural and man-made Disasters: Natural disasters such as droughts and man-made disasters such as wars and national emergencies can destroy productive land by causing heavy concentration of migrants to overburden an area which happened last two years in country.

2. Materials and Methods

The Main Mathematical statistical method is a successive coefficient. (Kostrowicki, J. and Szyrmer, J. 1991), determines six basic directions of use of sowing areas, that making it possible to analyze qualitative changes in the structure of the crops. This method doesn't present quantitative differences, so it is not possible to determine the extent and intensity of absolute changes. Detailed insight into the configuration of sowing areas can be verification by

comparing the results of successive coefficients and method of the proportional change analysis (shift-share analysis). Shift-share analysis could defined the absolute change of use of crops area, the net relative change, structural effect and the differential effect of sowing settlements.

2.1. Data Collection and Analysis

The main data were collected from the two main Census and annual reports of the Agricultural research Centre in Libya to cover the period of 1997 to 2007 and from several other sources published by the Department of Census and Statistics, including, Economic and Social Statistics of Libya (2009).

The five modules of changes were used to specify the following empirical model:

Reviewing of the relative land use change of agricultural production can notice two types of change: 1) Differential regional changes in every settlement alone. 2) Structural changes in the main groups of sowing crops.

2.2. Agricultural production in Libya

The agricultural sector in Libya is playing an important role in providing livelihood for the increasing population, which contributes 8.7% of GDP (Laytimi, Ahmed. 2002). Libyan economic depends primarily upon revenues from the oil sector, which contribute practically all export earnings and about one quarter of GDP development. The agricultural sector employs of average 5% of the labor force, with agricultural resources in the country characterized by diversity including forest, crop lands, grazing lands which estimated (2.150.000 ha). Crops areas are widespread on about 1.2 % of the arable land in the country, (FAO STAT database, 2005). Different settlements have different potentials, importance and the role in food production. The increase in production has the introduction of new cultivars of some crops, increased use of mechanization and fertilizer, etc. The most of the agricultural products, fruits (442.000 ha) and vegetables (36.300 ha) made the largest cultivated area and the largest tonnage production in the country. Cereals are extended at the area of 381.300 hectares, and olives are covering about 100.000 ha, (Laytimi, 2002). The levels of agricultural production do not meet local demands as evidenced by the large specter and quantities of agricultural produce that are imported every year. A yearly average of about 1.82 million hectares is cultivated for annual crops, about 0.34 million hectares is for permanent crops and permanent pasture areas are extended on about 13.3 million hectares.

About 95 percent of Libya's land covers desert and much of the remainder is used for grazing. Most of the arable land and pasture land are in the western parts of the coastal belt. The agricultural sector in Libya has been developing, but the prevailing climatic conditions, the low fertility of most of its soils, and irrigation problems limit the output. Grains are grown and some livestock is grazed to a lesser extent in the southeast area. Cultivation is sporadic and dependent on rainfall. Although, total agricultural production has increased as a result of irrigation projects and the use of fertilizer, but Libya still must import large amounts of food to satisfy the needs. Agricultural production included potatoes, watermelons, citrus fruits, tomatoes, wheat, olives, and livestock include sheep, goats, followed by cattle, camels, and poultry. Crop yields, rainfed or under irrigation, are generally low and most irrigation cultivation in the mountains area. About 90% of the fruits and vegetables, and more than 60% of grain productions are obtained under a variety of irrigation and farming schemes. Because of the prevailing sandy soils in most of the arable land, sprinkler irrigation is practiced on nearly all the irrigated plots in Libya. About 99% of irrigation uses groundwater, while the remaining 1% is irrigated by surface water and treated wastewater, (Laytimi, 2002).

A. 2.3. Shift-share analysis of the distribution of crop production.

Reviewing of the relative land use change of agricultural production which data gathered from two censes for the period of 1997 to 2007 can notice two types of change: 1) Differential regional changes in every settlement alone. 2) Structural changes in the main groups of sowing crops.

Absolute change (ACj) of use of sowing productions in the studied period is -689.399 ha, and representing a total reduction of crop production in Libya. The cereals production decreased by(323.213 ha), fodder for the (1.126.077 ha), fruites for (694.965 ha). Negative regional spatial changes in sowing areas are most pronounced in settlements: Benghazi (-58.511 ha), Al jabal al akhdar (-33.983 ha), Derna (-9.644 ha), AlBatnan (-10.425 ha), prousive settlements in Esterely Area, and Al kofra (-245.221 ha), Al wahat (-3.278 ha), these in Centeral Area, while Westerly area, there are six settlements as: Jafara (-585.842 ha), Tripoli (-375.160 ha), Al Margheb (-304.701 ha), Zawia (-60.406 ha), Al jabal Al garbi (-20.249 ha), and Nikhat Al kames (-1.576 ha), and last area is Southerly which have five settlements, just two of them have negative change as; Ghat (-106.450 ha), Wadi Al shati (-12.804 ha).

