A NEW CONCEPT ON THE AGRICULTURAL TERRITORY DEVELOPMENT AND ITS CARTOGRAPHIC VISUALIZATION

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Abstract
The agricultural territory is a rural area or a region centered on the production of goods from the primary sector and specialized mainly in a few agricultural products. Spatial planning of the agricultural territory which accounts for the allowing nature, mechanization and social production factors may be considered a crucial aspect of the economy, rural and regional development processes. Since the integrated management of the agricultural territories to create favorable territorial conditions for efficient and sustainable production of goods is poorly covered in the national legal framework, there was a need to develop a concept for its spatial structure. Furthermore, there was a need to develop the concept of the General Development Plan and the Specialized Detailed Development Plan to include the spatial elements and zones of the agricultural territory with certain visualization. The paper presents an outline of a concept for spatial planning of the agricultural territory on the base of zoning of the agricultural production, quality of land and nature resource peculiarities of the site. It describes the types of spatial zones and the territorial elements, which are to be included in the General and Detailed Development Plans. The concept is supported by cartographic visualization, which includes a signage system and problematic analysis of the urbanized territory mapping in these plans. The methods for basic cadastral and thematic information, its structure in GIS environment, the formats and data sources, the principles for creating the sign system, as well as its cartographic application are described in detail.

Keywords: Spatial planning, General Development Plan, Specialized Detailed Development Plan, Land-Use Plan, Agricultural territory, Zones, Territorial elements, Cartographic visualization

INTRODUCTION

The agricultural territory shares some 58% (MAF, 2012) of the national land fund and 80% of it has potential for agricultural production. In spite of its great importance for the specialization of Bulgarian economy, its spatial development is hardly reflected in the legislation of the country. There are some texts on agricultural spatial planning in the following normative documents: Spatial Development Act (SDA, 2001), Agricultural land Ownership and Use Act (ALOUA, 1991), Agricultural Land Protection Act (ALPA, 1996), Inheritance Act (IA, 1949), Agricultural Land Lease Act (ALLA, 1996) and in other regulatory and sub-normative documents. The SDA (2001) is laconic: Art. 111 generally regulates the development of Specialized Detailed Development Plans (SDD Plans) for agricultural and other territories, which are intended to “solve particular structural problems and cover structural parts of the municipality's territory”. The ALOUA (1991) addresses some issues of one-year land use planning for land use massifs, allows activities that are related to the spatial structure of the agricultural territory such as land compensation, land acquisition, and land consolidation. The ALPA (1996) foresees measures for conservation and restoration of soil fertility. None of the laws reflects a comprehensive management concept for integrated planning of the agricultural territory with objectives, measures and actions, based on technological indicators for ensuring the economic development of the farms, the sustainable land use and the balance of its functions with the other types of territories. Furthermore, there is no regulated terminology associated with such planning, although some sub-normative and legal-administrative acts use such terminology. The term “land-use plan” is used in the Implementing Regulations of ALOUA (IRALOUA, 1991). It is referred in Art. 13a, para. 4, item 2 and Art. 18b, para. 1 IRALOUA, (1991) to as a "structural land-use plan before
the formation of the cooperative farms and state-owned farms”: obviously a graphic documentary form the past. The terms "land-use draft project" and "land-use plan" are found in municipal planning and strategic development documents in their agricultural parts. Some legal and administrative acts that solve private property problems also mention them. The only contemporary legal reference for a document with such content is in the SDA (2001), i.e. the “Specialized Detailed Development Plan for agricultural territories”. The content of the General Development Plan (GD Plan) is full of details about the urbanized territories as it is supposed to be. The other territories are presented by their borders and several territorial elements. So is the agricultural territory. The problem is that the spatial development of all the other type of territories (forest, protected, etc.) has its regulations in particular normative documents. The regulatory mechanisms for the agricultural territory concern just the ownership and partially the use of the territory in terms of legal rules for its distribution among the tenants. There are no comprehensive regulations for spatial development of these territories, which is a serious legislation gap in the legal framework that has negative sequences on utilizing of land yield potential on the economy of farms, regions and the state. As a consequence of this gap the current spatial planning of the agricultural territory is unofficial, chaotic and non-holistic. This explains the lack of spatial decisions for the agricultural territories in the GD Plans, according to the natural characteristics and the anthropogenic impacts; rules and technical standards for the development of the Specialized Detailed Development Plans (SDD Plans) for the agricultural territories; developed and implemented land-use plans. If such plans will be developed in future, the conditional signs of topographical and cadastral mapping will need complementing and specifying.

