

SUSTAINABLE AGRICULTURE AND LANDSCAPE PLANNING IN VOJVODINA

Jasna Piperski

Agricultural Faculty, Department of Water Mangment, Trg Dositeja Obradovica 8,
21000 Novi Sad, Serbia and Montenegro
Tel/Fax: +381(0) 21 455 713, E-mail: Jasna_piperski@yahoo.com

Abstract

Modern industrial agriculture is one of the major factors responsible for degrading the environment. A new approach that will lead to sustainable solutions is needed urgently. Vojvodina, the northern province of Serbia and Montenegro, is the biggest agricultural region in the state, and also one of the biggest in Europe. Vast areas of agricultural land are intersected by numerous canals and roads while native vegetation could be found only in patches. Intensive agricultural practice and landscape modifications, have resulted in degradation of soil, water resources, and overall biodiversity. For sustainable development of the region, ecological principles must be applied. Possibilities include planting trees as the windbelts and other sorts of vegetational barriers, river and canal restoration and designing of additional wetlands, as well as application of sustainable agricultural practice. This paper examines the possibilities of applying permaculture to the problems, and considering also the social aspects based upon deep ecology principles. In general, the paper demonstrates a holistic approach to the subject of landscape planning and management in order to achieve sustainability of the region for the future.

Introduction

From the time the first human communities had been formed until today, people have the same need for the clean water and the reach soil, that can produce abundance of food. As human population, during milenia and centuries, has becoming more and more numerous, human needs has diversified over time. In order to satisfy not only basic needs but also some extravagant ones overexploitation of natural resources was inevitable, together with degradation and pollution of nature, restricting further development. Contemporary state-of-the-art is often defined as global ecological crisis, and its main cause, claimed by the deep ecology supporters, is dominant antropocentric view of the world. During past decade intensive efforts were made in order to overcome mentioned crisis. The shift has been made by defining the concept of sustainable development during the II UN Conference in 1992. in Rio de Jeneiro. Implementation of the mentioned principle into all aspects of human activity will be the main goal in the future (4).

Agriculture still plays the essential role in our survival, but at the same time it is one of the activities that exerts the negative effects on nature, causing degradation of available natural resources of soil, water and biodiversity. Since the depletion of arable land is increasing, in future for sustainable agriculture proper landscape planning will be neccesary in order to achieve sustainability. Vojvodina, the northern province of Serbia and Montenegro suffers from all of the mentioned indicators of ecological crisis. The paper examines application of the new approaches in landscape planning, based upon ecological principles, together with sustainable agricultural.

Sustainability and Landscape planning

General aim in landscape planning is to shape landscape in a way that would represent the best possible solution for fulfilling contemporary needs. Therefore, it follows trends, which are being changing regarding to dominant doctrines. The consequences of contemporary ecological crisis strengthened the belief that the available space, as well as the natural resources, are limited. In accordance with the mentioned fact modern landscape planning has to satisfied sustainability concept gathering following points:

- ecological sustainability
- economic sustainability
- social sustainability.

The main goal in landscape planning of an agricultural region such as Vojvodina is to enable optimal conditions for growing of a variety of (cultivated plants) agricultural crops. Therefore, characteristics of natural environment often must be modified by using different techniques. It is essential that the approach used for designing specific agricultural landscape has to be integral, rather than partial, because the problems in landscape planning of rural region are complex and depend on landscape, climate, soil properties, and social aspects.

