Revitalisation
of the Rural Landscape of the Blato Area on the Island of Korčula

UNEP

MAP

Thematic Study
on Landscape Management
in Croatia

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Preface
A formal framework of the workshop and the study preparation

The Barcelona Convention[1] states that "*Contracting Parties shall commit themselves to promote the integrated management of coastal zones, taking into account the protection of areas of ecological and landscape interest and the rational use of natural resources*". Therefore, the Contracting Parties to the Barcelona Convention, at their Ordinary Meeting in Catania, in 2003, adopted the recommendation "*to undertake thematic studies with a view to developing relevant guidelines and action plans on the issue of coastal land and sea environment and the utilisation of its resources*", i.e. landscape management.

Coastal landscapes of the Mediterranean have never been studied or elaborated in the MAP projects *per se*. Landscape was taken into account only indirectly, through proposals of various documents (plans, strategies, programmes), in projects oriented to local level, such as Coastal Area Management Programme (CAMP), by using Integrated Coastal Zone Management (ICZM) methodologies or by dealing with individual natural resources. However, the existing landscape-specific methodologies and concepts (such as landscape planning, vulnerability studies, and landscape characterisation) have not been introduced or taken into account. Also, knowledge of the landscape typology, i.e. variety of landscapes, is not adequate, nor are the main processes and forces influencing their transformation.

The activity entitled "Landscape Management in the Mediterranean" was entrusted to the Priority Actions Programme Regional Activity Centre (PAP/RAC), to be implemented within the framework of Integrated Coastal Zone Management (ICZM). As the first step to meet the above request, PAP/RAC organised an expert meeting, held in Dubrovnik, Croatia, on January 8-10, 2006. The meeting discussed two position papers prepared as background documents, and current landscape management practices in the Mediterranean presented by experts.

Among the plethora of activities that could take place in this framework, the following can be summarised as a conclusion of the meeting:

- Prepare an inventory, a survey of landscapes at the Mediterranean and national levels, to include identification, classification and evaluation of landscapes (landscape characterisation/typology, map of endangered landscapes, map of outstanding landscapes) important for the preservation of Mediterranean identity;
- Make effort to integrate landscape planning into planning documents at all levels (national, sub-national and local), particularly in agriculture, water management, and tourism sectors;
- Elaborate national strategies for landscape management in coastal areas;
- Co-operate with nature conservation initiatives, such as "Natura 2000" of the EU;

[1] Mediterranean Action Plan (MAP; http://www.unepmap.org) is the first Regional Seas Programme of UNEP, established in 1975. It brings together 21 coastal countries and the EU, all the Contracting Parties to the *Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean*, known as the Barcelona Convention, adopted in 1976 and revised in 1995.

- Develop and promote landscape planning methodologies and tools (landscape analysis/valuation, vulnerability, integration of landscape analysis into Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA);
- Organise awareness raising campaigns, promotion actions, training courses and seminars on landscape perception, methods and management;
- Develop education packages to improve knowledge about landscape values;
- Publish printed materials (brochures, atlases, posters);
- Organise workshops to demonstrate landscape management methods;
- Implement pilot projects to demonstrate in practice the above items, with a view to preparing guidelines and good practice guides; and
- Network landscape practitioners and enhance contacts with related organisations (such as UNESCO and the Council of Europe).

The meeting recommended starting the relevant activity at PAP/RAC by implementing a couple of thematic projects. These should be representative and complex enough to allow for solving problems by using the methodologies and approaches presented and discussed during the meeting, including involvement of public in a participatory process. The complexity of the area would mean a representation of the main development problems and pressures around the Mediterranean, such as tourism, urban sprawl, infrastructure, forestry, agriculture and alike. Therefore, they should cover different situations and should be pro-active, i.e. focused on problem-solving rather than being descriptive and focused on data collection only, in order to be of use for the exchange of experience with other countries, and to be used for the preparation of guidelines for landscape management at a later stage of this activity.

PAP/RAC, therefore, initiates preparation of two thematic studies on landscape management in the Mediterranean, namely:

- "*Thematic Study on Landscape Management in Tunisia: Characterisation of landscapes of Tunisian coastal areas*"; and
- "*Thematic Study on Landscape Management in Croatia: Revitalisation of the Rural Landscape of the Blato Area on the Island of Korčula*".

1.
Introduction

In the very particular world of the Mediterranean basin, a specific type of landscape has developed as a result of long-lasting economic use of space with distinguishable agricultural peculiarities: terraced landscapes, vineyards, olive groves, orchards, vegetable gardens, usually interlaced with drystone walls. The changes and processes related to agricultural landscapes, namely, modernisation of agriculture, on the one hand, and abandonment on the other, is a common problem in Mediterranean countries. Both processes are reflected in the landscape and can have positive or negative implications on it. Therefore, it is necessary to develop and put in practice instruments to keep the farmers on the land, which is related to the introduction of new technologies, and to support farmers in the form of subsidies.

In parallel, the planning instruments and procedures, such as landscape planning, should be introduced to adequately respond to these needs. In this context, participatory approaches in planning are very important, as the physical plans at local level define mainly land use, but not structural elements of the landscape, which are essential for a quality spatial development. It is obvious that the financial support to farmers in order to modernise their farming technologies is crucial. And in this case, when the public budget is used for the changes and transformations of the rural landscape, the public has the right to participate in the processes defining which landscape values are to be protected and to what extent the transformations are positive in a specific socio-economic context.

In Croatia, the cultural landscape in the karst has also evolved through long historical continuity under the influence of traditional agriculture developing into a regional landscape of unique identity and importance (Gams, 1993). It is characterised by vast typological variations and authenticity of both natural and cultivated landscape structures, which makes a distinctive element of formation of the human environment. Certain rare landscape sites in the coastal and Dalmatian area in the Republic of Croatia bear witness to our cultural heritage, and understanding of real value of these spaces is minor and still unexplored.

Due to their characteristics, these spaces are rather vulnerable and endangered, undergoing changes and anticipating new ones resulting from foreign investment inflow, accelerated tourism development, new infrastructure, especially main traffic arteries, and the like. However, their decay and disappearance is not inevitable. The solution lies in finding an interest in preserving and protecting some of these through special economic policy, and the most exquisite ones of them through category of monuments. It is also necessary to establish that this space has no future unless the physical planning strategy guarantees its economic safety.

The island of Korčula is a very typical coastal area with the problems very common to other Mediterranean countries and in particular to the islands, i.e. abandoned agricultural land and other developmental pressures that can significantly change the landscape, if the transformation process is not supported by expert proposals. It is more than obvious that the landscape transformations are not only a spatial issue, but also more a socio-economic one.

This study resulted from a workshop, which took place in Blato, on the island of Korčula, in September 2006. It was organised within the framework of the *"Landscape Management in the Mediterranean",* the activity implemented by the Priority Actions Programme Regional Activity Centre (PAP/RAC), and the two scientific projects, namely:

- *"The Mediterranean Landscape as a Factor of Identity of Croatia, its Protection and Development",* the then proposed scientific project of the Ministry of Science, Education and Sport of the Republic of Croatia, implemented by the Department of Landscape Architecture of the Faculty of Agriculture of the University of Zagreb; and
- *"Preservation and Development of Rural Areas of Croatia, Valorisation, Zoning and Revitalisation of Landscape on Korčula"*, implemented by the Croatian Institute for Agricultural and Advisory Service.

Besides, it was the second joint workshop in a sequence of advisory projects with an aim to develop modelling approaches for revitalisation of agrarian districts and their landscapes. The first one was organised in Krašić, in 2003, and the third is planned in the Pannonian region, in 2007.

This workshop was organised and conducted by the Department of Landscape Architecture of the Faculty of Agriculture, and in joint work lectures were given to the advisors from the Croatian Institute for Agricultural and Advisory Service of the Ministry of Agriculture, Forestry and Water Management, along with representatives of various interest groups from the local community. Graduate engineers of agriculture of different specialities of lifelong professional experience who are skilled in the making development models in agriculture along with stakeholders can create a scientific basis for development, by stimulating development and preservation of a defined space. Implementation was based on two methods, namely, ”learning by doing” and Participatory Rural Appraisal (PRA). The first method ”learning by doing” is a standard working method in education of adults. PRA is a method which emphasises a group approach, i.e. taking part of all participants in the area and in this way providing assistance to the local community on the occasion of developing plans, in decision making and fostering awareness for the benefit of an active participation.

Four lectures were delivered by prof. Dušan Ogrin, prof. Nikola Mirošević, Ph.D., prof. Branka Aničić, Ph.D. and Ivka Veić, M.S., making an introduction into the subject matter. During these lectures, the participants were acquainted with diversity and characteristics of cultural landscape of the Republic of Croatia, and with the working procedure to obtain the expected results. On the fifth day, after four days of hard work, the participants independently made their own presentation on the entire procedure.

1.1.
Structural and formal features of the landscape in the karst

The most important natural features of karst are numerous labyrinths of stony peaks, deeply furrowed canyons and gorges, marine bays, pits and abysses, underground holes, cracks in limestone, sink-holes, *dolinas* and valleys. These diverse relief patterns were used and modified by man to the best of his abilities, thus creating new structures and forms, which brought even wider diversity of landscape. They emerged from the need for arable land, differing among each

other according to the natural conditions, agricultural practices, methods and intensity of soil exploitation, producing various types of cultural karst landscape.

Basic land categories created in this area are: *pastures, grassland, vegetable gardens, fields, mixed cultures, orchards, vineyards, forest, barren land* and *settlements.* Each rural land-use category is distinctive depending on the quantity of stone gathered and the way of its arrangement. Stones gathered were arranged in *drystone walls* and *heaps,* which were constantly changing and enlarging, thus creating structures that support, intersect and border arable lands of various shapes and sizes. Depending on their function, they can be bordering walls (solitary structures) and supporting walls (escarpments), with vast complexity of shapes and methods of stone arrangement, height, texture and width (low, high, narrow, wide, thin, permeable, thick, filled, symmetrical, asymmetric, smooth, rough, dark light, etc.) (Gams, 1991). Regarding their wide distribution and recognizilability, they are the dominant structural element of the karst cultural landscape.

