

Condition of ameliorative issues and land consolidation measures in area of Popovo Polje area, Bosnia and Herzegovina

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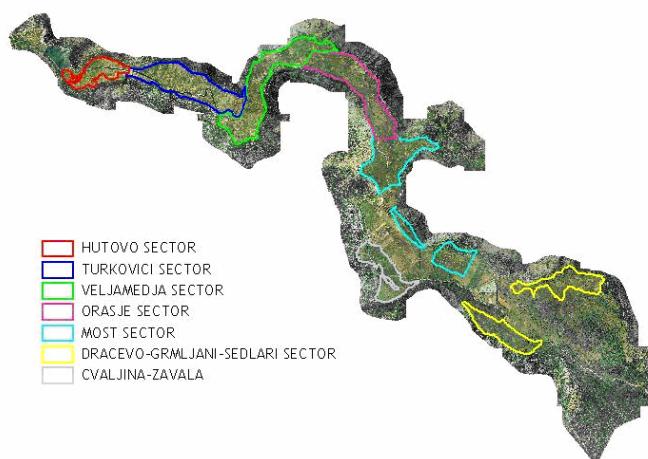
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Introduction

The area of Popovo Polje, where this research took place, is situated on the territory of two municipalities: municipality Trebinje, along the upper flow of the river Trebišnjica, which runs through the whole length of Popovo Polje, and municipality Ravno, around the lower flow of Trebišnjica. Both municipalities gravitate towards the Dubrovnik region, and the entire watershed belongs to the Adriatic basin. The river Trebišnjica and Popovo Polje are the most important resources in this area, both historically and today.

It is rare that the concentration of karst phenomena in one environment is as dense as here, where almost all karst phenomena can be found: bare karst, karst fields, sinkholes, caves, estavell, karst cockpits, valleys, and potholes. Popovo Polje is the part of a great karst depression, which stretches in the direction of Dinarides (northwest-southeast), roughly in line with the coast, from Hutovo to Hum in Herzegovina – the Mediterranean part of the country. The field occupies a territory of approximately 4600 hectare of fertile land on altitude from 227 to 251 m, while the surrounding hills have significantly higher altitude (Map 1. below).

MAP 1: POPOVO POLJE



Background

After the shutdown of the dam Grančarevo (1964) and the commissioning of Pumping Hydroelectric Power Čapljina (HEPČ-1978), the conditions have been created for a renaissance of agricultural production in Popovo Polje. By construction of these objects, the field has been protected against long-term floods, which used to last 5 to 9 months a year and impeded development. Also, the continual flow of water through the riverbed of Trebišnjica

has been provided for, which can be used for irrigation. Some more progressive farmers have started to use newly created production conditions, and began to establish modern orchards, vineyards, and to sow winter crops, alfalfa fields and other cultures. Nevertheless, all this has been happening without a plan, financial support, and assistance from State, or professional guidance. Only in the upper part of the field, after the enlargement of agricultural holdings (through purchase, exchange and lease) a public (state-owned) farm was established under the name “Popovo Polje under construction” on an area of 900 ha. But all this took place without a long-term strategy of agricultural development for the whole of Popovo Polje. There has been a conceptual wandering in the selection of cultures and plantations on the state-owned farm, while nobody took into account at all the peasant farms. Even the World Bank, when approving credit to the state-owned farm for the irrigation system, required the peasant farms bordering the state-owned farm to be included into system. This was, however, also refused. Wartime circumstances during 1991-1996 stopped development, led to displacement of local populations, and brought new, additional problems in initiating agricultural production.

On the other hand, the period from 1964 until today has shown that in the ambient of Popovo Polje fruit growing, grape growing, and cultivation of all vegetable and farming cultures can develop with great success, and especially the cultivation of alfalfa have demonstrated very good export results together with cultivation of vine stocks. But **a vision of long-term strategy of agriculture development in Popovo Polje has not been made until present times**. This also can not be realized without state support. Vision must be based on the real basis in agreement with the local population.

As the state-owned farm in the upper part of the field was privatized, and land in the lower and middle part of field is mostly privately owned but in the form of very small and dispersed holdings, the strategy of development must be based on inclusion of local population. However, the key problem is displacement of the population caused by war, which left Popovo Polje demographically deserted. Due to this, it is necessary to make a count of the local population and establish, based on well-made questionnaires, the desires, plans, and attitudes of land owners: whether they want to develop and enlarge their holding through land lease, purchasing or exchange, or rather sell or give for lease, and then, on this basis, create realistic visions. A vision of future development must be created on a real basis.

