

THE IMPACT OF URBANIZATION OF ALBA IULIA CITY ON THE SOIL

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Abstract. *The urban sprawl of the cities, caused by the development and diversification of industrial activities and by the spreading of individual houses in peri-urban areas, is responsible for the apparition of ecological disequilibrium, especially when environmental protection issues are not taken into consideration. The most affected part of the environment is soil, especially when cities don't have sewer systems, wastewater treatment plants and waste management systems. Also, in urbanized areas, the quality of the soil may be altered by some industrial activities with high soil pollution risk. Urban plans must undergo environmental assessment for plans and programs procedure and environmental issues must be taken into account when plans are prepared. The development of cities can't be stopped in order to preserve the environment, but there should be found some procedures and methods to ensure both the protection of the nature and the development of the cities. Alba Iulia city renewed its General Urban Plan in 2012, and in 2013 this plan underwent environmental assessment procedure. The scope of this study was to identify the main sources of impact on the soil associated with the implementation of the measures stipulated in this General Urban Plan. Also, the study aimed to find the measures required in order to minimize this impact.*

Key words: *urbanization, soil, green spaces, soil pollution*

INTRODUCTION

According to the Law 350/2001, as subsequently amended and supplemented, a General Urban Plan has both coordinating and regulatory role and it is the main instrument for operational planning, representing the legal framework for the implementation of programs and actions for local development. Each administrative unit must prepare and approve its General Urban Plan, which is regularly updated, at periods no longer than 10 years [5].

The General Urban Plan is comprised, among others, of short-term regulations for the entire administrative unit, which refer to the delimitation of intravilan plot in relation with the administrative plot of the city; the Plan also contains provisions for the use of the intravilan plots [5].

Planning needs to be more preventive rather than reactive to problems. The economic costs/benefits are especially important to consider in terms of predictive forecasting and preventive measures rather than awaiting impacts or problems to occur; usually at a stage when the situation is more costly to rectify. However, current practice seems to often follow a more reactive model of action. The environment and health results and benefits of urban planning are usually long-term. Thus, there exists a conflict between efforts to improve environment and health for communities and the political agenda of policy-makers. [1]

In urban planning field, it must be intensified the collaboration between architects, environmental protection and health specialists, so that the measures from the General Urban Plans to be in accordance with the highest environmental and human health protection standards.

Land-use planning is a complex process involving development of a land-use to include a statement of land-use issues, goals, and objectives; summary of data collection and

analysis; land-classification map; and report describing and indicating appropriate development in areas of special environmental concern. [2]

A successful city must balance social, economic and environmental needs: it has to respond to pressure from all sides. A successful city should offer investors security, infrastructure (including water and energy) and efficiency. It should also put the needs of its citizens at the forefront of all its planning activities. A successful city recognises its natural assets, its citizens and its environment and builds on these to ensure the best possible returns [3].

According to the data provided by the National Statistics Direction Alba in 2011, the total surface of the Alba Iulia city administrative territory is 102,467763 square kilometers and the surface of the intravilan plot is 2396,8 hectares. In the year 2011, Alba Iulia city had 58681 inhabitants and the density of population was 36,1 inhabitants/ hectare. The General Urban Plan approved in 2013 changed these numbers: the surface of intravilan plot raised to 3886,36 hectares, so it increased with 1509,43 hectares; as a consequence, the density of population decreased to 30,55 inhabitants/hectare.

Urban development of the city, in areas where there is no water and wastewater infrastructure and where there are no paved roads and other public services, leads to environmental problems, such as: surface and groundwater pollution, soil erosion, waste generation and alteration of vegetal layer.

Alba Iulia city is confronting with a lack of green spaces relative to the number of inhabitants, compared with the value established in *Government Emergency Ordinance 114/2007*, which it's 26 square meters/ inhabitant. The existing green spaces have a poor condition. They are situated mainly inside the collective living quarters and they have a heterogeneous distribution in the city. The existing public green spaces face a continuous pressure because of the spreading of buildings, on one hand, and because of the lack of public terrains to be arranged as new green spaces, on the other hand.

