

# **CULTURAL LANDSCAPE EVALUATION AND POSSIBILITIES FOR FUTURE DEVELOPMENT – A CASE STUDY OF THE ISLAND OF KRK (CROATIA)**

## **VREDNOTENJE KULTURNE KRAJINE IN MOŽNOSTI ZA PRIHODNJI RAZVOJ – ŠTUDIJA PRIMERA NA OTOKU KRKU (HRVAŠKA)**

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Cultivated karst area near Poljica.  
Obdelano kraško površje pri Poljici.

## **Cultural landscape evaluation and possibilities for future development – a case study of the island of Krk (Croatia)**

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**ABSTRACT:** Agricultural landscapes that resulted from many centuries of traditional agricultural cultivation are an important part of the cultural heritage in the European Mediterranean areas. Since a systematic study in the Republic of Croatia aimed at inventarisation and protection of cultural landscapes has not been carried out yet, the main purpose of this paper was to, based on a case study that took place on the island of Krk, show the method of agricultural landscape evaluation and possibilities for future development and protection of outstanding agricultural landscapes. The evaluation of all 12 identified agricultural landscape types was conducted and six of them were singled out as outstanding cultural landscapes. Possible structural changes of those landscapes were considered and a proposal for a strategy of the preservation of the valuable landscape heritage on the island of Krk has been formulated. It was concluded that for field landscapes, the preservation is possible through agricultural production modernization. Those outstanding agricultural landscapes that are not profitable, but have a great cultural and historical value, should be maintained through regular procedures for cultural monuments with 100% subsidy.

**KEY WORDS:** geography, traditional agriculture, succession, revitalization, protection, evaluation, Krk island, Croatia, Mediterranean

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# 1 Introduction

The Mediterranean is a unique macroregion, which has no match in the world (Staut et al. 2007). This geographical-cultural area has been under continuous human impact for thousands of years. Mediterranean cultural landscapes are one of the major cultural achievements and they »represent the combined works of nature and man« (Fowler 2003). Since the concept of cultural landscape is differently understood and used by various disciplines, as pointed out by Jones (2003) it should be stressed that this paper will focus only on agricultural landscapes. Centuries long tradition of agricultural cultivation has left the strongest mark on the Mediterranean landscapes.

It is presumed that some of agricultural landscapes, on the island of Krk, belong to the category of outstanding landscapes. Ogrin (1996) defines outstanding landscape as »... *an area of high scenic value that is a reflection of a distinct structure and as a rule it displays the following features: unique agricultural and settlement land-use patterns and an adequate presence of natural elements* ...«. They represent the highest achievement of landscape culture and are of paramount importance in the shaping of national identity.

At the end of the last century international instruments and conventions that call for the inventarisation and protection of landscapes appeared (Mediterranean Action Plan 2005; The European Landscape Convention 2000; Zimmermann 2006). Naveh (1993) proposed the Red Book (a unique registry of endangered landscapes of the Mediterranean). Even though the idea of the Red Book has not been realized, it resulted in a number of case study analysis (Rossi and Vos 1993; Grove and Rackham 1993; Makhzoumi and Pungetti 1999; Pinto-Correira and Vos 2002; Naveh and Carmel 2003; Aranzabal et al. 2007; Vogiatzakis et al. 2008). A good example can be found in the Republic of Slovenia where 100 outstanding cultural landscapes have been registered according to predetermined criteria (Ogrin 1996).

In the Republic of Croatia a systematic study aimed at the inventarisation and protection of cultural landscapes has not been carried out yet, but case studies about their structure have been performed (Aničić et al. 2004; Aničić et al. 2007; Hrdalo et al. 2008; Butula et al. 2009).

## 2 Problems and objectives

The identified landscape processes and changes in the study area, similar to those in other parts of Europe, are a direct consequence of the socio-economic situation. The main cause of change is associated with trends in agriculture and appears in the form of production intensification on more fertile soils or extensification on less fertile soils (Jansen and Hetsen 1991; Bastian and Röder 1998; Vos and Meekes 1999; Antrop 2005; Serra et al. 2008; Urbanc 2008). Reduction of agricultural cultivation is the most important cause of landscape changes on the Island of Krk, situated in the Adriatic Sea. Different stages of natural succession can be seen on the whole Island. Other causes of change include urbanization, improvement of infrastructure, increased demand for recreation, protection of nature and so on (Vos and Meekes 1999).

The main reason for the cessation of farming was depopulation triggered by socio-economic processes of the post-war period in the second half of the last century. On the Island of Krk agriculture employed 78.4% of the population and was the fundamental source of income until the middle of the 20<sup>th</sup> century, while in 2001 the percentage of farmers was only 3.1% (The Croatian Central Bureau of Statistics – CBS 2010). Direct consequences of emigration and reduction of agricultural production were neglect and, subsequently, the disappearance of agricultural landscape patterns. Nowadays, the population is again increasing mostly due to the development of tourism and other associated activities. Changes related to tourist development could substantially harm the landscape of the Island of Krk, unless a strategy with guidelines for its protection and management is determined in the immediate future. It is considered that the most desirable method for protection is the inclusion of the segment of cultural landscape protection into physical planning documentation.

Regarding the identified problems the following objectives were set:

- Define the agricultural landscape structure;
- Identify the outstanding agricultural landscape heritage;
- Consider the possibilities for development and protection of outstanding agricultural landscapes.

### 3 Materials and methods

To achieve the set objectives, the methodology described by Countryside Commission (1993) was used. The evaluation of the identified agricultural landscape types was performed in order to determine those of outstanding value.

The entire database (scale 1:25,000) was drawn on the basis of the following sources: topographic map (scale 1:25,000) (SGA 1997), basic geological map (scale 1:100,000) (Šušnjar et al. 1970; Šikić et al. 1969; Mamužić et al. 1969), pedological map (scale 1:50,000) (Bogunović 1978) and vegetation map (scale 1:50,000) (Rechner, 2002). Thus separate thematic maps were made (relief, forest, water and land division system) on the basis of the topographic map.