Relief features and ways of its exploitation, together with drystone walls, have influenced creation of certain types of karst cultural landscape (Ogrin, 2005):

1. One of karst landscape types is a **pasture landscape**, which exhibits several patterns: *a) open treeless pastureland,* and *b) pastures with scattered trees,* providing shade and preventing soil drainage. There is structural diversity even within those categories. In the beginning, pastures required only gathering of crashed stones, which were piled onto bedrock in stone gorges. Later on, with a shift from meat-oriented to milk-oriented animal husbandry, stone gathering was intensified in order to create larger areas of grassland. Stones were heaped into earthless and grassless topographic depressions. At the same time, drystone walls were built to enclose symmetrical and asymmetrical plots of land, to protect grassland and control grazing.
2. Another type of karst landscape is **sinkholes and karst valleys** with varying widths and depths. These are naturally rounded, funnel-shaped or elongated recesses, of different widths, depths and lengths, with substantial layer of fertile land. Depending on the purpose and type of drystone wall, there are:
    a) *enclosed sinkholes and karst valleys,* with single row drystone wall, with oval shapes following the relief forms. Extraction of stone has resulted in wider grassland areas or homogenous arable grounds. At higher altitudes, there are cattle pens – *drmuns* (enclosed plots with natural vegetation), whereas at lower altitudes, closer to settlements, these are arable fields;
    b) *serial karst valleys* – fields in a series, individually enclosed with a single-row drystone wall, located in a valley; they follow its configuration and emerge in various shapes - asymmetric, round, elongated and square plots; and
    c) *fragmented karst valley* – adapted for multi-purpose cultivation. Smooth, straight plot at the bottom was created by gathering stones for pastures or grasslands. On one side of the slope, there is usually a field, and on the other – several terraces with escarpments. This type of karst valleys is the only one without external walls.
3. The third type is a **karst field with arable land**. The fields are situated in the zone of elongated valley depressions, with a road cutting through the middle, influencing the

development and structure of the fields. Arable plots are usually stretching perpendicularly towards the road, formed as symmetrical rectangular network.

4. The fourth type of karst cultural landscape are **hollows** on southern slopes of the islands of Brač and Hvar, and Pelješac peninsula. They come as elongated stretches of plains, depending on the soil type and topography.

5. The fifth landscape type make **terraced drystone walls**. These were created on karst slopes with 6-20 degrees inclination. Stone was gathered and piled along the slopes in the form of escarpments in order to form terraces. They come in *a) symmetrical,* and *b) asymmetrical* shapes. Asymmetrical terraces can be found on moderate slopes suitable for growing fruit trees (olive trees, fig trees, carob trees, citrus trees, etc.). The trees grow far apart and planting in regular straight rows is not required, which allows for rock outcrops to remain untouched in the ground. This results in smaller planting plots, with semicircular, considerably short escarpments adapted to the land figuration at the foothills.

The largest influence and the most widespread changes in karst came from the construction of terraces with escarpments for planting grapevine. Stone was arranged in the upward direction, and terraces were filled by earth gathered *in situ* or *ex situ.* Escarpment height and width are proportionate to the inclination and volume of earth gathered. The most peculiar shape of terraces can be found on the islands, formed as equal narrow stretches going upward parallel to the slope. However, there are terraces created on the slope of 20 degrees and more, where escarpments are considerably compact, and some even supported by a solid rock, therefore, distances between them vary. On lower level terrain, with predominant karst surfaces, terraces are predominantly rectangular, with escarpments coupled by transversal partitions and larger heaps of stone (*gomilas* and *varvakanas*).

This brief overview testifies to a remarkable diversity of landscape types that has developed in these poor, stringent living conditions. They should be registered and any efforts to preserve them would be well deserved.

1.2.
Social characteristics of the space and transformation

Compared to other European regions undergoing the same processes, this region has experienced far more intensive and more variable human activity, so the most dynamic and complex section of this area can be found in the Adriatic mega-region of Croatia (Nicod and Sauro, 1993). First evident changes in this area took place during the Illyrian period in the 2nd century BC. Known as herdsmen and nomads, they were cutting the forest, clearing the *maquis* and removing stones, thus creating pastures. These were the first changes of landscape, slowly undergoing transformation, from natural forest into open cultivated pastureland. More intensive felling was done during the Antiquity, which was continued proportionally to demographic growth.

The impact of forest burning and felling, erosion and inadequate soil fertility was at its peak in the mid 19th century. Such a situation hindered the self-restoration of forest vegetation. At the same time, it has enabled the evolution of traditional karst cultural landscape based on a high

degree of integration of various uses – agricultural productions and residential with natural landscape conditions. The tools implemented were those ones causing least harm for the landscape and its natural resources, yielding optimal economic and other results, at the same time preserving the balance of landscape development dynamics.

Almost two millennia of stone gathering have enabled creation of arable land across on the karst surface. Before the Middle Ages, the pastureland was dominant, after which until the 17th century, the main economic branch along with cattle breeding (sheep and goat, but also pigs and bovine) was farming (cultivation of farm crops, olives and grapevine). In this very period of significant structural changes of cultural karst landscape, pasture and meadow plots were separated by partitions, and the need was increased for expanding arable plots along with more intensive grapevine-growing. Slopes are being taken for private possession, and new escarpments and terraces were built on them, which added to the creation of a largely complex and culturally significant landscape (Gams, 1987; Julian and Nicod, 1989; Sauro, 1987). The second blooming of intensive vineyard-oriented soil cultivation and creation of new terraces took place in mid 19th century and lasted up until the outbreak of phylloxera in 1909 (Encyclopaedia, 1973). At the time, what were not arable plots was covered by degraded karst - mostly bare and ecologically poor landscape. More intensive attempts of forest restoration were very slow, hindered not only by the natural conditions, but also by agricultural expansion. Searching for a solution through reforestation, in the second half of 19th century, some autochthonous species were introduced, such as Black pine (*Pinus nigra*) and Allepo pine (*Pinus halepensis*) (Horvat, 1951). These fast growing species, adaptable to limestone land and resistant to high summer temperatures responded well, whereas the autochthonous holly-oak forest (*Orno-Quercetum ilicis*) almost completely disappeared.

Social system is changing, along with economic cultural and technological progress causing also transformations in spatial organisation. Socio-economic processes of the post-war period have triggered depopulation of large regions in the entire Mediterranean. Rural areas of the islands and the coast share the same fate reflected in abandonment of cultivated land, more or less together with the abandonment of settlements. The consequence of such trends is uncontrolled self-rejuvenation of forests, erosion, and deterioration of centuries-old terraces, which all contributed to overall degradation of karst landscape.

Today, tourism is an extremely prominent activity in this area. However, it is also considered as the most questionable in the Mediterranean landscape. Tourism is an ambitious consumer of natural resources, showing its special interest in the most attractive parts of landscape, including agricultural land. Tourism is spreading at an unstoppable pace, extensively taking up land and following a linear pattern along entire seacoast. Its extended reproduction is opening distinct environmental conflicts, causing even wider changes in space (Barisel, 1969 and Ogrin, 2005). Spreading of new residential development around old Mediterranean settlements is changing the traditional balanced karst agricultural landscape. Conflicting with the space, construction of illegal weekend-settlements, metal, petrochemical, and shipbuilding industrial complexes and energy facilities, seriously threaten the area.

Compared with an inherited harmonised relationship of the environment and agriculture, the observed evolution along the coast has twofold effects. On the one hand, development of certain parts of coastal area is transforming quickly and unstoppably, changing the traditional

karst landscape into an urban one with constant presence of further construction. On the other hand, agriculture and other traditional activities are abandoned, surrendering this space to natural succession, erosion and overgrowth, which permanently deprives the area of its cultural character. In such circumstances, devastating forest fires become ever more frequent and far-reaching. Recently, forest fires occur on abandoned, uncultivated areas covered by underbush, grass and medicinal plants, which dry up in the summer and easily catch fire. These processes are a direct consequence of the absence of man and of soil cultivation. As fires are most frequent in the summer heats, they tend to spread very quickly into forests and present a severe hazard for human settlements. Damage of livelihood resources caused by erosion and fires, mostly endangers the quality of life of local population. In the same manner, such a devastated landscape is equally, although indirectly, unsuitable for tourism. Of all adaptation mechanisms used by humans, cultural adaptation (in the sense of achieving balanced, harmonious relations) carries the most weight. Nowadays, physical planning emerges as direct and effective means towards the preferred harmony (Odum, 1971).

Optimal management, in this sensitive Mediterranean area, can be achieved primarily with the help of certain planning procedures that emphasise the features of a particular landscape, its contents, patterns and possible land-use evaluation, which is normally in line with justified, anticipated social requirements or interests, and can be incorporated in any physical planning form (Marušić, 2001). It is a framework that requires a well prepared basis for defining and singling out valuable karst landscapes (primarily belonging to the category of traditional cultural landscape, but not excluding regionally determined categories) of national importance accompanied by relevant protection guidelines.

Identification of valuable landscapes of Croatia and their categorisation is in progress. This will improve our comprehensive knowledge of the national landscape heritage and will serve as a valuable point in making decisions about landscape protection and future land uses (Aničić, 2003). Based upon this insight, an approach was made in the quest for site selection location, where a revitalisation model of decayed cultural landscape of a great value could be defined and tested.

2.
Selection of site location – Blato on the island of Korčula

Evident proofs of a long agricultural tradition can be noticed in the near surroundings of Blato, on the island of Korčula (Photo 1). Although neglected, this cultural landscape along with the Blato settlement still attracts attention by its structural and complex diversity. As the time went by, on the morphologically developed terrain, specific landscape structures were generated, composed of very different terrace types, above which prevails a process of ongoing degradation. Despite this, according to the measures for selection of a distinguished landscape (Ogrin, 1996), the entire Blato area forms a distinguished landscape. It is necessary to quote definition of this spatial category: a distinguished landscape is an area, which can express scenery as a reflection of peculiar structures, as a rule, with the presence of the following elements:

- unique implementation (land use);
- favourable disposition of natural elements; and
- special settlement pattern.

Photo 1: View of the Blato field with Blato settlement from the west

This part of Korčula offers exceptionally favourable life conditions, so many proofs of existing life already in the course of the Bronze and Iron Ages can be seen here. There are eight prehistorical hillforts and about ten stone tumuli. Those in the elevation served as lookouts for observation and those ones in the lower areas were usually graves. Numerous chapels, as

known historical monuments are preserved in the area, while small stone houses of specific structure are located in the field. This very fact, as well as a possibility to watch upon this landscape as a cultural one, and to handle it accordingly, stimulated us to investigate a solution of its potential protection and development.

