

*Full Length Research Paper*

# The effects of urban expansion on cultural landscapes – Case study of Bursa

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**The expansion in population and in parallel in the urban sphere has caused radical changes in the structure of landscapes. This study investigates the effects of expansion in the urban sphere and diversity in area use on cultural landscapes in Bursa. Analyses of urban landscape change are maintained by the comparison of two plans of Central Metropolitan Planning Zone made 19-years apart and the chronological assessment of city plans prepared in country planning hierarchy. Comparisons and assessments are made with GIS (geographical information system). Even though the limits of planning expanded within years and the plans made preservation offers related with cultural landscaping with agricultural areas first on the list, it is seen that the use of urban and rural landscaping has varied and therefore cultural landscapes have changed in an unsustainable manner. It is concluded that in order to be able to put forward sustainable development strategies for cultural landscapes the changes in landscapes should be analyzed and landscapes be defined.**

**Key words:** Bursa, landscape change, cultural landscape, urban landscape, rural landscape.

## INTRODUCTION

The improvement in agriculture, population growth and the increase in the number of cities, occurred hand-in-hand throughout the history and more intensely in the previous century. Many countries are about to enter an era in which not only the urban population is greater than the rural population, but also the lands occupied by urban expansion compete with the lands for agriculture. One of the indicators of this change is the increase seen in the number, space and population of the cities. While the ratio of the people living in cities with a population of 100.000 or more to the world population was 1.7 in 1800s, it increased to 13.1 in 1950. This transformation which is realized in the level of population, scale and area change in the urbanization process has extended surface of the urban influence and brought the city values to self-sufficient villages which are, until that day, having a life-cycle almost basically similar to that of Neolithic culture. These changes also affected the size definition of the cities. Most important of all is the fact that the structuring and multiplication of the cities as such has vastly affected the balance between the urban population and agricultural population (Mumford, 2007).

Expansion of the cities has caused important changes

over cultural and natural landscapes (Catalan et al., 2008; Mas et al., 2004; Bray et al., 2004) and such changes occur more rapidly in developing countries when compared to the developed countries (Lopez et al., 2001). Solon (2009) determined that constructed areas have achieved growth against the land uses such as forest area and agricultural area due to rapid urbanization. Narain (2009) stated that urban expansion has affected the use of rural and natural sources and that housing zones, specifically, have expanded to the disadvantage of agricultural areas.

It is stated in the projections that the tendency towards expansion in the cities shall continue and that a major part of the world population will be living in the cities. This indicates that the processes which cause radical changes in the structure of cities and rural areas shall sustain and increase its effects. According to Antrop (2005) it is natural for landscape, which is a dynamic concept, to change. The main problem here is that the landscapes have changed by creating great break-points with the past since the 18<sup>th</sup> century.

The changes occurred in the last twenty years in many cities of the world are observed in Turkish cities as well.



**Figure 1.** Geographical position of the study area.

**Table 1.** Urban plans used in this study.

Date	Plan I
1924	Löcher's plan (Base plan of Löcher's P.)
1960	Piccinato's plan (1/ 4000)
1976	Complete city and immediate area plan(1/25000)
1990	Master development plan (1/5000)
1995	Revision of master development plan (1/5000)
1998	Environmental layout plan (1/100.000)
2005	Master development plan for the metropolitan area (1/25000)

According to a study carried out by Turkish Statistical Institute in 2002, in Turkey land uses have changed in 62.562 hectare area between the years 1991-2001. As a result of this change, the greatest loss is in agricultural areas with 40,194 ha (Gürün and Doygun, 2006).

Bursa, the context of the present study, is a city with important natural and cultural landscape values. However, there is a rapid landscape transformation due to growing population and its role in the industrialization of the country.

The present study evaluates the plans made for Bursa in the chronological development process and determines the changes experienced in cultural landscapes within the frame of the aforementioned plans. It is established that within the planning hierarchy in Turkey the size of the areas which are governed by planning has been increasing and the extension and variety in the use of urban areas have caused important

changes in cultural landscapes and mainly in agricultural lands. It is concluded that landscape values need to be defined in order to be able to maintain the sustainability of the natural and cultural landscape values of the cities in which the rate of change of the landscapes are beyond the planning processes.

## MATERIALS AND METHODS

The city of Bursa and its plans made in the process starting from the year 1924 until today form the material of the present study. Bursa is located in the southeast of Marmara Region between 28° 10' and 30° 10' north latitudes and 40° 40' and 39° 35' east longitudes (Anonymous, 2007). It is bordered by Bilecik to the east, by Sakarya to the northeast, by İzmit and Yalova to the north, by Balıkesir to the south and southwest and by Kütahya to the southeast (Figure 1).