Since landscape peculiarity is based on special structural features it is thus the formal point of departure for the identification of original landscape structure (Aničić et al. 2004). Photographs and topographic maps were mainly used for this purpose giving the pattern of agricultural landscape. In order to identify agricultural landscape types, pattern of agricultural landscape and other thematic maps were analysed using overlay technique.

The evaluation process aimed to define outstanding agricultural landscapes. Although it cannot be completely objective, it is necessary to pre-set criteria on the »... *basis of which it will be possible to repeat the whole process by which it becomes sufficiently objective* ...« (Hudoklin 1994). The criteria are the most desirable features of the landscape (Ogrin 1996). After defining the criteria, the landscape evaluation was carried out. All landscape types were marked from 1 (the lowest mark) to 5 (the highest mark) for each of the set criteria and the sum of the set values gave the total assessment of a particular landscape type. The evaluation procedure was conducted by the authors as relevant experts on the discussed topic.

In the last part of the research the possibility of the future existence of outstanding agricultural landscapes, was considered and possible structural changes, as a result of development alternatives (succession, revitalization and protection), were analyzed.

### 4 Area of study

The Island of Krk is the second largest island in the Adriatic Sea with the total area of 405.22 km<sup>2</sup> (Duplančić et al. 2004). It is located in the Kvarner Bay. Morphologically, three significantly different areas can be distinguished (Figure 1): northern, central and southern (Novosel Žic 1987). The northern part of the island is a lowland area where elevation does not exceed 100 m above sea level with slope inclination of 0–2°. The proximity of the Krk Bridge (connecting the island with the mainland) favored the development of industry that dominates this area.

The central part is slightly elevated (elevation up to 300 m above sea level and slope inclination of 0–5°) and has a well-indented relief. The interleaving of hills and valleys gives the relief a rolling character. In the hinterland agricultural activities are organized in dolines, whereas uncultivated areas are mostly overgrown with forest.

The southern part of the island is a highland area dominated by Baško polje, deeply cut into the mainland. This polje, used for agriculture, almost symmetrically divides the area in two parts. Karst plateaus at an altitude of 300–400 m, located on both sides of the Baško polje are used as pastures.

Lithologically, the island is build up of Cretaceous and Palaeogene carbonate rocks covered with Palaeogene siliciclastic flysch like rocks, terra rossa and weathered material (Šušnjar et al. 1970). Fissured carbonate rocks (folded and faulted by tectonic movements during Eocene (Blašković 1997)) exposed to the effect of climate and biological processes, were the basis for karst relief forming.

External destruction and accumulative processes gave the Island of Krk its final appearance. Material eroded from steep slopes accumulated in morphological depressions and on glaciis slopes (the base for the development of agricultural suitable soils) in the interior of the island, while the coastal line material was flushed or redistributed on the beaches by waves.

The analysis of demographic changes on the island was made using available data from CBS (2010). Continuous emigration and negative natural population movements after WW II resulted in a significant

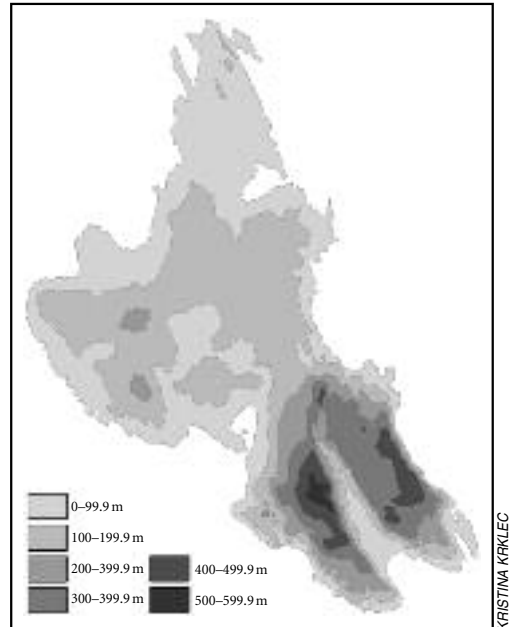


Figure 1: Hipsometric map of the Krk island.

reduction in the total population, so in the period from 1948 to 1971 the population decreased up to 25.9% (from 17,689 to 13,110 inhabitants). However, in the period from 1971 to 2001 an increase in population of 36.2% (17,860 inhabitants) was noted.

The dramatic decline in the share of agricultural population is reflected in the structure and use of agricultural land. During the period from 1975 to 2001 the total area of used agricultural land decreased from 40,917 ha to only 4335 ha (of which 94.5% is covered with forest and pastures). According to the register of agriculture from 2003 (CBS 2010), used area of agricultural land is further reduced to only 4102 ha. The average plot area of 0.48 ha indicates the extreme fragmentation of land, and thus profitability of production is highly questionable.

## 5 Results and discussion

Identified agricultural landscape typology displays a high level of structural complexity as a result of interaction of the described natural features and various land-use systems (agriculture, communications and settlements). They are characterized by small scale, clear structure (mostly defined by stone walls) and presence of natural vegetation. Although the criteria used as the basis of typology can be of different origin (natural-geographical, social-geographical, and other), in this case it is based on the elementary farming units, i.e. predominantly arable units (mostly in correlation with geological macro-forms). In accordance with the given criteria agricultural landscape types and sub-types were identified:

- Barren rocky landscape;
- Stone wall terraces (stone walled terraces; rectangular stone walled terraces; irregular stone walled terraces; and oval field terraces);
- Stone wall landscape (cultivated dolines; dolines – local term drmunns (forest plots) and tors (pasture plots); and landscape of regular stone walls at the karst plateau);
- Karst poljes (elongated parcelling in the direction of polje; regular parcelling; regular parcelling adapted to micro-relief; and karst poljes affected by overgrowth);
- Pasture landscape.

