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Green cities – problems and solutions in Turkey

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Abstract

Turkey, one of the twenty largest economies in the world is currently undergoing dynamic economic growth. Rich deposits of metal ores, i.e. iron, chromium, copper, zinc and lead ores, extraction of crude oil, bituminous coal and chemical raw materials affect the country's economic development and affect the functioning of the natural environment. The largest cities of Turkey, i.e. Istanbul, Ankara, Izmir, Bursa, Adana, etc. are not only the country's economic hallmark, but also a source of high emissions from technical and communication infrastructure. The impact of transport emissions or industrial pollution affects the share of green space in cities and the health of residents in large cities. Actions of municipal authorities may contribute to reducing adverse factors in the environment, which will improve the quality of life along with ensuring simultaneous economic development. The article presents the problems of the largest cities in Turkey in managing urban logistic processes and their impact on the natural environment, together with the opportunities of eliminating unfavorable ecological factors while simultaneously maintaining economic growth.

Keywords: Green cities, environmental problems in cities, Turkish cities.

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1. Introduction

Turkey covers two continents, Asia and Europe. Ankara being the capital of Turkey is the second most populous Turkish city. It takes 36th place in terms of area and 18th in terms of population of all countries of the world. The country shares its border with Greece, Bulgaria, Syria, Iraq, Iran, Azerbaijan, Armenia and Georgia. It covers an area of 783,562 km² with a population of 76.805 million persons (Aschner, Bane, Kaiser, Sene, 2011, www.pl.wikipedia.org).

The economic development of the country and the growing importance of Turkey in the international arena is associated with the industrialization of urban areas. The population and area of the largest urban centers of Turkey are presented in Table 1 and Fig. 1.

Table 1. Characteristics of the largest cities in Turkey

	Istanbul	Ankara	Izmir	Adana	Bursa	Gaziantep
Population [million]	15.03	5.445	4.274	1.753	1.854	1.51
Area [km^2]	5,343	25,632	7,340	1,945	1,036	7,642

Table 1 shows the population and the area occupied by a given city. Based on the above data, the largest city in Turkey is Istanbul, which has a population of 15.03 million people, covering 5,343 km^2. Istanbul in terms of population is the largest city of Turkey. In turn, Turkey's largest city in terms of space is Ankara, which covers 5.445 million people and it is three times less than in Istanbul and thus places Ankara in second place in terms of residents. The next big city is Izmir, covering an area of 7,340 km^2 with a population of 4,274 persons. The largest urban agglomerations in Turkey include Adana, Bursa and Gaziantep. These are not only the largest cities in Turkey, but also play the role of the most important urban agglomerations constituting the economic, industrial and cultural center of the country.

Fig. 1. The largest cities of Turkey (www.literasci.com/political-map-of-turkey.html as of 31.03.2018)

All urban agglomerations demonstrate many common features, i.e. the existence of a complex financial system, the importance of services in the city's life, global international operations including: the flow of information, capital and wealth, and the pursuit of a high quality of life. All these elements affect the lives of residents and the natural

environment. The increase in the quality of life is related to the increase of the city's capital, which in turn depends on the activity and functioning of industrial zones. The quality of life in cities is also influenced by the condition of the natural environment.

According to the World Health Organization (WHO), quality of life is a personal way of perceiving and assessing the life situation of a given person together with his/her personal value system. The quality of life consists of many factors such as physical health, mental state, level of freedom, social relations, interaction of social units with the main elements of society, etc. Quality of urban life is associated with economic and spatial factors securing the most important needs of the population and access to urban infrastructure, communication, transport, housing, services, education, health services along with social, cultural and political factors and processes. Social awareness and integration with the natural environment are essential for proper cooperation of all these factors. Deteriorating natural conditions affect, among other things, the quality of health, which translates into health care and general dissatisfaction and discouragement. That is why proper integration of the natural environment and urban infrastructure is of essential importance. (Sagocak, Arslan, Keskin, 2015).