The sources used in the study are the city plans made from 1924 until today (Table 1), 1/50.000 scaled topographic map which

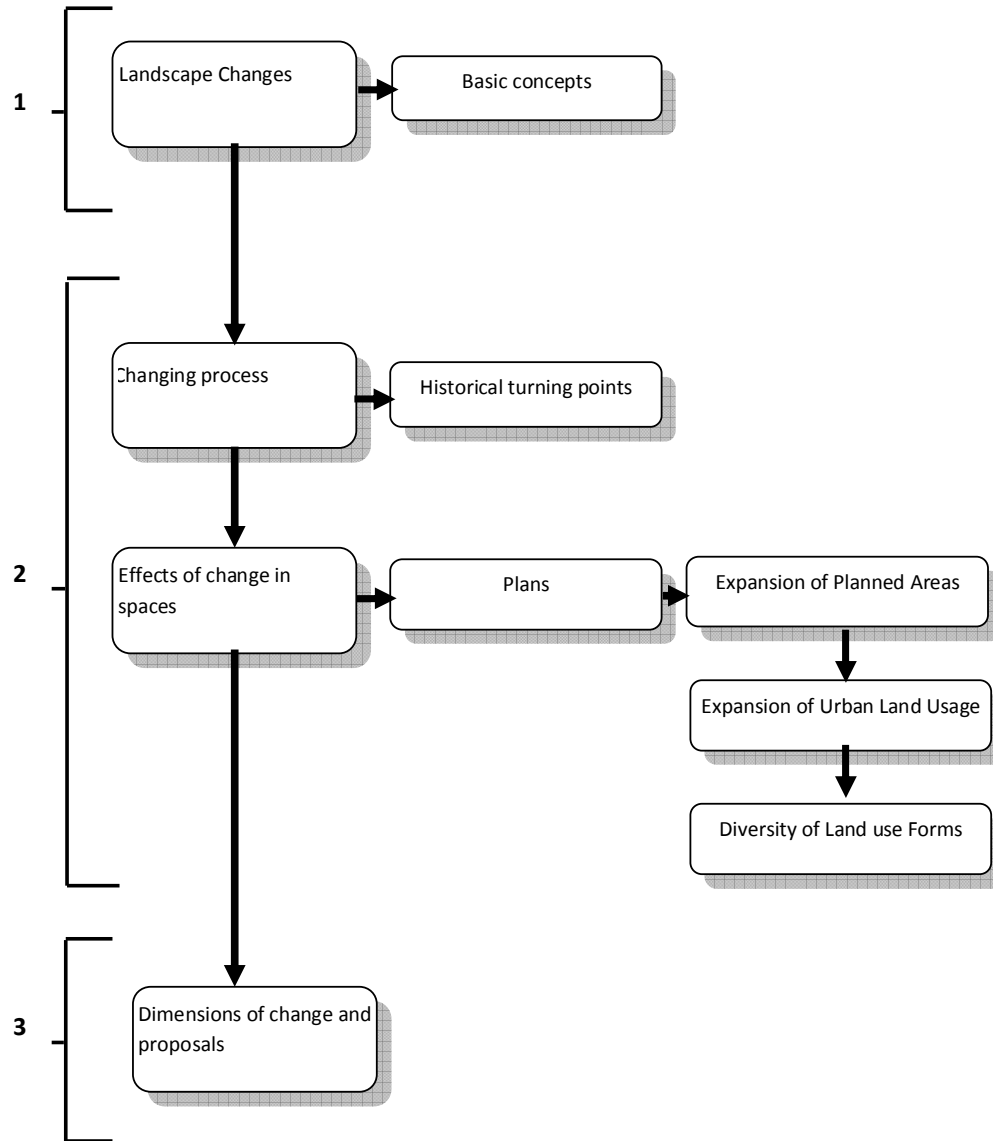


Figure 2. Method diagram.

belongs to Map General Headquarters, 2005 Master Plan for Metropolitan Area of Bursa Research Report, prepared analysis sheets based on the data obtained from the related institutions for this report, population consensus results of Turkish statistical Institute, domestic and foreign resources related with the study and research field.

The present study is conducted in three parts. In the initial part, a conceptual evaluation is made and similar studies that examine urban landscape changes are presented.

In the second part, based on the hypothesis that Bursa is experiencing a rapid landscape change, the process that causes landscape changes and its reflections on the space are evaluated. The processes that cause landscape change are the historical milestones in the period that stretches from the foundation of the city until today. The reflections of change over space are analyzed via city plans and the city plans which are transferred into GIS media are chronologically compared. For this purpose, the coordinate system of the 1/50.000 scaled topographic map that belongs to Map General Headquarters and published in 1981 is

transferred into all of the related city plans made starting from the year 1924 until today and these plans are respectively crossed over reference points. Quantifications and change calculations are made over the polygon maps obtained from the cross referenced plans. Arc GIS 9 software is used in quantifications and change calculations.

