The state of alley cropping and windbreak systems in Croatia

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Introduction

As part of the ERASMUS+ project „Agroforestry practices in West Balkan: weaknesses and strengths – AGFORWEB" we investigated the scope of agroforestry practices in Croatia. Most of the agroforestry practices in Croatia refer to silvopastoral systems while silvoarable agroforestry is poorly represented. The state of silvoarable agroforestry refers mainly to devastated windbreak systems in the Mediterranean part of Croatia and some experimental sites in the continental part (picture 1).

The objective of this abstract is to overview the existing situation regarding the silvoarable practices in Croatia.

Methodology

The investigation was conducted by reviewing papers and summarizing the information on silvoarable practices from publications but also personal communications.

Results

Silvoarable practices in Croatia are extremely rare as well as publications containing examples of silvoarable practices in Croatia. Most of it refers to windbreak systems in the Mediterranean part of Croatia (Tomašević, 1996; Ljubenkov, 2012; Kisić, 2017; Barčić et al., 2021). Winds in the coastal part of Croatia often can reach up to 100km/h, mainly during the winter months, which can result in soil degradation due to wind erosion (Ljubenkov, 2012). Large agricultural areas in Mediterranean Croatia are affected by it and as an instrument of protection, windbreak systems with trees have been established. The most common examples are "Čepić Polje" in Istria and "Sinjsko polje" in Dalmatia (Ljubenkov, 2012; Kisić et al. 2013; Kisić, 2017). Sinjsko polje is an arable area of 6190 ha where winds during winter are between 60-100km/h. Between 1950 and 1970 around 42000 poplar trees were planted in windbreak systems that stretched throughout 140 km of protective belts. In 1989 only 18000 trees remained which were further devastated in the last 30 yr. (Ljubenkov, 2012). Windbreak systems in Croatia have been neglected and today they provide poor protection from wind. There is a need to revitalize these windbreak systems and to consider using more appropriate tree species than poplar (Populus spp.). In windbreak systems of Mediterranean Croatia, mostly poplars are used however during winter months they provide poor protection. Coniferous species such as Cupressus spp. would provide protection all year round and as such are more appropriate in coastal Croatia.

At the Faculty of Agrobiotechnical Sciences Osijek field trials of alley cropping systems with tree rows of short rotation coppice (SRC) have been established (picture 1.). The alleys between tree lines are 24m wide and within the alleys, microclimatic parameters such as temperature, humidity, wind direction, and wind strength are observed. These experimental sites serve as a baseline for the future possibility of using SRC in an agricultural field. As of 2019 establishing SRC stands on poor agricultural soils is supported by governmental subsidies. This financial support can result in an increase of SRC stands in Croatia. The field trial aims to investigate the full potential of such stands. However, since it was established only a few years ago the effect of this system on soil improvement is not visible yet. It is expected that soil improvement will occur after 10-20 years of practicing alley cropping. Crop yields are not expected to change much as the tree lines are quite far from each other and the trees are managed in short rotation. The yields of trees might provide some additional income. During this period the economic aspects will be evaluated as well.

Conclusion

Silvoarable systems in Croatia are scarce although there is a huge demand for wind protection in the coastal part of Croatia. The state of windbreak systems in that area is devastated. With new agricultural policies where some forms of agroforestry systems have been subsidized there is a potential to revitalize the devastated windbreak systems but also establish new alley cropping systems in continental parts of Croatia where the necessity is soil improvement as well as production diversification.

Keywords
alley cropping, crop production, Eastern Europe, soil improvement, erosion phenomena

Aditional Attachment II.

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