2. The ecological situation of Turkey

Turkey took up environmental issues for the first time in the 1970s. In 1978, the secretary of state for the environment was appointed and this office's tasks included both national and international environmental issues. However, the adaptation of environmental policy could not keep up with the rate of the industrial development of the country. It was not until the early nineties of the twentieth century that the scope of responsibilities of the environmental department was extended and additional competences were added, including e.g. the possibility of enforcing penalties for non-compliance with pro-ecological legal regulations. Currently, the tasks of the Ministry of the Environment include such activities as (Okumus, 2002):

- Proper use of land,
- Preservation of natural resources,
- Nature conservation,
- Protection of plant and animal species,
- Coordinating anti-pollution activities,
- Raising the environmental awareness of society,
- Protection of nature reserves,
- Establishing ecological policies and strategies,
- Coordinating environmental activities at every level of the state hierarchy,
- Issuing environmental licenses,
- Actions to improve air quality,
- Establishing legal regulations regarding the storage, collection and utilization of hazardous, medical and solid waste,
- Protection of water reservoirs,
- Control of toxic chemicals.

Turkey is currently struggling with the task of adapting environmental requirements to the continuous development of industry. The coming years will involve implementation of relevant pro-ecological investments (Okumus, 2002). Turkey has undertaken a wider use of renewable energy and the promotion of energy efficiency. In the 2015 Environmental Performance Index ranking, Turkey took 66th place out of 178 countries. On the other hand, climate performance was determined to be very poor, gaining 54th place out of 61 countries. An increase in greenhouse gas emissions to the atmosphere has been recorded, from 2011 the level of gas emissions increased by 5.1%. Regulations regarding air quality related to industrial zones are poorly respected, and several years must pass for the effects to be seen. Issues related to waste management also do not fulfill the required function. The environmental problems of Turkey affect the country's economic development. Enterprises, residents and the Government have to bear significant costs in adjusting ecological requirements to the current state of affairs (Ömer, Subidey, Schulz, Karadag, 2016).

3. Green Cities

The definition of an ecological city is ambiguous. An ecological city can be understood as the area which is "greener", i.e. close to nature. The working definition of Ecocity Builders says that, "an ecological city provides a healthy environment for its residents without overeating by them more resources than they produced (renewable resources), without producing more waste than the possibility of their absorption (utilization) and without toxic actions in relation to themselves and neighborhood" (Brodowicz, 2015, Grzymała, 2016). On the other hand, some definitions refer to cities that are particularly healthy for residents, without significant human interference, while in the United States, ecological cities are considered to be places surrounded by greenery, which is of a wild nature. Another type of ecological city includes urban spaces incorporating nature in the form of parks, planted trees, with the promotion of ecological forms of transport (pedestrian and bicycle transport or city rental of hybrid cars). A wise approach to urban space management is associated with (Grzymała, 2016):

- • natural environmental preservation,
- • restoration of degraded green areas,
- • promotion of green technologies,
- • innovative energy solutions,
- • promotion of local industry and business based on environmental protection,
- • investing in renewable energy sources,
- • environmentally friendly transport,
- • increased expenditure on public transport,
- • traffic restrictions in the city centers,
- • preferring pedestrian or bicycle transport,
- • cars using alternative fuels,
- • reducing congestion in cities,
- • innovative solutions regulating the capacity of cities,
- • green and open spaces,
- • eco-friendly construction,
- • effective use of natural resources,
- • increased share of recycling, and
- • appropriate water management.

The specific elements of green cities affect their construction and functionality, which in turn are responsible for the differences between ordinary cities and green agglomerations. The basic element of green urban infrastructure is related to green areas. These areas are characterized primarily by rich vegetation and extensive terrain. It is necessary to create several such places in large urban agglomerations and it is not enough to develop green areas while creating green cities. In the era of globalization, the development of green cities must go hand in hand with the urban infrastructure's innovativeness, e.g. making use of energy-efficient construction, renewable energy sources, alternative solutions for urban transport management and increasing the share of public transport for minimizing private internal combustion engine vehicles (Okumus, 2002).