The plans are evaluated in three main frames. The first frame displayed the increase of the sizes that are subject to planning; the second frame determined the increase of the urban area uses. The third frame, however, included the comparison of the two separate plans made in the same field in different years and the analysis of the landscape change in the mentioned field. It is determined that the 1/25.000 scaled plan which was made in 1976 and the 1/25.000 scaled plan made in 2005 include the approximately the same grounds of the central metropolitan planning zone. Qualitative and quantitative changes of the area uses on these two plans are identified.

In the final part, however, the obtained results are evaluated. The flowchart of the methodology is presented in Figure 2.

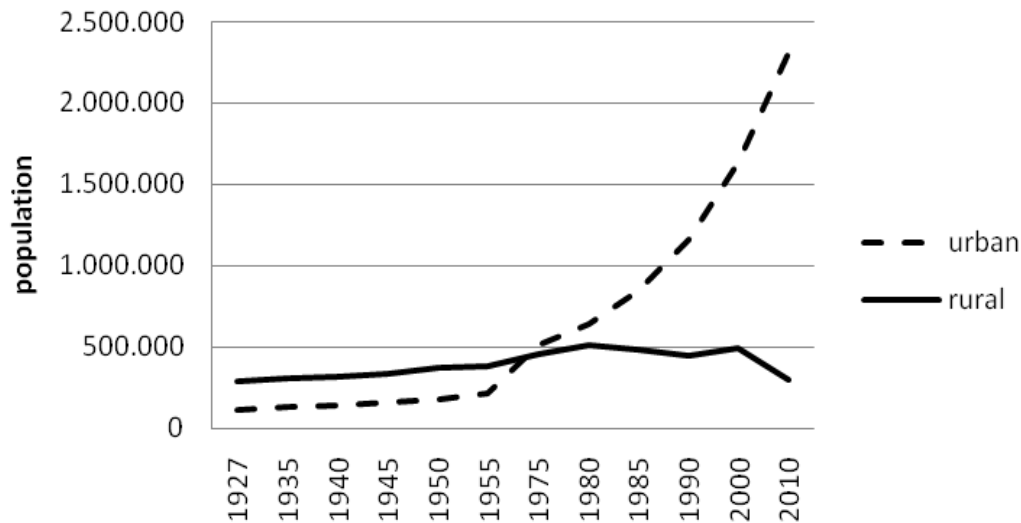


Figure 3. Yearly urban and rural population of Bursa.

## RESULTS

### The processes that affect landscape change in Bursa

Bursa, which was inhabited in all the periods in Anatolia chronologically, was conquered in 1326 and became the capital of the Ottoman Empire (Ortayli, 2008).

In the 19<sup>th</sup> century Bursa was the modernization symbol of the Ottoman Empire with its working class that appeared as a result of the textile industry and its new manufacture system that spread into villages (Ortayli, 2008).

Together with the proclamation of the Turkish Republic, a planning period led by western city planners has started. However, the fact that Organized Industry Zone was opened in 1960s and two automobile factories were founded, particularly Tofaş in 1968, has led to an uncontrolled migration towards the city (Ilkme, 2009).

In the 20<sup>th</sup> century, Bursa has grown twenty fold by industrialization movements and the migrations from Anatolia and the Balkans and become a city with a population of two million people (Vardar, 2008).

According to the results of the 2008 population census, Bursa is the fourth largest city of Turkey with a population of 2.550.645 people. It is fifth in terms of population density with a rate of 45 people per square kilometer (Anonymous, 2005). When rural and urban populations are compared, it is seen that rural population was almost stable whereas urban population has grown rapidly (Figure 3).

Today's Bursa is an industrial center with extensive automotive and textile sectors. Due to its immediate proximity to Istanbul, there is an intensive flow of people and goods between Bursa and Istanbul (Tomruk, 2008).

However, the city which has reached to a certain degree of saturation attempts to bring its historical-

touristic identity in the foreground. In spite of all these attempts, the city is growing rapidly and all of the natural and cultural landscape values including the ones in the city sphere are rapidly changing into a negative direction. Based on the notion that particularly Istanbul Environmental Layout Plan will increase the pressures on Bursa city for industry-centered use, it is concluded that the landscape change in the city sphere will accelerate.

### Urban growth in Bursa city

Urban morphology of today's Bursa is the overlapping of the early Ottoman urban development perception, the attempts of modernization in the 19<sup>th</sup> century, planning concepts, which were popular at the time, applied by the western city planners who worked for city planning at the beginning of the 20<sup>th</sup> century and the decisions made by local administrations after 1960s (Vural, 2008).