## 5.1 Agricultural landscape evaluation

The criteria for evaluation of agricultural landscapes on the island of Krk (Table 1) were defined according to relevant literature analysis (International Association for the Conservation of Nature 2010; Fowler 2003; Country Commission 1993; Ogrin 1996; Marušič and Jančič 1998; Bruns and Green 2001; Butula et. al 2009).

Table 1: Criteria for evaluation and attributed values of outstanding agricultural landscapes.

Criteria for agricultural landscape evaluation	Landscape types and attributed values					
	A.	B.	C.	D.	E.	F.
traditional land cultivation and adaptability to natural structure	5	5	5	5	5	5
symbolic, cultural and other associative values	5	5	5	5	4	4
highly valued visual experience	5	5	5	5	5	5
rarity	5	5	5	5	5	5
special values of their natural structure	5	5	5	5	4	5
significance for regional identity	5	5	5	5	4	5

Evaluation was carried out for all identified landscape types, but only those belonging to the category of outstanding are shown in Table 1 and due to their diverse characteristics and peculiarities, each outstanding landscape type (Figure 2) is described.

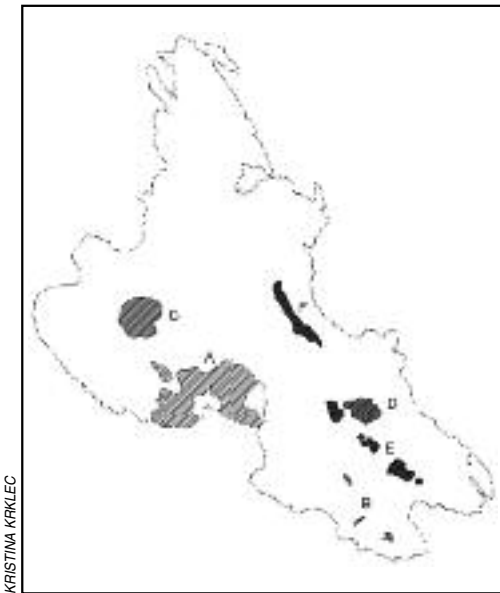


Figure 2: Outstanding agricultural landscapes on the Krk island.

A. Irregular stone walled terraces (Figure 3) are situated west from the town of Krk on a mild slope (0–2°). The basic units are irregular plots (mostly used for growing olives) fenced by stone walls. A high degree of interweaving is present between the landscape structure and the structure of the town of Krk (Figure 4), and results in an impressive reticular pattern (Aničić et al. 2004). Today this landscape is highly threatened due to the expansion of the town of Krk. Instead of the existing stone walls, roads and residential buildings are being built, thus resulting with the irreversible disappearance of this outstanding cultural landscape.



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Figure 3: Irregular stone walled terraces (detail – olive tree plantation).



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Figure 4: Plot structure surrounding the town of Krk.





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Figure 5: Oval field terraces near Stupo čelo.

B. Oval field terraces (Figure 5) are located in a SE part of Krk Island, south from Baška Valley. Plots are defined by stone walls and scarps forming irregular, oval units, sequenced into elongated, irregular forms. Even though situated in a very inaccessible part of the island, people still fenced those small plots of land and used them for agricultural production, which indicates the preciousness of water and soil. This is a highly recognizable landscape due to distinct plot arrangement particularly adapted to natural structures. Nowadays, inaccessibility and inability of mechanization use has led to their neglect.

C. Cultivated dolines are found on a karstic plateau in the western part of the island where numerous dolines appear. These enclosed karst depressions are usually circular or subcircular in plan form and vary in diameter from a few meters to even a hundred meters. Dolines on the Island of Krk are up to ten meters deep and the bottom is usually covered by residual debrites, sloping material and some soil adapted for agrarian use. Today, most of them are abandoned and left to the process of deterioration. Dolines are among the oldest surviving landscape artefacts. They represent an archaic form of land cultivation, and as such deserve the highest category of protection.

D. Dolines – drmuns (forest plots) and tors (pasture plots) (Figure 6) were developed on a plateau on the NE part of the island. Because of the flat topography, this area is exposed to a cold and dry winter bora wind (locally called the bura). To protect their animals against the strong wind, sun and storms,



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Figure 6: Dolines – drmuns and tors.



Figure 7: Landscape of regular dry stone walls.

cattle breeders fenced small forest and pasture plots to serve as shelter (Novosel Žic 1987). Basic units are round or moderately elongated in shape, occurring in various dimensions and their integration has resulted in complex structures with various recognizable patterns (Aničić et al. 2004). Outstanding characteristics of this landscape as well as the high degree of identity stem from adaptability to extreme natural conditions. Nowadays, abandoning of cattle breeding is causing overgrowth of these structures.

E. Landscape of regular stone walls at the karst plateau (Figure 7) is situated on a southern part of plateau on the NE part of the island. Soil particles washed out from adjacent areas were deposited, and a base for development of agriculturally suitable soils was formed. Its structure is limited by straight and single-row dry walls stretching horizontally and vertically to the contour lines, forming a regular, loose reticular pattern (Aničić et al. 2004) giving this part of the island a very distinct identity. Due to decreased agricultural usage, the succession process is visible.

F. Elongated parcelling in the direction of polje (Vrbničko polje) is formed in flysch-like beds, in the central part of Krk Island. It is positioned in NW-SE direction with a length of 5 kilometres and a width of up to 500 meters. This polje, surrounded with forest, is outstanding due to its fragmented elongated parcelling in the direction of polje (Figure 8). Presence of tree groups and soliterra contribute to plot pattern diversity and reflect traditional agriculture, thus creating a landscape with a high degree of identity.