The objectives of this study are: 1) to develop a concept for spatial development of the agricultural territories and its implement in the spatial development plans; 2) to develop conditional signs for the spatial and land-use plans.

MATERIALS AND METHODS

Documentary analysis was used on normative, strategic, historical and other documents from the country and abroad in respect of spatial and land-use planning, including national documents for regional development, the National Concept for Spatial Development (NCSD) 2013-2025, Ordinances of the Council of Ministers, acts of the Municipal Services of Agriculture, Analytical Reports on Sustainable agriculture management at municipal level, land use plans and maps. Quantitative and qualitative methods for collecting and processing economic, geographic and statistical information were used. With the help of expert assessment an up-to-date concept for the agricultural spatial and land-use planning was defined. The following cartographic imaging methods were used in the development for visualization: Non-Scale Method, Linear Method, Quality Asset Method, and Inscriptions. The graphics are stroke and color, and the territory is represented by variations of the main graphical variables.

RESULTS

I. A concept for completing the contents of the General Development Plan with agricultural territory zones and elements and their regimes

Regarding the main role of the GD Plan as strategic planning document, i.e. to provide for a complete layout and foreseeing for the development of all types of territories, the agricultural inclusive, it is necessary to distinguish and specify the mode of structural design, land use, preservation and construction of the following development zones within the agricultural territory, which will cause regulatory changes in the SDA (2001) and its sub-normative documents:

1) Development zone with market-oriented agricultural production. This zone will represent the major part of the agricultural territory. It is the main territorial element through which the national policy for the development of agriculture will be implemented. It will implement the entrepreneurship by natural and legal persons for primarily commodity production for the market. It will cover the main ways of method of permanent use: fields, perennials, pastures and meadows. The application of different systems of agriculture, mechanization, and integrated land use is peculiar for this zone. Defining such zone is necessary because of setting recommendatory planning regimes and put order the present chaotic use/non-use of the agricultural land, the practicizing of non-holistic and non-compliant with the natural resources farming and therefore not using the potential of the land to generate income. This zone will have long-term regime for agricultural production. The aim is to preserve the farmland for its main function.

From the point of view of the diversity of land quality and the nature of the agricultural use, it is appropriate to set up in the market-oriented production area sub-zones with recommendatory development regime. A criterion for their formation will be the method of permanent use that is regulated by Ordinance RD-02-20-5 of December 15, 2016 to the CPRA (1991) and the availability of technical infrastructure serving the agricultural production process. The purpose of this recommendatory zoning is to use the productive potential of agricultural land at each location. The sources of its formation are the zoning of agricultural production in Bulgaria and all related assessments of the soil fertility and
quality of Bulgarian lands. Subject to the recommendations of this zoning, the following desired effects will be achieved: the chaotic transformation of the fields into land for permanent crops, meadows, etc. will be limited and vice versa; the traditional production of national importance will be preserved, such as the production of roses and other essential oil crops; the structure of agricultural production will be improved by growing an appropriate amount of intensive crops - fruit and vegetables; maintaining the integrity of pastures and meadows with a focus on preserving the biodiversity and providing grazing areas for livestock farming in the future, etc.

Zoning and farming regimes in agricultural areas cannot be mandatory at this time. Any coercion to establish a method of permanent use against the owners’ will would create a constitutional contradiction, as well as a conflict with the provisions of the subsequent regulations. They would contradict Art. 17, para. 3 of the CRB (1991) and of Art. 4, para. 2 ALOUA (1991), according which "private property is inviolable" and "the owner freely chooses the method of permanent use of the agricultural lands according to their permanent purpose of use". In addition, the regulatory regime of the GD Plan does not regulate a development regime for the agricultural territories. On the contrary, the provisions of the GD Plan are mandatory under Art. 106 of SDA (2001) and Art. 2 of Ordinance 8 to SDA (2001). Obviously, the so-defined GD Plans and the democratic provisions in the CRB and ALOUA (1991) make it impossible to plan the agricultural territories and to apply mandatory regimes related to their use. The need to protect the public interest in extracting the necessary ecosystem services from the agricultural territory and preserving the natural quality of the land resource, however, points to the idea of protecting this resource and its production function through a flexible approach first applied in the legislation. In order to fulfill the Art. 106, items 1 and 2 of the SDA (2001) commitment that the GD Plan is set up for all types of territories, including the agricultural ones, it is necessary:

1) to develop a concept-scheme for the spatial development of agricultural land in the scope of GD Plan. This concept will be of a recommendatory nature but will be a tool for the implementation of the state agrarian policy. Similar to the developed European market economies, where Master Land Use Plans are recommendatory but incentive systems lead to rigorous follow-up, implementation of its projections could be stimulated by subsidizing the agricultural production policies, land tax policies and other financial mechanisms.

2) Art. 2 of Ordinance 8 to SDA (2001) to be amended by providing for a recommendation for certain structural foreseeing for the agricultural areas. This will make it possible to define development zones and territories with recommendatory cultivation regimes for different agricultural crops, applying different systems of agriculture, ameliorations, measures for the prevention of degradation processes, etc., corresponding to the local soil and climatic conditions and as an extensive approach to maximize the land use.

Here also arises the question of the extent to which the borders of the territorial elements "arable land – cropped fields", "arable land - perennial crops" and "non-cultivated land" are mandatory and are subjected to changes in the plan? According to Art. 2 of Ordinance 8 to SDA (2001), the answer should be that they do not change within the term of the GD Plan. On the other hand, Art. 4, para. 7 of Regulation 7 to SDA (2001) designates the activity in the agricultural landed properties as "agricultural activity". The agricultural activity in the farm land is for "the production of agricultural products, including harvesting, production of milk and livestock rearing and breeding for agricultural purposes and/or maintaining the land in good agricultural and environmental status" (§ 1 item 25 of the Additional Provisions of APSA (1998)) in the farm land, which is for "fields, fruit and vegetable gardens, vineyards, meadows, etc." and in the non-farm land, which is for "pastures, etc." (Art. 8, item 2 of the SDA (2001)). From the point of view of the depreciation period of a permanent plantation, which does not exceed, even is shorter than, the application period of the GD Plan, stems that the borders of the territorial elements are not mandatory. It is also likely that this problem has been left unresolved, as is the problem of structuring of the agricultural territory, with the identification of the most general objectives, measures and requirements for conservation, use, construction and development, according to the role of the GD Plan. It is therefore open to the development of the aforementioned spatial planning concept for agricultural areas, to the designation of farming regimes in accordance with the nature of the agricultural use and the measures necessary to maintain and improve the fertility of the soil.

This concept provides for the following recommendatory development zones for the agricultural land in the GD Plans:

- Recommendatory field zone for arable crops and crop rotations - annual cereals, industrial crops, annual and perennial fodder crops; for growing vegetables, flowers and ornamental plants; for greenhouses with temporary and permanent construction; for fallow land.

- Recommendatory permanent crops development zone - for orchards, vineyards, nurseries, essential oil crops, berries, etc.

- Recommendatory pasture development zone

- Recommendatory meadow development zone
• Recommendatory mixed development zone - to combine the agricultural production with other kind production and tourist function (e.g. a tourist farm with a profile of viticulture and wine/beekeeping/fruit growing, etc.)

Given the existence of agricultural areas with registered deviations from the natural state of the soil as a result of soil degradation processes and technogenic contamination, it is necessary to attend the GD Plan with recommendatory regimes to carry out the necessary activities for restoration of soil fertility. It is also mandatory to indicate the territories within the constructed irrigation and drainage systems in the spirit of the implementation of the “Strategy for Management and Development of the Irrigation and Protection against the Damaging Effects of the Water” in order to restore the performance of these systems and to increase the yield from agricultural territories. In this sense, the following spatial areas should also be indicated in the general development plan:

• Territory with prediction for irrigation - to reconcile the regime of the agricultural zone with the technological requirements of the irrigation system

• Territory with a prediction for drainage - for reconciling the regime of the agricultural zone with the technological requirements of the drainage system

• Territory with degraded ecological functions of the soil cover - for reconciliation of the regime of the agricultural zone with the measures for prevention of soil degradation processes

• Territory with independent development regime - with built-up, in construction or with open procedure construction of irrigation systems, recultivated terrains for agricultural use, etc.