#### *Löcher's plan*

It is the first plan of the city and dated back to 1924. It was prepared on the present map dated back to 1912 an under the impression of garden-city movement. This plan was not implemented (Batkan, 2006).

#### *Piccinato's plan*

This plan dated back to 1960 has significantly affected the macro form of today's Bursa City. When Piccinato's plan and the map underlying the first plan dated back to 1924 are compared, it is seen that all of the empty spaces in 1924 plan were replaced by urban uses and the city

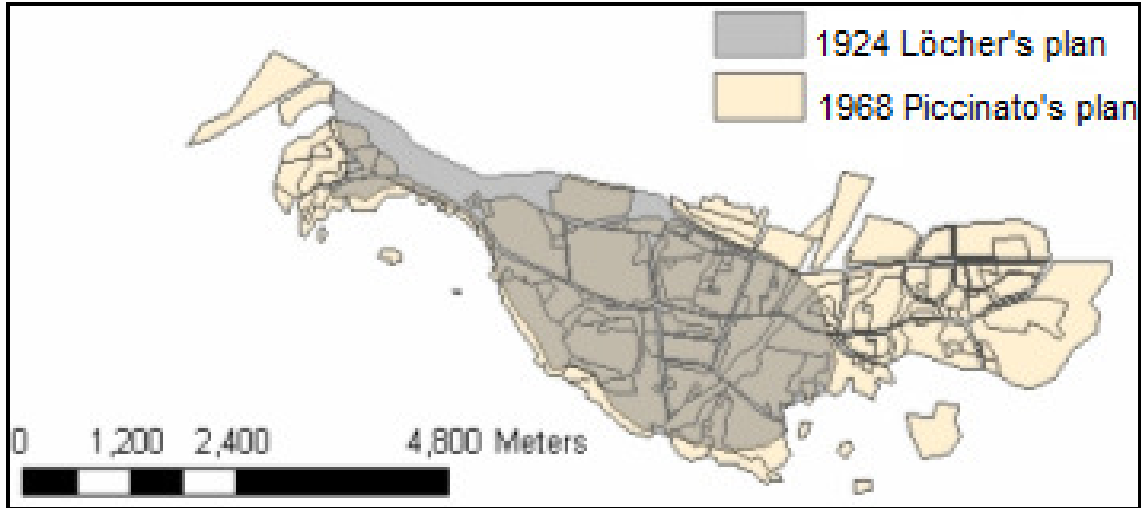


Figure 4. 1924 and 1968 plan borders.

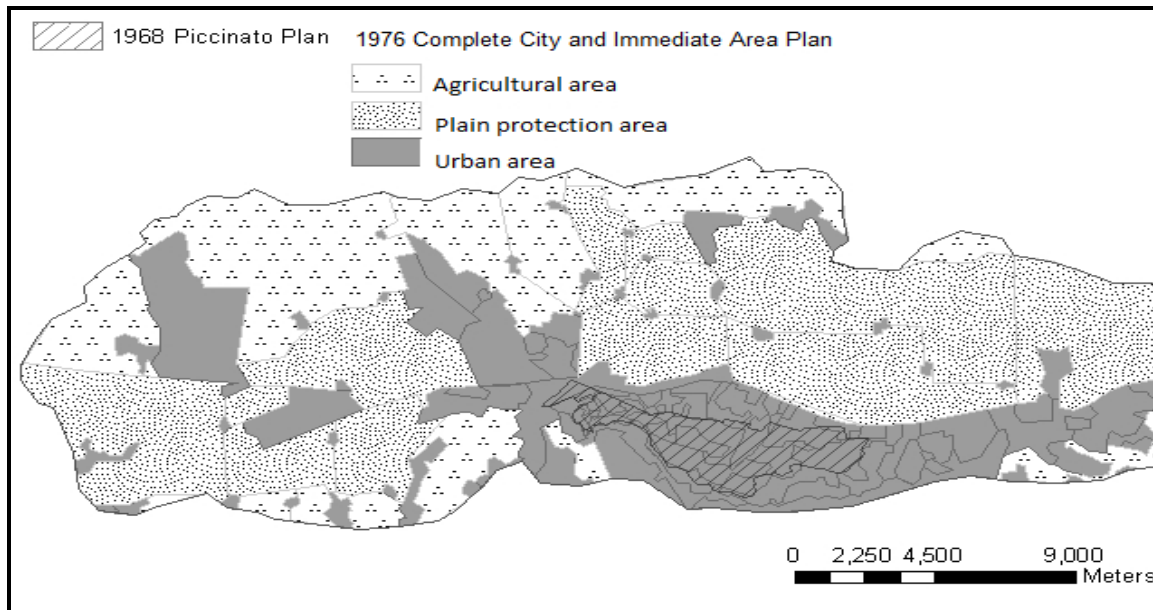


Figure 5. 1968 and 1976 plan borders.

started to expand in the eastern axle (Figure 4).