These settlements are disposed with the largest total acreage, while the direction of crops transformed from the dominant grain direction to mostly and uniform grain direction. Also, mentioned settlements have a good connection with the urban centers. On the other hand, the crop production was increased by a total of 1.138.851 hectares of spatially distributed in eight settlements: Murzug (310.993 ha), Sabha (22.8631 ha), Al Marj (187.692 ha), Misurara (173.536 ha), Wadi Al Haya (99.165 ha), Sirt (69.246 ha), Nalut (35.797 ha) and Al jofra (33.791 ha). The main characteristic on these settlements is that the average of acreage increased by about 42.356 hectares in the researching period It is evident that the settlements increased their acreage on the basis of increase of agricultural production and changes in direction of use of agricultural land. (Sibinović, Martinović, and Ratkaj, 2012).

Increasing of the crop production in this region should be taken with a grain of salt, because in some areas of country estimated a significant share of the land, that does not used for commercial agricultural production, but statistically shown as agricultural land. This phenomenon can be considered as quasi-agricultural land use. (Wood and Handley, 2001).

Regional development component:

$$N_j = E_j^0\left(\frac{T^1}{T^0} - 1\right) \quad (1)$$

Presents the result of settlements acreage in the base year, by a margin proportional change in sowing area in some production of the country, and the aggregate value of acreage settlement in the base year.The average value of the regional development component is (-689.399 ha) and the result is a continuous decrease in sowing area in this region.

Structural (Relative) effect:

$$S_j = \sum E_{ij}^0\left(\frac{T_i^1}{T_i^0} - \frac{T^1}{T^0}\right) \quad (2)$$

presents the sum of products derived from sowing area major groups of crops (cereals, industrial crops, vegetable crops, fodder crops) crops in country in the base year, with relative changes in sowing crops of the same size in all the settlements collectively, minus the average proportional change in the total sowing production in the country. Increased participation of production under crops that showed a growth rate higher than the average (or lower rate of decline than the average) determines a positive structural change in acreage in crop production. Positive structural effect was noted in (7) settlements, in absolute terms, the effect was greatest in these settlements: Sabha (242.843 ha), Al kofra (121.362 ha), Ghat (100.503 ha), Al Margheb (73.503 ha), Misurata (35.207 ha), Al jofra (22.886 ha), and Wadi Al haya (2.950 ha). Increased participation of fodder caused the positive structural effect because the share of fodder crops in the structure of sowing productions.

It is interesting that the largest positive structural effect occurs in the seetlements Sabha and Al-kofra, although it was in these settlements recorded the biggest loss of sowing production (collectively). The largest percentage of the ratio of the absolute values of the structural effect and the absolute value of the acreage in the seetlements saw in Sabha (92.4%) in the southern area of Libya.

In Sabha direction of crops production had an inverse transformation in ratio to area, but due to the increased participation of sowing production and trefoil in total across all productions, by 92.4% compared to 1997 and increased area of 228.631 ha, there is a positive structural effect. The negative structural effect is characteristic of the 15 settlements, and the lowest absolute amount recorded: Al-Marj (-168.126 ha), Murzuk (-90.308 ha), Tripoli (-77.033 ha) and Jafara (-65.135 ha). For this settlements are characterized mostly grain direction with a share of forage and industrial crops. These settlements recorded a high value of negative regional spatial changes in the amount of crops production from (-40.000 hectares). The highest percentage of negative structural effect recorded settlement A-Marj (-28%) in the Eastern area in Libya. For this resort is also characterized mostly grain direction with a share of forage and industrial crops that are transformed from dominantly grain direction with the participation of industrial and vegetables in 1997. Although 1/3 of settlements had a positive structural effect, the total value is negative and amounts to (-599.854 ha) while the typical average value is (-40.000 ha).