The common indicators that the recommended development zones should meet but which are yet to be explored and optimized are: coefficient of compactness; road coefficient reflecting the density of the main field road network under different topographical and soil conditions; the ratio of cultivated and non-cultivated land, etc.

The complex interaction between spatial model elements, in the case of urbanized and agricultural land, is a prerequisite for the formation of two other areas of agricultural activity, although with very small scope.

2) Suburban Agricultural Zone for cities - centers (of 1st and 2nd hierarchical levels according to NSRD 2013-2025) and for settlements with forecasts for increasing economic and social activity. In both cases, it concerns conditions of appropriate physical-geographic characteristics and availability of land resource. The suburban agricultural area is a transitional area between the urbanized and agricultural land. It is of ecological significance to create a natural environment around the major cities and to provide a quick contact of the population between the urbanized environment and the natural life factors. Another important role of the suburban agricultural zone is to create a spatial limitation to the extensive urbanization and ecologically "natural break".

The suburban agricultural area is for direct serving of the population with its freshly produced foods. Because of its proximity to the urbanized area, it is suitable for personal and family entrepreneurship, for limited agricultural production for family needs and the market. This development zone is also a means of coping with the modern tendencies of spreading the urbanized territory to agricultural land where the resource for food production is reduced and the sealing of soil is a fact. For this purpose, part of the suburban agricultural area should be designated as a land with a permissible regime for change of its permanent purpose of use for construction. The latter case should be provided for low-value land (“bad” and “unsuitable” for agricultural production land). The rest of the area – “very good”, “good” and “moderate” land must necessarily perform its agricultural functions, with the rules and design standards for the development of agricultural territories, which automatically excludes the right to change the permanent purpose of use, except in the cases provided by a law. The change of the land use for construction is allowed under the rules and order of the ALPA (1996).

The suburban agricultural zone includes all elements that are typical for the agricultural territory and defined by the GD Plan. As recommendatory development sub-zones where appropriate can be: fields, perennials, pastures and meadows. Because of its limited range and small-scale agricultural production, it is appropriate in this area to develop land for: nurseries, family gardens, greenhouses, growing of flowers and planting material, experimental fields for scientific purposes, etc. Agricultural land with a specific regime (areas suitable for linking the agricultural activities with recreational activities), depending on the characteristics and peculiarities of the settlement and natural resources, should also be found in this area.

The indicators of this development area are similar in terms of those of the market-oriented agricultural production development zone, but with adapted values given its specific features. The density of the field road network is expected to be quite high here. Terrains with permissible change of use shall not exceed 50% of the area of this planning zone (Yarlovksa, 2017)
3) **Urban farming zone within urban areas, mainly in cities - centers** (of 1st and 2nd hierarchical level, according to NSRD 2013-2025). Planning of landed properties for urban farming is needed in the large urban centers for several reasons. One of them, like the suburban agricultural zone, is ecological - the need for contact with nature environment. In this sense, similar properties can be planned as part of the city's green system. Another reason is the need of primary and fresh food products. In the economic sense, this area is for private and family entrepreneurship, for small-scale agricultural production for family needs and in individual cases for the market (subsistence agriculture, urban agriculture). It is appropriate to be included in the overall planning of urbanized territories. The planning tool is the DD Plan by the order of Art. 15-17 of the SDA (2001), which sets the concrete designation of the properties for agriculture and rules and norms for their land-use planning. This zone specifies eligible economic and concomitant activities and anthropogenic impact that does not conflict with the urban functions (Yarlovska, 2017).

