

Agriculture Reconstruction in the Suburban Areas of Bistrița Municipality

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Abstract. Starting with the Middle Ages, the German colonists firstly introduced the cultivation of vineyards in the suburban areas of the city; later on, they gradually planted individual orchards as well as grain and maize fields. During the communist period, the entire suburban territory of the city was turned into a new apple and plum orchard area and farmers started practicing other agricultural activities, such as dairy farming. Once with the collapse of the centralized economy in 1989, many of the vineyards and a great part of the intensive orchards were abandoned by the individual owners, who were financially and technologically incapable to sustain modern intensive agricultural activities. Concurrently, people shifted to individual cultivation of small parcels under corn and maize, fact that reflects the reconversion to subsistence agriculture. The city market is currently monopolized by imported fruit and vegetables, which imposes a reassessment of agriculture in the suburban areas of Bistrița Municipality and its adaptation to the urban needs under all aspects. This adaptation must be accomplished in accordance with the concept of suburban agriculture, the accurate territorial situation, the bio-edaphic and morphological potential of the area, the present needs of urban population, as well as with the situation of agricultural fields and their distribution. Our research tries to reflect the way in which a subsistence type of agriculture based on a high fragmentation of land property can be turned into a modern suburban type of agriculture. Our attempts have been facilitated by the real interest the local administration manifests towards supporting and promoting a sustainable development in the Bistrița area, where the large territory used for agricultural activities allows suburban agriculture play the central role in this process. Bistrița municipality represents one of the first cities that benefited from studies regarding integrated territorial development. These studies helped to set a series of measures for the reorientation of traditional agriculture towards an intensive market one, such as: local policies for the reorganizing of properties, allotting some public property land to tenants for temporary use, and changing the economic destination of the degraded fields.

Keywords: agriculture reconstruction, suburban area, suburban agriculture, integrated territorial development

INTRODUCTION

Suburban agriculture corresponds to a specific category of agricultural activities determined by the status of the territory they are practiced on, which is the suburban area. Suburban areas are included in the administrative territory of the city that corresponds to the area on the outskirts of the city. By definition, agricultural activities are practiced in rural areas where there is an extended agricultural land. Within the city, agricultural activities do not benefit from a basic condition for development because the ratio of agricultural land is small as compared to other areas having various economic uses. Much more, we can mention other restrictive factors that impede the development of suburban agriculture, such as: a) the increasing land request for residential constructions and expansion of the city; b) the high price of the land, which does not allow the unification of small plots into optimum sized agricultural parcels for establishing new farms; c) the destruct of agricultural infrastructures like farming establishments and equipments, irrigation systems; d) the high level of land fragmentation, which has been caused by privatization and redistribution of land to the former

landowners before 1989. The actual landowners perceive this category of land like an inherited good and they are anytime disposed to sell it, not seeing it like a means of agricultural production. On the other hand, the new landowners barely notice the role of the urban market in the management of agricultural products, the lack of experience and tradition in practicing suburban agriculture etc. In case of certain urban administrative entities, and also the case of Bistrița Municipality, the suburban area is much extended, while the agricultural areas hold an important ratio out of the total area. Having the fact that agricultural land represents a strategic resource, and wasted through improper management, being considered a threat to food security, therefore, in these suburban areas, we consider necessary to try managing this category of resources by initiating specific agricultural activities. Suburban agriculture represents that specific form of agriculture that has to be promoted in suburban areas and which has a more cultural value than an industrial one.

