

# We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

186,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index  
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?  
Contact [book.department@intechopen.com](mailto:book.department@intechopen.com)

Numbers displayed above are based on latest data collected.  
For more information visit [www.intechopen.com](http://www.intechopen.com)



# Effect of Environmental and Socioeconomically Change on Agricultural Production in Konya Region

Sukru Dursun\*, Serpil Onder, Ramazan Acar,  
Mithat Direk, Osman Mucehver

Selcuk University, Konya, Turkey;

\*Corresponding author, Email: sdursun@selcuk.edu.tr, Tel. & Fax. : +90-332-2232057

---

## Abstract

Recently environmental problems are increasing all over the world with increasing population and industrialisation which is the increasing human requirements. In the same way, there are many environmental problems in the Konya Closed Basin, such as scarcity of water supplies in the region for realization of the unplanned agricultural production with related irrigations, since water storage difficulties owing to geologic and topographic characteristics of the area and drainage problems of irrigated agricultural areas. Climatic conditions are shaped large flat steppe areas in Konya basin. There will be important water shortage problems in the basin and irrigation water demand should be planned. Water losses should be kept to a minimum so that the amount of water obtained from underground water resources can be reduced and eventually the possible biological and ecological adverse impacts of the project will decrease and the diversity of species of flora and fauna will be preserved and endemic species will be protected. With this investigation, we aimed to put forward source of problems come from the future, appeared recently and continue in the future. Our effort may help to reduce critical problem or save our environment for our children.

**Keywords:** Konya Close Basin, Environmental problem, Agriculture related to water, Climate change,

## 1. Introduction

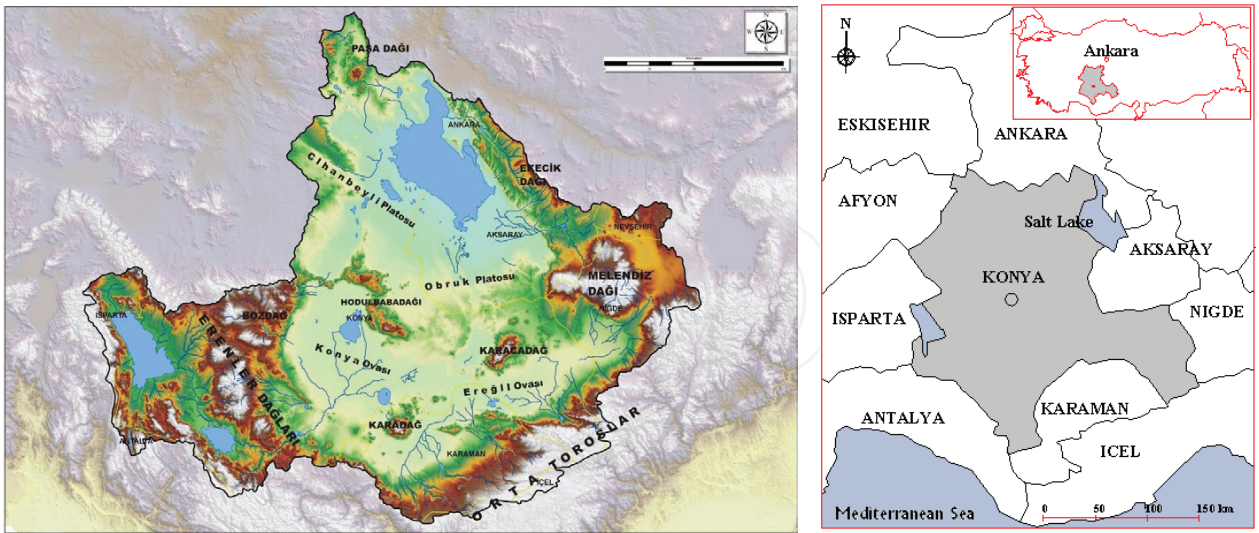
Turkey straddles Europe and Asia with an area of 779,452 km<sup>2</sup>, across the Marmara Sea with Istanbul and Canakkale Straits. Turkey's border is on the northwest by Bulgaria and Greece, on the east by Georgia, Armenia, Azerbaijan and Iran, and on the south by Iraq and Syria (Figure 1). Turkey's 8,333 km coastline extends along the Black Sea, the Marmara Sea, the Aegean and the Mediterranean Sea. Turkey is one of the fortunate countries in which all four seasons and various climate types are present. Large plains, highlands, mountains and deep valleys mainly characterize its geography. Turkey lies between the temperate zone and the sub-tropical zone. These peculiarities are causing different seasons to be lived at the same time, over the different climatic regions of the country. Turkey divides into five basic climate regions: Mediterranean Climate, Black Sea Climate, Semi-humid Marmara Climate, Steppe Climate and Continental Eastern Ana-

tolia Climate. Average altitude is 1,132 m and only 10% of the country is less than 250 m above the sea level. High mountains are concentrated in central and eastern Anatolia. The physical landscape is closely linked to environmental conditions.

Erosion is one of the most severe rural environmental problems affecting 81% of the total land surface in varying levels of severity. About 73% of the cultivated land and 68% of the prime agricultural land (Classes I-IV) is prone to erosion. As a result, about one billion tons of soil is carried away each year. Turkey has about 120 natural lakes, including small lakes in the mountains. The largest and deepest lake is Lake Van with a surface area of 3,712 km<sup>2</sup> and an altitude of 1,646 m from sea level. There are four main regions where lakes are intensively dispersed: The “Lakes District” (Eğirdir, Burdur, Beyşehir, Acıgöl Lakes), Southern Marmara (Sapanca, İznik, Ulubat, Kuş Lakes), Lake Van and its environs, and Lake Tuz and its environs. Turkey has 555 large dam reservoirs. The names and surface areas (km<sup>2</sup>) of the large ones are Atatürk (817), Keban (675), Karakaya (268), Hirfanlı (263), Altınkaya (118), Kurtboğazi (6). Turkey is rich for streams and rivers which many of them meet with seas within Turkey border. However, Turkey is not enough water sources for their requirements. Many lakes are under drying risk that needs to take measure for this problem (Table 1).

2. General View of Turkey

A large part of the Konya province is coincided on the high plains of Central Anatolia. Southern and western parts of Konya area are included the southern Mediterranean. Konya takes geographically in between 36° 41’ and 39° 16’ north latitude and 31° 14’ and 34° 26’ east longitude respectively (Figure 1). Surface area (excluding lakes) is 38,257 km<sup>2</sup>. This area is the largest face in cities area of Turkey (Anonymous 2008a). The average height of the city from the sea level is 1,024



meters. Average altitude is 1,016 m in Konya (Anonymous, 1998; Anonim, 1997).