II. **A concept of the content and scope of the Specialized Detailed Development Plans for the agricultural territories**

According to Article 111 of SDA (2001) and Article 45, para. 1 and para. 2 of Ordinance 7 to SDA (2001), the SDD Plan determines "the territories for agriculture, including those which permanent purpose of use cannot be changed". Art. 45 of Ordinance 7 to SDA (2001) can be applied only if it complies with the provisions of an acting GD Plan. From the review of the SDA (2001) and the SDA Regulations, it is clear that:

- A DD Plan is developed mainly in relation to the investment design for which it is mandatory (Article 108 of the SDA (2001)).
- The content, scope and regime of the DD Plan of settlements, settlement formations and their territory are specified (Chapter Six, Ordinance 8 of SDA (2001)).
- The amendment of the DD Plan in the part of “development regimes” requires an amendment of the GD Plan by first modifying the DD Plan through a procedure analogous to its creation (Article 134, para. 3 of the SDA (2001)).
- For development of a SDD Plan for the agricultural territory, it is necessary to justify an objective necessity for that (Art. 53, para. 1 of Ordinance 8 of the SPA (2001)).

Linking and transferring these provisions to a SDD Plan for agricultural territories (a land-use plan for which there is no specific regulation) raises the question about their feasibility to implement it. What is the specificity of the SDD Plan for agricultural territory and what makes it different from the DD Plans regulated by the law?

The SDD Plan or the so-called a “land-use plan” is related, above all, to land-use optimization with several specific objectives: priority focus on agriculture; economic development of the business units, regions and national economy; ecological conservation of lands; proper use of agricultural machinery in accordance with its development trends.

In contrast to the regulated DD Plan, the SDD Plan for the agricultural territory (the land-use plan) is generally shorter than that of the GD Plan because it is not intended for the investment design but for the functional organization of the territory (having much higher dynamics compared to the built-up areas). The scope and content is influenced by the dynamics of land relations, land use dynamics and agricultural subsidy policies. Another significant reason for the temporary nature of this plan are also the gaps and weaknesses in the existing regulatory framework related to the regulation of land ownership, land use, land relations and the lack of strict control over the protection of farmland. This dynamism is probably the reason for the incompleteness of the SDA (2001) and of the Regulations on SDA (2001) as regards the small scale spatial planning of the agricultural territory. The nature of the function of the land as means of production determines the specificity of planning of the agricultural territory, both in terms of the scope and content of the plan, and in terms of the method of operation. There are in the agricultural territory permanent territorial elements, mainly from the engineering infrastructure, which are parts of other types of territories, provided by the acting GD Plan and are implemented through the DD Plan. The long-term regime is logically established over time to the field roads that connect important territorial elements. During the long-term exploitation of these roads, tree and shrub vegetation develops along them, and they are inevitably involved as a lasting linear element in the plans for the agricultural territory. Other such lasting elements are the unused non-categorized lands such as pests, gullies, rays, etc.

The need for land-use planning in agricultural land is first generated at the level of "administrative-territorial" or "territorial unit" revealed by Art. 37c of the ALOUA (1991), which regulates the use of massifs in case of rent relations and cooperatives. The land-use planning in this case is limited to the mutual consent of the participants in the Use Agreement for the wielding of certain massifs. In the absence of such Agreement, these massifs are distributed among the user by the state authorities. The term of this planning is only one year without a specified development regime.
Another type of intervention in the spatial development of the land in the administrative-territorial or territorial units, in which land-use planning activities would arise, are land compensation and acquisition of land, the defining of land ownership under § 4 of the Supplementary Provisions of the ALOUA (1991). The plans that reflect these newly formed properties, as well as any changes resulting from partitions, inheritance, purchase, sale, and consolidation of landed properties have an unpredictable deadline. The timetables of these plans are subjected to the dynamics of land relations and cannot be bound by the terms of the acting GD Plan, and in particular by the specialized schemes/concepts for spatial development of agricultural territories.

The next level of spatial development planning of land owned or leased is a matter of private initiative without stringent requirements and rules. What the landlords are legally concerned with is: the right to freely choose the permanent use and purpose of use; requirements for land protection but without strict accountability for their implementation; the clauses included in the land use agreements for massifs.