MATERIALS AND METHODS

Our study is based on the classical methodology used in territorial planning, which follows a two-step analysis, one of the current status and dysfunctions registered in the city, at all functional levels, while the second phase is represented by the proposals. This analysis comprises a series of indicators used in urbanism and territorial planning, as well as numerical values obtained by norms and standards currently available and established by specific regulations. Based on these analyses, we elaborated proposals and scenarios for development out of which there were selected the most likely, having in view the territorial reality as well as the prognoses regarding demographical and economic development of the city. The major element in defining suburban agriculture has been the assessment of the existent agricultural land and that is proposed to be maintained within the territory, on categories of use, as well as its territorial distribution. To this, we added the reassessment of the level of suitability of land for practicing various crops, by using *bonitation method*. This represents a quantitative method of calculating the suitability of agricultural land. After correlating the results with the concept of suburban agriculture, the major guidelines for developing suburban agriculture, with the environmental context of the territory and the availability of agricultural land by uses, with the experience and the traditional agricultural practices in the area, we established a redefinition of agricultural activities, by mentioning the location of the available plots and their proposed agricultural use. These proposals are reflected by the cartographic material, which can be considered an operational instrument for regulating the development of agriculture in the suburban areas of Bistrița municipality. The maps also reveal the most favourable locations for practicing agriculture activities and they also mention the possible practices, afterwards them being rigorously decided by the Office of Agriculture, subordinated to the city administration.

Among the most used methods of analysis we also mention: a) the classification of land by the principle of urbanism, which divides the categories of land use into two significant classes: agricultural fields and non-agricultural fields; b) digital planimetry of the surfaces on aerial photoplans, this representing the most precise source to define the categories of land agricultural use; c) territorial mapping by use aiming at establishing the preliminary forms of agricultural use of the land (i.e. arable – pastures, orchards – hayfields, pastures - hayfields); d) the planimetry of the aerial digital photoplans and setting the agricultural fields by use, which are more precise than data obtained from the „declarative” statistics. When selecting the most suitable locations for agricultural activities, we went through the following analytical steps: 1. Assessing the urban expansion and the need of land for this purpose. 2. Assessing the size of verdure spots and the need of land for this purpose. 3. Assessing the need for land for developing the technical infrastructure. 4. Assessing the necessary land surfaces to be preserved by forestation. 5. Assessing the necessary land surfaces for special preservation (protected areas, archaeological sites). 6. Using the unexploited areas for agricultural purposes by changing their agriculture profile (i.e. rearranging natural pastures into hayfields, transforming the unproductive and degraded arable land into pastures etc.).

SUBURBAN AGRICULTURE – A FORM OF SUSTAINABLE AGRICULTURE. CONCEPTUAL PERSPECTIVE

Suburban agriculture corresponds to the agricultural activities that are practiced right nearby the city area, on its administrative territory, although traditionally, agriculture develops the most optimum in the rural areas. On the other hand, as a dynamic structure, the city has its own manner of economically managing the land in accordance with its rhythm of development, its current needs and perspectives. If we have in view the ambient features in the urban area, as well as the reduced size of

the city outskirts in comparison with the urban, then the agricultural activities in this area are specific due to the fact that: 1. Usually, the city disposes of reduced agricultural areas, them being permanently threatened by city expansion; except for the cities located in the plain areas, where the agricultural land holds about 80-90% of the outside city area, subsequently these cities being able to economically develop through agriculture (i.e. the cities of Țândărei, Făurei, Ianca, Pogoanele in Bărăganului Plain). 2. Up until 1989, there was a high level of agricultural specialization, based on intensive farming or intensive horticulture, pomology and growing grapevines. 3. In case of market economy, suburban agriculture does not seem profitable, except for horticulture, due to the small-sized surfaces it needs and the position agriculture holds in the urban economy. 4. The decreasing number of specialized workforce or the poor interest of urban population in working in agriculture. 5. The high price of the agricultural land in the suburban areas that simply blocks the process of reunification of plots and starting new farms. 6. The lack of experience in starting and developing small farms associated with agritourism activities. 7. The lack of research studies issued on urban integrated development that would have in view the outskirts of a city as an organic constituent of urban development. 8. The inexistency of national policies for agriculture development, and especially for highly specialized agriculture, having the fact that all activities are presently practiced according to personal motivations and interests. 9. The insufficient encouragement of the suburban agriculture concept at a national level, underlining the fact that its attributes of development are different from the extensive agriculture.