The process of creating green cities is of key importance for the country's economic development and has an impact on the international arena. Degradation of the natural environment has evoked the need to reverse the negative effects of globalization, industrialization and the development of transport. Although partial restoration of green areas and reduction of greenhouse gas emissions is currently an extremely difficult, time-consuming and costly process, attempts to develop urban space for ecological areas have been at least partially successful. (Tirla, Manea, Vijulie, Matei, Cocos, 2014)

4. Ecological characteristics of the largest cities in Turkey

Air pollution in cities comes from many sources, i.e. transport, industry, services and residents' activities. The transport sector includes all public transport and the total number of motor vehicles, trains, aircraft, ships and boats. Industrial activities account for the combustion of fuels, i.e. coal and gas for heating and production purposes, as well

as the production of industrial waste. Service activities include energy processes to heat or cool homes and buildings. Air quality is crucial to the health of residents and all living beings. The well-being of people staying in urban agglomerations is synonymous with high production efficiency and further development of urban centers (Incecik and Im, 2012).

Istanbul covers an area of 5343 km^2 and with its population of over 15 million inhabitants it is the largest city in Turkey and the fifth leading center in the world. The city origins date back to the Neolithic period (8,000 years BC), which is why Istanbul was the capital of many civilizations, including three great empires. The city is a very important point in the trade of goods between Asia and Europe and the economic center of the country. Over 32 thousand international business entities are operating in the city. Thanks to stability and a competitive business environment, Istanbul is a very attractive place to develop and create investments and attract new investors. The city has two airports, Istanbul Atatürk and Istanbul Sabiha Gökçen. The headquarters of Turkish airlines and the fourth largest airline network in the world - Turkish Airlines is located in Istanbul (Istanbul Fact Sheet, 2017). There is also a sea port in the city with an extended passenger terminal (www.seaoo.com). The Turkish metropolis enjoys high economic efficiency and a very favorable business atmosphere. It is among the 25 largest economies in the world. The key position of the metropolis is a haven for investors from the Persian Gulf and North Africa. Istanbul accounts for approximately 40% of the GDP of the Turkish economy. The city is the largest, richest and most diversified economy in Turkey. It is also a leader in creating jobs through the development of the private sector (Istanbul Fact Sheet, 2017).

The problem of air pollution in Istanbul is Turkey's key ecological problem. During the late 1980s and early 1990s significant emissions of sulfur dioxide and particulate matter were generated by burning fossil fuels in households and in industry. Changes in the policy on particulate matter emissions along with the legal regulation of fuel combustion decreased the concentration of hazardous factors. NOx molecules are another problem for the city. Currently, the largest source of pollution in Istanbul comes traffic along with road dust, industrial processes, heating and cooling of residential and office premises, and biogenic emissions. The number of vehicles in the city is constantly growing, and the growth of cars is associated with an increase in the emission of harmful chemicals into the atmosphere. According to data from 2010, 2.72 million vehicles were registered in the city. Every day, 700 new cars join Istanbul streets, 60% of which are petrol-powered and 40% use diesel fuel. The increase in the number of vehicles is accompanied by the increase in the number of roads. There are three industrial zones in the city for small and medium industrial operations. Enterprises generate large amounts of industrial waste and greenhouse gases. Systematic sources of pollution are classified according to five criteria: particulate matter (PM10), sulfur dioxide (SO2), carbon monoxide (CO), non-metallic volatile organic compounds (NMVOC) and nitrogen oxides (NOx), which is presented in Table 2 (Incecik and Im, 2012).

Table 2. Sectoral emissions in Istanbul (Based on Incecik and Im, 2012)

	Emissions (tons/year)					
	PM10	SO2	NOx	NMVOC	CO	Total
Industry	7360	58458	9394	117	1714	77043
Domenic Heating	13631	10983	7014	18451	123510	173589
Traffic	5200	1016	158000	38500	270000	472716
Total	26191	70457	174408	57068	395224	723348

The basic factor generating pollution in Istanbul is the large population in a relatively small area. Therefore, there is a population cluster using every centimeter of the city for its needs, not taking into account the needs of nature and the environment, and thus eliminating green squares for new roads or buildings. With the increase of the population in the city, the number of apartments, houses and buildings is growing, which translates into the need for heating and/or cooling, which results in harmful emissions of pollutants into the air. Another consequence of the growing population in cities is the number of cars and the construction of new roads. The lack of emission limits for passenger cars and lorries in the city center is also not conducive to improving environmental conditions. On the basis of Table 2, the largest environmental threat is transport, which emits 472,716 tonnes of pollutants during the year, which confirms the number of cars registered per day (700 items). The amount of pollutants emitted by residents amounts to 173,589 tons per year. The least generating quantity of total pollutants is industry, which generates 77,043 tons of

pollutants per year. However, the industry releases 58,000 tons of sulfur dioxide annually into the air and it dominates this category of emissions.