Figure 1. Location maps of Konya City and Konya Closed Basin

Konya Basin Wetlands	Original Scale*	Protection Status	Recent Situation
Samsam Lake	830 ha	SPA* (1992)	Drying activity for opening Agricultural. Lake area decrease under 400 ha
Kozanlı Lake	650 ha	SPA (1996)	Lake area decreased to 50 ha
Kulu Lake	860 ha	SPA (1992)	Lake was dried with usage of under-ground water for irrigation of agricultural area. Kulu town wastewater and solid waste discharged via Kulu stream. Lake decrease % 40.11.
Eregli reedy (Akgöl)	37,000 ha	SPA (1992), Nature reserve (6,787 ha)	The reedy dried during Eşmekaya Barrage construction. It lost Natural SPA status in 2005. Surface area decrease 92.85%.
Esmekaya reedy	11,250 ha	SPA (1992), Permanent wildlife reserve (4,500 ha)	Area nearly dried with barrage building on water source for irrigation system construction. Lake area decrease 41.76 %. Single water source of area wastewater swage channel of Eregli town.
Beyşehir Lake	73,000 ha	SPA (1988/91)	Extreme water pulled for irrigation Konya-Cumra plain. Wastes of around settlement and industry discharged into lake. Lake was decreased 2.96%.
Sugla Lake	16,500 ha	-	Irrigation of 14,600 ha agricultural area in Konya was planned with building of Sugla barrage in Seydişehir Town in. Lake was turn to water reservoir with decreasing surface area to 2,500 ha.
Hotamis reedy	16,500 ha	SPA (1992)	Lake area was decreased 27.85%.
Bolluk Lake	1,100 ha	SPA (1992)	It dried in 2007 year.
Tersakan Lake	6,400 ha	SPA (1992)	It was decreased 81.24%
Tuz Lake	92,562 ha	SPA (1992), national site status (71,44 km²)	Huge amount of untreated domestic and industrial waste water of neighbour city and town was discharged. Lake area 62.84%.
Meke Lake	40 ha, depth 12 m	Meke crater (493 ha) accepted as Ramsar side in 2005.	Lake depth was decrease to 1 m with extreme irrigation water usage.
Karapınar reedy, Sultaniye reedy	6000 ha	-	Surface was decrease % 43.43

**Table 1.** Wetlands and Lakes in Konya Closed Basin (Anonymous, 2008b; Durduran, 2008)

SPA\*: strict protected area.

2.1. Population

The population of the city was about 56,462 in 1940, which increased slightly to 119,841 in 1960 and finally showed a high rate of increase and reached 980,953 in 2008. Estimations for 2020 showed that population will be 1,311,200 in 2020 year. The density of the population is 57 people /km<sup>2</sup>. Konya is the 2<sup>nd</sup> most crowded city centre in the Interior Anatolian region and 7<sup>th</sup> overall in Turkey (Anonim, 1994; Anonym, 2010; Anonim, 1996; DİE, (2003)).

2.2. Soil

Different big soil groups were originated due to differences climate, topography and a variety of major soil main components in Konya. In addition, some of the land types without soil cover can be seen. Konya plain is covered with young geological formations. Plain towards the centre is covered the young segmented edges, increasing the thickness of 500 m. 4/5 of the province is flat and the rest is mountainous. Konya is reputation as a wheat warehouse for Turkey, there are other plains Akşehir and Eregli (Anonim, 1997; Anonim, 2000a; Anonim, 2003a).

Land Use Main Class	Land Use Sub-Class	Area (ha)	%
Artificial areas	City building	75,265	1.5
	Industry, commerce and Transport area	12,464	0.3
	Mine, wasteland and Construction area	11,284	0.2
	Artificial Non-agricultural green areas	497	0.0
Agricultural Areas	Agricultural suitable Areas	2,000,966	40.2
	Continual products	39,608	0.8
	pasture Areas	281,841	5.7
	Mixed Agricultural Areas	443,531	8.9
Forest and semi natural areas	Forest areas	72,511	1.5
	scrubs and grass plant areas	863,707	17.3
	nude and low plant areas	927,316	18.6
	Terrestrial Wetlands	61,408	1.2
Wetlands	Coastal Wetlands	4,655	0.1
Water surface	Terrestrial Water	184,663	3.7
Total		4,980,534	100

**Table 2.** Land use value in Konya Closed Basin (CORINE 2<sup>nd</sup> level classification; ÇOB, 2009)

Source: TUBITAK CBS; ÇOB, 2009

Territory of the Konya province, flat or slightly undulating topography formed on the old lake and marine sediments and volcanic rocks. The Provence soil quality is middle degree



despite moderate forces the yield limiting factors such as drainage and erosion composed of fine-grained components of this land with the water thickness. The most important limiting factor is water. Unconsciously irrigation activity in provinces areas made unavailable inefficient agricultural. Floods were caused serious damage in the past few years with more rainfall. The ground water problems flooding and soil salting in a large area will be reduced with followed the completion of “Konya Plain Drainage Project” (Tables 2, 3).

Town	Total area	Planting Land Area		Fallowing area		Vegetables Garden Area		Fruit area	
	ha	ha	%	ha	%	ha	%	ha	%
Karatay	165.592	87.675	52,9	76.956	46,5	695	0,4	266	0,2
Meram	58.945	34.059	57,8	19.653	33,3	4.581	7,8	653	1,1
Selçuklu	87.406	40.514	46,4	46.291	53,0	420	0,5	181	0,2
Ahırılı	5.282	3.022	57,2	1.417	26,8	14	0,3	830	15,7
Akören	21.334	10.409	48,8	10.806	50,7	30	0,1	88	0,4
Altınekin	74.683	63.479	85,0	10.900	14,6	265	0,4	39	0,1
Beyşehir	59.634	43.672	73,2	13.847	23,2	1.302	2,2	814	1,4
Bozkır	19.614	6.031	30,7	9.695	49,4	59	0,3	3.830	19,5
Cihanbeyli	206.793	121.522	58,8	85.247	41,2	24	0,0	0	0,0
Çumra	140.676	90.263	64,2	46.716	33,2	3.374	2,4	323	0,2
Derbent	15.131	10.661	70,5	4.151	27,4	176	1,2	144	1,0
Derebucak	2.668	1.326	49,7	1.264	47,4	7	0,3	70	2,6
Emirgazi	73.509	18.871	25,7	54.630	74,3	0	0,0	8	0,0
Ereğli	125.866	57.529	45,7	58.574	46,5	4.916	3,9	4.847	3,9
Güneysınır	27.962	10.656	38,1	15.437	55,2	650	2,3	1.219	4,4
Halıkapınar	7.318	2.455	33,5	4.048	55,3	2	0,0	813	11,1
Hüyük	19.733	9.738	49,4	9.363	47,4	171	0,9	461	2,3
Karapınar	136.426	94.652	69,4	40.437	29,6	1.121	0,8	216	0,2
Kulu	133.094	55.301	41,5	77.766	58,4	4	0,0	24	0,0
Sarayönü	108.819	71.499	65,7	37.093	34,1	123	0,1	105	0,1
Seydişehir	35.957	33.177	92,3	819	2,3	1.482	4,1	478	1,3
Tuzlukçu	49.725	23.387	47,0	25.833	52,0	170	0,3	335	0,7
Yalıhüyük	3.769	2.760	73,2	660	17,5	6	0,2	342	9,1
İL TOPLAMI	1.579.933	892.656	56,5	651.603	41,2	19.591	1,2	16.084	1,0