## 5.2 Preservation and revitalization of outstanding agricultural landscapes

The tendency of preservation and protection of outstanding landscape values is fully recognized in the Europe. Although it is still not possible to establish their future development with certainty, it is possible to put forward assumptions based on various methodological approaches. Since the characteristics of agricultural landscape stem mainly from the way agricultural production operates, it can be said that the prospects of revitalization will depend on their production efficiency. Should the traditional landscape prove non-profitable, the trend of their degradation and devastation will continue (Makhzoumi 1997). Regardless of the model implemented in the future, it will probably not result in production competitive on a broad market. The entire production should be adapted to the needs of local inhabitants, with particular regard to tourists. Including local products (wine, olive oil, figs, sheep cheese and the like) in the



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Figure 8: Vrbičko polje – elongated parcelling in direction of polje.

tourist offer could contribute not only to the preservation of the agricultural landscape, but also to the economic development of the island.

The question of how to preserve the character of the rural landscape still remains. The process of physical planning should take into account the exceptional diversity of landscape structures in the EU emerging from differences in the environment and the historical development of European landscapes as well as the social processes in them (Jansen and Hetsen 1991). Therefore, it probably won't be possible to create a uniform spatial policy. Instead, it will be necessary to adapt it to the intricacies of any given area. There is obvious urgency in preventing the loss of cultural landscape by implementing a planning strategy which would define guidelines for sustainable landscape management (Antrop 2005; Pungetti 1995; Cudlinová et al. 1999; Jansen and Hetsen 1991). Actions for maintaining the existing landscapes are needed on all levels and should be taken by local, national and European authorities (Palang et al. 2006).

One of possible strategies for agricultural landscape preservation is the development of organic food production and sustainable development of cultural landscape (Makhzoumi 1997; Hietala-Koivu 1999). It is necessary to develop a strategy with differentiated protection zones (Vos and Meekes 1999), but there seems to be an agreement that »... *the best-maintained and most 'authentic' cultural landscapes should be protected and preserved as traditional agriculture systems* ...« (Austad in Antrop 2005) through the category of landscape museums (Ogrin 1996, Vos and Meekes 1999; Aničić and Perica 2003).

It can be concluded that the main problem for the survival of outstanding agricultural landscapes on the island of Krk is related to production profitability (which is questionable due to extreme plot fragmentation and inaccessibility in most cases). Most identified types of agricultural landscapes are structurally defined by dry stone walls, and therefore it is not desirable, and sometimes (due to very small area) not possible to change them without losing their character. Therefore, achieving profitable agricultural production most likely will not be possible, but it should become a part of tourist offer. The survival and further development of traditional agriculture, in this case, completely depends on government subsidies. Customizing the agriculture efficiency mainly refers to fields (in this case only Vrbičko polje). In order to show different possible structural changes of the agricultural landscape on the island of Krk, 3 development alternatives were considered.

## 6 Conclusion

Research has shown that the island of Krk has a rich and diverse landscape heritage with outstanding characteristics. The established development processes on the island, together with the spatial alterations they cause, are identical to such processes in other parts of Europe. Taking into account all the findings resulting from the research for this paper, a proposal for a strategy of the preservation of the valuable landscape heritage on the island of Krk has been formulated:

- Revitalization: agricultural production modernization that is based on the economic model of subsidized farming.
- Protection: outstanding agricultural landscapes should be maintained through regular procedures for cultural monuments with 100% subsidy.

Considering that a relatively large number of outstanding landscapes has been identified on the island of Krk, it is certain that many more could be found in the Croatian Littoral. It is possible to assume that some of these landscapes would be outstanding on a European and even global level. Despite their great cultural value, and considering that a significant part does not have the necessary profitability, the question of economic cost effectiveness comes up that is the justification of their conservation. In any case it is necessary to identify the heritage of agricultural landscapes in the Croatian Littoral and to develop a strategy for their conservation and management through spatial planning documentation. It should define not only the protection of agricultural landscapes but also the management of the entire landscape. Unless appropriate measures for the conservation of agricultural landscapes are formed and implemented in the immediate future, there is a likelihood that this exceptionally valuable cultural heritage will be irretrievably lost and with it a significant part of the national and even European identity. In any case the question if such large financial investments, needed for the conservation of agricultural landscapes in their authentic form, are justified because of their cultural, social and historical value or is their loss just a matter of time, still remains.

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## **Vrednotenje kulturne krajine in možnosti za prihodnji razvoj – študija primera na otoku Krku (Hrvaška)**

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**IZVLEČEK:** Kmetijska krajina, ki je posledica tradicionalne kmetijske rabe, je pomemben del kulturne dediščine na območju Sredozemlja. Sistematična študija inventarizacije in varovanja kulturne krajine v Republiki Hrvaški še ni bila opravljena, zato je glavni namen tega prispevka na podlagi študije primera (otok Krk), prikazati način vrednotenja kmetijske krajine ter opredelitve možnosti tako za njen prihodnji razvoj kot tudi varovanje. Izvedena je bila ocena vseh dvanajstih tipov kmetijske krajine in šest od njih je bilo opredeljenih kot izjemna kulturna krajina. Ob upoštevanju možnih strukturnih sprememb je bil oblikovan predlog strategije za ohranitev te dragocene kulturne dediščine na otoku Krk, kar je mogoče doseči tudi z modernizacijo kmetijske proizvodnje. To izjemno kmetijsko krajino, ki sicer ni kmetijsko donosna, ima pa veliko kulturno in zgodovinsko vrednost, je v celoti treba vzdrževati s pomočjo sredstev, ki so namenjeni kulturnim spomenikom (s 100% subvencijo).

**KLJUČNE BESEDE:** geografija, tradicionalno kmetijstvo, nasledstvo, oživljanje, varovanje, vrednotenje, otok Krk, Hrvaška, Sredozemlje

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## 1 Uvod

Različne stroke koncept kulturne (po)krajine razumejo različno (Jones, 2003), zato moramo potrebno poudariti, da se članek osredotoča zgolj na kmetijsko krajino. Stoletna tradicija kmetijske rabe je Sredozemlje najbolj zaznamovala.

