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## The role of Agroforestry Innovation Networks in rural development of the Eastern-European Region

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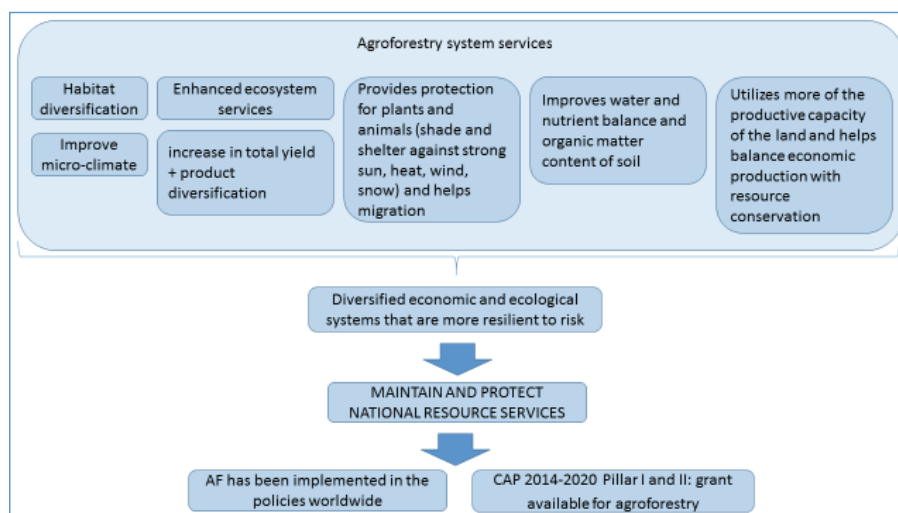
**Abstract:** Agroforestry systems can increase resource efficiency, enhance productivity and improve the overall resilience of agro-ecosystems. The potential of agroforestry to contribute to sustainable rural development has been recognised in research and political circles, but still there are several obstacles for the implementation of these systems. National innovation networks have an important role in promoting land use best practices. In recent years, eastern European countries have gained the possibility to contribute to the research and development activities of the European agroforestry community. As a result, the first national agroforestry innovation networks have been established in the region. The paper introduces good examples of such initiatives in Eastern Europe.

**Keywords:** agroforestry, innovation, rural development, network

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Agroforestry is the land use practice of integrating woody vegetation with crops and/or livestock systems to optimise the benefits from their ecological and economic interactions. As a multi-purpose mixed and integrated system, agroforestry has thousands of types with different combinations of woody, herbaceous and animal components, adapted to local conditions. Furthermore, agroforestry practices may both spatially and temporally (Mosquera-Losada et al., 2016).

Tzilivakis et al. (2015) compared the ecological benefits of eighteen of the Ecological Focus Area (EFA) elements<sup>1</sup> and found agroforestry highest in almost all countries surveyed. In total, 22 mitigation actions were assessed in a meta-review of mainstreaming climate action in the Common Agricultural Policy (CAP) by Martineau et al. (2016), who concluded that agroforestry is among the mitigation actions having the greatest potential. Also new results from the SOLMACC<sup>2</sup> project (Guttinger, 2016) show that it is possible to reduce greenhouse gas emissions (GHG) from agricultural practices such as agroforestry, improved on farm nutrient recycling, or improved crop rotation and among these agroforestry had the highest record in GHG savings.



**Figure 1. Agroforestry system services support the development and climate adaptation of rural areas**

Source: not stated.

<sup>1</sup> An Ecological Focus Area (EFA) is an area of land upon which agricultural practices that are beneficial for the climate and the environment are carried out by using six EFA options on their own or in combination: fallow land, buffer strips, field margins, catch crops, green cover, nitrogen-fixing crops.

<sup>2</sup> SOLMACC (Strategies for organic and low-input farming to mitigate and adapt to climate change; <http://solmacc.eu/>) is a LIFE-co-funded project that runs from 2013 to 2018.

The European Union (EU) Framework 5 research project Silvoarable Agroforestry for Europe (SAFE) used field experiments and modelling to show that agroforestry could increase land resource use efficiency by up to 40 per cent relative to 'standard' monoculture arable or monoculture woodland systems (Dupraz et al., 2005). The introduction of agroforestry practices can greatly contribute to increasing the sustainability of farming and diversifying production (e.g. fruits, woody biomass, fibres), making farms more resilient to market changes and more profitable.