**Table 3.** Agricultural land usage status in Konya closed basin (TUBITAK CBS; ÇOB, 2009; Anonim, 2000/b Anonim, 2003/b)

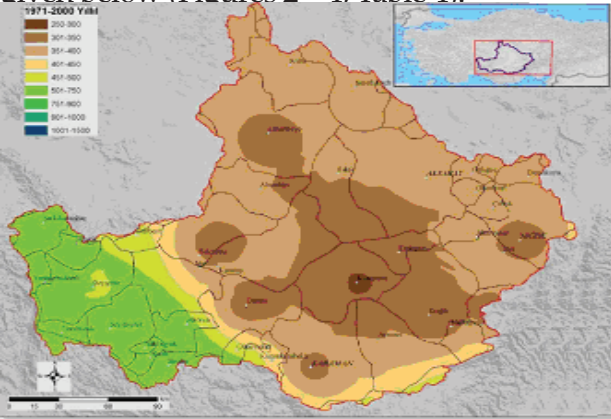
2.3. Vegetation

Steppe vegetation is dominant in both Konya and its vicinity. The flora of the providence consists of Irano-Turanien species and Anatolian endemic species (Çetik, 1985; Akman, 1990).

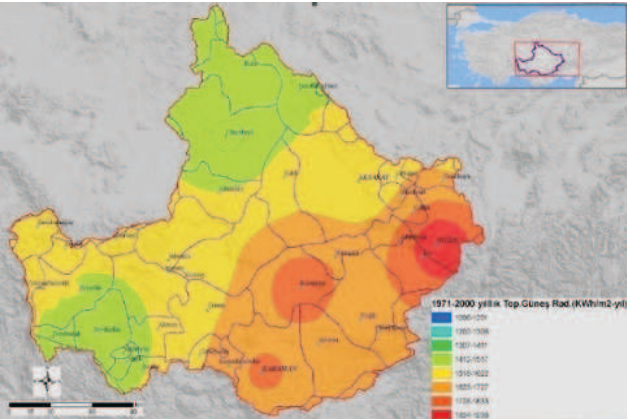
2.4. Vegetation

The climate of Konya is typical terrestrial climate which is mostly known as hot, semiarid summers with cold, rainy and snowy winters. The annual average of total precipitation is 319.2 mm/year. Konya has located in the lowest precipitation receiving region of Turkey. The average value of relative humidity is %59 (ACIR, 2009; Anonim, 1998). There has not been a study about how

much is used the consumed net annually total amount of solar energy in the province of Konya. But the solar energy is used in provinces residences during summer. Konya city centre Average monthly sun irradiation level and Figure 4. Monthly Rainfall (mm) levels of Konya city centre are given below (Figures 2 – 4: Table 4).



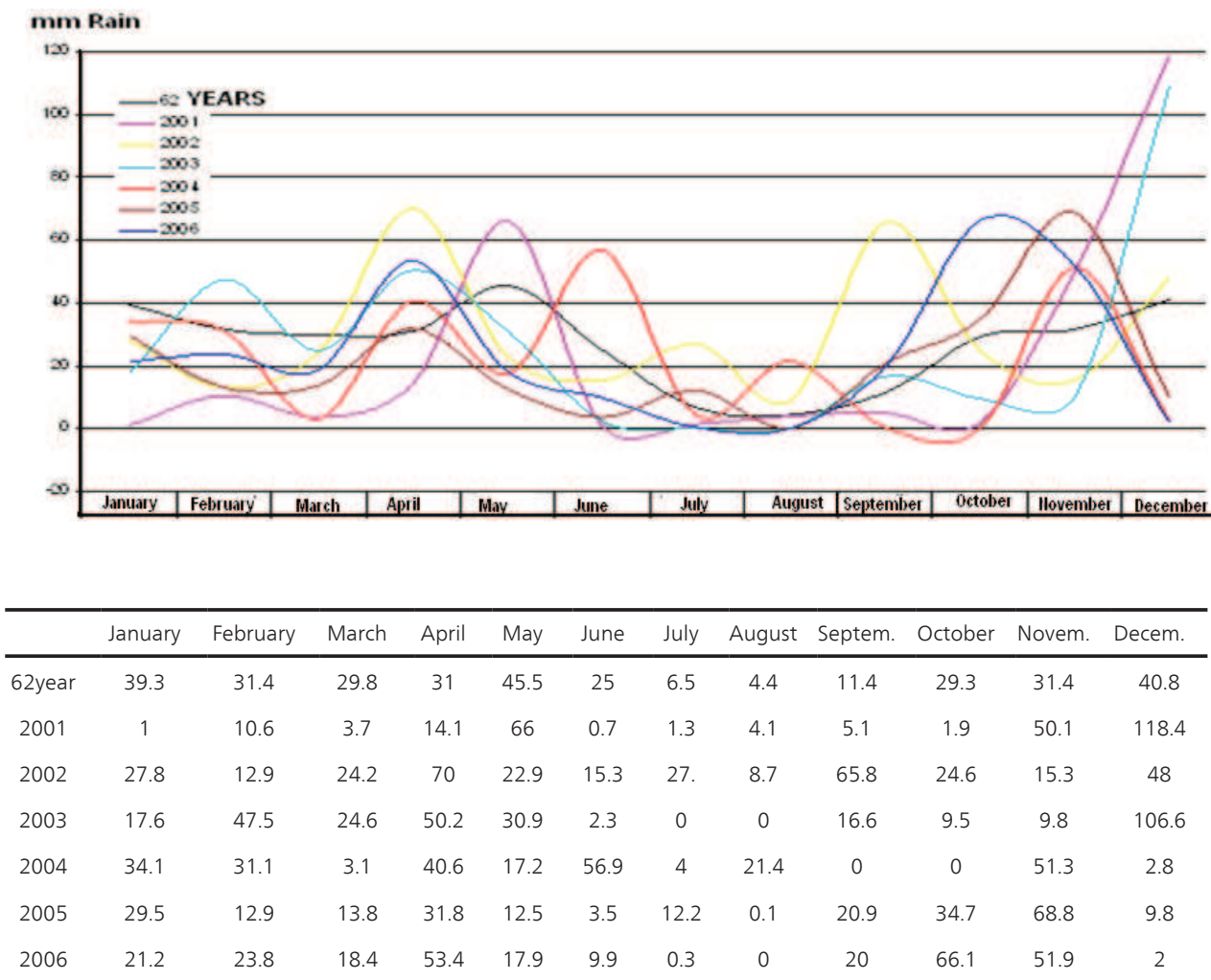
**Figure 2.** Yearly total precipitation distribution map of Konya closed basin (DMI, 2010 DMI, 2006)