2.1.
Social and natural characteristics of the Blato area

The western part of the island of Korčula (Photo 2) has always been more populated and more active, due to its favourable relief, climatic and, therefore, existential conditions. During the Middle Ages, there was a case that population kept moving contrary from, one could have expected in the time, i.e. people from the town of Korčula would move towards villages. Thus, Blato as the oldest and the biggest settlement on the island was located on the plateau in the middle of its western part at the junction of almost all important routes, next to the karst field, having the same name – the Blato field. The settlement is located amphitheatrically among seven hills covered in pine forest and orchards (Photo 3). Such a peculiar location resulted in genuine settlement pattern where streets, houses and agricultural plots follow the terrain topography up to the very peaks of Mali and Veliki Učijak.

Photo 2: Western part of the island of Korčula (http://www.prizba.net/korculamap4.html)

Photo 3: Segment from the settlement from digital orthophoto map, 2001

Photo 4, Photo 5: View of settlement Blato

Photo 6, Photo 7: View of the western and eastern part of the Blato field

Large cultivated fields dominate in the area of this municipality, around which slopes enclosed by drystone walls once planted in olives and vineyards keep alternating (Photos 4 and 5). In the 19th and at the beginning of 20th century, the population number in Blato reaches its peak. It was then, when the entire necessary urban infrastructure was built, such as: hospital, schools, and open public spaces (squares, tree avenues and parks laid out and the like). The most propulsive branch of that period was agriculture; there was 10,000,000 litres (2,193,000 gallons) market surplus of wine and 300,000 litres (65,000 gallons) of oil exported. In order to increase production, they started draining the marshes of the lake by excavating through the tunnel when additional 130 ha of fertile plough-land – the present Blato field was created (Photos 6 and 7). With the onset of phylloxera, a mass emigrating process was even more accelerated and its intensity would last all until 1970. After the census conducted in 1991, it was asserted that for the last 80 years, the population number was reduced by 53% (Blato Annual, 2002). In the course of the last 10 years, immigration wave went up and it is estimated that population number increased by 20%, thus stimulating economic growth and further development. Currently, Blato has 4,000 inhabitants and is the settlement with the largest population on the island.

Tourism has become a basic strategic branch of economy. The inhabitants of Blato help fostering much greater awareness of the agricultural potential of this traditional cultural space. They wish to return to agriculture, to their roots, to produce without devastating the existing landscape structures, but the problem keeps arising from small fragmentation of planting lots and unresolved ownership (owners of the title). All these entrepreneurial ideas of revitalisation end up on small and non-profitable land plots. By restoring vineyards and olive groves, a new economic perspective could be generated, not only by means of agriculture but also through agro-tourism. Progress in agriculture will not be possible without regrouping of agricultural land, but the main obstacle is inaccessibility or indifference of its owners living in the overseas countries (South America and Australia).

From times immemorial water shortage has always been a problem on islands, since rain water collecting was its only source. However, Blato has such a location that it disposes of several karst fields at the foothills, which are just a few metres above sea level, representing the only and the largest natural accumulation of rain-water used in water supply network for settlements in the entire western part of Korčula. The subject matter is a closed karst field before regulation and tunnel construction, its confluent and own waters have frequently flooded vast field areas. Water would sometimes remain for several years but it would often inundate only through autumn and winter periods. Today, we can see several wells in the valley connected to the water supply system and quite a few of shallow wells with a depth between 4-20 metres. Their main purpose is irrigation of crops in the valley. Due to some easier usage of new technologies in tillage practices, despite inversion, almost the entire agricultural production has moved from the slopes into the valley, thus, how a diversified structure of cultivable plots developed in these elongated fertile fields, contributing towards its visual quality by their shape, texture and volume of crops diversity. Meanwhile, this intensive production activity threatens nowadays to pollute drinking water. So, either some new production programmes and technologies are being introduced instantaneously, with the least possible impact on the environment, or production in the valley is being completely abandoned in order to reoccupy terraces on the surrounding hillsides.

2.2.
The Blato landscape

The Blato landscape is thoroughly cultivated; all natural relief formations were exploited for agriculture in the past. It was abandoned by agriculture altogether and has become covered with natural vegetation (underwood or forest). It was not until the last fire that these centennial terraces were discovered, as nobody was aware of their previous existence. In Blato environs, two basic types of cultural landscape can be noticed. Division is made according to structural features since it is possible to identify processes effectively and have them easily surveyed only by means of monitoring the alterations in landscape (Map 1). Based upon this understanding, it will be possible to fix guidelines for its development and space management.

Among different types in the surroundings of Blato, we can trace *field landscape* and *drystone walls landscape.* Drystone walls landscape is dominant and can be divided into two subtypes: *drystone walls landscape as the element of escarpments* and *terraced drystone walls.* Terraces occupy the major part of agricultural land and represent the main symbol of recognisability of this location. One can clearly distinguish two types of terraces: *long regular terraces on sloping*

terrains and *asymmetrical wider terraces on somewhat milder slopes.* The Blato elongated field spreads on the very foothill direction EW. The quality soil, which is obtained from lake drainage, favoured viticulture so a *field landscape* was created in the field. Parcelling and land distribution policy has conditioned some varieties, such as: symmetrical, elongated, asymmetrical and irregular planting lots. These tilled fields are rather complex in the structural sense and are also visually impressive.

Map 1: Structural analysis

2.2.1. Landscape of drystone walls and terraces

There are three types of drystone walls and terraces landscape, namely:

1. **Terraces with symmetrical elongated type** are located on steeper slopes and follow the hill and terrain topography in its entirety. On these terraces, grapevine was grown, while olives and fruit trees appear less frequently. We can classify them according to their width as *distinctly narrow* and *narrow* ones (Photos 8, 9 and 10, Figure 1).
2. The **narrow type of terraced drystone walls**, which do not form a terrace, but they either separate (or enclose) it. They can be seen on more gentle slopes on a gradient of 12-30 degrees, planted with olive trees and on a smaller scale by grapevines. More than one half of these plots are surrendered to overgrowth, covered with *maquis* or in some places with forest. In present time, these types of terraces were the first, which have sporadically undergone clearing and restoration (Photos 11, 12 and 13).
3. **Elongated wide and asymmetrical terraces** are located on gentle slopes up to 12 degrees inclination (Photos 14 and 15, Figure 2). They are mainly situated on the edge of hollows and fields. They form an interesting pattern with their structure. This type of terraces was mainly covered with olive-trees, while a mosaic displaying agricultural land use appeared closer to the settlement. Even though this type of landscape is neglected, its proportion is the highest among still cultivated agricultural areas.

Photo 8, Photo 9: Due to lack of fertile soil, peasants exploited each square metre of land, even in the most unsuitable terrain, so these types of structures used to wrap in entire hills. This is also an example of narrow symmetrical terraces, which have before all become prone to overgrowth.

Photo 10: Restored olive groves and vineyards on terraces near Blato

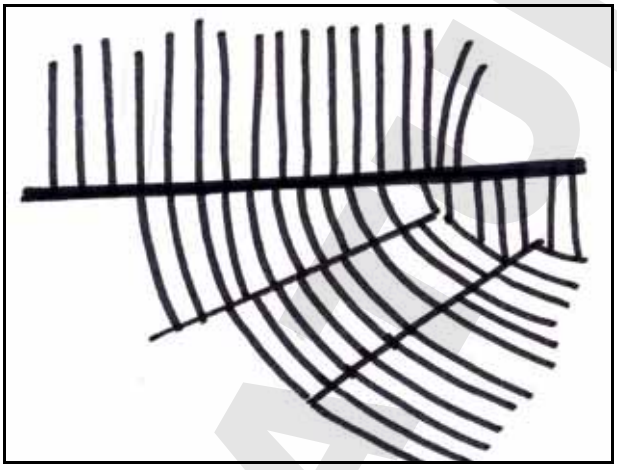


Figure 1: Draft of a symmetrical terrace parcelling

Photo 11: Agricultural production is hardly visibly regaining the hilly terrains around Blato. Olives are less demanding trees, therefore, they are the only visible ones on partially restored terraces. A close proximity to road has probably favoured revitalisation of olive groves on this site.

Photo 12, Photo 13: It took an agricultural labourer a period of fifty years to build drystone walls up to 1 m thickness. Although this example of terraces is exceptionally valuable, they fall into decay due to the absence of heirs.

Photo 14: Wider type of asymmetrical terraces developed on more gentle slopes. Studying COC from 1971, it was established that these terraces were once mainly cultivated with olives.

Photo 15: The same location captioned from the air (The state orthophoto, 2000)

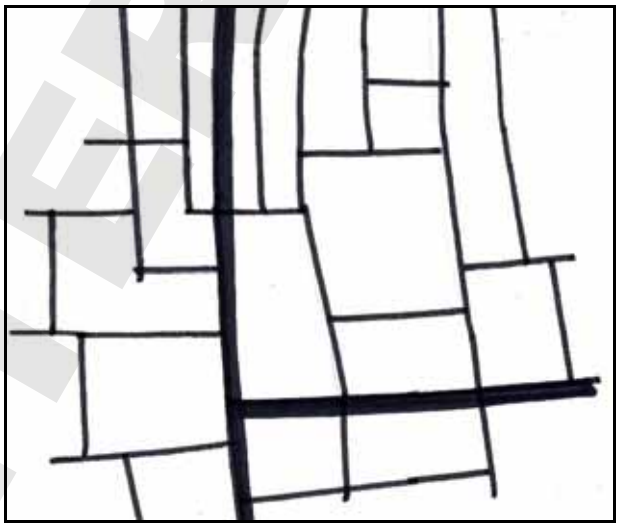


Figure 2: Sketch of asymmetrical terrace parcelling

2.2.2. Field landscape

This type of landscape develops on almost flat terrain (up to 5 degrees slope). Blato field is a typical karst field, which is, according to the soil property, divided into two mapping units. The eastern side comprises the red soil – *lessivé,* which as dominant is typically deep, next to the brown on limestone and red calcareous – dolomitic, while the western major part is trenched on loess as dominant against sirozem siliceous carbonate and eutric brown on loess as dominant (Mirošević and Romić, 2006). This pedological difference is supported by diversity in its structural sense through parcelling and its surface cover. The biggest proportions in the existing type of landscape are those still cultivated areas. Crops mainly consist of vineyards, orchards, and vegetable gardens while ploughlands are quite rare.