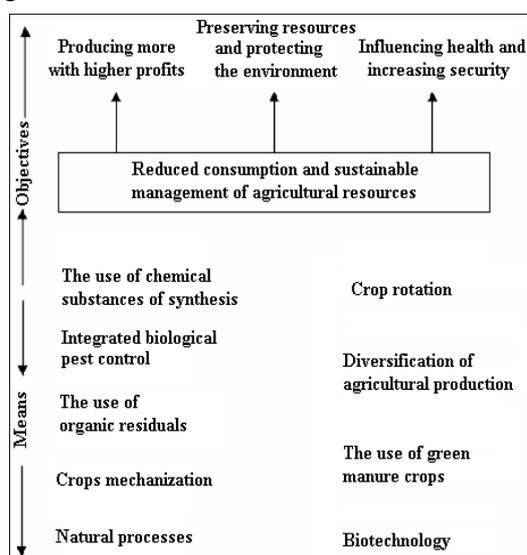


Fig. 1. Principles of sustainable agriculture (after J. F. Parr and others, 1990).

Other reasons for including suburban agriculture in a specific category are given by the necessity of using the unexploited agricultural areas of the suburban areas, therefore, contributing to the diversification of the urban landscape, as well as its role in the urban economy, with small-scale economic implications, by supporting new activities of small farming and agritourism. When attempting to revitalize suburban agriculture we have to consider several *guiding principles*: 1. The correlation between the development of suburban agriculture and urban development of the city. 2. The need of urban expansion and ecological networks to take over large agricultural plots. 3. To maintain and rehabilitate the traditional agricultural landscape specific to that area. 4. To change the use of the agricultural land affected

by degradation into forestry utilization for its rehabilitation and preservation. 5. The relocation of grazing and animal breeding outside the suburban area for delimiting the extension of epizooties. 6. Starting new activities of small-farming by the reunification of plots in association with agritourism. 7. The preservation of land and the rehabilitation of land fund.

Sustainable agriculture presupposes intensive production of competitive products by an environmentally friendly technological process. The most common saying, that of “integrated systems”, signifies the scientific harmonious utilization of all technological elements, starting with soil work, crop rotation, fertilization, irrigation, integrated biological pest control, and continuing with animal breeding, collection, treatment and use of waste resulted from agricultural activities in order to achieve high and stable productions in multi-sectoral, both vegetal and animal farms. Surprisingly obvious is that researchers in the agricultural field, which represents a biotechnological, ecological and economic system, thoroughly search for an “ideal” change so as to create a less polluting and energy wasting ecosystem. Turning to alternative agriculture has to be gradual, like “a slow process of changes that would allow long-term use of environment, so that economic development remains possible along with maintaining the quality of environment at an acceptable level. In other words, it is not possible to fully adopt biological agriculture, but a sustainable, integrated and ecological one. There appears the necessity of transitional agriculture, meaning biological, microbiological and industrial, altogether but managed according to ecological principles.

STRUCTURAL MODIFICATIONS OF AGRICULTURAL PRACTICES. CURRENT STATUS AND PROPOSALS

When analysing the structural modifications at the agriculture level in the suburban areas of Bistrița municipality, we have to start from with the analysis of the available land fund, type of land propriety and its size, the bioclimatic features of the territory, the length and distance to the market, as well as the experience in the field. The results bring out that the land suitable for agriculture in the suburban areas of Bistrița municipality represents more than 60 %, out of which pastures hold 18,56 %, hayfields 18,25 % and orchards 17,33 %. Arable land registers the lowest values of only 7 %. The present structure of agriculture indicates a certain orientation towards pomology and eventually animal breeding. Cereals, technical plants and vegetable crops register poor values of production. The structure of agricultural land by use is the expression of both morphological and biopedoclimatic potential of the territory, which, due to the predominantly hilly relief and mild climate, has been suitable for being cultivated with the two major cultures mentioned above. Patches of arable fields appear isolated in the hilly area outside the city and more compact in the meadows and terraces, especially on the territory of Sărata locality.