**Figure 3.** Yearly total sun radiation distribution map of Konya closed basin (DMI, 2010)

Average monthly sun irradiation of Konya city centre		Konya city centre Average monthly sun irradiation level of	
Months	Average period (h/min.)	Months	Average level (cal/cm²min)
January	3:2	January	186.36
February	4:6	February	287.80
March	6:1	March	381.84
April	7:0	April	465.09
May	8:6	May	576.70
June	10:4	June	652.92
July	11:3	July	649.94
August	11:0	August	600.03
September	9:6	September	478.69
October	7:2	October	344.93
November	5:0	November	247.99
December	3:0	December	164.47
Annual Mean	7:25	Annual Mean	419.73

**Table 4.** Konya city centre Average monthly sun irradiation level (ACIR 2009; Anonim, 1998; Çiftçi, 1991)



**Figure 4.** Monthly Rainfall (mm) levels of Konya city centre (Meteorology region directorate-2009)

2.5. Water Resource

**Drinking Water Resources and Dams:** There are more than 200 drinking water wells in the Konya city centre (General directory of KOSKI, 2008; Anonym, 2008). Their outputs change from 10 to 50 L/sec and average deeps are 150 m. Water taking levels were less than 100 m about 20 years ago but it increased up to 250 m in recent years. That means high amount of water sucking from the underground water, decreasing ground water levels with increasing city centre population (about on millions in 2010). There are four dams west of Konya to protect the Konya land from the flood, with the intent of water use and irrigation to ensure. These are Apa, Altınapa, May, Silke dams. Also Beyşehir Lake is used as a source of drinking water for the centre of the County of Beyşehir.

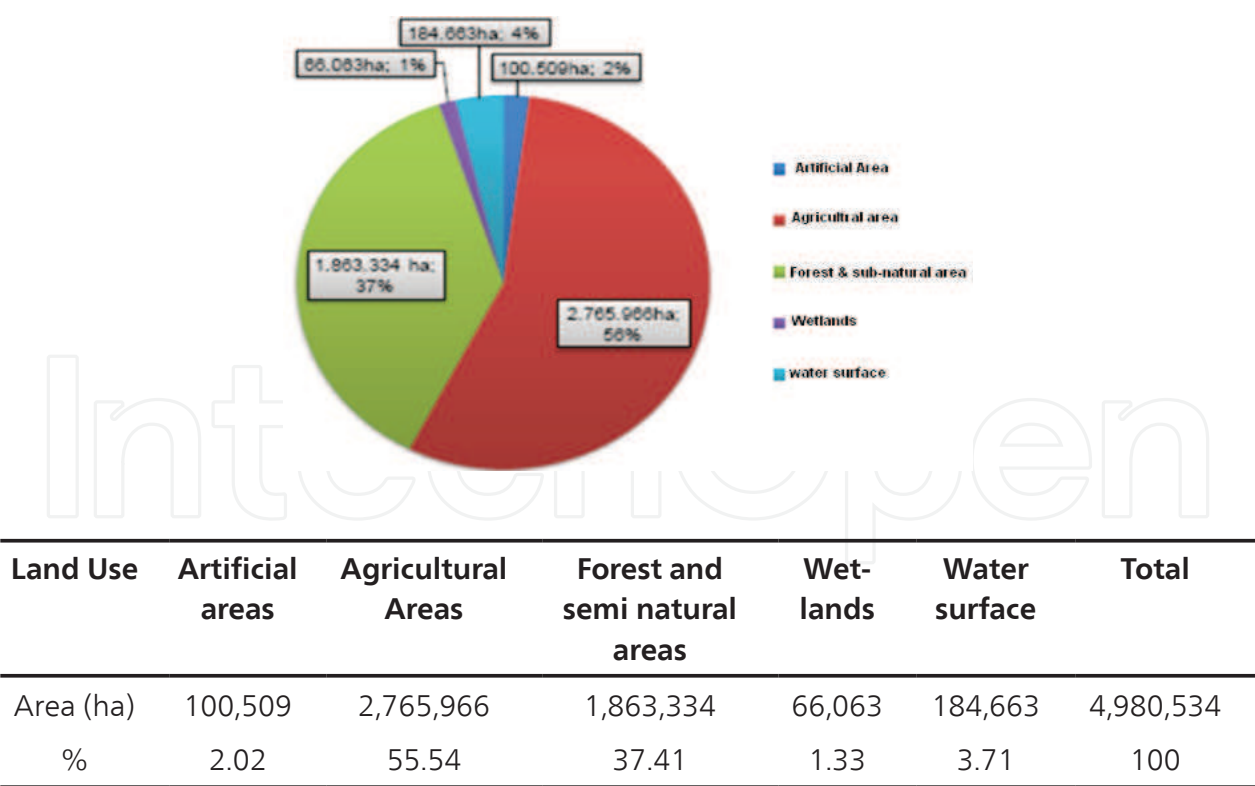
**Ground Water Resources:** Determining the situation of ground waters in the Konya province will be discussed separately within province and independent Konya-Çumra-Karapınar and; Cihanbeyli-Yeniceoba-Kulu Plains. Studying area, the geological formations in the plains, which



those transport to water (aquifers), the depth of these formations in groundwater, its flow direction, purpose, status and location distribution of the number of wells will be discussed (Anonym, 2008).