Differential (spatial) effect:

$$C_j = \sum_{i=1}^{n} E_{ij}^0\left(\frac{E_{ij}^1}{E_{ij}^0} - \frac{T_i^1}{T_i^0}\right) \quad (3)$$

Arises from the sum of the difference between the actual surface of changes in the major groups of sowing crops production and hypothetical changes, which would occur, if the productions changes of the crops was the same proportional change in production of crops in rural areas of the region. In this way, changes are defined in the deployment of sowing production resulting from the change of location area under different crops. Positive values of spatial effects were noted in (15) settlements. The largest differential effect possess: Murzuk (444.250 ha) Al Marj (439.037 ha), Miusrata (164.468 ha), Wadi Al-Haya (96.810 ha), Sirt (82.679 ha) and Wadi Al shati (56.554 ha).Settlement Murzuk mainly characterized by a change of grain direction with a higher share of fodder crops in 1997, in the evenly grain direction with a higher share of fodder crops and vegetables in 2007. In this way, was substituted the area under cereals with vegetables, which reduced the rate of decline in crop production. Because of that recorded positive value Murzuk regional (actual) spatial change of crop production amounting to 444.250 hectares. The percentage of the highest differential effect value recorded settlements: Murzuk (29.4%) and Al-Marj (29.1%). Both resorts have changed the direction of crop production in the same way, from mostly grain direction with a higher share of vegetables to uniform grain direction with a higher share of vegetables and forage crops share. In both settlements was detected a high value regional spatial changes in crop production: Murzuk (444.250 ha), Al-Marj (439.037 ha).
The negative value of the differential effect occurs in (7) settlements. The lowest values were recorded in the settlements: Jafara (-409.631 ha), Al kofra (-322.837 ha), Al Margheb (-298.436 ha) Tripoli (-246.847 ha), and Ghat (192.215 ha), which is directly related to higher negative values of regional spatial changes in crop production expressed in these very rural areas. Total reduction in crop production in these settlements is 1.506.109 hectares. Percentage-wise, the lowest percentge differential effects recorded Banghazi (-36.5%), and Al-jabal Al-gharbe (-8.6%), settlements with relatively small crop areas.

Net relative changes of crop production:

$$R_j = E_j^1 - E_j^0\left(\frac{T^1}{T^0}\right) \quad (4)$$

stems from differences acreage settlements at the end of the studied period and the hypothetical acreage that would have resort to the surface of the base year changed proportionally to changes in all the settlements collectively.

Mathematically this corresponds to the sum of the structural component (Sj) and comparative (Cj) components. Reducing crop production in relation to the expected hypothetical

change was noted in (8)seetlments. The biggest negative net relative change occurs in settlements: Jafara(-474.766 ha), Tripoli (-323.880 ha) and Al Margheb(-224.933 ha), which is directly related to the relative negative net change in farmland values and high negative regional (actual) spatial changes in crop production. For a typical settlement, Al-jabel Al-Akhdar is extremely low differential effect, but highly positive structural effect due to a favorable change in the direction of agricultural production, increasing the share of vegetables. Positive net relative change recorded in (8) settlements, the most notable being Murzuk (353.942 hectares), which is a consequence of the extremely high value of the differential effect.

Differential component, in relation to structural effects, has a much greater impact on net relative change of Seed production, which can be seen through the fact that the ratio of positive and negative differential effect and the positive and negative net relative change completely not identical, for the all settlements. The settlements: Jafara, Tripoli, Al-Margheb, Al-kofra, Al-jabal Al-garbi, Ghat, Benghzi, and Al-jabal Al-Akhdar), noted a negative structural effect, but positive net relative change, while in (14) settlements: Murzuk (353.942 ha), Al-Marj (270.911 ha), Sabha (261.700 ha), Misurata (199.675 ha) and other 10 settlements reports a positive structural effect, but a negative net relative changes. More important location component arises from the fact that the structural changes occurring as a result of the overall decrease in agricultural land, and not intended as a factor of change in the direction of agricultural production.

3. Typology of Crop Production

The purpose of field survey is to support the analysis processes and to verify certain data interpretations. Because of these serious consequences of structural changes of crop production there becomes a high need to combat this process. The first step is to monitoring structural changes through measuring land use changes and processes in various years (1997 and 2007) of last two agricultural censuses in Libya. Standard methods of undertaking such measurements are the equations and mathematical analysis that have economically feasible. These modern methods have been short of standardization because of the range of criteria and indicators (Hill, J. 2004). The various data sources are available through various data censuses and some of field studies. Although no one can confirm that, the mathematical analysis will replace traditional sources of data. However, an obvious role that it would play in assessing and monitoring structural changes of crop production.

It has been demonstrated that satellite and remote sensing systems offer a considerable potential in assessing and monitoring structural changes of crop in general.