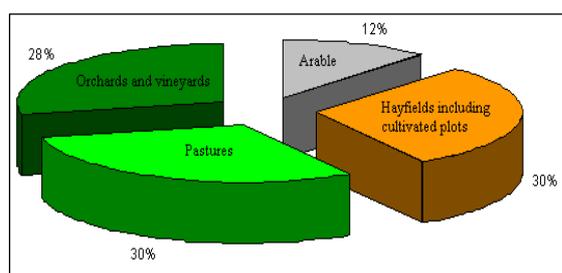


Table 1. Fig. 2 The agricultural structure. Current situation¹.

Categories of use	Surface (ha)	Ratio (%)
The total surface of extraurban area	12184,40	82,50
Agricultural land	7477,59	61,37
Arable land	880,68	7,23
Hayfields including cultivated plots	2224,24	18,25
Pastures	2261,00	18,56
Orchards and vineyards	2111,25	17,33

The presence of an urban food market nearby, embodying about 80000 inhabitants, should have constituted a major factor for the development of the suburban agriculture. Yet, besides this, the private propriety over the agricultural land delays this process, as. Traditions and local experience are also recognized especially in case of pomology and sheep breeding. All these advantages and favourable factors for the development of agriculture until 1989 were at least managed satisfactorily, thus agriculture activities in Bistrița being able to produce food-products both for the local market and for the regional one. Currently, the status of agriculture in Bistrița municipality is strongly affected by the long transition and the lack of a specific policy or a strategy in this field. Much more, it gains a specific character in the new economic context, along with the process of urban expansion of the municipality. The first major modification that appears within it affects the territory; therefore, the surfaces and structure of agricultural fields, by use, are affected by changes (table 2). Therefore, the agricultural surface decreases from **7477,59 ha**, value that reflects the current situation, to **3867,82 ha**, value that reflects the proposals (table 3).

Categories of use	Surface (ha)	Ratio (%)
The total surface of extraurban area	12184,40	82,50
Agricultural land	3867,82	31,74
Arable land	173,07	4,47
Hayfields including cultivated plots	1323,35	34,21
Pastures	761,79	19,70
Orchards and vineyards	1609,60	41,62

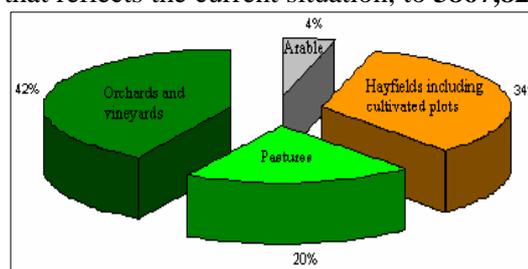


Table 2. Fig. 3. The agricultural structure. Proposals.

Table 3. The agricultural structure. Current situation and proposals.

Categories of use	Current situation (ha)	Ratio (%)	Proposals (ha)	Ratio (%)	Surface variation (ha)	Ratio increase/decrease
The total surface of extraurban area	12184,40	82,50	12184,40	82,50	0	0
Agricultural land	7477,59	61,37	3867,82	31,74	-3609,77	-29,63
Arable land	880,68	7,23	173,07	4,47	-707,61	-3,76
Hayfields including cultivated plots	2224,24	18,25	1323,35	34,21	-900,89	15,96
Pastures	2261,00	18,56	761,79	19,70	-1499,21	1,14
Orchards and vineyards	2111,25	17,33	1609,60	41,62	-501,65	24,29

¹ The surfaces were determined by planimetry of the aerial digital photoplans in 2005.