Two types of field structures can be distinguished in the Blato field, namely:

1. The western part of Blato field is characterised by fragmented parcelling and by an elongated *dolina* type field structure (Photos 16 and 17, Figure 3).
2. Southern side of the Blato field is characterised by asymmetrical square parcelling shape, representing fields planted with diverse cultures (Photos 18, 19 and 20, Figure 4).

Photo 16: Blato field in which typical elongated plots are predominant of a shape which is probably predetermined by road access and land-reclamation canals.

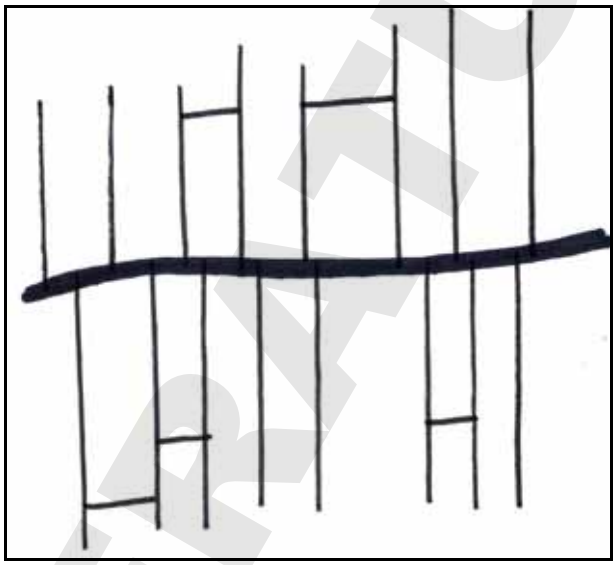


Figure 3: Sketch depicting asymmetrical elongated plot parcelling

Photo 17: A view of the same field (The state orthophoto, 2000)

Photo 18: Aerial photo (The state orthophoto, 2000)

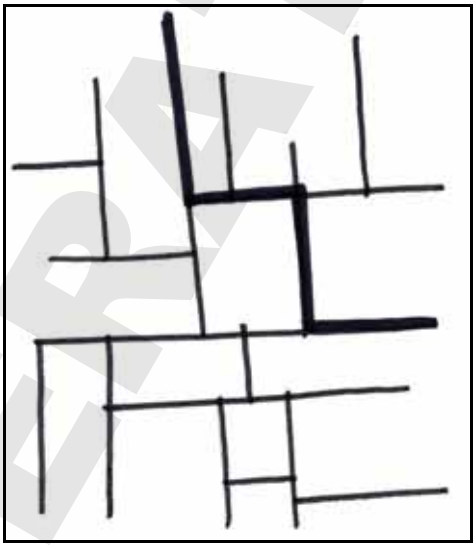


Figure 4: Sketch depicting an asymmetrical elongated plot parcelling

Photo 19, Photo 20: Asymmetrical parcelling on the eastern side (the photo on the left was taken in 2000, below is a photo taken in 2006)

3.
Defining problems

Succession represents a major issue in this space, since in a developed cultural, but structurally diversified space, on the one hand, the natural potential keeps regenerating, which, on the other hand, represents a potential danger from fires and a permanent loss. Frequent fires cause soil erosion and threaten with a lasting devastation of terraces and stone structures. Drystone walls are being pulled down and are going to disappear, while stone is used for building purposes. Uncontrolled and exaggerated use of pesticides and pertaining agricultural measures tackle the key issue of drinking water quality and their sources in the valley, *dolina*. A high degree of depopulation is a serious problem in Blato. Depopulation has not only dragged this problem tackling the lack of farming people, but also a non-definable ownership, thus discouraging local residents in their plans to restore the existing abandoned agricultural planting plots, whether the subject matter is aiming at enlarging land plots or renting them for production purposes. Should agriculture be reactivated on these elevated sloping terrains around Blato field, we would come across the problem of present-day technologies. Inaccessible terrain renders the use of modern equipment impossible, since it could destabilise terraces. It is also necessary to mention that understanding of these problems and values of distinguished landscapes, contributing towards identity in general public, is very low.

3.1.
Objectives

The objectives are the following:

- identifying cultural and natural landscape values;
- defining degraded cultural values;
- recognising existing trends in further development processes in space with their consequences;
- defining type of production in the future and commitment to dominant activities;
- proposing models of developing activities (those ones which are going to have the greatest impact on environment) along with protective measures to achieve landscape development optimum; and
- defining areas suitable for revitalisation and description of space use, having in mind each specific activity.

3.2.
Working method

Method of work was based upon some aforementioned problems in order to obtain the land-use plan, which is integral with regard to technological and economical, ecological and cultural requirements of the newly created landscape. The first steps taken comprised inventarisation, analysis and valorisation of the monitored area. Inventarisation comprised collecting elementary

and inferred particulars on this space, which are presented in sequence of thematic maps (pedology, vegetation, hydrology, inclinations of terrain, etc.).

These data were further used for analysing and valorisation of space, elaborated and based on two essential starting points. Firstly, it was necessary to ensure the attractiveness of the area for productive economy, and secondly, to guarantee the pursuit of landscape values in the newly arranged area. In analyses of attractiveness, to locate certain activities for a productive economy, we sought for the most attractive areas. As distinguished from them, the landscape values (protective model) had to be incorporated within natural and cultural features of this space. They can be manifested in different ways (as visual characteristics, through degree of preservation of the traditional land use or parcelling, etc.). As an outright result of this analysis and valorisation maps, the graphic surveys of areas with the greatest attractiveness (models of attractiveness) were obtained for productive economy, as well as the maps of landscape values (models of landscape values).

Putting these models into mutual relations – for productive economy and model of landscape values, the possible spatial conflicts are reduced to the smallest possible degree. This is depicted by means of several alternative solutions. They can favour technological and economical visions to a smaller or greater degree, and respect ecological, i.e. cultural landscape values, just as well. As an optimal model, and simultaneously, a final product of the planning process of this workshop – a land-use plan was created, which in a newly structured landscape ensures preservation of ecological and cultural values to the highest degree. But, on the other hand, it ensures far the most profitable engagement in agriculture. The importance of such an approach is derived from the fact, that this kind of landscape can offer a basis for different forms of rural tourism, retaining the original landscape values along with possibilities for proportionally profitable agriculture.

3.3. Vision

Landscape in the surroundings of Blato has a very high value, due to the presence of terraces as the best proof of a long-standing traditional agriculture. Working hypothesis prescribes that only through a successful economy one could prevent further demographic decline and restore vital traditional landscape. It is impossible to stop spatial processes, which radically change traditional features of rural areas, but it is possible to direct and build these processes on the principle, which follows the historical continuity of the space. This could lead towards creation of a new type of landscape, which is going to satisfy economic, cultural and ecological vision.

3.4.
Working process

Working process is presented by the following flowchart.