According to Piccinato, it is necessary to use the natural structure and agricultural opportunities productively in order to prevent the poor an unfit urban development in Bursa (Vural, 2008). However, despite the suggestions of the plan regarding agriculture, the proposed industrial zone is in the agricultural grounds.

**1976 complete city and immediate area plan**

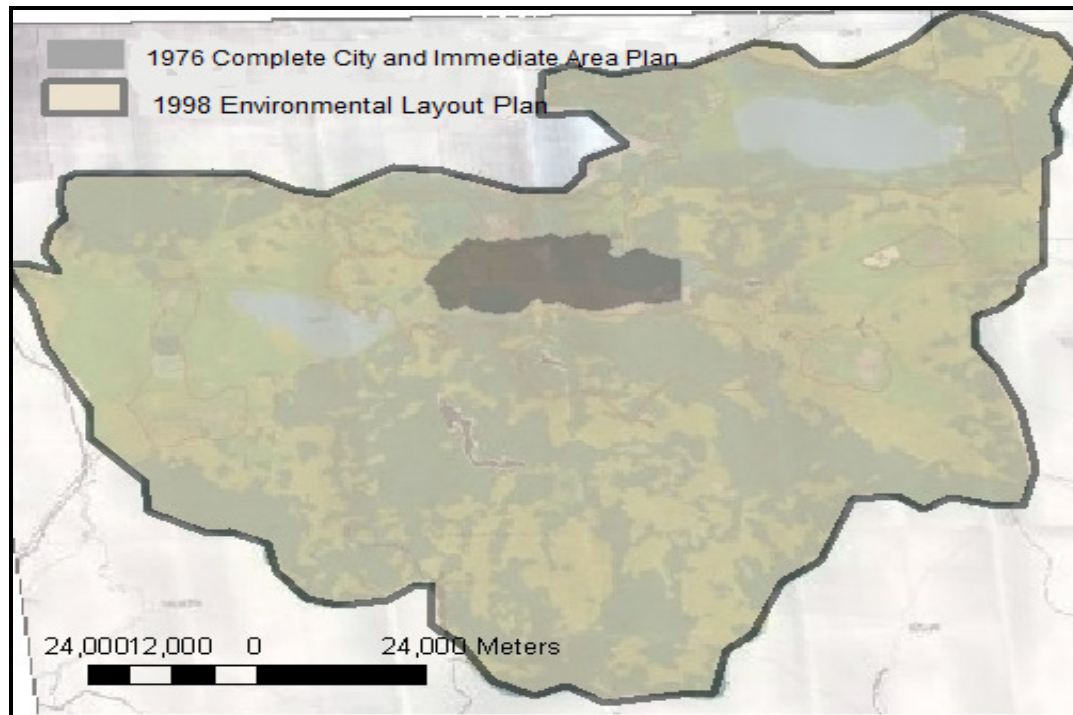
This plan was prepared in the process when Bursa plain was threatened by rapid urbanization, industrialization

and shanty establishments and aimed to preserve Bursa Plan which has a high agricultural value.

When 1976 Plan is compared to Piccinato's Plan, it is seen that the increase in urban area uses continues by spreading towards east, west, north and northwest (Figure 5).

**The plans made between the years 1976 and 1998**

After the year 1976, a 1/5000 scaled Master Development Plan was prepared in 1981 and was revised in 1990 and 1995. The spread of the urban areas



**Figure 6.** 1976 and 1998 plan borders.

towards the agricultural grounds in the city sphere continued in these plans in the parcel scale. For instance, it is seen that Bursa Organized Industrial Zone which had approximately 400 hectares of land in 1976 expanded to approximately 1200 hectares of land in 1990 plan and that this increase occurred in the area which was defined as agricultural ground in the previous plan.

#### ***1/100.000 scaled environmental layout plan of 1998***

The borders of the plan included the whole city of Bursa. Aiming for the year 2020, its purpose was to establish a sustainable growth and development in the city of Bursa (Anonymous, 2005b). With this plan, 7 separate planning zones were formed within the definition of metropolitan area. Each of these zones were conditioned to prepare a 1/25.000 scaled plan according to their potentials. The preparation of a plain action plan was the precondition of the Plan (Ilkme, 2009). However, plain preservation plan was not signed and the principles of the plan were not implemented.

The 1998 Plan is important for the fact that it displays the size of the area administered by planning (Figure 6).