Permaculture approach, meaning permanent culture or permanent agriculture, has a lot of useful tools to offer as it is focused on sustainable living: providing (producing) food, and shelter (settlements) for people, in a way that will not harm the natural environment but opposite, to contribute to its richness and development. The main ideas of permaculture could be summed up in these ethical statements: Earth care people care and fare share (7). First step of landscape planning in the Province of Vojvodina, where permaculture approach is applied, is careful observation of relief, existing resources and living conditions. The region lies on the southern part of Great Hungarian Plain. The main features are plain relief, 97% is lower than 200m above the sea level, with only two higher parts – low mountains: Fruška Gora and Vršачki Breg. The area of more than 2 000 000 ha is intersected by dense hydrographic network which consists of big rivers, smaller rivers their tributaries, and drainage canals. The amount of precipitation satisfies the needs for growing of most crops, but their unequal distribution over year could cause draughts, or sometimes flooding. Mentioned characteristics together with the fact that arable land covers 76,62% of its territory, and 43,42% of the whole territory is the most productive type of the soil chernozem (5), made Vojvodina the leading agricultural region in the state. The rapid development of agriculture (industrial agricultural practice) after World War II contributed to serious depletion and degradation of wildlife since most of the territory is being used for crop production or for pasture (above 83%), while only a small part, a little bit more than 1%, of wildlife and native ecosystems is being preserved within protected areas (5,2). Therefore, it is evident that agriculture has the biggest impact to the environment of the region.

Problems of landscape planning in Vojvodina

Rigid technical and anthropocentric approach has been dominating in landscape planning in the past and unfortunately it is still the case. Maximization of crop production was the most important goal, in the past decades, which was achieved by turning as many natural ecosystems as possible into productive land. Land consolidation of the region has been conducted partially. That is why in most of municipalities, size, shape and ownership of allotments and distribution of transportation network has not been arranged properly.

The main problem in the region is decreasing of arable land and degradation of soil and water resources. It is estimated that each year 1200ha of productive arable land (5) is being used for the purpose of building of new infrastructures and suburbs, although the Law of landscape planning of Republic of Serbia 13/96 states "strict restriction of using arable land of I - IV categories in the purpose that is not agricultural, and protecting and preservation of soil fertility." The only way for proper regulation of the mentioned problems lies in integral and adequate land consolidation, that has to include following:

- flood control and regulation of river banks,
- maintaining optimal water–air regime in soil by designing of drainage or irrigational canals,
- grouping of allotments according to ownership,
- rational designing of (appropriate) transportational network, that can satisfy the need for the better use of modern mechanization and equipment, the measure can also contribute to formation of allotments to desired rectangular shape,
- planning of areas that should be reclaimed by using appropriate methods (e.g. for desalinization) or additives (of chemical or organic origin).

Land consolidation performed up to now resulted in obtaining more than 1 000 000 ha of arable land by digging Danube-Tisa-Danube canal network that helped in maintaining optimal water regime. Although, new canals are responsible for the loss of 2-4% of land (1), benefits obtained by the measure are numerous. While drainage system functions good, exploitation of water for the purposes of irrigation is not satisfying, because only 4% of available ground water has been used. From the whole amount of water in the region, 26% is used for productive purposes, comparing to 74% used for dilution of waste water (5). Quantity of water in the region does not represent a problem, but attention has to be paid on its quality. Problems may occur when inappropriate water is used for irrigation resulting in degradation of soil quality. In general the territory is well supplied by the water concerning the issue. According to different classifications 69.3-51.2% is of available water is suitable for irrigation, 37,5-29,4% of water is suitable under certain conditions, while 26,6-1,3% is no suitable at all (8).

Preserving of natural resources and sustainable agriculture in Vojvodina

Main feature of the landscape are vast plain areas of arable land. Lack of windbelts and shelterbelts between allotments, along roads or canals represents a serious problem, because the bare land, left after harvesting of crops, is exposed to wind erosion. It is estimated that each year due to the wind 2 500 000 t of top soil is being drifted away (6). Present state-of-the-art in Vojvodina shows that only 6 -7 % of whole territory has been forested. The situation is aggravated because forests are grouped into 4-5 large complexes (taking 90% of overall forests), while only 10% has been scattered within vast areas of arable land. At the other side there are areas of more than 500000 ha where trees cover only 1% (3). In order to reach optimal forested areas of 14,32%, area of 308 035 ha has to be planted with trees. Biggest areas under forests can be found in the district of Srem - 16,75%, where only new 18,28% is necessary to be planted with trees. At the other side the most alarming situation is in the north Banat where only 2,28% is forested. For sustainable agriculture in this part an increase of 475% is required (9).