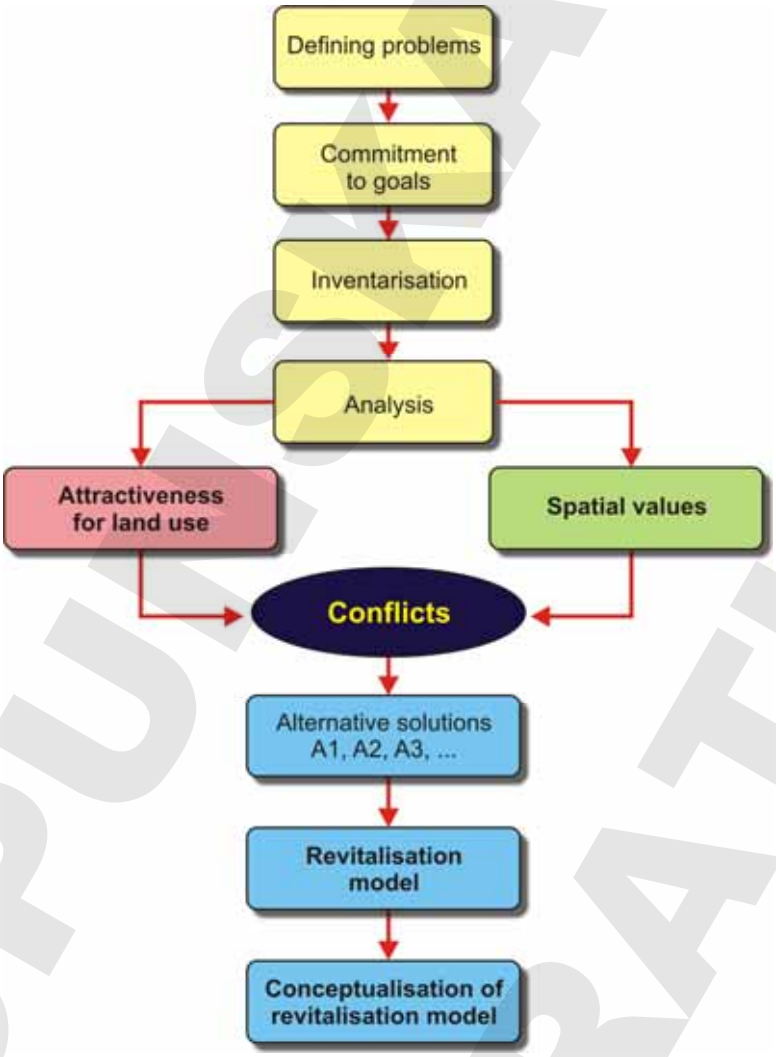


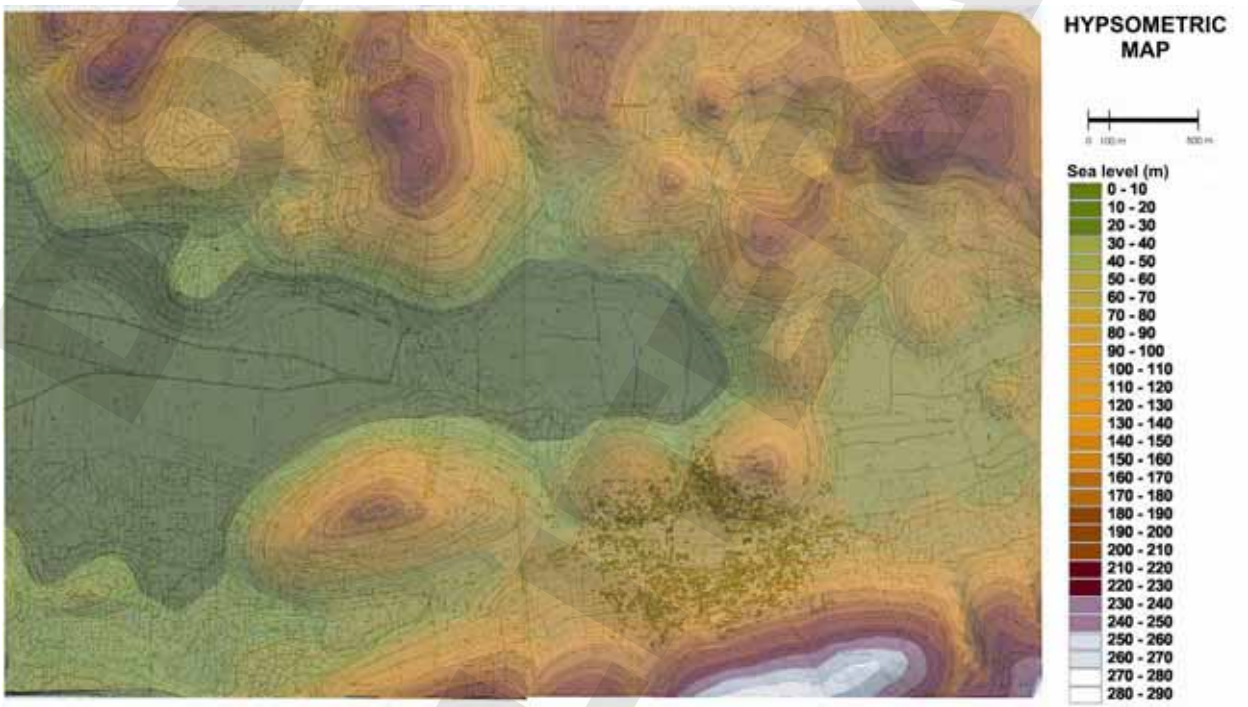
Figure 5: Working process

4.
Inventarisation

Inventarisation procedures are related to identification and description of landscape structure as well as their processes (parts and structures). Result of each inventarisation is a database making a true copy of the entire area under observation with all particulars considered relevant regarding commitment to goals. Data collected through inventarisation serve as a basis for further analytical steps and spatial assessment. In compliance with these goals, the database completed by means of thematic maps (Map 2 – Map 7) comprise the following relevant data for the area of Blato:

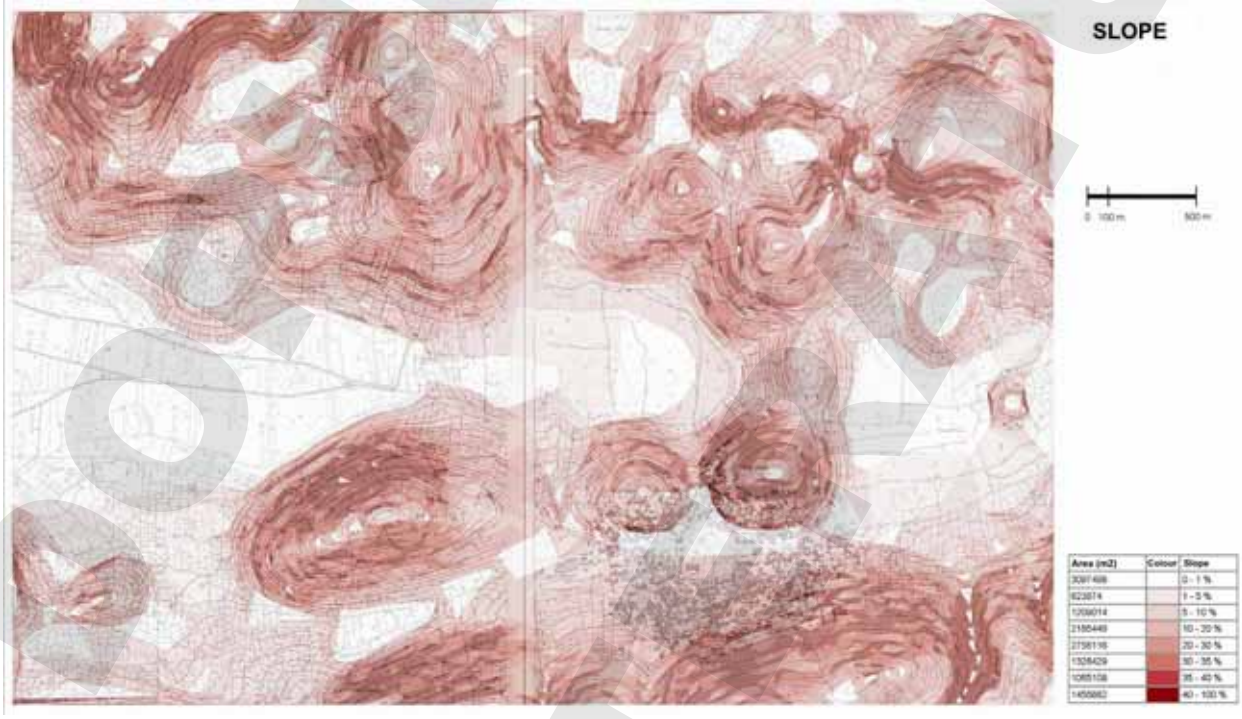
- hypsometric map;
- terrain expositions;
- land use;
- slopes;
- pedological map;
- hydrological characteristics;
- parcelling of land; and
- visual characteristics.

Basic state map (*Osnovna državna karta*) – Scale on 1: 5000, and an aerial photo, served as a basis. At the same time, we used data on demographic and economic characteristics, including relevant figures from the physical plan. An informative discussion took place with the local community representatives, who got us presented with problems of development in their region.