#### ***2005 master development plan for the metropolitan area***

The borders of Bursa Metropolitan Municipality increased

from 255 square kilometers to 2800 square kilometers in 2004. In the year 2005, Master Development Plans were prepared for the parts of the six metropolitan zones (defined in the 1/100.000 scaled plan) (Figure 7) that include the lands of the Municipality borders. Figure 8 displays the location of the 1/25.000 plans dated back to 2005 in 1998 Environmental Layout Plan.

Absolute and marginal agricultural grounds were not defined and the agricultural grounds and other natural values were not preserved in the plans and the approved plans were applied without the decision of a Ground Commission (Ilkme, 2009).

#### **The change in the area use pattern**

Central Planning Zone in the 2005 Plan includes approximately the same borders with the 1976 Plan. As a result of the comparison of the two plans, it is seen that landscape uses have undergone important changes. First dimension of change is quantitative (Figure 9).

In this context, commercial and industrial areas, mainly housing, have expanded more than 100% between the years 1976 and 2005. The same expansion is observed in the use of open spaces defined in the plan. While the areas reserved for agriculture and public use have decreased, contrary to the previous plan, tourism is also defined in the central planning zone. Considering that the 2005 Plan included 6 zones in total, the size urban growth has reached within 19 years could be better

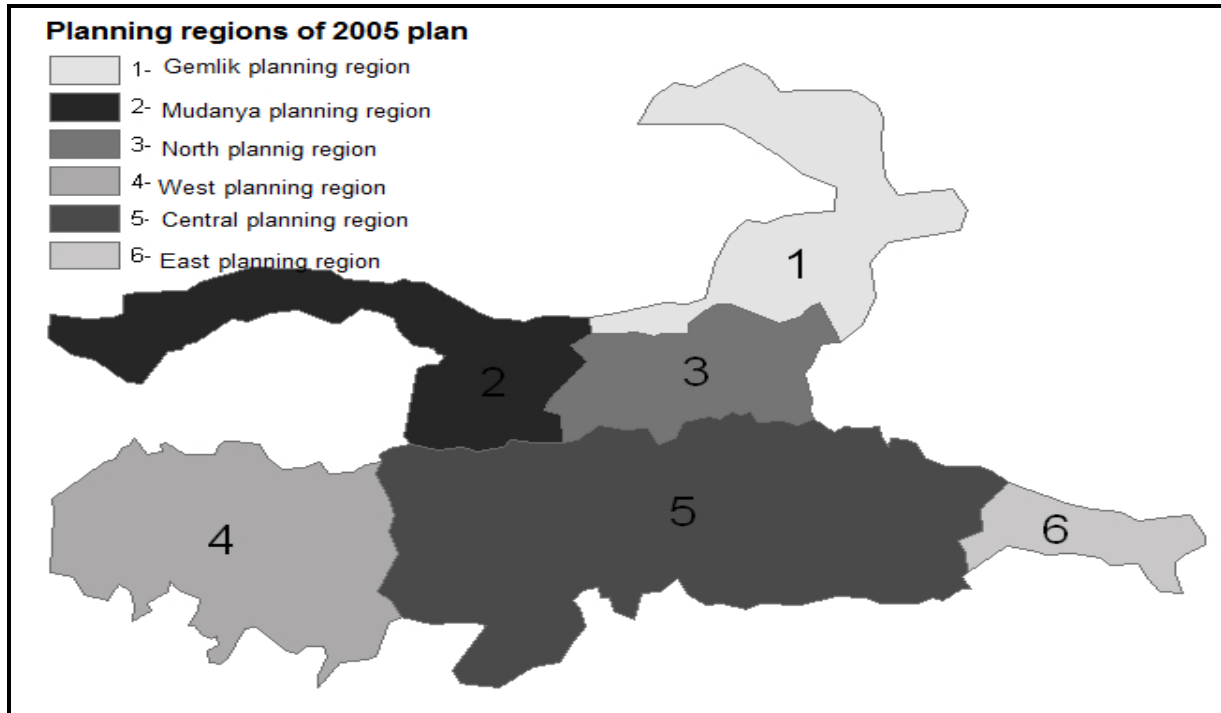


Figure 7. 2005 Metropolitan area planning regions.