4. Results and Discussion

The result shows that, the type (1) is dominant deagrarization, which contain (7), settlements as follows: Al-Kofra, Ghat, Western mountain, Benghazi, El-Mrgeb, Tripoli, El-jafara. Due Al-kofrah and Ghat are in a big Sahara, while Benghazi is in the marsh land and El-mrgeb, Tripoli and El-jfarah are holding the most of Libyan Population, which mean started to desertification by behavior of people, that represented by change land use of fruitful groves and palm trees to use it for residential or industrial use, this change was going on the former secret and in a limited fashion which caused the spread of the phenomenon of private bribery and favoritism during the last two decades of the last century, after that it has expanded and become public and common phenomenon especially, after the events of 2011(time of war in country), because of weak law enforcement and weak of government, which no one afraid or care from it.

Second type (2) is moderate decline under negative (Sj), which contain one settlement: El-jabal El-Akhtar. Because of a geographical location and the climatic conditions enjoyed by the Green Mountain made him a green area somewhat conservative.

The type (3) is moderate decline under positive (Sj), which doesn't contain any settlement in Libya.

While type (4) is moderate growth under positive (Cj), which contain (6), settlements as follows: El-wahat, El-batnan, Darnh, wadi El-shate, zawia, zwara. All these settlements are consider as agriculture areas, due located in good places and have appropriate climatic conditions. Although total agricultural production has increased as a result of irrigation projects and the use of fertilizer, settlement's agriculture performance remains low, the country still need to import large amounts of food.

The type (5) is moderate growth under negative (Cj), which doesn't contain any settlement in Libya according to data analysis.

The Last one type (6) which focused on intensive increasing in production, that contain (8) settlements as follows: El-mareg, Sirt, Musrata, El-jfrah, Sabha,Murzig, Nalwt, Wadi Al-haiat. All these settlements are very rich resources to be agriculture areas, due located in good places and have good climate conditional with enough of water resources, so these areas produce most of food that people used daily.

According to the pervious results we got new map, which shown the ratio of positive and negative differential effect and the positive and negative net relative change completely not identical, for the all settlements as Figure 1.

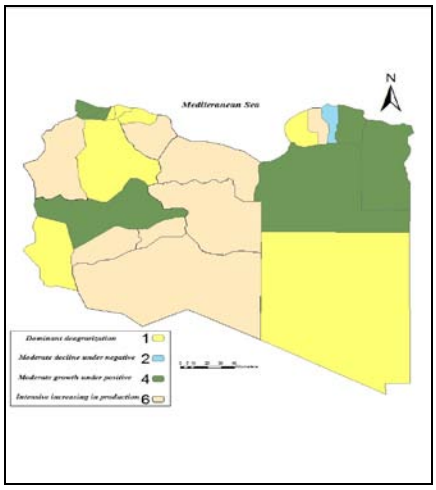

Figure 1. Ratio of positive and negative net relative change for the all settlements.

The relatively "intensive" farming in these settlements has traditionally been in or around the narrow northern Mediterranean coastal belt where most of the arable land exists and most of the fruit, vegetable, olive, and cereal productions take place except wadi El-haiat which located in south area.

5. Conclusion

According to the comparing the results of the shift-share analysis and directions of crops production at the end of the period under study, it is possible to identify certain principles. The six settlements are detected in the area of the Libya, where the grouped settlements are characterized by positive net relative change, positive structural effect and a positive differential effect: There are various regions that consisting of some settlements which spread in the different areas of Libya. These areas are characterized by the continuity of the dominant gain direction that was most widespread in the (6) settlements as follows: El-wahat, El-batnan, Darna, Wadi El-shati, Zawia, Zwara. All these settlements are considering as a positive production crops area, due located in good places and have good resources. Areas which Intensive increasing in production, which consisting of (8) settlements as followes: El-mareg, Sirt, Musrata, El-Jfrah, Sabha, Murzig, Nalwt, Wadi El-haiat. there were no significant changes in the direction of use of sowing area, which characterized by a uniform grain direction and the increased percentage of vegetables, which is a feature of specialized, market-oriented agricultural production; these settlements are very rich resources to be agriculture production crops areas, due located in good places and have good climate conditional with enough of water resources, so these areas produce most of food that people used daily. The area around the El-Jabal El-Akhtar, which the direction of crops in the period from 1997-2007 was transformed in this region mostly complete substitution of grain direction with a higher share of forage, evenly grain direction of a greater share of fodder crops and vegetables participation. These changes affect a significant reduction in the area under crops and the effect of transport accessibility.