Predpostavljamo, da nekatera območja kmetijske krajine na otoku Krku spadajo v kategorijo izjemnih krajin. Ogrin (1996) je izjemno krajino opredelil kot območje z visoko doživljajsko vrednostjo, ki odraža posebno strukturo in praviloma odraža sledeče elemente: izjemne kmetijske in poselitvene vzorce ter zadovoljivo prisotnost naravnih elementov. Kmetijska krajina ima velik pomen tudi pri oblikovanju narodne identitete.

Konec zadnjega stoletja so različni mednarodni mehanizmi in konvencije pozivale k inventarizaciji in varovanju krajine (Mediterranean Action Plan 2005; The European Landscape Convention 2000; Zimmermann 2006). Naveh (1993) je predlagal vzpostavitev t. i. Rdeče knjige (Red Book) kot enotnega registra ogroženih vrst na območju Sredozemlja. Čeprav ideja ni bila uresničena, pa je vzpodbudila številne analize primerov (Rossi in Vos 1993; Grove in Rackham 1993; Makhzoumi in Pungetti 1999; Pinto-Correira in Vos 2002; Naveh in Carmel 2003; Aranzabal et al. 2007; Vogiatzakis et al. 2008). Ena takšnih je tudi register 100 izjemnih kulturnih krajin, ki so bile opredeljene po vnaprej določenih kriterijih (Ogrin 1996).

Na Hrvaškem zaenkrat še ni bila izvedena sistematična študija inventarizacije in varovanja kulturne krajine, z izjemo nekaj študij primerov (Aničić et al. 2004; Aničić et al. 2007; Hrdalo et al. 2008; Butuła et al. 2009).

## 2 Problematika in cilji

Prepoznani procesi in spremembe v pokrajini preučevanega območja so primerljivi z ostalimi predeli v Evropi in so neposredna posledica družbeno ekonomskih razmer. Spremembe so v veliki meri povezane z usmeritvijo kmetijstva in se odražajo v intenzivnejši proizvodnji na rodovitnejših tleh ter v ekstenzivni proizvodnji na območjih z manj rodovitnimi tlemi (Jansen in Hetsen 1991; Bastian in Röder 1998; Vos in Meekes 1999; Antrop 2005; Serra et al. 2008; Urbanc 2008). Zmanjševanje kmetijske rabe je ena glavnih sprememb na otoku Krku v Jadranskem morju. Različne stopnje naravnih sukcesij je mogoče opazovati na celotnem otoku. Drugi vzroki za spremembe pa so urbanizacija, izboljšanje infrastrukture, povečano povpraševanje po rekreaciji, varovanje narave ipd. (Vos in Meekes 1999).

Glavni razlog za opuščanje kmetovanja je bila depopulacija, ki so jo povzročili družbeno ekonomski procesi po drugi svetovni vojni. Kmetijstvo je na otoku Krku zaposlovalo 78,4 % prebivalstva in je predstavljalo glavni vir dohodka vse do sredine 20. stoletja; leta 2001 je bilo na otoku le še 3,1 % prebivalstva zaposlenega v kmetijstvu (Hrvaški statistični urad 2010). Neposredna posledica emigracije in zmanjševanja kmetijske proizvodnje je bilo zanemarjanje in posledično izginjanje kmetijske kulture pokrajine. Danes število prebivalstva ponovno narašča, zlasti na račun razvoja turizma in z njim povezanih aktivnosti. Spremembe povezane z razvojem turizma lahko bistveno vplivajo na pokrajino otoka Krka zlasti ob pomanjkanju jasne strategije z razvojnimi usmeritvami varovanja in upravljanja v prihodnosti. Najboljša metoda varovanja je vključevanje segmenta kulturne pokrajine v prostorsko načrtovanje in samo dokumentacijo.

Glede na prepoznano problematiko so bili oblikovani sledeči cilji:

- Opredelitev strukture kmetijske pokrajine;
- Identifikacija izjemne kmetijske pokrajinske dediščine;
- Prepoznavanje razvojnih možnosti in varovanja izjemne kmetijske pokrajinske dediščine.

## 3 Gradiva in metode

Za doseganje zastavljenih ciljev je bila uporabljena metodologija iz leta 1993 (Counttryside Commission). Izvedena je bila evalvacija in opredelitev tipov kmetijske pokrajine z namenom določitve tistih z izjemno vrednostjo. Celotna baza podatkov (merilo 1 : 25.000) temelji na sledečih virih: topografske karte (merilo 1 : 25.000) (SGA 1997), osnovne geološke karte (merilo 1 : 100.000) (Šušnjar et al. 1970; Šikić et al. 1969;

Mamužič et al. 1969), pedološke karte (merilo 1:50.000) (Bogunović 1978) karte vegetacije (merilo 1:500.00) (Rechner 2002). Na osnovi topografskih kart so bile ločemo izdelane tematske karte reliefa, pogozdenosti, voda in delitve parcel/zemlje. Pokrajinske značilnosti temeljijo na posebnih strukturnih potezah, ki so pomembne pri identifikaciji originalne pokrajinske strukture (Aničič et al. 2004). Fotografije in topografske karte so bile uporabljene za ugotavljanje vzorcev kmetijske pokrajine in identificiranje njenih tipov, za kar je bilo uporabljeno prekrivanje tematskih kart. Ocenjevalni postopek smo uporabili za opredelitev izjemnih kulturnih pokrajin. Čeprav ne gre za povsem objektivni pristop, pa je pomemben za predhodno vzpostavitev kriterijev, na osnovi katerih je mogoče v celoti ponoviti proces, kar zagotavlja njegovo objektivnost (Hudoklin 1994). Kriteriji so tako najbolj cenjene poteze pokrajine (Ogrin 1996).