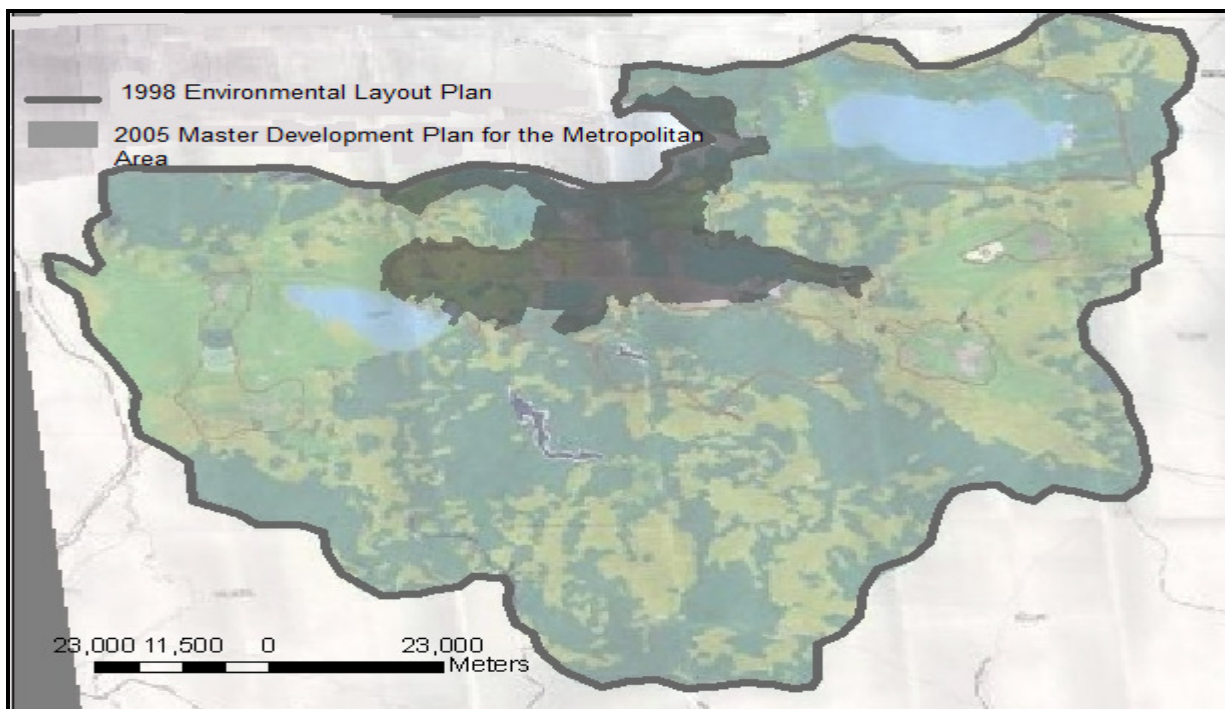


Figure 8. 1998 and 2005 plan borders.

comprehended.

Second dimension of change is also, variation of the landscape use and newly emerged area types (Table 2).

For instance, the area uses which do not exist in the 1976 plan and are defined as “other areas” in the 2005 plan include the areas for refinement, dumping grounds,