MATERIALS AND METHODS

The General Urban Plan of Alba Iulia city underwent environmental assessment procedure for plans and programs. The conclusions of the environmental assessment have been synthesized in an Environmental report. The Environmental report contains the conclusions of the environmental assessment conducted for this General Urban Plan and it was prepared in order to obtain the Environmental Permit, in accordance with the requirements of *Government Decision no. 1076/2004 establishing the procedure of environmental assessment for plans and programs* and the requirements of the *Minister Order no. 995/2006 for approving the list of plans and programs covered by Government Decision no. 1076/2004 establishing the procedure of environmental assessment for plans and programs*.

In this study, there are presented the conclusions of this environmental assessment, emphasizing the impact of the General Urban Plan on the soil and on the green spaces from Alba Iulia.

RESULTS AND DISCUSSIONS

Considering as starting point the actual shape of the city, the relation of this shape with the natural capital and the ecologic, economic and administrative restrictions, the General Urban Plan of Alba Iulia aims the spreading of the intravilan plot on the following directions (figure 1) [5]:

- to the North: the locations administrated by Alba Iulia city (Bărăbañ, Micești, comprising the free areas between these and the main body of the Alba Iulia city)

Intravilan balance proposed in the General Urban Plan of Alba Iulia city is presented in the Table 1, while in the Table 2 there is a comparison between the surfaces of existing intravilan plot and the surfaces of intravilan plot proposed in the General Urban Plan.

Table 1

Intravilan plot balance proposed in the General Urban Plan of Alba Iulia City [5]

Functional areas	Alba Iulia	Oarda	Barabant	Micesti	Paclisa	Isolated bodies	Total	%
Total intravilan plot	2783,04	592,06	161,07	147,99	197,78	24,29	3906,23	100
Central area	118,42	0,00	0,00	0,00	0,00	0,00	118,42	3,03
Mixed area	304,72	3,32	3,09	22,86	9,73	0,00	343,72	8,80
Institutions and services	48,45	0,56	0,43	0,45	0,57	1,20	51,67	1,32
Habitation	1434,73	397,59	110,25	105,40	144,68	3,56	2196,20	56,22
Industrial and storage units	167,54	98,10	29,89	0,00	5,65	11,20	312,38	8,00
Local management services	13,19	1,86	3,12	1,39	9,02	6,05	34,63	0,89
Traffic routes	389,20	64,78	6,07	13,58	13,00	1,00	487,63	12,48
Green areas/Recreational areas	238,84	25,85	8,22	2,12	15,13	0,40	290,56	7,44
Water	19,81	0,00	0,00	2,19	0,00	0,88	22,88	0,59
Urban technical constructions	21,00	0,00	0,00	0,00	0,00	0,00	21,00	0,54
Areas with special destination	27,14	0,00	0,00	0,00	0,00	0,00	27,14	0,69

Table 2

Comparison between the surfaces of existing intravilan plot and the surfaces of intravilan proposed in the General Urban Plan [5]

Surface Intravilan plot	Surface			
	Existing -ha-	Proposed -ha-	Variation -hectares-	Variation -%-
Total intravilan plot	2396,80	3906,23	1509,43	62,15
Central area	115,80	118,42	2,62	2,26
Mixed area	123,00	343,72	220,72	179,45
Institutions and services	42,00	51,67	9,67	23,02
Habitation	1455,80	2196,2	740,4	50,86
Industrial and storage units	250,00	312,38	62,38	24,95
Local management services	27,00	34,63	7,63	28,30
Traffic routes	210,00	487,63	277,63	132,21
Green areas/Recreational areas	110,40	290,56	180,16	163,18
Water	2,80	22,88	20,08	717,14
Urban technical constructions	21,00	21	0	0
Areas with special destination	39,00	27,14	-11,86	-30,44

In order to accomplish the required green space surfaces relative to the number of inhabitants regulated in *Government Emergency Ordinance no. 114/2007* (26 square meters/inhabitant), in the General Urban Plan are proposed the following measures:

- along the Eastern limit of the administrative territory, in the neighborhood of Ciugud lands, it is proposed the designation of a green corridor. This is situated on the banks of Ampoi River, to the area where it flows into the Mures and it is intended to be a recreational park and, in the same time, the main element of the correlated development of these two cities. This park is supposed to fulfill the stringent need for green spaces and recreational and sport facilities in the peripheral quarters.