The city of Ankara is located in the center of Anatolia surrounded on three sides by mountains. The first mention of the city comes from 1555. The available sketches show that Ankara was an open city, located on the plain that surrounded the hill topped with the castle. Ankara has been the capital of Turkey since 1923. The population of the city grew rapidly from 20,000 inhabitants in 1920 to 75,000 inhabitants in 1925. Currently, the population of the city has about 5 million inhabitants. There have been five attempts to develop urban plans for Ankara:

- Jansen's Plan (1928)
- Plan Uybadin-Yücel (1957)
- Plan of the metropolitan planning office (1970)
- Ankara 2015 METU structure plan (1985)
- Ankara 2015 Greater Municipality (1996) (Ercoskun, Varol, Gurer, 2005).

The first plan included the development of north-south directions along with the development of the railway line. Walking and cycling routes have been developed. The green belt around the city was enriched by integrating it with the protection of river beds, valleys and hills. The plan was aimed at highlighting the natural values with clear marking of green areas, amounting to 1490 hectares. Implementation of the plan lasted 20 years, after which competition for a new town development plan was held (Ercoskun, Varol, Gurer, 2005). Fig. 2 presents the scope of changes taking place in Ankara over a period of 65 years. Ankara significantly expanded its borders. The drawing also presents each subsequent urban plan and directions of spatial development of the city.

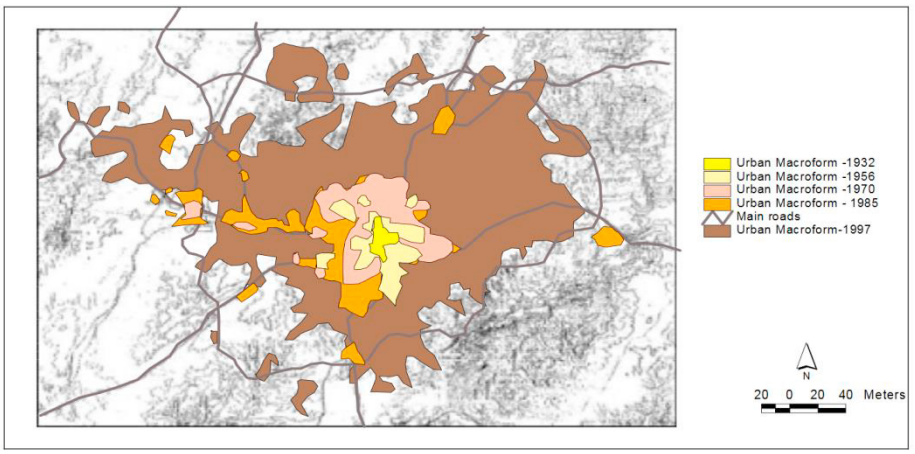

Fig. 2. Ankara (Ercoskun, Varol, Gurer, 2005)

The next project assumed a continuation of the Uybadin-Yücel plan. The City Garden ideas have been extended. The plan underlined the north-south axis, with its new contribution to build a new road in the western part of the city. Part of the old town has expanded its current functions, while the new city has gained land for residential, commercial and service constructions. The plan proved to be insufficient in solving all the problems of the city and did not provide the required form and infrastructure for further development. The plan was based on the current and past views of the metropolis, but it did not include future developmental aspects. The architectural concept was insufficient, which resulted in significant overloading of the population and loss of the initial idea of the garden city. During this period, the city grew at a much faster pace than was previously expected and the first problems with environmental pollution appeared at the end of the sixties. Continuous population growth and pressure of the inhabitants forced the creation of a new plan (Ercoskun, Varol and Gurer, 2005).