All these aspects are key to recognising the important role that agroforestry has to play as a technique for mitigation and adaptation of rural areas to climate change (Figure 1). To reach the goals of maintaining and protecting national resource services may be possible through agroforestry programmes carried out in cooperation with rural populations (Szedlák, 1993). Stakeholder networks have an important role as catalysers in this process.

### **State of agroforestry in Eastern Europe**

Agroforestry is a traditional land use practice across Europe, but still there is limited information available on the extent of agroforestry in the Central-Eastern region, especially as regards the modern practices. Recent studies (Hartel and Plieninger, 2014; den Herder et al., 2016) imply that agroforestry – both in traditional and modern forms – might be present to a notable extent in the landscape of this region.

According to the study of Kachova and Mosquera-Losada (2015) on the state of agroforestry in Bulgaria, particular focus has been placed on the creation of agroforestry systems, in relation to the energy crisis, the recent increase of prices of conventional fuels as well as with regard to climate change. Successful forms of implementation of agricultural use in plantations, protective forest belts, forest-grassland complexes and specialised plantations of fast growing tree species are known. Also, high value fruit bearing trees such as ordinary walnut, hazel, almond and wild cherry, among others, are cultivated in plantations. The development of the forest farming is particularly suitable and promising in Bulgaria.

In Romania, large areas of wood pasture can be found in Southern Transylvania. These were created by the grazing of closed oak woodlands and they are considered to have high cultural and natural value due to the presence of the ancient oak trees. These dynamic systems derived from previously closed woodlands during the past two centuries due to the increasing demand for timber and agricultural products. (Hartel, 2014).

Agroforestry practices have also been traditionally used in the Czech Republic. Concerning the situation of agroforestry in this country, the literature is inconsistent. Krcmarova et al. (2016) state that agroforestry in the Czech

Republic has vanished both from the landscape and public conscience, while according to Zelba et al. (2016) a significant area of traditional farming systems combining trees (mainly traditional fruits) and agricultural crops is still remaining with small-holders in the Czech Republic.

In Poland, experts have recognised and evaluated diverse services and products offered by woody patches and belts in agricultural areas, particularly soil protection, water balance improvement and biodiversity enhancement functions or amenity values. The extensive studies on these aspects are supportive of the environmental policy in terms of protecting trees in the agricultural landscape, however current legislation considers merely natural protection of individual trees, thereby blocks development of agroforestry systems within farms. Despite this, agroforestry systems have come to be incorporated in farms, especially on pastures and hilly areas, some farmers introduce also hedges in their fields. Recently, therefore a strong national cooperation of foresters and agronomists has started to promote agroforestry nationwide (Borek, 2015).

**Table 1. Resources allocated to measure 222 in the 2007-2013 EU rural development programming period and actual expenditure**

Country	Region	Resources (EUR)	Realised expenditure (EUR)	Expenditure/planned %
Belgium	Flanders	500,000	11,752	2.4
	Total	500,000	11,752	2.4
UK	Northern Ireland	96,610	0	
	Total	96,610	0	0.0
France	Hexagon	2,852,202	101,138	
	Guadeloupe	326,000	0	
	Guyane	50,000	0	
	Total	3,228,202	101,138	3.1
Hungary	Total	2,813,540	720,574	25.6
Italy	Marche	1,270,000	0	
	Veneto	30,000	9,797	
	Total	1,300,000	9,797	0.8
Portugal	Mainland	6,644,519	102,827	
	Azores	160,000	0	
	Total	6,804,519	102,827	1.5
Total EU-27		14,742,871	946,088	6.4

Source: not stated.

In Hungary, agroforestry was a widespread technology of land use but has been declined and disappeared from large areas of the Hungarian countryside in recent decades. Nowadays, with the exception of forest belts (16,000 ha) and traditional silvopastoral systems (5,500 ha), agroforestry technologies are not widely used in Hungary (Takács and Frank, 2008; Vityi et al., 2015). Other arable agroforestry systems such as alley cropping and forest garden – considered as new (atypical) land use practices in Hungary – exist mostly on small

farms or newly-established pilot systems for educational and/or experimental purposes (Vityi, 2014). In Hungary the high share of agricultural territories (57 per cent) (KSH, 2016) and of the agro-environmentally sensitive and/or 'triple-risky' areas (floods, droughts, inland waters) demonstrates the strong need for development in climate-adaptive agro-technologies. The use of arable agroforestry systems or re-adaptation of traditional ones could become a new pathway for realising more resilient and sustainable agricultural production (Vityi and Marosvölgyi, 2013). In the 2007-2013 rural development programming period, Hungary was the only country in Central Europe to implement the EU Measure 222 (First Establishment of Agroforestry on Agricultural Land) with the aim of maintaining a sustainable land management and facilitate protection of soils against erosion (Szedlák, 2006) (Table 1).