According to the Law of landscape planning until the year of 2010. 3,9% of new forested areas are planned. The measure will result in an increase of overall forested area up to 10,7%. Planting trees in forms of windbelts and shelterbelts would decrease arable land, but it would also, in a large extent, contribute and support sustainability of crop production, by improving microclimatic conditions, e.g. humidity, and protect from wind. Especially, useful will be planting of native vegetation along canals, that will both reduce erosion of river banks, and retain surplus of nutrients from the soil.

Conclusion

In order to enable sustainable use of natural resources in future in the Province of Vojvodina there is an urgent need for applying ecologically based landscape planning. Holistic approach is an essential part in the process of examining this complex problem and finding the best solutions. This means that the new model has to satisfy the requests for preserving integrity of arable land, as well as quality of available water and soil resources, and enriching

biodiversity. In the new struggle for sustainability, economical and social aspects of the problem have to be solved at the first place, if there is an intention for solving the problem right from its root. This would include optimisation of food production systems and sustainable settlements – revitalisation of villages and local economies and other measures that would contribute to preserving of cultural heritage. According to the mentioned, most important issues concerning sustainable landscape planning in Vojvodina could be summed up in following points:

- conducting of land reclamation measures where necessary,
- preserving the integrity of arable land (planning of infrastructure and buildings on soil with poor properties, with careful calculation of optimal density of traffic network),
- planting windbelts and other vegetational structures, and reaching the minimum of 14% of forested area,
- applying of natural restoration of canals and rivers, as well as designing of new wetlands,
- developing ecological awareness by means of ecological education is inevitable if the goal is long-term sustainability.

References

- 1) Damjanović T., Benka P. Uređenje zemljišne teritorije Vojvodine sa gledišta hidromelioracija i zaštite sredine, In: Hidrotehničke melioracije u Vojvodini, monografija, poglavlje VII, Poljoprivredni fakultet, Institut za uređenje voda, str.169-185., Novi Sad, Yugoslavia, (1995)
- 2) Institute for Protection of Nature of Serbia, <http://www.natureprotection.org.yu/english/parks.php>, (23 Aug. 2003).
- 3) Marković J., Tatalović I. Značaj i uloga vanšumskog zelenila na prostorima Vojvodine Eko-konferencija `95, Ekološki pokret grada Novog Sada, str. 305-314., Novi Sad, Yugoslavia, (1995)
- 4) Piperski, J. Belić, S. Deep ecology – An Alternative Way to Sustainable Use of Water Resources, 6th World Congress on Integrated Resources Management, Geneva, Switzerland, (February 12-15, 2002)
- 5) Romelić J., Lazić. L. Poljoprivreda In: Regionalni atlas Vojvodine, Univerzitet u Novom Sadu, Prirodno-matematički fakultet, Institut za geografije, str. 1-20., Novi Sad, (2000)
- 6) Savić R., Letić, Lj. Božinović M. Eolska erozija na obradivom zemljištu, Letopis naučnih radova, Vol 26, No 1, Poljoprivredni fakultet, str. 60-66., Novi Sad, (2002)
- 7) SEED International, http://www.permaculture.au.com/SEED_Int.html, (23 Aug. 2003).
- 8) Škorić M., et al. Navodnjavanje u Vojvodini, In: Hidrotehničke melioracije u Vojvodini, monografija, poglavlje VI, Navodnjavanje u Vojvodini, Institut za uređenje voda, Poljoprivredni Fakultet, str.125 – 163., Novi Sad, (1995)
- 9) Vlatković S. Optimalna šumovitost Vojvodine u funkciji zaštite zemljišta, "Uređenje, korišćenje i očuvanje zemljišta", IX kongres Jugoslovenskog društva za proučavanje zemljišta, str. 678-683., Novi Sad, (1997)