The spatial development plan determined the development of the western direction while preventing the construction of new housing estates and industrial zones. The development of the city was inevitable and higher parts of the areas adjoining the agglomeration were developed (Ercoskun, Varol, Gurer, 2005).

Another plan was prepared by scientists from the Middle East, who defined a different development perspective of the city. Ankara's main goal was decentralization. The forecasts specified the increase of the city's population to 5 million inhabitants within 30 years. In addition, the city's macroform is definitely limited in geographical terms. Six directions of growth were proposed along with green belts. The new plan included the road network system and a new hierarchy in urban transport. The concept also included a system of green areas, i.e. parks, forests, clearings, etc. Although the plan was not implemented, it is a valuable source of information about the current situation of the city and the suburbs of Ankara. Finally, Ankara widened its borders to the higher areas of the surrounding mountains in the north and the south, and the bottom of valleys and low lands in the west (Ercoskun, Varol and Gurer, 2005).

For the time being, the last spatial development plan of the city defines the north-west extension of Ankara's borders. The creation of new settlements, forests and recreation areas was expected in this direction. The expected population of the metropolis in 2025 is 6.5 million. The southern areas are referred to as green areas, while the upper parts of the city are dedicated to tourist services (Ercoskun, Varol and Gurer, 2005).

Currently, Ankara covers an area of 26,897 km2 (Board and Acar, 2013). Due to its geographical location, Ankara is the city with the highest land prices in Turkey. The linear development of the city towards the west causes linear commercial activity along the main axes of the city together with the creation of logistics centers on the outskirts. Illegal settlements and industrial areas located on different sides of the metropolis are characteristic for inhabitants with low incomes and cause social segregation (Ercoskun, Varol and Gurer, 2005).
Air pollution is the main problem of Ankara, and this is especially painful during the winter period. The national air quality standards in Ankara have been exceeded several times (Baris, et al. 2010). There are approximately 5,000 micro and small enterprises registered in Ankara that operate in 100 different sectors of trade, services and production. Employment in the private sector is about 50,000 persons. A major part of the industry is focused on the production of machinery and equipment, or components and spare parts for industries related to medicine, military, construction, automotive, agriculture or mining (Prepared by Project Coordination Department of OSTIM Industrial Investment and Business Inc. 2013). The main industries in Ankara include:

- Production of plastic and rubber,
- Construction works and production of building materials,
- Metal and metalworking (subcontractors for the automotive industry),
- Production of machinery and equipment,
- Electronics, and
- Technology and data processing (Prepared by Project Coordination Department of OSTIM Industrial Investment and Business Inc. 2013).

Public transport and heating of apartments and buildings are the main sources of pollution in Ankara. The city's industrial zone and the production of rubbish by economic entities and residents of the city also significantly contribute to the pollution. The specific geographic location of the city is not conducive to the circulation of the air, and all dangerous chemical compounds float above the city (Prepared by Project Coordination Department of OSTIM Industrial Investment and Business Inc. 2013).

4. Ways to reduce pollution in the largest urban agglomerations of Turkey

In fighting pollution, Turkey has adopted emission standards for vehicles in the city center. Istanbul has invested in the development of a subway, which currently has 6 lines, 95.3 km in length. In 2013, a 13.6-kilometer-long railway tunnel under the Bosphorus was opened. It runs 56 m below sea level which makes it the deepest tunnel in the world and it connects two continents (Incecik, Im, 2012, www.polwikipedia.org, http://www.transport-publiczny.pl/wiadomosci/tunel-pod-bosforem-stambul- dream-performance-Sultan - 647.html). The General Directorate for Environmental Protection in Istanbul adopted resolutions to reduce the emission of harmful chemicals into the air. The initiatives mainly concerned urban transport by introducing a vehicle restriction to the city center and increasing expenditure on public transport, including in particular the development of the subway. The regulations also banned the use of less efficient and of poor quality coal for heating buildings. Currently, about 95% of the city is supplied with natural gas, but this fact did not reduce solid particles level in the air. Due to the increase in gas prices,

many apartments are still heated with coal (despite having a gas installation). The city is still unable to prevent the emission of harmful substances from road traffic. The legal provisions do not regulate the environmental impact of the industrial zone. The emissions of pollutants from the industrial zone still constitute a significant percentage of the total of harmful compounds emitted into the air (Incecik and Im, 2012).