						(%)
The total surface of extraurban area	12184,40	82,50	12184,40	82,50	0	0
Agricultural land	7477,59	61,37	3867,82	31,74	-3609,77	-48,27
Arable land	880,68	7,23	173,07	4,47	-707,61	-80,35
Hayfields including cultivated plots	2224,24	18,25	1323,35	34,21	-900,89	-40,50
Pastures	2261,00	18,56	761,79	19,70	-1499,21	-66,31
Orchards and vineyards	2111,25	17,33	1609,60	41,62	-501,65	-23,76

This decrease of the agricultural surface with 48,27 % is determined by two categories of specific factors:

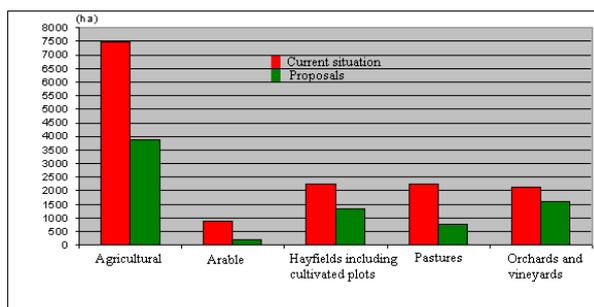


Fig. 4. Structural modifications of agricultural use. Current situation and proposals.

Intrinsic factors in which category we mention the need for urban and economic development of the municipality, which in fact represents a normal phase of urban evolution. This need for urban and economic development of Bistrița municipality started with the relocation of residential and economic establishments on the outskirts of the city, exactly

on the agricultural fields located nearby. Thus, the highest level of occupying the agricultural land registered in the period between 2003 and 2007 with residential familial households, declared as secondary residences for holiday purposes. To this, we may add the newly constructed economic establishments as well as the ones proposed for relocation from the urban area.

Extrinsic factors, which are represented by a series of factors related to the general economic status, as well as to the decrease of interest towards agriculture, especially in the suburban areas. Low economic capitalization in this field, as well as the decrease in the number of workforce or its ageing, fact that did not superpose in time with the starting process of farming, has much determined the degradation of a large part of the agricultural fields. Subsequently, agricultural surfaces suffered new structural modifications, such as: replacing crops, transforming arable land into hayfields or pastures, the degradation of pastures by forestation, the degradation of orchards and their change into hayfields or pastures, the excessive increase of agricultural land affected by erosion and landslides etc. Changing the propriety status over the land after 1989 by re-establishing propriety titles to the former landowners has also determined the abolishment of agriculture state companies (IAS) and of co-operatives (CAP), and the new organization of land propriety into small plots, unsuitable for practicing competitive agriculture. The process itself, along with the delays practically blocked agriculture activities. Nowadays, it is mainly practiced a subsistence agriculture, economically low-level and uncompetitive. This process caused farms break-up and the destruction of agricultural cars and tractors park. This represented the case of Bistrița municipality as well, its suburban areas being now subject or agricultural reorganization, aiming at eventually performing a *sustainable suburban agriculture*.

Categories of use	Surface (ha)	Ratio (%)
The total surface of extraurban area	12184,40	82,50
Agricultural land	3867,82	31,74
Intensive cereal crops	54,50	0,45
Horticulture practiced in irrigational system	118,56	0,97
Mixed agricultural fields (proposed hayfields and forage crops)	430,72	3,54
Proposed natural pastures	761,79	6,25
Hayfields	892,63	7,33
Productive orchards	812,96	6,67
Rehabilitation of orchards	742,99	6,10
Rehabilitation of vineyards	53,65	0,44

Table 4. The agricultural structure. Proposals.

Based on theoretical assumptions and realities in the field, in case of Bistrița municipality, we proposed the implementation of suburban sustainable agriculture concept by establishing the following priorities: 1. The mid-intensive and intensive management of the available agricultural fields suitable for other uses in accordance with urban and economic development of Bistrița municipality. 2. The correlation between crops and agricultural practices and the morphologic and bio-climatic potential of the area. 3.