Po opredelitvi kriterijev je bila izvedena evalvacija krajine. Vsi krajinski tipi so bili ocenjeni od 1 (najnižja ocena) do 5 (najvišja ocena), in sicer za vsak kriterij posebej. Na podlagi vsote vrednosti je bila izdelana skupna ocena določenega pokrajinskega tipa. Evalvacijo smo izvedli avtorji prispevka.

Zadnja faza raziskave je bila namenjena možnostim bodočega obstoja izjemnih kmetijskih pokrajin, vključevala pa je analizo možnih strukturnih sprememb kot rezultata razvojnih alternativ (uspešija, revitalizacija in varovanje).

## 4 Območje preučevanja

Otok Krk leži v kvarnerskem zalivu in je z 405.22 km<sup>2</sup> drugi največji otok v Jadranskem morju (Duplančić et al. 2004). Morfološko ločimo tri različna območja (slika 1): severno, osrednje in južno (Novosel Žic 1987). Severni del otoka je uravnan in nadmorska višina ne presega 100 m (naklon površja 0–2°). Bližina krškega mostu, ki povezuje otok s celino, je pogojevala razvoj industrije. Osrednji del otoka je rahlo dvignjen (do 300 m n. v.; naklon površja 0–5°), zaznamuje ga razgiban relief. Hribovito površje, ki ga večinoma porašča gozd, dopolnjujejo doline, v katerih se je razvilo kmetijstvo. Južni del otoka je najvišji, zaznamuje pa ga Baško polje, ki je zarezano globoko v notranjost. Polje, ki skoraj simetrično deli območje na dva dela, je v celoti obdelano, kraška platoja na nadmorski višini 300–400 m pa sta namenjena pašništvu.

Otok gradijo kredne in paleogene karbonatne kamnine, ki jih prekrivajo paleogeni silikatni klastični sedimenti, podobni flišu, terra rossa in preperelina (Šušnjar et al. 1970). Na prertrih karbonatnih kamninah (nagubanih in prelomljenih zaradi eocenske tektonike) (Blašković 1997), izpostavljenih klimatskim in biološkim procesom so se razvile kraške reliefne oblike. Preperevanje in akumulacijski procesi so oblikovali sedanjo podobo površja otoka Krk. Gradivo je bilo erodirano s strmih pobočij in akumulirano v morfoloških depresijah ter na manj nagnjenih pobočjih (osnova za razvoj prsti) v notranjosti otoka, gradivo v obalnih predelih pa je bilo odnešeno in prerazporejeno po plažah s pomočjo morskih valov.

Analiza demografskih sprememb na otoku je bila izvedena na osnovi popisnih podatkov iz leta 2010. Nadaljevanje emigracije in negativni naravni prirast prebivalstva po drugi svetovni vojni se odraža v zmanjšanju števila prebivalstva, ki se je v obdobju 1948 in 1971 zmanjšalo za 259% (od 17.689 na 13.110 prebivalcev). Kljub temu je v obdobju 1971–2001 opazen porast števila prebivalstva za 36,2% (17.860 prebivalcev).

Močno zmanjšanje prebivalstva zaposlenega v kmetijstvu se odraža tako v strukturi kot tudi v kmetijski rabi zemlje. V obdobju 1975 do 2001 se je površina kmetijskih zemljišč zmanjšala s 40.917 ha na 4335 ha (od teh jih je 94,5% pokritih z gozdom in pašniki). Glede na podatke kmetijskega registra se je obseg kmetijskih zemljišč od leta 2003 dodatno zmanjšal na 4102 ha (CBS 2010). Povprečna velikost parcel je 0,48 ha, kar kaže na močno razdrobljenost zemljišč. Profitnost proizvodnje je zato zelo vprašljiva.

Slika 1. Hipsometrična karta otoka Krk.  
Glej angleški del prispevka.

## 5 Rezultati in razprava

Prepoznani tipi kmetijske pokrajine odražajo visoko stopnjo strukturne kompleksnosti, kot rezultata interakcije med opisanimi naravnimi elementi in različnimi sistemi rabe tal (kmetijstvo, infrastruktura, poselitev). Zanje je značilna jasna struktura, večinoma so ograjeni s kamnitimi zidovi, prisotna je naravna vegetacija. Čeprav imajo kriteriji, ki so bili izbrani kot osnova tipologije, lahko različen izvor (naravnogeografski in drugi), pa v našem primeru temeljijo na osnovnih kmetijskih enotah – npr. pretežno obdelovalne enote

(večinoma v korelaciji z geološkimi makro strukturami). Tipi in podtipi kmetijske pokrajine so bili tako identificirani v skladu s predstavljenimi kriteriji:

- Gola kamnita pokrajina;
- Terasa s kamnitimi zidovi (terase s kamnitimi zidovi; kvadratne terase s kamnitimi zidovi; terase nepravilnih oblik s kamnitimi zidovi; ovalne terase)
- Pokrajina s kamnitimi zidovi (obdelane vrtače; vrtače – lokalni izraz drmuni (površine z gozdom) in tori (pašne površine); pokrajina s pravilnimi kamnitimi zidovi na kraški planoti);
- Kraška polja (parcele v smeri polja; pravilna parcelacija; pravilna parcelacija prilagojena mikro reliefu; kraška polja v zaraščanju);
- Pašna pokrajina,

## 5.1 Vrednotenje kmetijske pokrajine

Kriteriji vrednotenja kmetijske pokrajine na otoku Krku (preglednica 1) so bili opredeljeni na osnovi analize relevantne literature (International Association for the Conservation of Nature 2010; Fowler 2003; Country Commission 1993; Ogrin 1996; Marušič in Jančič 1998; Bruns in Green 2001; Butula et. al 2009).