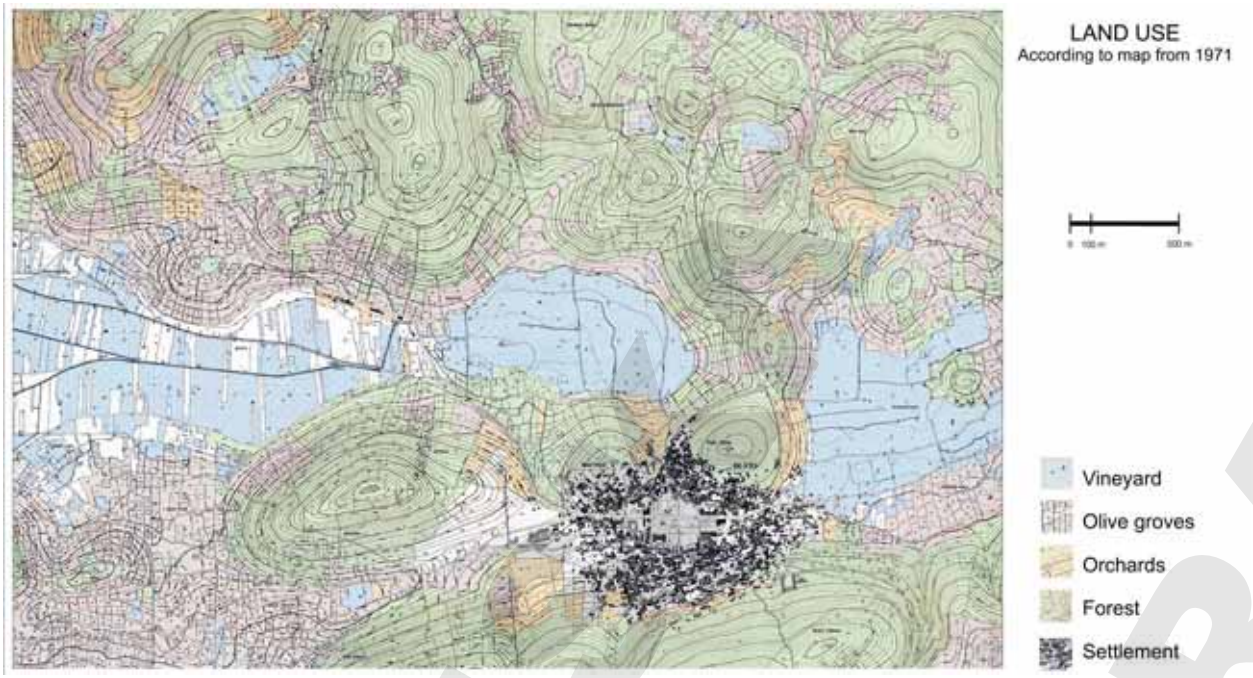


Map 2: Hypsometric map

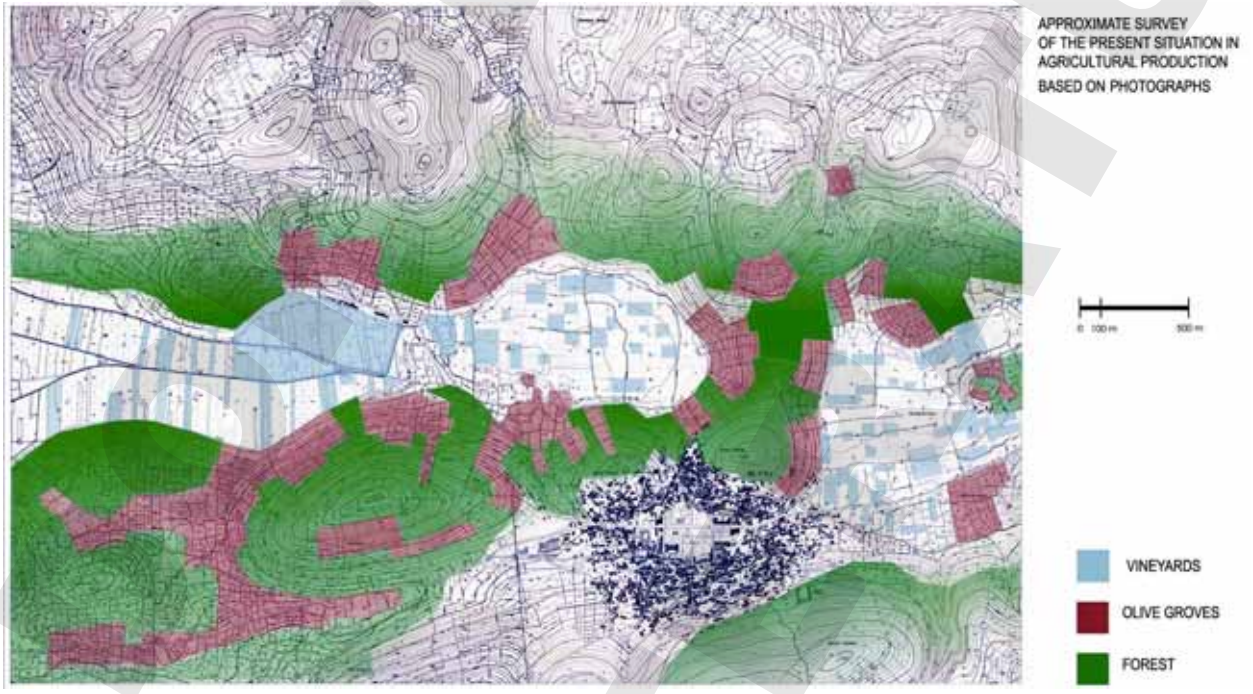
Map 3: Exposition – a survey of the terrain in relation to insulation



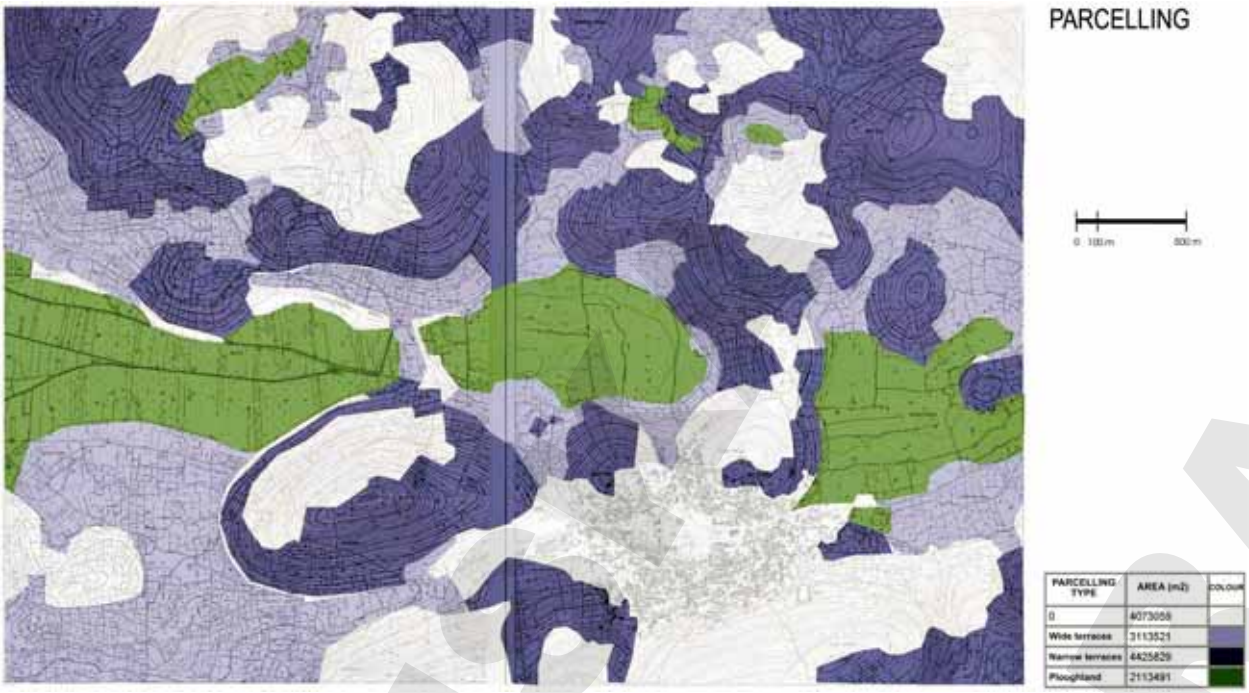
Map 4: Slope



Map 5: Land use – situation in 1971



Map 6: Land use – situation in 2006



Map 7: Parcelling – an overview of the fundamental zone of planting plot types

5.
Analysis and valorisation of the area

5.1.
Analysis and valorisation for productive economic operation from the feasibility standpoint

Feasibility for productive economic operation of this area is related to the identification of possibility of different types of soil use for particular purposes. They comprise three kinds of agricultural intended use, namely: *viticulture, fruit-growing* and *cultivation of olives.* In order to find an area with the highest potential for their development, models were made (depicted by maps of attractiveness) with fixed position for each of these branches in space. Models are established on predetermined criteria in compliance with spatial conditions required by a specified branch and their most desirable development (types of soils, topographic characteristics, planting plot sizes for profitable use and the like). For each of these activities, criteria are singled out as evaluation instruments (depending on spatial demands of these activities), and each criterion specified was discussed and evaluated separately. This evaluation is to define certain criterion assessment, depending on the feasibility level for development of the activity. For example, criteria on terrain exposition for *fruit-growing* is divided into several categories: the most favourable exposition (S), less convenient (SE) and the least adequate exposition (SW), while the other expositions are evaluated as unfavourable ones. Based upon criteria determined within each single branch for these three agricultural intended uses, a graph is made (model of attractiveness) showing attractive areas for location of these activities.

5.1.1. Model of attractiveness for vineyards

In order to specify attractive spaces for viticulture, it is necessary to understand climatic characteristics of the location. Out of microclimatic components, the following factors are important for cultivation of grapevines: heat, light, precipitation (humidity) and winds. Some sorts grow well on flat terrains, while some do on the slopes. In most cases, wine species are much better adapted to the hilly terrains, so the best steep terrains for their cultivation are gradients between 10 and 30%. Grapevine is adapted to life in the most diversified types of soil, therefore, it can successfully grow in barren karst. Hilly terrains are by far the best, without being influenced by fog, freezing or high presence of moisture, air, i.e. more airy and better-lit spaces (Mirošević, 1996). The forest proximity plays an important role, too. It acts as humidity regulator and protects from northern winds. The role of viticulture in these parts is primarily cultivation of grapes for wine production.

These are criteria for the most desirable location (Map 8):

Exposition:

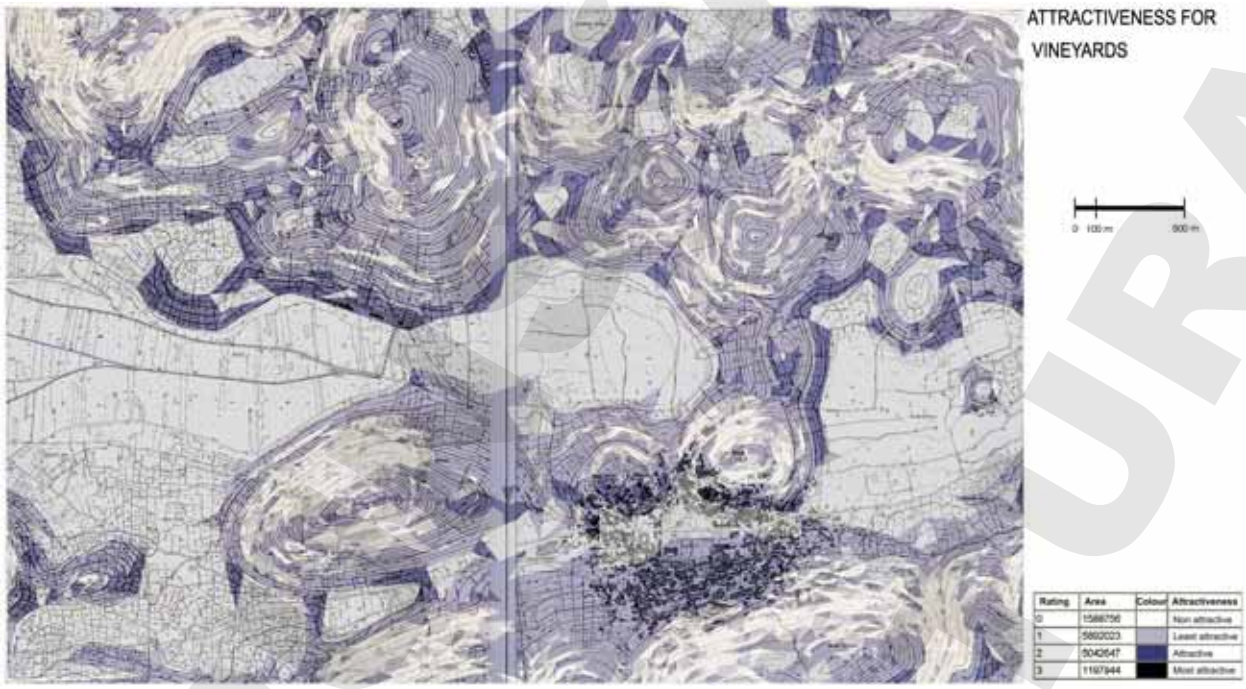
- southern, south-eastern and western – *the most attractive;*
- south-eastern and eastern – *medium attractive;* and
- northern, north-western and north-eastern – *the least attractive.*

Slope inclination:

- from 10 to 20% – *the most attractive*;
- from 20 to 35% – *medium attractive*; and
- from 0 to 10%– *the least attractive*.

Terrace shape:

- Narrow *terraces* on steeper terrains are considered preferential.