**Groundwater Depth and Flow Direction:** Konya-Çumra-Karapınar plain is the most important one of the subdivided plains in the province. Water-bearing formations are varied. Therefore, these formations also vary depending on the state of the ground water. General groundwater flow direction is from southwest to northeast. There is largely groundwater recharge From Neogene age limestone in the south and marls west, in the Kretase age limestone to plains. DSI, Rural Services and well as many private companies have opened number of wells in order to meet drinking and irrigation water requirements in Konya-Çumra- Karapınar plains since 1956. The total area irrigated by these wells are approximately 76 000 ha. Depths ranging between 23 m and 409 m wells have different flow rates MTA, 2006a,b).

Konya closed basin, especially wetland area keeps the widest and virgin halophytic steps of Turkey and also the world contains special fauna and flora. WWF International declared the Konya closed basin in the 200 special ecological regions with its 16 important bird area and 6 special plant containing place. WWF-Turkey (National Life Protection Foundation) began the project “Intelligent Use of Konya Closed Basin” September, 2003. But most of the wet lands were lost with wrong and unconscious applications (Anonymous, 2008b; Table 1).



**Table 5.** Land use value in Konya Closed Basin (CORINE 1st level classification; Anonim, 1997; Günay, 1985)

Source ÇOB, 2009; TUBITAK CBS

**Water potentials:** Konya is the 7<sup>th</sup> city of Turkey having a high population. Water sources of the city are limited and annual precipitation (319.2 mm/a), for this reason, economical usage of irrigation water for green areas of Konya city centre is more important. In this study, the importance of irrigation for continuing usage of city centre green areas was emphasised, and water conservation measurements were explained for Konya city centre green area sample.

**Wetlands:** There are 12 important wetland area in the Konya closed Basin. A project used Landsat satellite images showed that most of the wetlands were dried or lost, as it has been wetland characteristics in last 20 years (Durduran 2008; Aygen, 1967).

**Rivers:** Çarşamba Brook is originated from west of the Hacimer Mountain, under the name of Sırıstad from 2200 m elevation. Meram River located near to the village Başarakavak is discharged from sources northwest of Konya, Akdağ hillsides. Other rivers and streams are Ivriz stream, Zanapa River, Gümüşler creek. İnsuyu Creek is the most important river in Cihanbeyli - Kulu region (Table 5). Table 6. Water storage areas in Konya closed basin, Table 7. Land use value in Konya Closed Basin (CORINE 1<sup>st</sup> level classification). Protected land and areas in Konya closed basin is given in Table 7.

## 2.6. Industry and Technology

### City Industry Development, Site Selection Process and These Influencing Factors

#### Development of industry in the province of Konya

Economically active population is 9.1% in the Konya who work in the industrial sector, industrial investments, and significant investments began in 1950s with the sugar factory and realized after 1960. In 1963 the first large scale factory production is cement production plant in the 1960s. After then the chrome-magnesite brick factory was started production in 1968. The biggest aluminium plant in Turkey 'was started build in Seydişehir, 1969. Aluminium Factory was launched in 1970,

LAKE	LOCATION	RIVER	PURPOSE	AREA (m <sup>2</sup> )
Güzelyurt Göleti	Aksaray	Selindiz	Sulama	442.538
Helvadere Göleti	Aksaray	Taşlıgöl	Sulama	400.498
Dokuzyol Göleti	Karaman	Kurudere	Sulama	198.427
Akören Göleti	Konya	Bayındır	Sulama	888.234
Aydoğmuş Göleti	Konya	Boğaz	Sulama	331.009
Aydoğmuş Göleti	Konya	Boğaz	Sulama	331.009
Başhüyük Göleti	Konya	Kurudere	Sulama	296.177
Bostandere Göleti	Konya	Kalaycı	Sulama	405.092
Cihanbeyli Göleti	Konya	İnsuyu	Sulama	1.574.576
Çağlayan Göleti	Konya	Yayla	Sulama	889.403
Çavuş Göleti	Konya	İlmen	Sulama	276.139
Çiftliközü Göleti	Konya	Karakaya	Sulama	356.115
Çukurçimen Göleti	Konya	Çökük	Sulama	165.530
Derbent Göleti	Konya	Belbaşı	Sulama	151.639
Erenkaya Göleti	Konya	Çarşak	Sulama	919.179
Evliyatekke Göleti	Konya	Arkil	Sulama	268.759
Güneydere Göleti	Konya	Gavur Deresi	Sulama	2.354.084
Kızılören Göleti	Konya	Yayla Deresi	Sulama	145.670
Malas Göleti	Konya	Uludere	Sulama ve Kullanma	235.065
May-Kayasu Göleti	Konya	Peynirli	Sulama	159.458
Sefaköy Göleti	Konya	Kavaklıdere	Sulama	140.738

**Table 6.** Lakes and characteristics in Konya closed basin kaynak gösterilmeli

which provides great contributions to the province and the country’s economy, that Turkey’s only plant producing raw aluminium. Tümosan diesel engine factory began production in 1981, has an annual production capacity of 25,000. 1970s, most large-scale enterprises in Konya belongs to public sector consists of businesses and establishments belonging to the private sector, the business demands of the region are not geared towards mass production for a production that consists of small and medium-sized businesses. These establishments are farm equipment, engines and spare parts and food industry engaged in the production of small places. Current industry state of Konya is listed below.

storage areas	location	river	area (m <sup>2</sup> )
Hotamış Depolaması	Konya		52.138.774
Suğla Depolaması	Konya	Suberte, Irmak Çayı, BSA	44.359.924