Preglednica 1. Kriteriji vrednotenja in pridružene vrednosti izjemnih kmetijskih pokrajin.

kriteriji vrednotenja kmetijske pokrajine	tipi kmetijske pokrajine in pridružene vrednosti					
	A	B	C	D	E	F
tradicionalno obdelovanje zemlje in prilagajanje naravnim razmeram	5	5	5	5	5	5
simbolne, kulturne in druge sorodne vrednote	5	5	5	5	4	4
visoko cenjena doživljajska vrednost	5	5	5	5	5	5
redkost	5	5	5	5	5	5
posebna vrednost naravnih struktur	5	5	5	5	4	5
pomen za regionalno identiteto	5	5	5	5	4	5

Vrednoteni so bili vsi prepoznani pokrajinski tipi, v preglednici 1 pa so prikazani le tisti, ki izkazujejo izjemnost. Glede na njihove raznolike značilnosti in posebnosti je opisan vsak tip izjemne kulturne pokrajine (slika 2).

Slika 2. Izjemne kmetijske pokrajine.  
Glej angleški del prispevka.

A. Terasa nepravilnih oblik s kamnito ograjo (slika 3) so zastopane zahodno od naselja Krk, na blagem pobočju (0–2°). Osnovne enote so nepravilno oblikovane površine (večinoma namenjene gojenju oljk) omejen s kamnitimi zidovi. Visoka stopnja prepletenosti se kaže med pokrajinsko strukturo in strukturo naselja Krk (slika 4); rezultat je impresiven reticular vzorec (Aničič et al. 2004). Danes ta pokrajinski tip ogroža širjenje naselja Krk. Obstoječe kamnite zidove so zamenjale ceste in stanovanjske hiše, kar pomeni nepovraten proces oz. izginjanje te izjemne kulturne pokrajine.

Slika 3. Terasa nepravilnih oblik s kamnitimi zidovi (detajl – oljčni nasad).  
Glej angleški del prispevka.

Slika 4. Parcelna struktura okrog naselja Krk.  
Glej angleški del prispevka.

B. Terasasta polja ovalnih oblik so tipična za jugovzhodni del otoka Krk, južno od doline Baške. Parcele omejujejo kamniti zidovi, ki oblikujejo nepravilne, ovalne enote, ki se nadaljujejo v podolžne, nepravilne oblike. Čeprav je območje na najbolj težko dostopnem delu otoka, so ljudje kljub temu omejevali parcele in jih uporabljali za kmetovanje, kar kaže na dragocenost vode in prsti. Gre za zelo prepoznavno pokrajino,

parcele pa so izjemno prilagojene naravnim razmeram. Danes sta slaba dostopnost in nemožnost rabe mehanizacije povzročila opuščanje kmetovanja na teh površinah.

C. Obdelane vrtače so značilne za kraško uravnava na zahodu otoka, kjer so vrtače številne. Te omejene kraške depresije so navadno okroglastih oblik z ravnim dnom premera od nekaj metrov pa vse do 100 metrov. Vrtače na otoku Krku so globoke do 10 m, dno pa je običajno prekrito s preperelino, pobočnim gradivom in prstjo ter so urejena za kmetijsko rabo. Danes je večina vrtač opuščanih, kljub temu pa spadajo med najstarejše pokrajinske elemente. Predstavljajo arhaično obliko obdelovanja zemlje in kot take zaslužijo najvišjo kategorijo varovanja.

Slika 5: Ovalne terasirana pokrajina pri vasi Stupo čelo.  
Glej angleški del prispevka.

D. Vrtače – drmuni (gozdne parcele) in tori (pašne parcele) (slika 6) so se razvile na uravnavi v severovzhodnem delu otoka. Zaradi ravnega površja je to območje izpostavljeno hladnemu in suhemu vetru, burji (lokalno ime bura). Pastirji so majhne pašne in gozdne parcele omejili tako, da so služile za zavetje živalim pred močnim vetrom (Novosel Žic 1987). Osnovne enote so okrogle oz. rahlo podolgovate oblike, različnih dimenzij. Rezultat njihove umeščenosti v pokrajini so kompleksne strukture z različnimi prepoznavnimi vzorci (Aničič et al. 2004). Izjemne karakteristike te pokrajine in visoka stopnja identitete kaže na prilagojenost ekstremnim naravnim pogojem. Danes se parcele zaradi opuščanja reje živine, zaraščajo.

Slika 6: Vrtače – drmuni in tori.  
Glej angleški del prispevka.

E. Pokrajina pravih kamnitih zidov na kraški uravnavi (slika 7) zavzema južni del uravnave v severovzhodnem delu otoka. Delci prsti iz zaledja so bili odloženi na tem območju, kar je bila osnova za razvoj prsti, primerne za kmetijstvo. Značilni so ravni suhi zidovi z eno vrsto, ki se raztezajo horizontalno in vertikalno na plastnice in tvorijo pravih loose reticular vzorec (Aničič et al. 2004), ki daje temu delu otoka zelo prepoznavno identiteto. Zaradi zmanjšane kmetijske rabe je opazen proces zaraščanja.

Slika 7: Pokrajina pravih suhih zidov.  
Glej angleški del prispevka.

F. Pramenaste parcele v smeri polja (Vrbničko polje) so nastale na flišu podobnih kamninah v osrednjem delu otoka Krk – Območje v smeri severozahod – jugovzhod je dolgo 5 kilometrov in široko do 500 metrov. Polje obdaja gozd, značilna pa so razdeljen pramenaste parcele v smeri polja. Prisotnost drevesnih vrst in soliterra so pripomogli k vzorcu parcel in odražajo tradicionalno kmetijsko rabo, z visoko stopnjo identitete.

Slika 8: Vrbničko polje – zemljiška razdelitev je usmerjena vzdolž polja.  
Glej angleški del prispevka.