Quality characteristics of soil surveyed area in Popovo Polje

Based on previous soil research and basic characterization of soil on the territory of the entire Popovo Polje, the following quality category soil categories have been defined (Map 2):

- I quality category 2260 hectare (49,1%)
- II quality category 630 hectare (13,7%),
- III quality category 85 hectare (1,9%)
- IV quality category 125 hectare (2,7%)
- V quality category 1500 hectare (32,6%)

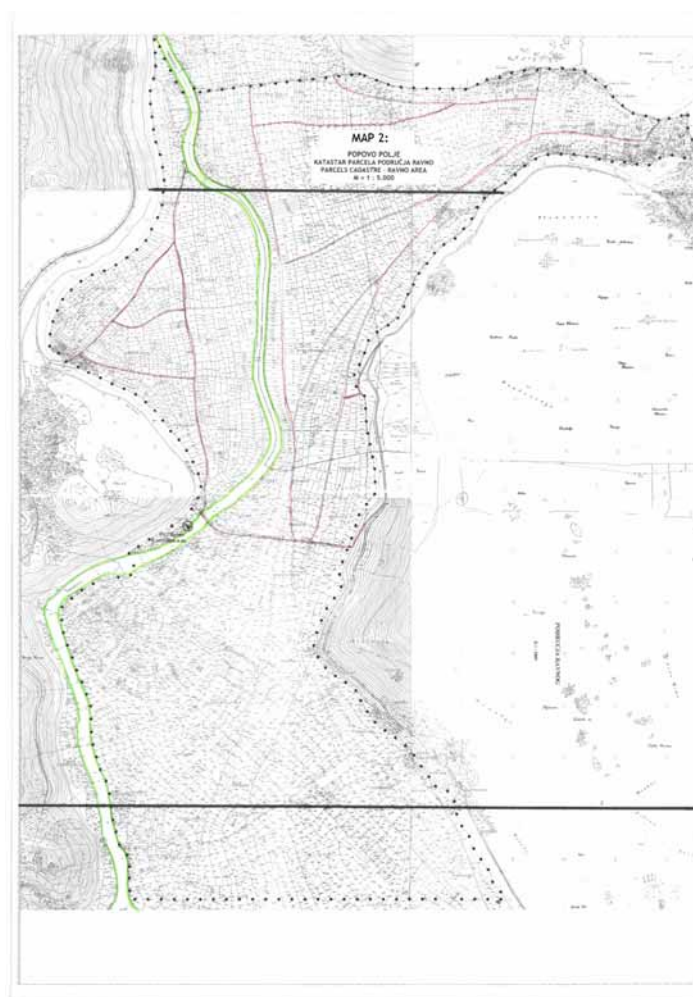
The following elements were used in defining individual quality categories and their subcategories:

- Textural (mechanical) properties
- content of carbonates
- content of skeleton
- depth of profile
- percentage of rockiness
- type of soil

Issue of small and dispersed scattered holdings and parcels

On the map of Popovo Polje at 1:2500 scale, made before the last war by the Institute of Geodesy of B&H, the patchwork of land units in Popovo Polje itself is evident.

During this research, very negative indicators were found about the small size and dispersion of holdings on the territory of Popovo Polje. For example, one landowner from Ravno owns 2,5 ha of land in 17 different places on the field, therewith there is a great number of such cases, many with even less favorable structures of holding. In the analysis of holdings' small size and dispersion during research carried out by Faculty of Agriculture in Sarajevo (Map 2), the small size and dispersion of holdings is presented on a map of 1:2500 scale of the middle part of the field as an example, where there are 2 361 parcels (lots) on area of 353,35 ha, while the average parcel does not exceed 0,149 ha. In addition, this example illustrates well also the nonexistence of a road network providing access to these parcels, especially for modern machinery. As early as then it was concluded that this is one of the limiting factors of the development of agricultural production in Popovo Polje, because the access and application of modern machinery has been disabled or very irrational.



Another example with the survey of State owned land in different cadastre sheets in the cadastral municipality of Ravno is presented in table 1. This land in former times belonged to the private farmers. During the intensive industrialization of country and big migration of

young people in cities this land has been donated to the State for child's allowance or social assistance. To get this kind of social support it was not possible to have own land properties.