It is worth mentioning that, there are no types(3) and (5) which first mean moderate decline under positive (Sj), that doesn't contain any settlement in Libya, and second one mean moderate growth under negative (Cj), also doesn't contain any settlement in Libya.

In general, Libyan loss of arable land everywhere over the last fourty years, and the agricultural revitalization efforts are reduced to the intensification of agricultural production and land reclamation in that sense, it is more realistic to expect an increase in the area under vineyards and orchards, and not covered by meadows. So, as of results there are (7) settlements under dominant deagrarization as follows: El-Kofra, Ghat, Western mountain, Benghazi, El-Mrgeb, Tripoli, and El-jafara, because of El-kofrah and Ghat are in a big Sahara, while Benghazi is in the marsh land and El-mrgeb, Tripoli and El-Jfarah are holding the most of Libyan population and producing almost of food like vegetables and fruits which mean started to desertification by behavior of people. (Chomitz. K, M. and Gray D. A. 1996).

References

[1] Antrop, M. (2000a).Rural-urban conflicts and opportunities. Landscape, (83-91pp).
[2] Antrop, M. and Van Eetvelde, B, (2000). Holistic aspects of suburban landscapes, visual image interpretation and landscape metrics, Landscape and Urban Planning, (43-58 pp).
[3] Antrop. M, (2000b). Changing patterns in the urbanized countryside of Western Europe. Landscape and Ecology, Vol. 15, No. 3, (257-270pp).
[4] Boserup, E. (1965). The conditions of agricultural growth, the economics of agrarian change under population pressure. London.
[5] Chomitz. K, M. and Gray D. A. (1996). Roads, land use and deforestation. A spatial model applied to Belize. World Bank Economic Review, vol. 10, (487-512pp).
[6] FAO. (2005). Aquastat database. Review of water resource statistics by country. The Libyan Arab Jamahiriya. Rome Italy.
[7] Fezzi. C, and Bateman. I.J. (2009). Structural Agricultural Land Use Modeling. In: International Association of Agricultural Economists, Conference, Beijing.
[8] Hill, J. (2004). Remote Sensing in Desertification Research. University of Trier, Germany, (p6).
[9] Højrink, K. (2002). The right to roam the countryside – low and reality concerning public access to the landscape in Denmark. Landscape and Urban Planning, 59 (1),(29-41pp).
[10] Irwin. E, G. and Geoghegan J. (2001). Theory, data, and methods. Developing spatially-explicit economic models of land use change. Journal of Agriculture, Ecosystems and Environment, vol. 85, (7-24pp).
[11] Kostrowicki, J. and Szyrmer, J. (1991). Typologies rolnictwa - concepts and methods. Warsaw, PAN-IGIPZ.
[12] Laytimi, Ahmed. (2002). Agricultural Situation Report – Libya. market and Trade Policies for Mediterranean agriculture, Medfrol project.

[13] Lowenthal. D, (1997). European landscapes transformations. The rural residue. In: Groth, P. and Bressi. T.W. eds. Understanding ordinary landscapes. Yale University Press, New Haven, (180-188pp).
[14] Ratkaj. I, and Sibinović, M. (2011). The productivity of agriculture in rural areas of the region of Belgrade. In Problems and challenges of modern geographical science and teaching. Belgrade: University of Belgrade - Faculty of Geography. (385-392pp).
[15] Sibinović. M. Martinovic, M. and Ratkaj, I. (2012). Changes in agricultural land use patterns in the rural area of the Belgrade region. In Local government in the planning and development of areas and cities in this century. Belgrade: APPS.
[16] Vos. W, and Klijn, J, (2000).Trends in European landscape development. Prospects for sustainable future. In: Vos, W, Klijn, J. eds. From landscape ecology to landscape science, Kluver, Dodrecht. (13-30pp).
[17] Wehrwein. S, G. (1942). The rural-urban fringle. Economic Geography.18 (3) (217-230pp).
[18] Wood. R, and Handley. J, (2001). Landscape dynamics and the management of change. Landscape research, 26 (1),(45-54pp).
[19] Wood. R. and Handley, J. (2001). Landscape dynamics and the management of change. Landscape research, 26 (1), (45-54pp)

Author Profile

Ali Jarad received the B.S. degrees in Geography from Zawia University 1995, and M.S. degrees in Geography from Zawia University, he entered postgraduate program in 1997/98, at the Department of Geography, Al-Fateh University, Tripoli. During 2002-2007, he engaged in the Department of Geography, University of Zawia, as an assistant, for objects Agricultural Geography. He is now PhD Candidate in Belgrade University.