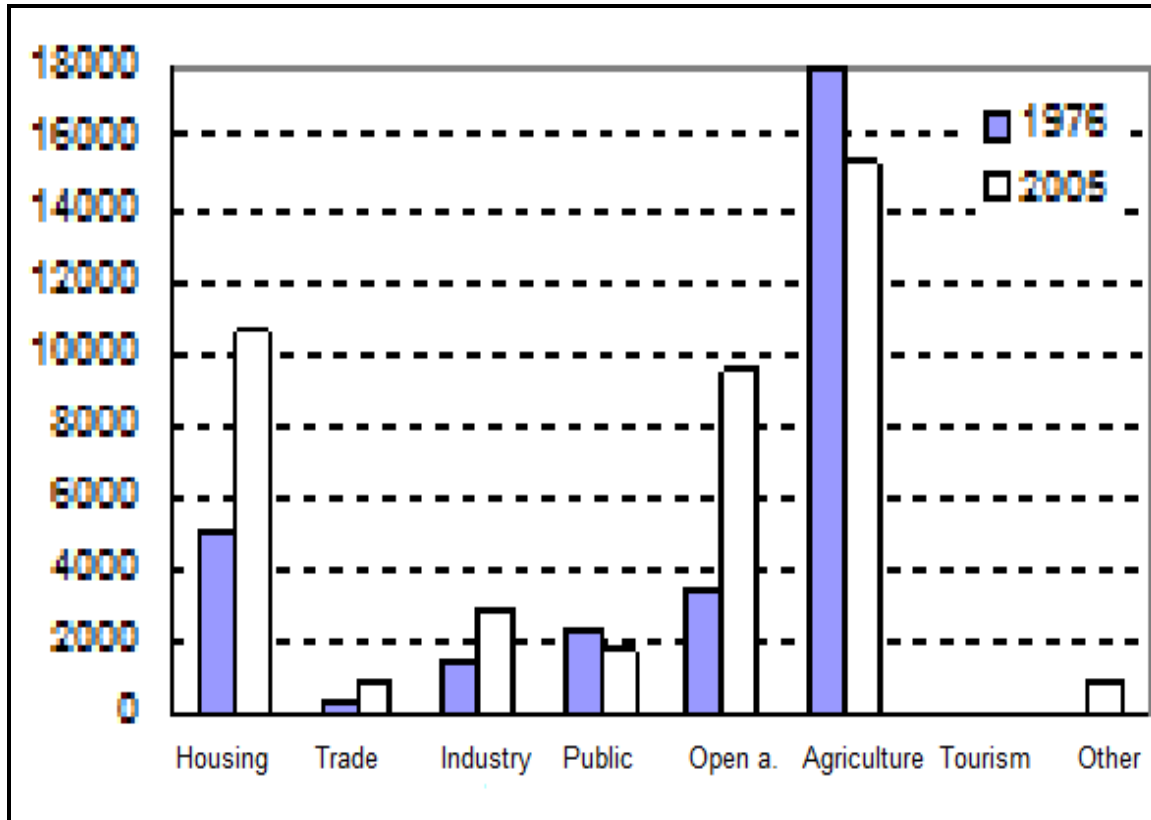


Figure 9. Quantitative change of land use from 1976 and 2005 in the central planning region.

waste treatment facilities, technical infrastructure. But these definitions do not exist in the 1976 plan. Almost all of these areas are located in the grounds which were defined as agricultural grounds in the previous plan.

Housing zones were divided into two categories as inhabited and developing housing zones in the 1976 plan. In the 2005 plan, however, the same areas were first classified as urban and rural housing zones and then each divided into two subgroups as inhabited and developing housing zones.

Commercial uses were defined merely as trade and storehouse grounds in the 1976 plan whereas in the 2005 plan the concepts of central business area, 2<sup>nd</sup> and 3<sup>rd</sup> degree central were added to these definitions. Industry was defined as industry and small-scale industry in the 1976 plan; in the 2005 plan however, industrial zones included six different industrial uses such as central business area, organized industrial zone, etc.

In the 1976 plan, two open space uses were defined under the title of forest and park and excursion spot whereas in the 2005 plan a total of 10 different open space uses such as city park, fairground, exhibition ground, festival ground, metropolitan green field, recreation, zoo, municipal and local sports ground, forest and the ground to be afforested were defined.

The agricultural grounds which were defined under the title of agriculture and plain preservation in the 1976 plan

were gathered in three groups in the 2005 plan as the area agricultural quality of which is to be preserved, special harvest ground and other agricultural grounds.

## DISCUSSION

It is concluded in the present study that urban area uses in Bursa have been rapidly increasing in a way verifying the similar related studies conducted that the demands regarding area use have varied and that this situation have rapidly changed the cultural landscapes in the city sphere. The sources of the main stress on the natural and cultural landscapes are housing-settlement, production demands and recreation (Antrop, 2000). The fact that housing, industry, agriculture and recreation are the most areas that varied and changed most has confirmed this idea as well.

It is thought that this structure about landscape change presented in Bursa is to give the same results in global scale. Such changes are considered in their own city planning practice in every country. It might be useful to prepare more sustainable plans if the elements in landscaping structure, their functions and the changes that they have experienced are known. It is necessary to urgently define natural and cultural landscape values and relate them with city planning process in the countries



**Table 2.** Form of land use in 1976 and 2005 plans.

	<b>1976</b>	<b>2005</b>	
<b>Housing</b>	Current housing Housing development	Urban (Current and development) Rural (Current and development)	
Total area (ha)	5016		10616
<b>Trade</b>	Trade Storage space	MIA(Central Business Area) 2. and 3.degree center other trade wholesale trade	
Total area (ha)	383		851
<b>Industry</b>	Industry Small industry	Organized industrial zone Industry Small industry Urban working zone Storage place Agricultural storage place	
Total area (ha)	1445		2952
<b>Public</b>		Cemetery University campus Military zone	
	Public Culture, health, education	Urban social reinforcement	
Total area (ha)	2261		1761
<b>Open area</b>	Play area, park area, Forest	Regional park Fair, festival area Big urban greening Recreation Zoo Urban and regional sports field Forest Wooded area	
Total area (ha)	3489		9568
<b>Agriculture</b>	Plain protection area Agriculture	Protected agricultural qualification area Special yield area agricultural area	
Total area (ha)	17897		15323
<b>Tourism</b>		Tourism area Daily area	
Total area (ha)			79
<b>Other</b>		Technology development zone Special Project zone Purification zone	
Total area(ha)			921
	30491		42072

where the planning practice is forestalled by the change processes of the landscapes.

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