Popovo Polje: Review of State ownership land at the different cadastre sheets

(cadastral survey example with size and dispersion of cadastral plot at the
Cadastre Municipals Ravno - Scale 1:2500)

Table 1

Number of Cadastral sheets C.M. Ravno	Total area in ha	Total number of parcels	Average size of parcels	Maximum size of parcels	Minimum size of parcels
6	1,78	11	0,162	0,40	0,05
7	1,08	6	0,180	0,23	0,02
8	5,30	18	0,283	1,24	0,10
9	13,90	39	0,356	3,65	0,05
10	1,62	17	0,953	0,23	0,01
16	7,10	4	1,525	0,35	0,03
17	2,89	14	0,206	0,65	0,05
18	1,80	13	0,138	0,25	0,05
19	2,10	8	0,263	1,40	0,01
20	9,42	28	0,336	2,10	0,01
30	10,93	40	0,273	1,32	0,01
40	1,93	19	0,102	0,29	0,01
50	8,05	30	0,268	1,22	0,03
60	10,64	31	0,343	2,34	0,04
70	9,37	24	0,390	3,22	0,02
Total	87,91	302	0,291	3,65	0,01

Road inaccessibility of parcels

A special problem is the inaccessibility of parcels by roads, manifested in the fact that the largest number of parcels do not have an access road, by which a parcel can be reached by vehicle. Existing field roads abut only one part of parcels (Map 1). In extensive conditions, where vehicles were small, and parcels were entered rarely and on foot, this problem was not acute. However, the intensification of production causes also enlargement of transport vehicles, and for entrances into parcels to become more frequent and mechanized, so activities cannot be carried out, as it is impossible to transport mechanization across the properties of others. The access to parcels from the field road was tested in one location, and it was established that the owner must cross 20 parcels of other owners in order to reach his own parcel. Besides, the irregular shapes of parcels and their small size and dispersion cause a great loss of land area to boundaries. This was the major reason behind the strategy of public (state-owned) farm establishment before the last war, where the first step was grouping of land through exchange, purchasing and lease. The need to make field road and canal networks for evacuation of external and internal waters will require expropriation of significant areas of land, which can be equally allocated among all users if carried out together with consolidation.

Distance between parcels within one holding and distance between economic objects and holding in field

Dispersion of parcels makes this problem even more complex because parcels of one owner are very far from each other, 1 to 2 km or even more. The small size and irregular shape of parcels make cultivation more difficult and cause great loss in area. For example, the mentioned holding of 2,5 ha is dispersed into 17 parcels with average area of 1470 m². Under the assumption that the ratio between length and width of every parcel is 1:5, every parcel has 200 meters of boundaries. Multiplied with 17 parcels, this would be 3 400 m of boundaries length. If this holding was grouped in one place, with ratio of length and width 1:3 (taken as average ratio), than this holding would have only 70 m of boundaries length instead 3 400 m, or five times less.

Other conclusions can also be drawn from this analysis, about the possibility of arranging land on such parcels, work productivity, rationalization and better organization of production, market aspect of production and similar, which all is not the subject of this research.

Evidently, the management of such dispersed holding cannot be economical, as a lot of time is spent on traveling and transportation, and a large portion of land is lost to boundaries.

Besides, all settlements on rigs of flooded karst fields are situated above flood height level, because it was passive way of protection against floods. As a consequence, economic objects are very far from production parcels. The field is now protected against floods, but for preservation of soil so scarce in karst, it would not be smart to demote together with economic objects into the field itself. It would be recommendable to locate economic objects on field rigs on karst rocky ground, and not in the field.

Consolidation of land

The above mentioned problems make consolidation a priority task. Consolidation is very important, but also a very expensive agrarian, technical, economic and legal operation, aiming at concentration and grouping of spatially dispersed and mutually distanced parcels of one holding in, if possible, one place. This so-called **classical redistribution**, by which existing boundaries are completely erased and new ones established, is a very radical measure.