Istanbul authorities have undertaken a project to build a third airport, with the location in the northern part of the city. The project area covers 10 km long and 7.5 km wide plane between the villages of Yeniköy, Akpınar and Ağaçlı. This region abounds in forests, lakes, ponds, streams and sand fields, and is located along the Black Sea. Apart from a number of benefits for the city, i.e. the distribution of the load of international transport to three airports, the increase in employment during the construction of the airport and the boost of the local and national economy, the project brings a number of negative factors. The whole ecosystem (forests, heaths, pastures, meadows, farmland, dunes, land habitats, lakes, etc.) will be adversely affected by the construction of a new airport. All these areas will be thoroughly destroyed by construction processes and, later, by the operation of airport infrastructure. Biodiversity of fauna and flora threatens many species and will have a negative impact on water reservoirs, air quality and natural bird biotopes. Forestation of Istanbul is one of the most ecologically important regions in the world and a protected area in Europe. Dense forestation within the city limits is an important link in the development of wild species of life and contains important water resources and purifies the air (Northern Forests Defense 2015).

The unplanned urbanization process in Ankara and the massive inhabitation of green spaces has increased sharply and resulted in a very dense urban network without green open spaces and buffer zones. Constantly growing density and development of the city has not given way to the protection of existing green areas and limited the development of cities (Baris, et al. 2010).

The terrain south of Ankara is defined as huge green areas, natural mountains and valleys and tourism centers. The southern part of the city is a partly protected area. Plans for proposed housing projects in these grounds have now been adopted. Urbanization will cause unbalanced development of the city due to excessive land development in ecologically sensitive areas (Ercoskun, Varol and Gurer, 2005).

An important factor in saving the natural environment in Ankara has been related to greenways, which relieve transport in the city center. Apart from the introduction of greenways, Ankara has not taken any particularly pro-ecological measures. Numerous problems with Ankara's spatial development plans focus on actions to bring an immediate solution in the face of constant flow of people into the city. The capital also increases energy consumption and the share of private cars, due to the decline in the share of urban transport in the city. This has caused growing environmental problems, a significant reduction in the quality of life in the capital, high levels of air and water pollution, noise, and congestion. Currently, the city authorities are developing new plans to reduce pollution, reduce congestion and improve the quality of life (Baris, et al., 2010; Ercoskun, Varol and Gurer, 2005).

5. Green Cities in Turkey

Turkey faces enormous challenges to improve the quality of life conditions and green areas play a very important role in this aspect. They are responsible for the control of pollution and noise, protection of water reservoirs, groundwater and soil erosion, reduction of the impact of bacteria on humans and animals by cleaning the atmosphere, mitigating the urban climate and improving the quality of life in cities through psychological and sanogenic effects. The creation of ecological cities is undoubtedly a huge challenge and at the same time a need for Turkey. The growing Turkish agglomerations need to make an effort and use resources to create green urban areas and the proper spatial development of cities. Harmony between the industrial, residential, service and green zone of the city is necessary to achieve minimization of pollution, noise and improvement in the quality of life. Istanbul authorities have taken measures to protect the natural environment and improve living conditions in the city, but these measures taken so far are very inadequate for the needs of an ecological city. The development of Turkish cities as strictly green cities is becoming an impossible task for the time being. Over the longer period, Istanbul has a chance to become a green city, which will undoubtedly be a great opportunity for the place to attract new investors, residents and establish Istanbul's position in the international arena. Currently, Turkish cities do not fulfill pro-ecological functions. It is necessary to increase expenditure in the development of public transport along with the introduction of innovative solutions for the management of efficient flow of vehicles in the city. Investments towards green construction and development more land for green areas are also required as much as is the implementation of emission and pollution standards together with the extension of ecological education.