Table 7. Water storage areas in Konya closed basin

Protected Area	Characteristic	Area (ha)
Antalya Cevizli Gidengimez Dağı	Yaban Hayatı Geliştirme Sahası	5.925
Konya Bozdağ	Yaban Hayatı Geliştirme Sahası	59.308
Mersin Çamlıyayla Cehennemderesi	Yaban Hayatı Geliştirme Sahası	17
Kocakoru Ormanı	Tabiat Parkı	331
Akgöl(Ereğli Sazlığı)	Tabiatı Koruma Alanı	6.681
Beyşehir Gölü	Sulak Alan	90.671
Col Gölü	Sulak Alan	4.744
Uyuz Gölü	Sulak Alan	112
Kulu Gölü	Sulak Alan	2.206
Kozanlı Gökgöl	Sulak Alan	967
Tuz Gölü	Sulak Alan	328.347
Tersakan Gölü	Sulak Alan	9.511
Bolluk Gölü	Sulak Alan	9.697
Meke Maarı	Sulak Alan	339
Konya Acıgöl	Sulak Alan	267
Kızoren Obruğu	Sulak Alan	281
Samsam Gölü	Sulak Alan	2.218
Ereğli Sazlıkları	Sulak Alan	22.263
Cirali Obruk	Sulak Alan	337
Meyil Obruğu	Sulak Alan	101
Tuz Gölü	Sulak Alan	5
Tersakan Gölü	Sulak Alan	5
Beyşehir Gölü	Milli Park	86.833
Kızıldağ	Milli Park	54.718
Beyşehir Gölü	Milli Park	0,07
Kızıldağ	Milli Park	0,07

Table 8. Protected land and areas in Konya closed basin

Small Industrial Sites

Small industrial estates, small and medium-scale industrialists and artists visited the existing infrastructure, education and social facilities of the Ministry to ensure that the credit support the work of a healthy workplace or directly carried out by own resources of entrepreneurs. There are a total of 17 units with Small Industrial Estate with a capacity of 4409 business launched in Konya (Table 9, 10).

Industry Region (KOSB)		
Sector	Firm nu.	Ratio%
Automotive side Ind.	27	18
Farm tool & Machine	16	11
Machine & spare part Ind.	13	9
Smelting Ind.	11	7
Paper & Packing Ind.	4	3
Sounding, Pipe & Irrigation sys.	13	9
Plastic, Paint & Chemistry Ind.	12	8
Construction Materials Ind.	4	3
Leader & Textile Ind.	5	3
Metal Property & hardware Ind.	1	1
Mill machine Ind.	6	4
Metal Ind. (No iron)	5	3
Other	33	22
Total	150	100

**Table 9.** Industrial sector distribution in Konya 1<sup>st</sup> Organised

Industry Region (KOSB)		
Sector	Firm nu.	Ratio %
Automotive spare Ind.	57	18
Smelting Ind.	30	10
Machine Ind.	27	9
Farm Machine & tools Ind.	23	7
Construction Ind.	21	7
Plastic Ind.	19	6
Food Ind.	13	4
Packing Ind.	13	4
Lorry box dumper Ind.	8	3
Mill machine Ind.	8	3
Textile Ind.	7	2
Rubber Ind.	7	2

**Table 10.** Industrial sector distribution in Konya Organised



### 3. Environmental Problems in Konya

#### 3.1. Soil Pollution

An investigation on contamination of the Konya province on the territory by metals and microbial, the main discharge channel of Konya Plain is known to cause Salt Lake pollution, the water withdrawn for agricultural irrigation and soil be contaminated with the decrease in the efficiency of agricultural land indirectly. (Water samples taken at different times of Main Discharge Canal to results of analyze; and used in accordance with Food Ingredients Regulation this should be regarded as dangerous waters). According to the results of an other project, Konya Closed Basin province, the identification and elimination of pollution in the Salt Lake; Main Discharge Canal reached the Salt Lake and agricultural areas due to agricultural use for irrigation purposes, the necessary precautions are not taken, otherwise soil will be contaminated so that is not irreversible situation.

#### 3.2. Atmospheric Pollution

There have been done some measurements in the city on the atmospheric  $\text{SO}_2$ , and fluorinated compounds, hydrogen sulphur, magnesite powder, carbon dust and heavy metals in the soil as it will cause accumulation of particulate matter.

#### 3.3. Pollution from the waste

There is a little investigation on hazardous matter contamination on soil. There are some heavy metal accumulations in waste water watered agricultural lands.

#### 3.4. Land Property

The raising quality classification of land use is taking into consideration the degree of conformity to the classification system of cultivars, land pasture, forest and home animal husbandry. Processing show considerable differences from the territory of the province in terms of features for this classification needs of the land, limiting factors (soil, topography, drainage failure, etc.) (Table 12).

#### 3.5. Unplanned urbanization

Konya city population was rapid increased as a result of migration from rural to city centre after 1950 years due to the establishment of factories in, to be come mechanized, increasing the agriculture production of the province, connection of Konya to highway network, development of industry. However, Konya is one of the provinces of rare non shanty. When we look at the transportation, infrastructure and social service standard development pattern is a concern that the city is public improvements. However, the existing environmental impacts are not considered in the development of the city. Air pollution is to reach a large size especially during the winter months due to Meteorological and geomorphologic structure of the city. Establishment of industrial zones in the northern part of the city has important effect on air pollution problem, especially stainless steel sector.

Usage form	Land Use Capability Classes Forms (ha)										TOTAL
	I	II	III	IV	Total	V	VI	VII	Total	VIII	
Dry Farm (fallowing)	494,017	384,132	439,779	291,568	1,609,496		154,973	78,272	233,245		1,842,741
Irrigated farm	367,249	310,025	372,948	276,276	1,326,498		126,698	56,358	183,056		1,509,544
Less irrigated farm	7,931	5,941	9,512	1,971	25,355		84		84		248,081
Vineyard (dry)	374	663	1,512	2,655	5,241		9,919	21,536	31,455		36,696
Garden (irrigated)	77		215		292						292
Garden (dry)	400	783	928	367	2476		232	206	438		2,916
Vineyard (irrigated)	11,121	6,565	1,566	339	19,591		120	52	172		19,763
Meadow-pasture	39165	38252	103419	131641	312477	17041	214170	516660	747871		1,060,348
Meadow land		1994	6248	7146	15388	16635	5269	56668	78572		93960
pasture land	39165	38252	103419	131641	313477	17041	214170	516660	747871		1,060,348
Forest-shrub		1994	6348	7146	15388	16635	5269	56668	78572		93,960
Forest-land	39165	36258	971711	124495	297089	406	208901	459992	669299		966,288
Shrub land	176	322	1927	3588	6013		16987	109203	126190		132,203
Non-farming land	13119	3949	2774	1317	20250		2471	1715	4186	35410	59,846
Residential (Heavy)	202	93			295			218	218	35410	35,923
Residential (rare)	123353	2391	1446	1067	17257		484	815	1299		18,556
Industry land	564	93	271	235	1163		774	198	972		2,135
Army land		463	1057		1520		12131	463	1678		3,196
National Park				15	15			21	21		36
Other lands										160037	160,037
Water surface										189621	189,621
TOTAL	546477	426151	549756	436266	1958650	17041	414481	1050460	1481982	385068	3,825,700

**Table 11.** Land Use Capability Classes Forms of Konya Breakdown 2008 (Konya Province Land Property Inventory)

### 3.6. Reduction of Green Areas

Vegetation in the Konya province is shaped according to climatic conditions. Steppes are covered with large flat areas. Weeds will sprout with spring rains of the plains in spring season, but a variety of greenery lasts a short life would not be long. Herbs are immediately dry and roasted starting high summer temperatures. Wide plains take the steppe form. There are shrub and forest areas in the mountainous of province. Forested area is 559 759 hectares in the province. Percentage of forest in the province was 14.6%. Reforestation initiatives are supported by people and companies in Konya province. A major work is done for the proliferation of green areas. Reforestation campaign is underway.