Map 8: Attractiveness for vineyards

5.1.2. Model of attractiveness for orchards

In order to determine attractive planting spaces for fruit-growing, it is necessary to be familiar with soil, relief and climate of the area. Apart from macroclimatic factors, microclimatic ones, such as frost and incidence of low temperatures, are essential. In a successful fruit-growing it is important to avoid open locations with direct wind impacts. It is also important to avoid ravines and *dolinas* where air stagnation and temperature drop might occur, what is typical of Blato region. The most suitable expositions for fruit-growing are southern, south-eastern and south-western positions. Slanting is fundamental, since production becomes more costly, as the gradient tends to grow. It is considered that 15% slanting is the most appropriate, but we must take into consideration that the points in question are mainly already existing terraced terrains; therefore, the elevation difference has already been overcome. In this case, acceptable inclination would be up to 35% (Miljković, 1991). Semi intensive crops, such as: fig tree (*Ficus indica*), almond tree (*Prunus amygdalus*), carob tree (*Ceratonia siliqua*) and strawberry tree (*Arbutus unedo*) are suitable.

These are criteria for site location (Map 9):

Soil:

- anthropogenic soils – *the most attractive;*
- red soil (*terra rossa*) – *medium attractive; and*
- brown on limestone bedrock – *the least attractive.*

Exposition:

- southern**,** south-eastern and south-western – *the most attractive;*
- western and eastern – *attractive;* and
- northern, north-western and north-eastern – *the least attractive.*

Slope inclination:

- from 5 to 20% – the most attractive;
- from 20 to 35% – attractive; and
- from 0 to 5% – the least attractive.

Map 9: Attractiveness for fruit-growing

5.1.3. Model of attractiveness for cultivation of olive trees

In the Adriatic region, olives are the most widespread plantations. In the last couple of decades, their cultivation was pretty neglected and most of the olive groves fell into decay. Favourable climatic conditions and the growing demand for quality olive oil should become a stimulus for revitalisation and further development of this activity. Olive-tree is an evergreen tree with broad leaves, growing to live for several centuries, and not quite seldom for several thousand years. The success of its inflorescence and fecundation depends on the climate. During its inflorescence, a mild breeze is desirable. One should avoid the areas with strong winds since they accelerate the fall of fruit before its maturity to the full. Permeable soils are more adequate. It is possible to preserve humidity, partially by spreading a layer of organic substance (mulch).

This plant alone is not susceptible to draught, but water quantity contributes to its quality and quantity. Gathering olives comprises major production costs (50-70%), therefore, mechanisation is recommended. It also dictates the selection of production facilities (slope).

These are criteria for site location (Map 10):

Exposition:

- southern, south-western south-eastern – *the most attractive;*
- south-eastern, south-western, western and eastern – *medium attractive;* and
- flat – *the least attractive.*

Slope inclination:

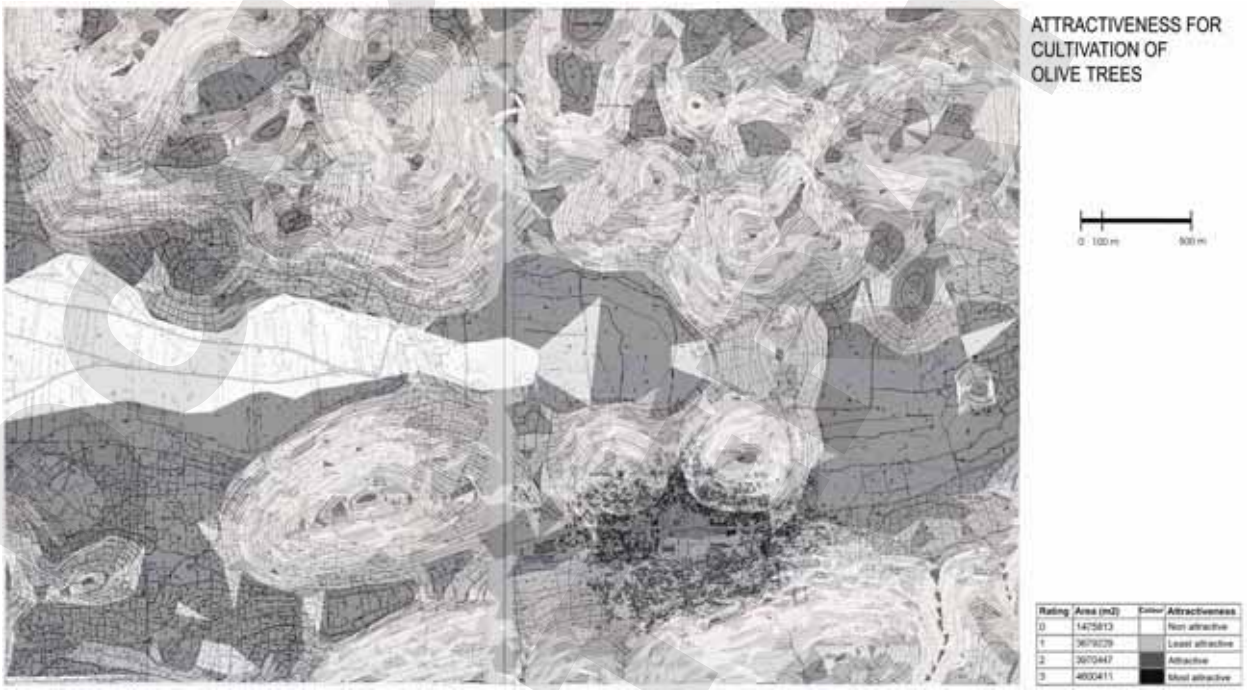
- from 0 to 5 % – *the most attractive*;
- from 5 to 15 % – *medium attractive*; and
- from 15 to 35 % – *the least attractive*.

Elevation:

- Acceptable elevation is 10 m above the sea level.

Terrace shape:

- Wide terraces are considered preferential.

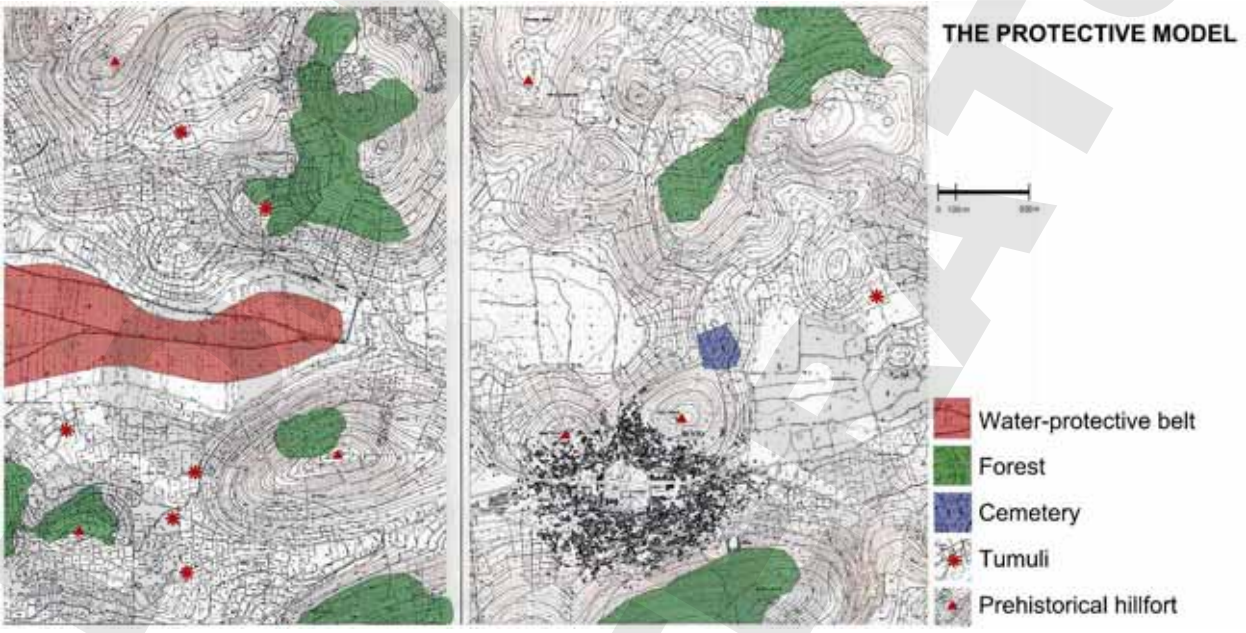


Map 10: Attractiveness for cultivation of olive trees

5.2.
Analysis and valorisation of the area in regard with spatial values

Since models of attractiveness represent development aspects, i.e. maximum possible development of each agricultural activity, it is also necessary to take the protective model into consideration. We define spatial values, which could become endangered with introduction of planned interventions. By means of protective model, we can see the following spatial qualities: *water-protective belt*, *the existing forests* and *historical heritage.* Agricultural development with exaggerated use of pesticides could endanger drinking water of Blato valley, so this potentially endangered valley is marked on the map (Map 11). Forestlands are just as valuable and should be preserved, as for their natural resource, so for their site-specific character. Valuable forest areas are selected by means of digital ortho-photo map of this district in which major, more compact and darker stretches, displaying older cover were taken into consideration.

Through overlapping this map with attractiveness, these valuable spaces will be eliminated as potential ones for production. In Blato and in its surroundings, there is a considerable number of *prehistorical hillforts from Bronze and Iron Ages,* tumuli, as well as some Roman buildings. These points in space should be marked, and well incorporated within planned activities by connecting them to the existing communications to gain their access.



Map 11: The protective model

6.
Conflicts

Upon completion of development models and models of landscape values, zoning of this district is formulated. It has established a mutual relationship between development vision of monitored activities (viticulture, fruit-growing, cultivation of olives) and spatial values (protection model). With their overlapping we can separate sources of conflicts in space, which are mainly related to competitiveness of diverse activities on the same locations, as well as overlapping in attractiveness of certain activities with their spatial values. In resolving these conflicts, the two basic dilemmas are comprised: location of activities and their internal analytical break down, i.e. *where it will be located* (*land-use plan*) and *in what way it is going to be assigned (structural plan).*

Several propositions, which were considered, have determined the final decision, namely:

- to take into account how big the total proportion of each single activity in space occurs with the competitiveness of more activities on the same location (decision on location will give preference to the activity with better opportunity for development);
- to consider a wider context of development range, for example, if tourism activity is planned during decision-making procedure on implementation and structuring of new landscape, a very important criterion is to respect visual significance of such a landscape (for example: agriculture cannot occupy the entire landscape, nor agriculture can be permitted to assume an intensive character);
- to ensure that determination of proportion of each activity will depend on wider context of space development (for example: fruit-growing and viticulture are more attractive for development of tourism than farming and growing of vegetables); and
- to make allowance for the possibility that decisions about structuring and manner of land use for certain activity are based on spatial values (for example: new parcelling of land coinciding exactly with traditional parcelling, decision on protection of the existing parcelling fostering crops, which are profitable on such planting plots).