With such plans, it is possible to establish a recommended arrangement of land plots with different permanent use and purpose of use - fields, perennials, pastures, meadows and meadows. They may be linked to predictions to improve soil fertility and other public utilities, rotation grazing, rotational mowing, design of a field road network, anti-erosion forest belts, terraces, etc. At present, the only incentive to implement holistic agriculture with environmental protection are the European subsidies under Measure 10 "Agroecology and Climate" of the Rural Development Program 2014-2020. It is logical that the territories subjected to these draft projects and plans would have different development regimes: a longer period for the permanent crops and pastures, much shorter for the fields and meadows.

The current legislation does not contain aggregate indicators to link spatial planning of agricultural land on “farm level”. The plan, which Art. 111 of the SDA (2001) associates with the SDD Plan (with an analogy with the DD Plan), is very different in content and purposes from the DD Plan. Its role is mainly advisory for choosing an appropriate land-use pattern and their indicators are mostly related to economic criteria and environmental norms (not construction ones). Consequently, it is essentially different from the DD Plan and the SDD Plan. It needs a specific regulation and a specific name, such as the existing "Land-Use Plan" (LU Plan). The SDD Plan contain the design elements of the higher-level plan: the GD Plan, and is subjected to its foreseeing. The reason for this is provided by Art. 105 and 109 SDA (2001). The latter determine the concrete designation of the properties, which according to Art. 8, item 2 of the SDA (2001) may be for farm land and non-farm land. These general formulations do not reflect the diversity of the land use patterns in the agricultural territory and the ways of sustainable use in the so-called "farm land".

The LU Plan regulation could be to Ordinance 8 to the SDA (2001) in a separate chapter on “Specialized Development Plans for the Agricultural Territory (Land-Use Plan). Since this change affects the legal framework related to the agricultural territory and its legal provisions, it is appropriate to regulate the scope and content and the technical implementation of LU Plans by a separate Ordinance to SDA (2001).

LU Plans (SDD Plans for agricultural areas) should be developed for a land or part of a land. The scope is directly related to the scope of the agricultural holdings for which the contracts for rent or cooperatives are being developed. Land-use planning is carried out at the request of the landowners and the land-users. The LU Plan should be elaborated for the territory of:

- a farm or a part of a farm
- a group of agricultural holdings or a part of their total territory

The LU Plan should treat agricultural use in accordance with the integrated functions of this territory and their complexity according to its relief, climate and anthropogenic interference. It may include the following territorial elements:

- Agricultural land for cultivation of arable crops and introduction of crop rotation - annual cereals, technical crops and annual and perennial forage crops; for growing of vegetables, flowers and ornamental plants, greenhouses with temporary and permanent construction, artificial meadows up to 2 years after planting, for production of seeds and propagating material; fallow land.
- Agricultural land for perennial cultivation, vineyards, orchards, nurseries, etc.
- Agricultural land for grazing livestock - pastures
- Agricultural land for meadows.
- Land with foreseeing for irrigation
- Land with foreseeing for drainage
• Land included in irrigation and drainage systems and / or have approved projects and projects in process of validation for construction of irrigation systems

• Land requiring special action due to deteriorated fertility of the soil - conducting of meliorations, prevention of floods and foreseeable disasters, etc., forest-ameliorative and hydro-technical measures for protection of the soil cover from water and wind erosion, agro-ameliorative activities

• Unprocessed agricultural land - unused land with developed shrub and forest vegetation (including those protected under the Forestry Act (2011), ravages, gullies, slopes, field roads, serving the field production terrains, etc.

• Territory, suitable for consolidation of land ownership

• Territory for agricultural use and recreation (under §4 of the AR of the ALOUA)

• Territory of permaculture farming (including alternative and organic farming)

• Route of main and secondary road network,

• Animal paths

• Crop rotation fields

• Plots for rotational grazing in herds massifs

• Terrains for animal summer camp and water supply in the pastures

• Sequential mowing fields in the meadows.

Depending on the objectives of the SPD for agricultural territories, they are developed on the basis of: cadastral map; soil map; map of soil categories; exposure map; map of the slopes; ownership map; schemes of irrigation systems and irrigation areas to them; schemes of the amelioration activities envisaged for the project for restoration of soil fertility.