Still in Central and Eastern Europe, particularly in Romania, Bulgaria and Poland, a significant share of agroforestry areas is related to diversified land cover use on agricultural holdings with highly fragmented structures, within arable as well grassland areas. This implies that a significant share of rural areas in these countries can be considered as traditional agroforestry at the landscape scale.

### Examples to follow: Agroforestry Innovation Networks

During 2014, an European participative research and development network was established to focus on different types of European agroforestry systems within the frame of the AGFORWARD project<sup>3</sup>. This international network comprises 12 national arable agroforestry stakeholder groups, 8 stakeholder groups dealing with agroforestry systems for livestock and 10 stakeholder groups of agroforestry systems that are recognised for their high natural and cultural value. The stakeholder groups include farmers, breeders, foresters, landowners, representatives of regional and national associations, agricultural service companies, extension services, nature-related NGOs, local action groups, policy makers and scientists. The facilitators of these groups synthesised their results to identify key areas on which to focus research and development in the coming years (Mirck et al., 2014; Hermansen et al., 2015; Moreno et al., 2015).

In cooperation with the national associations, the network of agroforestry stakeholders is continuously growing throughout Europe<sup>4</sup>. Development of successful agroforestry systems and knowledge share are common attributes of these groups which are framed by the AGFORWARD project and the European

<sup>3</sup> AGFORWARD (AGroFORestry that Will Advance Rural Development; <http://agforward.eu/index.php/en/>) is a four-year research project funded by the European Union's Seventh Framework Programme for Research and Technological Development. The project involves two international institutions and over 23 universities, research and farming organisations from across Europe.

<sup>4</sup> European Map of National Agroforestry Associations. AGFORWARD project. <https://www.agforward.eu/index.php/hu/associations.html>

Agroforestry Federation (EURagroforestry). In recent years, more and more Central-Eastern-European countries (e.g. Czech Republic, Romania, Poland, Bulgaria and Hungary) have gained the possibility to contribute to the activities of this community. As a result, agroforestry innovation networks in Hungary and Poland have been established in the Eastern European region in 2014.

The Hungarian Agroforestry Network was established with more than 70 stakeholders. The Cooperational Research Centre of the University of Sopron has a leading role within the network. The members are farmers, extension services, related NGOs, Local Action Groups, policy makers and scientists. The scope of activity ranges from organising national and international forums to share knowledge and experiences to representation of interests and catalysing common innovations (Vityi, 2014). Regular meetings, conference attendance, consultations and participatory work with farmers ensure the fastest way of knowledge exchange, instant feedbacks for policy development and opportunities for farmers to realise common ideas together with other stakeholders. As result of the network's activity the number and total area of agroforestry systems has increased, the Hungarian Agroforestry Civil Association has been created and joined the organisation of EURagroforestry, and agroforestry has been more integrated into the research and educational programme of the University of West Hungary Faculty of Forestry.

The Polish Agroforestry Innovation Network is based mainly on cooperation between foresters, agronomists and ecologists, initiated by present members of Polish Agroforestry Association (OSA). The group has the ambition to develop agroforestry systems in Poland, cooperating with farmers and advisors and participating in consultative meetings at governmental level, particularly the Ministry of Agriculture and Rural Development. Presently, the main Polish research unit engaged in agroforestry activities is the Institute of Soil Science and Plant Cultivation – State Research Institute in Puławy, a unit conducting numerous interdisciplinary studies in the framework of policies on sustainable agriculture, involving farmers and advisors from across the country. An important role in dissemination of innovative agricultural ideas is played by the public network of agricultural advisors, managed by Agricultural Advisory Centre at Brwinów, responsible for dissemination and knowledge exchange through a network of Agricultural Provincial Advisory Centres. The unit is the core of the National Network of Innovations in Agriculture as a part of EIP-Agri. Agricultural universities and other agricultural state research institutes are relevant stakeholders.

Bulgaria and Romania are among the agroforestry 'hot-spots' in Europe (Burgess, 2016). Romania has a significant area of wood-pasture systems in southern Transylvania. In this country, ADEPT<sup>5</sup> has a significant role in hel-

<sup>5</sup> Fundatia ADEPT Transilvania is a landscape stewardship NGO, aims at protecting the nature-rich, farmed landscapes of Transylvania, and supporting the traditional farming communities who have created them over centuries and who maintain them today.

ping farmers to work together and organising the national agroforestry stakeholder network. As a result of their activity, the importance of protecting wood pastures with high natural and cultural values and assuring their sustainability is gaining recognition and starting to receive support from political, institutional and NGO levels (Hartel, 2014).