7.
Revitalisation model

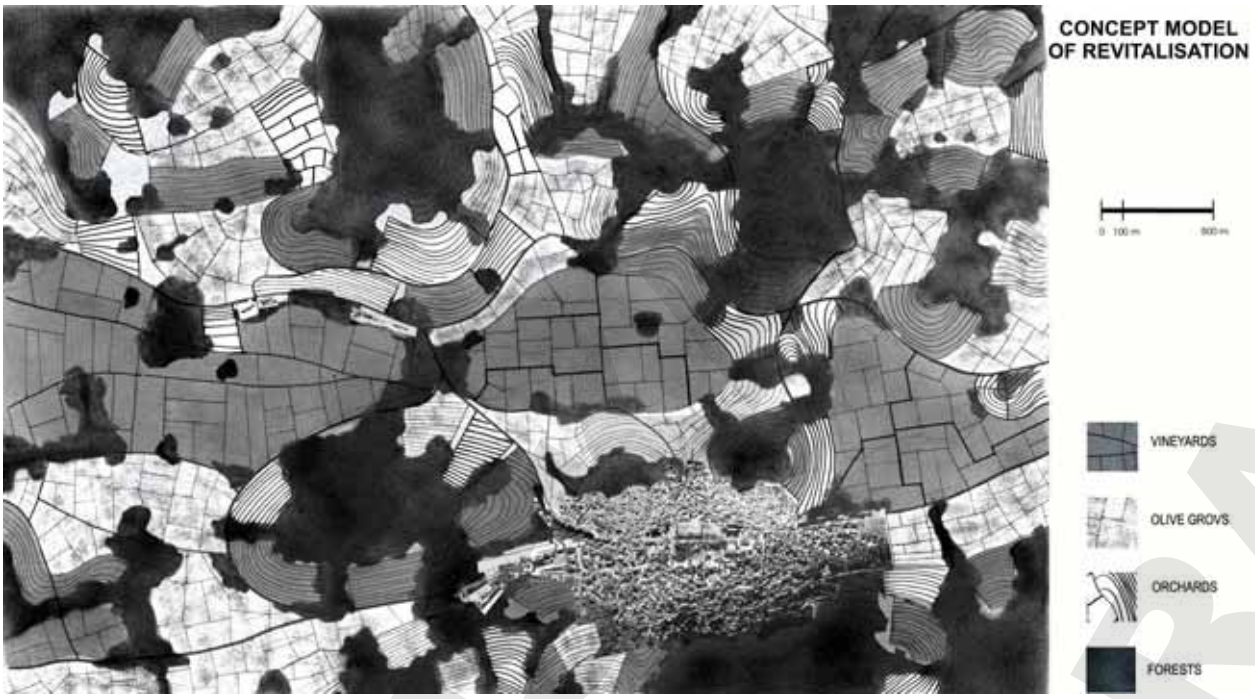
Alternative solutions based on these propositions were considered. The final outcome is an optimal model of revitalisation made, i.e. land-use plan, which represents possibilities of special restructuring that could be economically feasible, but at the same time, to contribute to a more complex landscape picture (Map 12). The most cost-efficient areas in which agricultural production can develop without jeopardising the traditional pattern, were defined. Thus, in this model, structure of future planting plots is clearly depicted consistently following land configuration and respecting the existing parcelling shapes. With overlapping of this attractiveness, preference is given to viticulture, as to the most profitable and the most recognisable crop cultivation in this region. The second most widespread field crops are olives spreading all over northern expositions on wider terraces with access for mechanisation. Orchards are the least present ones, being located on more or less accessible locations due to the very character of their growing. We propose semi intense crops, such as fig trees (*Ficus carica*), almond trees (*Prunus amygdalus*), carob trees (*Ceratonia siliqua*), pistachio (*Pistacia vera*), jujuba tree (*Zizyphus jujuba*) and strawberry tree (*Arbutus unedo*) to justify the selection of location.

Shapes of these plots are adapted to the land configuration. The goal is to achieve an optimal relation in sizes and shapes of these elements (forest, vineyards, orchards and olive groves) in such a manner to create the more complex image of the space, so to avoid large level surfaces of identical crops. There exists cultivation of a single agricultural product to the exclusion of other uses of the land – areas under monocultures in the hollows, while smaller plots alternate with other kinds of crops and belts of greenery on the terraced slopes.

Apart from the existing forests, which were worth preserving, some new ones were added and their joint growth is conceived in several ways. Most of the forestlands are surrendered to a spontaneous succession, but in order to create diversity in a visual and economic sense, a directed succession is rendered possible by planting pine trees and holm oaks.

Yet another category of forest areas, which might contribute towards their diversity, would be an intervention of level surface plantations. This type of planting would be adequate for exposed and enhanced smaller areas among plots or passing over from flat terrains onto terraces. Species, such as heather (*Erica mediteranea, Erica arborea*), flowering ash (*Fraxinus ornus*) *and* mock privet (*Phillyrea latifolia),* might be taken into consideration. Planting of fruit bearing flowery ligneous species is possible alongside the main access paths.

The problem of accumulation in Blato field and potential pollution of drinking water owing to more intensive growing, is solved by planting autochthonous resistant species of grapevines, which demand protection to a lesser degree, as well as with partial leaving out in agricultural production. Rural landscape shaped in this manner is attractive for tourism purposes not only for its visual complexity, but also for providing an opportunity to develop tourism in rural households.



Map 12: Concept model of revitalisation

8.
Discussion with public participation

At the end, all participants of the workshop prepared a comprehensive presentation of the entire work, which was open to all local residents from Blato. The Mayor of Blato also took part with his associates. Subsequently, a discussion was generated on the possible implementation of this plan, as well as the use of this method to achieve optimal spatial solutions of revitalisation of the cultural landscape.

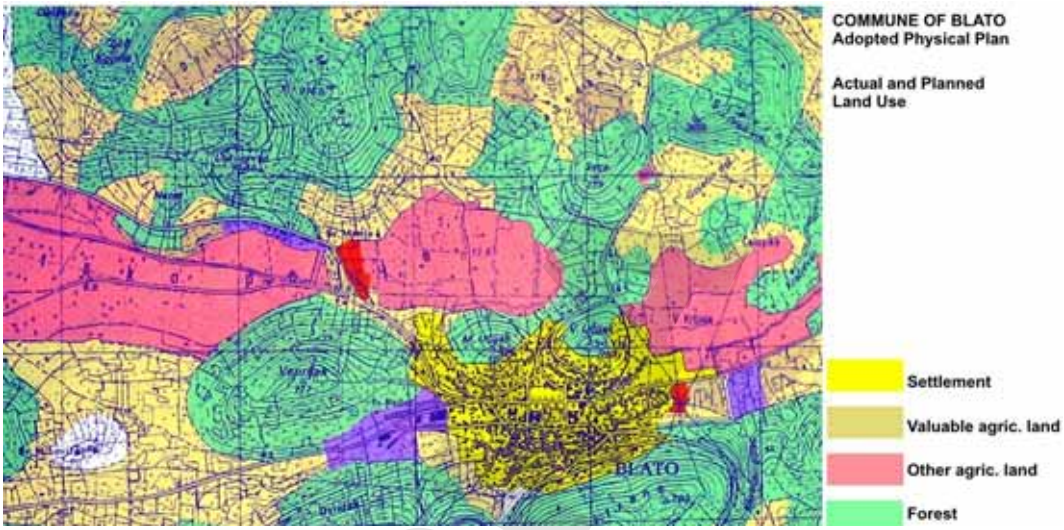
Finally, revitalisation plan (Map 12) was overlapped with the adopted spatial plan, which was carried out by using another method. This confronting was especially useful to indicate to the incompleteness of these plans with regard to revitalisation of this valuable agricultural space, as well as to the benefit of development in agricultural production. The participants of the local community were obviously surprised with the results achieved from the workshop and especially with its outcome in relation with the adopted plan.

The adopted plan has completely disregarded cultural features of the traditional landscape. Still further neglect, i.e. surrender of major part of agrarian areas to the forestland (green areas) is anticipated, the Blato field is classified as a very valuable agricultural soil (brown areas), without any guidelines what to do and how to act in this particularly delicate area. The rest of surfaces, other than the settlement itself (marked (yellow), classified only as other cultivable land (ocher), have also remained without guidelines for further activity (Map 13).

On the contrary, cultural and natural landscape values are identified in the plan of revitalisation model. Fundamental agricultural branches, which are the most productive ones for this location, are defined. Priorities are also defined: viticulture as the predominant activity, olive-growing and, finally, vegetables-growing. Revitalisation model indicates to the possible more intensive agriculture, based on principles of sustainable development in which exploitation of natural resources is rationalised, agro-technical measures restricted and the traditional parcelling pattern respected.

With overlapping it was ascertained that a great number of cultivable areas was lost in the physical plan and those planned to serve the purpose are located on the most unsuitable locations, without any support for further agricultural development of the commune. Nor has it supported revitalisation of this cultural landscape, in general. According to the revitalisation model, a simulation of the possible revitalisation of Blato field was presented on the principle of intensifying agricultural production, through regrouping of plots of vineyards around water protective belt and renewal of olive groves and terraces with orchards, and all this in compliance with the existing spatial structures (Photos 21 and 22).

Finally, simulations of the expected consequences in this valuable space caused by abandoning agriculture were elaborated. Terraces will gradually be covered by *maquis* and by forest and will become in the long run completely amalgamated with the forest. This represents a lasting loss of these valuable structures and, consequently, this visually diversified and attractive place of abode will become transformed into a uniform landscape of exclusively natural features as depicted in the pictures (Photos 23-25).



Map 13: Commune of Blato – adopted physical plan

Photo 21: Existing situation in 2005

Photo 22: Proposal of revitalization of the Blato field

Photo 23: Present view of the Blato field

Photo 24: Aspect in case of partial succession, several small plots with vineyards are visible in the valley and olive groves up in the mountain

Photo 25: Complete overgrowth, the space without identity and complexity