### 3.7. Land Problems

It can be grouped in seven levels.

**1. Large scale and fragmented lands:** Land fragmentation directly affects on the soil entire work the in the agricultural sector based.

a. Effects of land use areas

- 1.Increased border losses
- 2.Losses caused by excess land routes
- 3.Losses small and far parcels leaving empty

b. Impact of working time and labour costs

Work and labour costs by shrinking has negative impact on non-economic forms with increasing fragmentation in acquiring parcels losses caused by excess land routes

1. Increased routes
- 2.Preparation of work duration increase
- 3.Returning time losses increase

c. Fragmentation effects on mechanization

Partly or messy parcels subdivided from the land, more of the time spends cultivation period and going each small part. Machine efficiency and usage trend is going lower. The efficiency reduces with time going to land and returns, preparation, going from a parcel to other parcel, increasing machinery work.

d. Effects of fragmentation on Culture Technical Services

Service surface area per unit area for common small land parcels is increases with road and irrigation, drainage length of the area and therefore production efficiency decreases accordingly. Also construction costs and service spends are increase.

e. Effects of fragmentation from Operating Activities

There is effect on planting time and harvest time, on alternation business organization, on the agricultural struggle, on transportation efficiency. Taking in all of these failures;

Increase the agricultural production, agricultural settlements in order to develop the agricultural sector and enterprises belonging the people and more than a small surplus divided into parcels scattered in various positions in the Management School or impractical, according to the principles of modern agriculture and land ways, shaped the development of the culture of technical services in accordance with the format, design and arrangement need a new or amended land consolidation.

**2. Unconscious or More Soil Manipulating Activity:** Manipulating the soil, the structure of the soil, namely sand, clay, silt, organic ratios are damage. Soil tillage must be suitable with rainfall, climatic conditions and plant species and necessary cultivation in accordance with the increasing costs balanced unnecessary and excessive soil tillage and soil compaction and underlying supporting structure, forming harm base stone. The is important effect of forming harm base stone on infiltration and surface of the water in the soil prevents the occurrence of leakage may be caused by water erosion in the region. High soil tillage has effect on such as fuel and labour costs, increased more and more crumbling supporting structure, and paves the way wind erosion.

**3. Irrigation with Wastewater:** Irrigation with wastewater is common in Konya city. Chemical and medical wastes in wastewater become leading as soon as the soil desertification and insolubility of soil available useful organic and inorganic substances.

Changing property of soil these pollution effect take negative rolls on ability of as needed chemical fertilizers by the plant in the soil. If the sewage and detergents, chemicals and medical waste speared and sewage water after treatment can be used safely to be applied to the irrigation of landscape areas and irrigation of agricultural land.

**4. Erosion:** Wind erosion is dangerous for some parts of Konya city. Erosion is the most important factor at L organic matter poor unproductive soils in sierozem lands at around Karapınar town.

**5. Alternation application as need:** Konya city is in continental climate zone. Product range is limited due to lack of sufficient irrigation ability. According to the available range of products with a suitable climate and soil characteristics, useful production pattern of land must be used. Applying rotation, production increase and as well as effective land use would be useful. Different plant groups have different nutrients uptake and left from the soil. For this reason, applying the necessary alternation rule, trying to get sufficient efficiency in the land in the region, and we must maintain the structure of the land and must start applying right functioning.

**6. Unconscious Fertilization:** Fertilizer applied in Konya city without taking account to soil and plant needs. Thus, the chemical properties of soil deterioration spoil and can not be get requested advantage from the fertilizer. Fertilizer should be applied after analysis of soil at amount and sort need of land.

**7. Carelessness in application building industrial plants region:** Stage of the establishment of industrial area must be kale in consideration of the predominant wind direction and the land will be established in the industry, not be agricultural land, regardless of whether the city centre in particular, the factory chimneys of particles and chemical compounds into the atmosphere, due to the prevailing wind hovering over farmland productivity is negatively affected. As a result of



the establishment of industrial plants in productive agricultural lands located within the boundaries of city centre disposed directly or indirectly.

#### 4. General Discussion and Recommendations

**Water Economising Measures in the City Centre Green Areas Irrigation:** Irrigation was described as watering the plant for their necessary in a controlled and an artificial way (Kara, 1983). Active way of usage the irrigation water is to give enough water to grow plants necessary. Water amount must be estimated concerning the plant type in the water poor places and used in control and order. Barış (2008) has recommended to followings for active and economical water usage in the green areas;

- Suitable planning and conceiving should be done. Present natural conditions should be considered while planning green areas.
- Soil should be well presented and soil quality must be improvement.
- Regional plant types should be selected for local climate.
- Simple growing grassing area and dry climate resistance grass type should be selected.
- Selection of the irrigation system should be suitable with green area wideness.
- Water carriage of the soil and soil temperature should be controlled. The mulching must be presented against to erosion.
- Necessary attention should be followed after construction of green areas (pruning, wild plant control, pest control, irrigation etc.).

The natural factors have effect on the environmental which urban data form climate, topography, rivers, flood areas, geomorphologic structure, vegetation and soil ability. The formation of urbanisation plans for the future is not determined for natural form, the macroeconomic data, but it played a role in limiting and conditioner direction. There is an interaction between artificial and natural environmental processes. This interaction may be contradictory as that may be in harmony with the environment but also damaging both give rise to negative results in some processes, jobs and products. In general, balance degradation such as environmental pollution, ecological processes are this kind. These events can be seen in Konya.

Water is the foundation of life and is a driving force for economic and social developments and for the poverty eradication. But drought and water crisis have been a global problem since last years of 21st century. For this reason saving water usage is the most important necessity in the solution of this problem.