- designation of recreational areas of local importance, recreation facilities and other public green spaces (arboretum park; park; water bodies in Micesti Stadium area; green recreation area, water sports on both banks of Ampoi River; development of sport and recreation facilities, the park from Paclisa area; designation of Muresului Valley for recreation, water sports, water bodies, green space, windbreaks.

- rehabilitation of the free surfaces of land situated in residential areas, recovery and rehabilitation of residual land surfaces
- providing land for the establishment of public green spaces in the centers of the neighborhoods

For the protection and rehabilitation of green spaces within residential areas, there are suggested the following measures [5]:

- the spread of lots for private gardens at the periphery of the quarters (Barabant, Micesti, Paclisa), as a complement to public green spaces
- the delimitation of green spaces from neighborhoods, the protection and transformation of vacant spaces in green spaces
- the development of new neighborhoods centers with the provision of a significant proportion of public green spaces.

After the implementation of this General Urban Plan, the surface of green spaces for sport and recreation will be 290.56 hectares, which corresponds to an average of about 49 square meters / inhabitant.

After the implementation of the measures proposed in the General Urban Plan, the soil will be adversely affected in particular by replacing the agricultural land with constructions, which may cause soil pollution, such as [4]:

- development of economic activities;
- occupation of free intravilan plots with constructions having urban functions (housing, facilities, manufacturing, urban technical infrastructure and municipal services etc.).
- modernization and extension of traffic roads, including the ring road to Zlatna;
- by directed extension of the intravilan plots in different areas.

In order to prevent a possible negative impact of implementing the Urban Plan on the soil and subsoil, the following recommendations will be taken into consideration [4]:

- any construction works can be done only after obtaining environmental approval from the Environmental Protection Agency Alba.
- the provisions of the local urban regulations will be strictly respected;
- construction works that will be conducted in the area shall not commence before ensuring adequate storage space for materials and for waste;
- the economic agents responsible with the construction works have the responsibility to collect and dispose or reuse specific construction waste; unorganized outside warehouses are not allowed; at the completion of construction works, the land will be cleaned and this type of deposits will be removed;
- the alimentation of equipments with fuel will be made only in authorized stations;
- proper technical condition of the equipments used in manufacturing must be ensured in order to avoid fuel and lubricants spill and to minimize emissions into the atmosphere;
- the occupation of additional land plots, excepting those included in the General Urban Plan, is forbidden;
- the fertile layer of soil obtained after soil excavation works must be properly stored and, at the completion of construction works, it will be used in ecological reconstruction of areas affected by pollution;
- the rainwater that washes some public and industrial car parks that will grow in the area must be passed through a hydrocarbon separator before being discharged into the city sewerage system or into an emissary;
- the installations for collection and treatment / disposal of wastewater must be periodically checked, in order to maintain them in proper working condition;

- after the expansion of sewage system and the modernization of wastewater treatment plant, all houses in the area will be mandatory connected to them;
- the fermented sludge resulted from wastewater treatment plants will be used as fertilizer on agricultural land.

CONCLUSIONS

If environmental problems won't be taken seriously into consideration, in the future the urban development of Alba Iulia City will have adverse effects on the environment and on people's lives. These effects refer to: climate change, reduction of green spaces, reduction of natural areas at the expense of anthropogenic areas, increased noise level, increased level of air pollution, increased level of surface and groundwater pollution, increased level of sound pollution.

Alba Iulia is currently confronting with a shortage of green spaces in relation to the number of inhabitants, and it doesn't respect the minimum limit required by *Government Emergency Ordinance no. 114/2007* of minimum 26 square meters / inhabitant. After implementing this GUP, the surface of green areas that can be used for sport and recreation will increase to 290.56 ha, value which corresponds to an average of about 49 square meters / inhabitant.

The agricultural land situated on the territory of Alba Iulia city is continuously reducing its surface, because of ongoing pressure from investors and from residents of the city, who want to expand the intravilan plot; this trend is expected to be maintained in the coming years.

By implementing the measures proposed in the General Urban Plan, the surface of intravilan plot of Alba Iulia will grow with 1509.43 hectares, which represent mostly agricultural land inserted into the intravilan; thus, it is encouraged the apparition of agricultural land pollution and the reduction of agricultural areas in the city of Alba Iulia.

If the issues of environmental protection and human health will be seriously taken into account, the urban development of the town will lead to a sustainable development of Alba Iulia and to an improved living environment for its inhabitants.

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