III. Problematic analysis of the design of graphic elements of the territory for the types of spatial plans defined in Annex 2 of Ordinance 8 to SDA (2001) on the content of spatial plans

Ordinance 8 to SDA (2001) is used more than fifteen years as a tool for managing all types of development plans. From the point of view of cartography, the spatial plans are considered as specialized maps for use of different users - public and commercial sectors, municipal and governmental administrations, etc. as consumer services in accordance with clearly defined content and graphic layout rules. Whether because the distant year of creation (2001) or the lack of cartography specialists in the process of its development, today it is criticized and gives rise to new proposals for its amendment. Some parts are extremely detailed, while others are liberal and miss important guidelines. Some signs are described, but there is no sign system. There are certain ideas for designating objects, but there are no basic scheme and general rules for constructing the signs and linking them to a system (Vasilev, 2015).

As a major drawback of the ordinance, noticed by todays specialists is the inappropriate choice of the RAL color scheme (RAL, from German Reichsausschuß für Lieferbedingungen und Gütesicherung). This system was invented in Germany in 1927 for the needs of industrial production of paints, lacquers, floor coverings, ceiling and wall coverings. The system itself is catalogue, i.e. the color is selected by catalog number rather than designed by the user himself. The system started with forty colors that today have risen to 1900. The classic color scheme includes 213 colors. They are displayed with a RAL code represented by a four-digit number. Color numbers are not related to any of their properties or the way they are received. For this reason, the colors of each monitor or printer differ. RAL is not a color system, but rather a collection of colors used for painting and varnishing on surfaces that is not used to design the colors to be reproduced on an ink jet plotter by mixing the color in CMYK system and it is not particularly useful when designing colors for plans and maps (Jennings, 2003).

Color is one of the most important graphical tool for influence in the hands of cartographers.

Assuming that the laws and factors in physics and human physiology that are related to the knowledge of color use are well-studied and slowly changing, the technological development of mankind is happening with a tremendous speed. If, up until a few years ago, the main media of maps and plans were paper and designed colors on a CMYK color scale, now the colors have to be designed and used for media such as a display, projector or paper with a printed card. This requires the use of other color scales, identifiers and number of colors appropriate for the respective media. With the development of electronic services, access to spatial data and maps of government activities and services, free access and an increasing share of open data sources, it is necessary to define and describe all the colors used in the maps depending on the use of different media.
Therefore, as a first step to changing the ordinance is to move to a color definition on CMYK (for printing) and RGB (for display).

The second graphical variable, (Bertin, 1984) which plays a major role in distinguishing the types of spatial zones, which is practically the use of the qualitative background method, is the hatch (Penev, 2013). Some of the types of territories / areas, except in color, are complemented with a hatch. In Master Plans a hatch is used to represent sub-areas of the main areas or other specific characteristics. It displays mixed areas, highlighting the predominant. For example:

![MSP: Example of a mixed multi-purpose development area ('Cмф')]({})

The hatch the signs for PPPs and PFs is used only in the sign of cultural heritage territories (P.4.2.3.). The problem is that there is too much resemblance to the sign depicting a mixed service-production area ('Con').

![MSP: Example of a mixed service-production area ('Con')]({})

The use of an extra thick contour as an additional graphic element to the territorial unit is repeatedly used, but it hides its risks. For example, to designate Protected Forests (0.2.10.2), it may be that the contour itself becomes a common background for narrow and long areas.

Sometimes the contours also have a complementary meaning, depending on their color. In contrast to the GD Plan, where mixed-use territories are shown in hatch, the thickened contours are used to map mixed-use territories in DD Plans (PPPs and PPs).

Another example of (misleading) contour use is the large similarity in characters depicting different things in the Master Plan and the Detailed Development Plan: P.2.10. Recreational Recreation Development Areas for Villages Recreation and O.2.10.4. Forest lands.

![Basic principles in the design of graphic elements for agricultural territories.]({})

The following principles are formulated and respected in the cartographic design of the signs system:
• Avoiding the drawbacks of the graphical application of Ordinance 8 (SDA (2001) described above;

• Continuity of the characters and the graphical variables for the types of territories and the coverage of their specificity where possible while at the same time, where necessary, additional colors are added to the respective function of the territory / zone.

• Replacing the RAL color scheme with two color systems, respectively, for designing colors for CMYK plotting, and RGB color design, (Boughen 2003).