Ankara appears to be particularly affected by ecological concerns. The non-repeated, unsuccessful attempts to develop urban space resulted in 'freedom' with regard to the location of factories and industrial zones as well as housing construction. It caused a large urbanization problem for the city. Ankara's adaptation to a green city will be very problematic due to:

1. Specific geographical location,
2. A space-limited place,
3. Lack of consistency in the implementation of spatial development plans,
4. A large 'freedom' of housing and industrial construction,
5. Lack of proper enforcement of penalties for non-compliance with environmental law,
6. Continuous demographic explosion of the city,
7. Increase in private means of transport (mainly passenger cars),
8. Growth of road congestion.

All these factors favor an ecological disaster and a significant deterioration of the quality of life in the city. Bringing the metropolis on the ecological path to success will be an extremely complicated, time-consuming and costly process, if the city decides to take such a step. Subsequent spatial development plans should, first of all, consider the protection of the natural environment with the designation of green areas and the containment of activities related to construction arbitrariness.

The already initiated actions of the Istanbul authorities to reduce the emission of harmful chemicals into the atmosphere have created opportunities for Istanbul to become an environmentally friendly city. On the other hand, making Ankara green city is a huge challenge.

Conclusions

In general evaluation, megacities have increased the level of pollution and environmental degradation. Many factors affect the pollution in the city, e.g. geographical location, climate, meteorology, emissions from heating of buildings, industry, traffic and its intensity, waste management and the quality of green areas. The level of air pollution in metropolises depends on national technologies and the possibility of pollution control as well as the willingness and possibilities to improve air quality. The rapid urbanization of cities has increased the share of air pollution, especially in developing countries. Over 90% of the emission of harmful compounds into the air is attributed to motor vehicles. Increased population density also has a negative impact on the number of green areas. In order to improve the quality of life in cities, it is necessary to adopt new visions for the development of urban space and their effective management (Incecik, Im, 2012).

Istanbul's natural environment is in a poor condition. Globalization processes are not conducive to improving the city's ecosystem, on the contrary, they have a negative impact on the environment. The city's economic development also has a detrimental effect on air quality, the amount of green areas and the development of living species. A new venture for the construction of a third airport will thoroughly destroy the flora and fauna around the city. Air pollution will deepen and the quality of life in the city will decrease. There will be a significant increase in the number of disease incidents and deaths, which will translate into an economic slowdown and lack of manpower. The Chamber of Geological Engineers in Istanbul emphasizes that the destruction of forests within the city limits will bring the collapse of the city's ecosystem. An important ecological area for the city, which is at the same time a forest corridor to the Black Sea, comprises 6672 ha of sea pine forests, stone pines, Turkish pines, black pines, oaks, hornbeams, ash trees, limes, alders and other trees. Destruction of this ecosystem will have irreversible consequences for the environment of the whole country (Northern Forests Defense, 2015). However, environmental resolutions adopted by the city council may soon bring improvement of environmental conditions, not taking into account investments in the new airport. Increased expenditure and investments on environmental protection and generation of new green areas may be reflected in the creation of the ecological and environmentally friendly city.

Natural green systems support environmental integrity. Human activities result in depletion of natural resources, degradation of the natural environment and production of waste. Lack of harmony in the actions of mankind and the ecological system causes tensions and conflicts. Nature responds to these activities by reducing resources and increasing the likelihood of natural disasters. To avoid negative consequences, the relationship between man and

nature requires balance and prudent action. There are two key factors affecting the relationship between the natural environment and the human environment. The first refers to population growth and thus to enlarging geographical spaces, which translates into exploitation of nature (The Istanbul Master Plan Summart, 2007). These are the basic factors shaping Ankara. The capital of Turkey is not focused on being an ecologically friendly city. Lack of consistency in spatial planning of the city and unfavorable location of the city contributed to the great freedom in single-family buildings and industrial constructions. The rapid and constant increase in Ankara's population seems to be impossible to avoid and may harm the natural structure and resources of the city. It is possible to protect the Ankara's natural environment by shaping ecological awareness and enforcing the principles of the zoning plan.

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