In Bulgaria, traditional sylvopastoral systems, shelterbelts and alley cropping are the most common types of agroforestry. Though the current conditions are favourable for the development of agroforestry due to the socio-economic incentives and environmental necessities, it is not very familiar to stakeholders as a scientific theory or as practice, therefore Stancheva et al., (2007) highlight the importance of wide-scale popularisation of agroforestry, a comprehensive research and educational programme, and supportive governmental policy. The role of catalyst has been taken by the Agroforestry Centre which is aiming at the development of a national structure for agroforestry research and education, as well as to build the network of agroforestry practitioners. Kachova et al. (2016) explain that although the successful implementation of agroforestry systems in forestry and agriculture is known both for science and practice and there are also “legal basis and political understanding for promoting these types of systems” based on their ecological and social benefits, the entire concept and strategy of supporting the development of agroforestry in Bulgaria is still missing.

In the Czech Republic the availability of new studies on the extension of agroforestry practices in the country shows that the ecological, cultural, socio-economic and historical value of agroforestry and its important role in rural development is starting to be recognised.

The existing national networks and initiatives serve as potential bases for LEADER Local Action Groups, National Operational Groups and other participatory research co-operations as well as providing professional and practical support for decision making, thus playing a significant role in rural development in this region.

## **Recent options for agroforestry in the Rural Development Programmes**

In the 2014-2020 EU programming period, grants are available for agroforestry within Pillar 1 and Pillar 2. In Pillar 2, grants are available for establishment of new agroforestry systems on either agricultural or forest land. Private land holders, municipalities and their associations may be beneficiaries of this support. The main instrument for new agroforestry systems on agricultural land is submeasure 8.2. If the RDPs are fully implemented, the total area of newly established agroforestry in Europe will reach 74,000 ha. Submeasure 8.2. has been activated only by Hungary out of the surveyed Eastern-European countries (Lawson et al., 2016). At the moment, financial support for esta-

blishment and maintenance of sylvopastoral and shelterbelt systems is available in Hungary<sup>6</sup>. In addition to submeasure 8.2, funding to assist agroforestry is available under other measures and submeasures related to, among others, Operational Groups, advisory services or climate adaptive land use practices of lower production risk and higher environmental benefits. Pillar 1 grants are also available for agroforestry, but in practice the uptake is limited. It is derived from the uncertainty over whether the area remains eligible for Pillar I direct payments<sup>7</sup>. For newly-established EFAs, grants for agroforestry are only eligible if the EFA is established on arable land and within a Pillar 2 scheme (Lawson et al., 2016).

The potential of agroforestry to contribute to sustainable development has been recognised in international policy meetings, including the United Nations Framework Convention on Climate Change (and the Convention on Biological Diversity, justifying increased investment in its development (Buttoud, 2013). Therefore, it is regrettable that most of the surveyed countries in the region did not activate measure 8.2. and the agroforestry EFA. However, this is not an obstacle for funding agroforestry system establishment from other relevant measures and submeasures and even more underlines the important role of agroforestry networks in formulating stakeholder groups to promote innovative land use practices in rural areas.

## Conclusion

The results of recent studies and achievements of the European agroforestry networks show that agroforestry has high potential in the ecological, economic and social improvement of rural areas. Agroforestry is one of the most recognised practices to fight against climate change and an effective tool for climate adaptation of agriculture. Thus, networks promoting agroforestry strongly contribute to the sustainable and climate adaptive development of rural areas. Despite the fact that agroforestry has a tradition in all European countries, agroforestry networks are less developed in the Eastern European region. Also CAP instruments for new agroforestry systems are more poorly implemented compared to the rest of Europe.

The discussion on the post-2020 CAP reform should take into consideration the necessity of evaluation of all the benefits of land use practices and systems. Current and future implementation of Rural Development Plans should better encourage the use of beneficial agricultural practices such as agroforestry. National stakeholder networks have a key role in promoting innovative land use practices in rural areas, therefore following already operating examples would accelerate rural development in the Eastern European region.

<sup>6</sup> According to the National Rural Development Plan of Hungary.

<sup>7</sup> Also called in Member States as Basic Payment Scheme – BPS, or Single Area Payment Scheme – SAPS.

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