• Color design uses the applied arts in cartography, such as a color choice printer, colorblind safe or photocopy tool - COLORBREWER 2.0 color advice for cartography, (Harrower and Brewer, 2003)

• Possible and easy application of the signs for most common CAD and GIS;

• Loss of the contour as an additional graphic element to the territorial objects;

• Clear functional distinction in the use of graphical variables "color" and "hatch". Color defines all kinds of territories and zones, and a hatch is added to the function or activity of the already defined area;

• Further study of the characters in the map field, their "behavior" and "matching" with each other.

Mapping signs towards a concept to complement the content of the Master Plan with elements of the agricultural territory and the respective regimes

The current sign system is designed to complement the content of the Master Plan with elements of the agricultural territory and the relevant regimes, where the following recommended development areas for agricultural territories are envisaged in the CSSO:

RECOMMENDATORY DEVELOPMENT ZONES

• **Recommendatory field zone for arable crops and crop rotations** - annual cereals, industrial crops, annual and perennial fodder crops; for growing vegetables, flowers and ornamental plants; for greenhouses with temporary and permanent construction; for fallow land.

• **Recommendatory permanent crops development zone** - for orchards, vineyards, nurseries, essential oil crops, berries, etc.

• **Recommendatory pasture development zone** - vegetation, ravages, gullies, slopes and other non-agricultural land

• **Recommendatory meadow development zone**

• **Recommendatory non-utilizable land zone** - unused land with developed shrubs and forest vegetation, ravages, gullies, slopes and other non-agricultural land

• **Recommendatory mixed development zone** - to combine agricultural production with other kind production and tourist function (e.g. a tourist farm with a profile of viticulture and wine/beehive/fruit growing, etc.)
It is also imperative to indicate the territories within the scope of the constructed irrigation and drainage systems in the spirit of the implementation of the Strategy for management and development of the irrigation and water protection, in order to restore the work of these systems to increase the yield from agricultural territories. In this sense, the following spatial areas should also be indicated in the general development plan:

**Territories with prediction for irrigation** - to reconcile the regime of the agricultural zone with the technological requirements of the irrigation system

**Territories with a prediction for drainage** - for reconciling the regime of the agricultural zone with the technological requirements of the drainage system

**Territories with degraded ecological functions of the soil cover** - for reconciliation of the regime of the agricultural zone with the measures for prevention of soil degradation processes

**Territories with independent development regime** - with built-up, in construction or with open procedure construction of irrigation systems, recultivated terrains for agricultural use, etc.

**Suburban Agricultural Zone for Cities** - Centers from 1st and 2nd Hierarchical Levels

**Urban farming zone within urban areas, mainly in hierarchical city centers (1st and 2nd hierarchical level)**
5. Map Signs to Concept of Supplementation of Content within the Spatial Planning Area for Agricultural Areas

Territory, suitable for consolidation of land ownership

Territory for agricultural use and recreation
(under §4 of the AR of the ALOUA)

Territory of permaculture farming
(including alternative and organic farming)

Territory for protective forest plantations

Territory intended for terraces

New stretch of irrigation system

Field crop rotation

A field of a cereals crop rotation

Processing area of a field of a cereals crop rotation

Fodder crop rotation

A field of a fodder crop rotation

Processing area of the section of a field crop rotation

Special crop rotation

A field of a special crop rotation

Processing area of the section of a field crop rotation
CONCLUSIONS

The planning protection and optimization of the utilization of agricultural lands at the level of the Genera Development Plan and the Specialized Detailed Development Plan is realized through proposals for introduction of two new documents with different functions than the status of the GD Plan and the SDDP:

1) Specialized scheme / concept for spatial development of agricultural territories within the scope of the relevant GD Plan - obligatory to the content of the GD Plan, but unlike the basic plan, the scheme is recommendatory.

2) A Land-Use Plan (instead of the SDD Plan for agricultural territories) having an analogous to the specialized scheme/concept for spatial development of agricultural territories regulation but dealing with structural tools for the inherent scale

3) The concept is supported by cartographic visualization, which includes a signage system. The methods for basic cadastral and thematic information, its structure in GIS environment, the formats and data sources, the principles for creating the sign system, as well as its cartographic application are described in detail.

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