The correlation between the typology of agricultural activities with the status of suburban agriculture. 4. Stimulating the transactions with agricultural land so that it should be reunified and become an economically viable land plot. 5. Stimulating the partnerships so as to establish agricultural associations and ecological farms. 6. Supporting the implementation of the concept regarding agritourism. After satisfying the land needs for the urban and economic development of Bistrița municipality, on short, medium and long term, we considered that we should plan the management of the remained agricultural land in a mid-intensive and intensive way so as to compensate production. Along with this, we proposed to reconfigure the structure of agricultural land, by use, in accordance with the morphologic, biopedoclimatic potential, as well as with the status of suburban agriculture (table 4). Data presented in the table reveal that agricultural activities practiced in Bistrița municipality area are directly oriented towards pomology and animal breeding, organized in dairy small farms. As a second priority the most prevailing practices focus around horticulture, cereal crops, technical plants and the rearrangement of several vineyards for the revitalization of local wine tradition and for improving the suburban agricultural landscape. Presently, *pomology* activities still hold important land surfaces, by the existence of over 800 ha of productive orchards, plus other 742 ha included in the proposals for the rehabilitation of fruit trees plantations. This rehabilitation is mainly important for the proper management of the specific infrastructure left from the former plantations and needing small adjustments, including terraces, agricultural roads, water drainage systems, and temporary storage platforms for fruit. These measures would substantially decrease the costs for creating new plantations from the start. On the other hand, the presence of “*The Research Centre for Pomology*” in the area represents another important factor for stimulating pomology practices, due to its experience over the years and its prestige at both national and international levels due to the new varieties of fruit discovered and bred. Among other reasons for which we considered pomology an important activity to be practiced in the suburban areas of Bistrița municipality we can mention that: 1. It represents the most suitable agricultural activity for the suburban area due to the agricultural landscape it creates. 2. Fruit represent a significant element of a healthy alimentation of people, hence the urban food market becomes a larger consumer of fruit. Because they are perishable, once the distance is shorter, it becomes more advantageous to breed fruit. 3. The area of Bistrița – Dumitra disposes of a rich morphological and biopedoclimatic potential favourable for pomology. 4. Pomology crops succeed in stabilizing the soil and diminish erosion and landslides processes. 5. By practicing an ecological and sustainable pomology can help fortifying the local ecological network, and its inclusion in the network structure as an ecological corridor. Currently, we find two massive plots cultivated with fruit trees (apple trees) under the observation and management of *The Research Centre for Pomology* and one located in Slătinița locality, to which we can add a small orchard located at Ghinda locality (see fig. 5). They do not need any major work for maintenance and exploitation for the next 10-15 years and represent the basic fund of Bistrița pomology practices. But we should not forget the fact that, after 10-15 years, there orchards would be overexploited and we have to replace those crops with others. In anticipation we proposed to rehabilitate the former orchards, and populate them with new and productive fruit species, thus setting the premises for a new sustainable agricultural development for pomology practices in Bistrița suburban area. The most suitable locations for these practices are revealed by figure 5 and the surface involved in this process cumulates 742,99 ha. After assessing the territorial balance we notice a high availability of the surfaces with pastures (761,79 ha), hayfields (892,63 ha) and agricultural land with mixed use (hayfields and forage crops - 430,72 ha), together cumulating 2085,14 ha – quite a significant land surface for supporting livestock. Due to the relative fragmentation and concentration of surfaces used for pastures and hayfields, due to the economic context, the status of suburban area of the territory under study, and last but not least due to the presence of a market with increased potential for consumption and continuously growing, a coherent management of this land can be optimally achieved by creating ecological specialized small dairy farms (30-50 cows for milk), or in mid-open regime including stabulation and organized grazing in specific periods of vegetation. Complementary, some farms can adopt agritourism character and then practices. The most suitable locations for such agricultural practices we consider the areas of Sigmir, Slătinița and Ghinda localities. Sheep breeding is not so much supported in the Bistrița suburban area, but only in the peripheral areas around Slătinița and Ghinda localities due to the character of “bearer” in case of multiplication of parasites.