In the period before the last war, in BiH 60 000 ha of holdings was consolidated on the territories of Bijeljina, Brčko, Orašje, Odžak, Livno, Bosansko Grahovo and Grude with high costs for state and numerous complaints. The effect was grouping of holding, but not also the enlargement, as holding remained small (mostly around 2 ha). Also the Law about consolidation was adopted (Official Gazette SRB&H No. 24/85), followed by numerous regulations and directives passed by municipality administrations. According to that Law, consolidation took place in two phases:

In the first phase the borders of the consolidation area were determined, together with existing condition of holdings, approximate and detailed evaluation of land, recording of objects and permanent cultures, calculation of relative value of land, and making up of books of consolidation mass fund.

In the second phase, the making up of statement register and collections of statement register of land was carried out, together with making new plans, calculating relative value of new condition of consolidation mass, presentation of old condition of holdings, making of canal and road network project, taking statements about locating new holdings and division of new

holding, transferring taking about consolidation projects (parcels and tables) to field, introduction of new owners into holdings, establishment of new surveying and plan in appropriate scale, making of books of ownership certificates (land-registry elaborate) and cadastres (registry of owners). During the process, also other administrative-legal operations were carried out.

This was very complex and long process, which lasted 3 to 4 years, even longer. It was often impeded with great number of complaints and lawsuits.

Concerning that classical consolidation is very expensive and complex process, in pre-war period there were attempts in ex-Yugoslavia to enlarge holdings in different ways, by using some moderate measures, such as:

- functional, working or production consolidation,
- redistribution of the fields or holding concentration through exchange, lease or purchase
- market-based or commercial consolidation

Functional, working or production consolidation comprises of joining together all working and technological operations on land, while ownership relations as registered in the cadastre do not change. New single technology and the single selection of cultures on newly created large units of land are introduced. This model did not have great impact on the enlargement of holdings. The reason lies probably in fact that peasants during socialism were skeptical towards all forms of association and collectivization, as they were often deceived.

Arondation or holding concentration is the individual grouping of holdings through exchange, lease or purchase in order to get larger concentrated holding in one place. In this way many public (state-owned) farms were concentrated and increased their holdings during times of forcing state-owned sector in socialist agriculture. For example the state-owned farm “Popovo Polje under construction” was established in such way on area of 900 ha in the upper part of field. Also other state-owned farms redistributed and increased their holdings in similar way in BiH (UPI, HEPOK, AIPK, PK Spreča and some smaller ones). However, during transition under way, there farms are due to privatization being fragmented, become smaller again, which is from economic-production aspect not good.

Market-based or commercial consolidation is modern trend of holding enlargement, which is developed especially in USA. Such model in USA and other countries is used by large agro corporations. The number of family farms in USA was between 1941 and 1980 decreased from six to two millions, so family farms, even of size 100-200 ha, can not compete with big corporations.

In our country “marketability” of land is not developed, but it can become one of the models of holding enlargement if land market simplifies, land transactions free from taxes, and if agencies or institutional services are introduced which will provide fast and cheap transaction services. The American experience concerning land sustainability even gives preference to purchase over land lease. The contractor in most cases does not take care about land sustainability because he is not the owner, so land degrades over time. This is well expressed in syntagm: “If you lease a parcel of fertile land, you will have a desert over time, but if the desert becomes private land, it will soon transform into a flower garden.”

Regardless of which model of holding enlargement will be applied in Popovo Polje, thorough preparation is necessary, which will start with inventory of holdings and ownership relations, and questionnaire on existing owners about their plans for land use in the future.

Conclusion

Only a few cadastre plans were transferred into digital form, between 1-2%. This could be a big problem and obstacle to establish a modern integrated informational system. Even more the existing digital cadastre plans are not use in an adequate way.

Unfortunately, rural planning during the whole period after the Second World War has been neglected. The Project of territorial planning in the part of the country (Federation) is already going on, and should be finish in two years time. For Bosnia and Herzegovina it is crucial for future development to bring a new law of restitution, a law of heritage, and a law of soil protection.

Since territorial planning in rural areas has been chaotic with many illegal activities and mismanagement of rural resources, a law of rural development is essentially important together with a planning system. For that purpose a Strategy of Spatial development, spatial planning at all levels, master plans of Cities and parcel Plan of Village is a precondition for future sustainable rural development.

Until now there was no connection between land consolidation and terrain planning, and plans of village urbanization. Economical and market principals were not include in all processes nor was the democratic participation of all interesting stakeholders. Final results were mistrust, discrediting of whole process and deep division between state authorities and people.

In this moment for B&H it is crucial to get help from international communities especially for: training program, pilot project realization, financial support in purchasing new technology and capacity building process at the State level.