Necessary precautions for economical water usage in irrigation of urban green areas may be explained as the followings:

- The existent irrigation system planning should take into consideration of plant pattern, water amount, water quality, soil characteristics, and a project may be presented in relation with selecting low water requiring plants and techniques.

-Before presenting green areas, soil characteristics should be known and prepared for activity, and necessary measures (quality improvement etc.) should be done in planning period.

-Natural and endemic plant species may be preferred for green area formation. Endemic and natural species have more resistance to ecological difficulties and they may be effected less from local climatic conditions if they were grown in right position.

-Selecting the plants for green areas other than natural plant species should have resistance to dryness and water requirements must be lower.

-Specially, presentation of wide scale green areas (park and recreation area, city centre and city sides, gardens of public institutions and university campus etc.) should be preferred xerophytic plants, brier, which have a large shelter over soil surface instead of grass and plants desire high water.

-Municipality water system is not preferred for irrigation and an alternative water sources should be constituted. For this matter, precipitation water in suitable reservoirs may be sawed during rainy period. These systems save the underground water source in dry period.

-The orderly and careful maintenance (irrigation, pruning, struggle with undesirable plant and animals etc.) will be followed after presentation of green areas.

It was attempted to give some examples which were chosen from the hundreds of them showing energy wasting in our country. As it could be seen by examples, unfortunately waste its own energy and energy source fast by using them ineffectively. This makes us vey upset as being as Turkish scientist. This paper have been presented to worn the people and want them, to take necessary precautions as soon as possible.

## 5. References

- [1] ACIR, 2007. Air Conditioning Industry Report. The research report on Konya's air conditioner industry. Konya.
- [2] Akman, Y. 1990. İklim ve Biyoiklim, Palme Yayınları, 319s, Ankara.
- [3] Anonim, 1994, "1990 Genel Nüfus Sayımı", Nüfusun Sosyal ve Ekonomik Nitelikleri, 42: Konya, DİE Yayın No: 1641, Ankara.
- [4] Anonim, 1996, "İstatistik Göstergeler", T.C. Başbakanlık Devlet İstatistik Enstitüsü, Ankara.
- [5] Anonim, 1997, "Ülkemiz Arazi Varlığı Kullanım Analizi", Ziraat Mühendisliği Dergisi No:303,Sayfa:19, Ankara.
- [6] Anonim, 1998. Cumhuriyetin 75. Yılında Konya. Konya İl Yıllığı, Konya Valiliği, Konya.
- [7] Anonim, 2000/a, Tarım ve Köyişleri Bakanlığı, Konya İl Müdürlüğü Kayıtları, Konya.
- [8] Anonim, 2000/b, DİE Tarım Şubesi BİM Kayıtları, Ankara.
- [9] Anonim, 2003/a, "Konya Tarım Master Planı", T.C. Tarım ve Köyişleri Bakanlığı, Konya Tarım İl Müdürlüğü, İl Tarım ve Kırsal Kalkınma Master Planlarının Hazırlanmasına Destek Projesi, Konya.
- [10] Anonim, 2003/b, <http://www.die.gov.tr>

- [11] Anonim, 2010. Türkiye İstatistik Yıllığı. [www.tuik.gov.tr](http://www.tuik.gov.tr) (Erisme tarihi: 16.09.2011)
- [12] Anonym, 2008, Devlet Su İşleri Genel Müdürlüğü Ankara <http://www.dsi.gov.tr>
- [13] Anonym, 2008. Konya Valiliği KOP Tarım Eylem Planı, Konya.
- [14] Anonymous 1998. Konya Büyükşehir Çevre Düzeni Revizyon Nazım İmar Planı Raporu. Konya City Municipality, Konya.
- [15] Anonymous 2008a. Turkish Republic Konya Governorship. Available online at: [www.konya.gov.tr](http://www.konya.gov.tr)
- [16] Anonymous, 2008b. [www.wwf.org.tr/wwf-tuerkiye-hakkinda/nerede-calisiyoruz/konya-kapali-havzasi/18k](http://www.wwf.org.tr/wwf-tuerkiye-hakkinda/nerede-calisiyoruz/konya-kapali-havzasi/18k) Erişim:Aralık 2008.
- [17] Aygen, T, 1967, Manavgat-Oymapınar (Homa) Kemer Barajı ile Beyşehir-Suğla Gölü Manavgat Çayı Havzasının Hidrojeolojik ve Karstik Etüdü, DSİ Raporu, Ankara,.
- [18] Barış ME, 2008. Sarıya Bezenen Kentlerimizi Kimler ve Nasıl Yeniden Yeşertebilir. Available online at: [http://www.peyzajmimoda.org.tr/genel/bizden\\_detay.php?kod=1173&tipi=2&sube=0](http://www.peyzajmimoda.org.tr/genel/bizden_detay.php?kod=1173&tipi=2&sube=0)
- [19] Çetik, R., 1985. Interior Anatolia vegetation and ecology. S.Ü.Publish No: 7, Konya.
- [20] Çiftçi, N. , 1991. Konya-Çumra Ovasında Sulamaya Açılmakta Olan Bazı Arazilerin Drenaj Sorunlarıyla Dren Derinliklerinin Belirlenmesi. Selçuk Üniv. Zir. Fak. Dergisi, Cilt:1, Sayı:2, Konya.
- [21] DİE, (2003) Genel Nüfus Sayımı 2000, TC. Devlet İstatistik Enstitüsü Yay. No:2759, Ankara.
- [22] DMI, 2006. Meteoroloji İşleri Müdürlüğü Çalışma Alanının Coğrafi Durumunu Gösteren 1 /250000 Ölçekli Harita, Konya.
- [23] Durduran S. 2008. Göllerimiz Kuruyor. Yeni İpek Yolu Dergisi. Konya Ticaret Odası Yayını, Sayı:125, Konya.
- [24] Günay, Y., Durusu, A. ve Tabuman, F.C., 1985, Isparta ve Yöresindeki Göllerde Su Kalitesi, Evsel ve Endüstriyel Atıklarla İlgili Parametreler; TÜBİTAK Çevre Araştırma Grubu. Proje No: ÇAĞ-47/C, 14-24, 48, Ankara.
- [25] Kara M, 2005, Sulama ve Sulama Tesisleri . S.Ü. Ziraat Fakültesi Ders kitabı, ISBN 975-448-177-6 Konya.
- [26] MTA Genel Müdürlüğü 2006a. Jeoloji Etütleri Dairesi, Araştırma Alanının Jeolojik Haritası, Konya.