Animal breeding is considered to be another traditional practice in Bistrița area, this fact being revealed by the large surfaces used for pastures and hayfields in the past and still in the present. Yet, there are industrial agrotechnical enterprises, such as dairy and meat farms, pig farms or poultry farms, of great size, on the intensive production system, which are completely dependent on large surfaces of

arable land for producing forage and eventually not disposing of favourable conditions for development, the only suitable area being located at Sărata locality, where we proposed the construction of an agroindustrial farm (see fig. 5).

Olericulture (horticulture), known as a specific suburban agricultural branch, practiced in greenhouses or outside, benefits from all favourable conditions for development, such as: fertile sandy meadows, water resources for irrigations, a growing food market in the neighbourhood, and mild climate without extreme phenomena. Nevertheless, we do not know about any local attempts to practice this type of activity, which is a negative aspect. By yearly cultivating corn monocultures, the lack of crop rotation and by applying a superficial agrotechnology, will cause continuous land degradation.

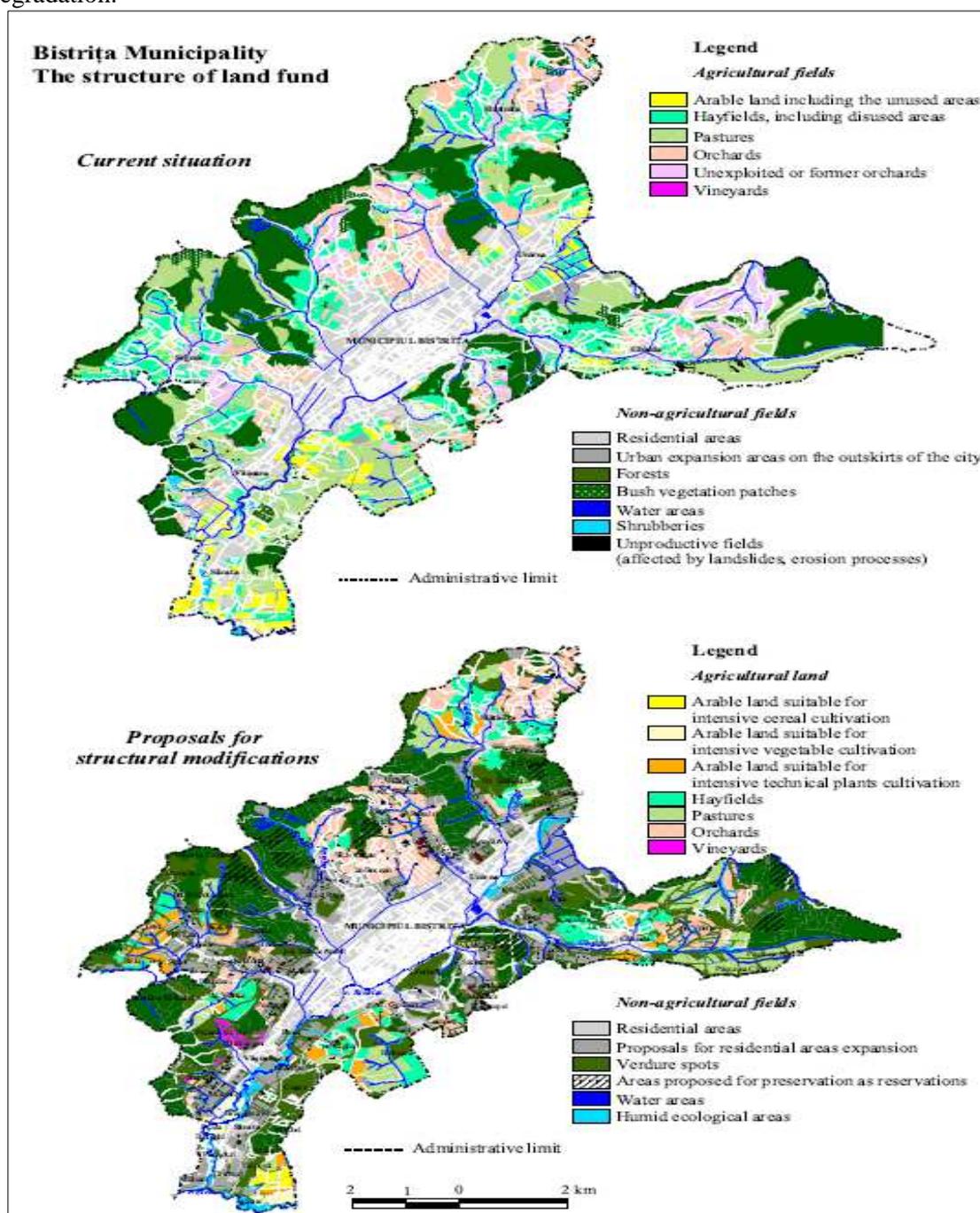


Fig. 5.

Current situation and proposals regarding agricultural development.

Considering these, there were identified 118,56 ha of land suitable for practicing olericulture using irrigational system, on the meadows of Bistrița and Șieu rivers (see fig 5). On these establishments we recommend to create specialized vegetable micro-farms specialized in the production of fresh vegetables for Bistrița municipality market.

Cereals and technical crops do not represent an agricultural branch of first importance for the Bistrița suburban area and are cultivated on small size arable land plots, cumulating 54,50 ha. The only viable establishment that is worth mentioning to start 1 or 2 farms specialized for cereal crops or for intensive technical crops is situated in Sărata area (Dumbrava Plateaux). The quality of land for mechanization, the soil fertility and the size of the plots in this area prove to be the proper site for such agricultural activities, as well as improving the landscape and preserving it.