## 5.2 Varovanje in revitalizacija izjemnih kmetijskih pokrajin

V Evropi je zelo prisotna težnja po varovanju in zavarovanju izjemnih pokrajinskih vrednot. Čeprav ni mogoče zanesljivo napovedati njihovega bodočega razvoja, pa ga je mogoče ob rabi različnih metodoloških pristopov predvideti. Značilnosti kmetijske pokrajine so večinoma odvisne od kmetijske rabe, lahko pa rečemo, da je revitalizacija odvisna od učinkovitosti proizvodnje. Če se tradicionalna pokrajina izkaže za ne profitno, se trend degradacije in opuščanja nadaljuje (Makhzoumi 1997). Ne glede na model, ki se bo uveljavil v prihodnosti, pa proizvodnja ne bo tržno uspešna. Celotna proizvodnja bi morala biti prilagojena potrebam lokalnega prebivalstva in turizma. Uvrščanje lokalnih proizvodov (vino, oljčno olje, fige, ovčji sir in drugo) v turistično ponudbo lahko prispeva ne le k ohranjanju kmetijske pokrajine, ampak tudi k ekonomskemu razvoju otoka.

Vprašanje kako varovati samo podeželsko pokrajino ostaja. Prostorsko načrtovanje mora vključevati izjemno diverzitetno pokrajinskih struktur v EU, ki je rezultat raznolikega okolja in zgodovinskega razvoja

evropske pokrajine, prav tako pa tudi družbenih procesov (Jansen in Hetsen 1991). Oblikovanje enotne prostorske politike najbrž ne bo mogoče, saj jo bo potrebno prilagajati specifičnim razmeram območij. Očitna je nujnost preprečevanja izgube kulturne pokrajine, pri čemer je pomembno udejanjanje načrtovalske strategije, ki bo vključevala usmeritve za trajnostno upravljanje pokrajine (Antrop 2005; Pungetti 1995; Cudlinová et al. 1999; Jansen in Hetsen 1991). Ukrepi za ohranjanje obstoječih pokrajin so potrebni na vseh nivojih – tako na lokalnem, nacionalnem kot tudi na evropskem (Palang et al. 2006).

Ena od možnih strategij ohranjanja kmetijske pokrajine je razvoj ekološke pridelave hrane in trajnostnega razvoja kulturne pokrajine (Makhzoumi 1997; Hietala-Koivu 1999). Potrebno je razviti strategijo z različnimi območji varovanja (Vos and Meekes 1999). Obstaja pa soglasje o najbolj ohranjenih in najbolj avtentičnih kulturnih pokrajinah, ki morajo biti varovane in ohranjene kot tradicionalni kmetijski sistemi (Austad in Antrop 2005) preko kategorije pokrajinskih muzejev (Ogrin 1996, Vos in Meekes 1999; Aničić in Perica 2003).

Lahko zaključimo, da je glavna težava pri preživetju izjemnih kmetijskih pokrajin na otoku Krku povezana s profitnostjo proizvodnje (slednja pa je vprašljiva zaradi velike razdeljenosti parcel in njihove slabe dostopnosti). Večina identificiranih tipov kmetijskih pokrajin je strukturno opredeljenih s suhimi zidovi, zato ni zaželeno, včasih pa niti ni možno (zaradi majhnih območij) njihovo spreminjanje brez izgube njihovih značilnosti. Prav zato doseganje profitne proizvodnje najbrž ne bo možno, lahko pa postane del turistične ponudbe. Preživetje in bodoči razvoj tradicionalnega kmetijstva je v tem primeru odvisno od državnih subvencij. Učinkovita kmetijska proizvodnja je vezana zgolj na polja (v tem primeru gre za Vrbeničko polje). Z namenom prikaza različnih možnih strukturnih sprememb v kmetijski pokrajini na otoku Krku so bile pretehtane tri razvojne alternative.

## 6 Sklep

Raziskava je pokazala, da ima otok Krk bogato in raznoliko pokrajinsko dediščino z izjemnimi značilnostmi. Potekajoči razvojni procesi na otoku, ki povzročajo tudi prostorske spremembe, so identični podobnim procesom v drugih delih Evrope. Ob upoštevanju vseh rezultatov raziskave je bil izdelan predlog strategije varovanja vredne pokrajinske dediščine na otoku Krku:

- revitalizacija: modernizacija kmetijske proizvodnje, ki temelji na ekonomskem modelu subvencioniranega kmetovanja;
- varovanje: izjemne kmetijske pokrajine naj se ohranjajo preko običajnih postopkov za kulturne spomenike s 100 % subvencijo;

Glede na to, da je bilo na otoku Krku identificiranih veliko izjemnih kmetijskih pokrajin, je dejstvo, da jih je še precej več zastopanih v drugih obalnih predelih Hrvaške. Mogoče je trditi, da so nekatere pokrajine izjemne tako z vidika Evrope kot tudi na svetovnem nivoju. Kljub njihovi veliki kulturni vrednosti je jasno, da ne dosegajo potrebne profitabilnosti, zato se zastavlja vprašanje ekonomske upravičenosti njihovega varovanja. V vsakem primeru je nujno potrebno identificirati dediščino kmetijskih pokrajin v hrvaškem obalnem območju in razviti strategijo njihovega varovanja ter upravljanja tudi v dokumentih prostorskega načrtovanja. V primeru, da ne bodo sprejeti in udejanjeni ustrezni ukrepi za varovanje kmetijskih pokrajin v bližnji prihodnosti, obstaja velika verjetnost izgube te izjemne kulturne dediščine s tem pa bo izgubljen pomemben del nacionalne in tudi evropske identitete. V vsakem primeru pa ostaja vprašanje ali so tako velike finančne investicije za ohranjanje kmetijskih pokrajin v njihovi avtentični obliki upravičene zaradi njihovih kulturnih, socialnih in zgodovinskih vrednosti ali pa je njihova izguba zgolj vprašanje časa.

## 7 Literatura

Glej angleški del prispevka.