Viticulture, once well-represented in Bistrița area, it has practically disappeared today. Still, we can notice the former establishments that were transformed into pastures or hayfields, yet, completely unproductive due to the high slope and Southern exposition. Many of the plots have been affected by degradation by surface erosion processes or landslides. They can be presently included in a programme of revitalization by reforestation or recreating vineyards. Therefore, we proposed that in the studied area to reorganize and cultivate 53,65 ha with grapevines both in wine farms and also in small vineyards for household needs. The most extended surface cultivated with such vineyards would be located in Vișoara area, on the western slope of Corhana Hill (having the highest altitude of 546,4 m), where the presence of an agritourism viticultural farm with local specificity would be appropriate. Another suitable viticultural farm later on integrated in agritourism activities could be established in the area of Tăietură, South from Sărata, over a former viticulture establishment.

CONCLUSIONS

As for conclusions, we consider that the proposals achieved for the reconfiguration of the suburban agriculture of Bistrița municipality were in direct correlation with the reality in the field but also with the perspectives for city development and other specific activities. Except for pomology and partially horticulture, the other agricultural practices are rather complementary, decorative and aiming to diversify the agricultural landscape. By supporting and applying the concept of suburban agriculture, we aimed at an efficient management of agricultural fields in the urban area in accordance with the local environmental potential, as well as with the needs of urban market. This aspect can be optimally solved by studies for integrated development of the urban area in which agriculture is perceived like a form of urban economy and not as a dysfunction. The revitalization of agricultural activities in the Bistrița suburban area has to be accomplished along with urban expansion and development through a functional integration among the other types of economic activities, these bringing direct and indirect benefits to the city: an accurate management of the available land fund, the preservation of land and diminishing erosion processes by efficient agricultural practices, developing SMEs for processing agricultural products, supporting the development of agricultural micro-farms along with agritourism activities. *Ultimately, suburban agriculture does not stand for an industrial agriculture, but for a cultural one, aiming at structuring a harmonious urban landscape.*

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