

# IDENTIFYING BOTTLENECKS AND GATEWAYS FOR AGROFORESTRY DEVELOPMENT IN POLAND

Borek R<sup>1\*</sup>, Gałczyńska M<sup>1</sup>

(1) Department of Bioeconomy and Systems Analysis, Institute of Soil Science and Plant Cultivation - State Research Institute, Pulawy, Poland

\*Corresponding author: rborek@iung.pulawy.pl

## Abstract

The paper presents results from the Regional Agroforestry Innovation Network (RAIN) established in Poland, as part of the Horizon 2020 AFINET Project. Participants were asked to list most important barriers for agroforestry (AF) development in Poland in five categories and suggest priority ways to tackle these barriers. The development and implementation of agroforestry is blocked by existing legislation regarding trees outside forest: primarily relating to protection orders for individual trees, and the responsibility for trees in spatial plans is in the hands of municipalities. More knowledge about agroforestry and collaboration between experts, local decision makers and practitioners is needed to develop local markets of innovative AF products. Support programs for AF technologies/products and introducing guarantee instruments for origin or awarding system could make AF development easier. Participants agreed that education, promotion and DSS systems concerning AF are crucial.

**Keywords:** agroforestry in Poland; land use policy; forestry policy; trees outside forest; rural innovation networks

## Introduction

The development and implementation of innovations in agriculture require both reliable information and a willingness on the part of farmers to learn. Knowledge transfers among farmers, researchers, experts and agricultural advisors is crucial for sustainable growth in food and non-food production under competitive conditions and in the long term. Increasing the importance of tree resources into agriculture will improve stability and resilience of crop and livestock production in terms of climate change (Olejniki et al. 2001; Kędziora et al. 2001). The paper presents results from the transdisciplinary Regional Agroforestry Innovation Network (RAIN) established in Poland, as part of the Horizon 2020 AFINET Project. RAINs have been established in 9 EU countries. A team from Institute of Soil Science and Plant Cultivation (IUNG-PIB) is facilitating the Polish regional network. These initial results from the Polish RAIN workshops identify bottlenecks and propose solutions to resolve problems. The bottom-up process helped to formulate the needs for agroforestry (AF) innovations under the country conditions.

## Materials and methods

The data were acquired using a multi-actor approach. Key actors (stakeholders) with complementary types of knowledge (scientific and practical, agronomists and foresters, officials and representatives of NGO sector; technology developers and scientific consultants) were invited. Innovation Broker (person purposefully catalyzing innovation through bringing together actors and facilitating their interaction) played a key role in discussions on identification bottlenecks of agroforestry development in Poland. Participants were asked to give five most important barriers for them in five categories: communication and awareness raising, economic barriers, technical barriers, administration and legal barriers, barriers for chain development and

commercialization. Twenty-eight experts and farmers participated in the meeting. After the workshop with stakeholders, an survey online was provided to participants to confirm their views on ways to tackle the issues raised during the meeting and to introduce AF innovations.

## Results and discussion

### Barriers to adoption

Communication and awareness raising - Lack of coherent action for educating on options for afforestation and agroforestry. Agroforestry systems are not familiar to farmers and advisors. Hence, there is weak collaboration between advisors/educators and, even, organic farmers, who should constitute an important group of agroforestry practitioners. "Agroforestry" is a term not recognized by agricultural producers and decision makers. The extent of agroforestry in Poland is also not known. Shelterbelts systems in Wielkopolskie province and riparian buffers are well known in Poland. There are a number of different social actions aimed at planting trees on rural areas carried out by NGO (FER, Klub Gaja) and research studies related to trees on farming lands (e.g. Ryszkowski 2001; Orłowski and Nowak 2007; Zajączkowski and Zajączkowski 2009; Kędziora et al. 2012). Nonetheless, lack of unequivocal definitions considering trees on agricultural land, particularly trees management rules (Borek 2015, 2016; Kujawa et al. 2017) discourage farmers to plant trees. A negative perception among farmers of the role trees and shrubs on agricultural land. There is also a lack of information on guidelines for AF development (what, where, how and when).

Economic barriers - A lack of financial support for AF practices. The government did not implement Article 23 of the EU RD Regulation which supports the establishment and maintenance of AF areas (Lawson et al. 2016). More information on cost benefit analysis of planting different species and the consequences of scattered trees on the basic (i.e. CAP Pillar I) payments farmers receive is needed. AF is not included in the measures for EFA within CAP Policy (EC 2015). Country regulations do not include support for trees on agricultural land (e.g. environmental programs; favourable tax provisions).

Technical barriers - Physical conditions are difficult for farming in Poland: in the majority of cases with poor soil quality, low size and high fragmentation of farms/parcels. This restricts agroforestry to marginal areas and large fields in more agroforestry-friendly farms. When planting trees it is important to select species and provenances which are appropriate to the soil and location. The spacing and planting patterns should match the intended balance between agricultural and timber production and be appropriate for the existing land use, climate and soil conditions.

Administration and legal barriers - There is a lack of a clear definition and legal regulations relating to agroforestry. The Forest Act is a barrier for the introduction of silvopastoral systems, including the case when permanent pasture parcel (particularly of low size) partly covered by trees canopy can be considered as a land under forest. Absence of tree policies in Spatial Management Plans of communes and problems with complicated ownership characteristics of many land parcels in terms of inheritance also hampers implementation of AF systems. In opinion of RAIN stakeholders some aspects of policy regarding cutting trees outside forest, micro-installations using local biomass and timber market are also unclear.

Barriers for chain development and commercialization - Because of lack of development of local entrepreneurship using agroforestry products and raw materials (forest products vs. organic products), AF products are not recognized as an ecolabel in Poland.

### Paths forward – towards agroforestry innovations

Participants of the workshops were asked to indicate the most relevant solutions to tackle problems of agroforestry development in Poland (Table 1). The innovations were rated and the highest score has been given to developing and dissemination of knowledge of AF practices.

The second important issue is to undertake actions to support legal regulations on trees on agricultural farms.

Psychological and social barriers seen as the most important can be tackled through developing and dissemination the best practices of design, management, species selection/combination. Due to the fact, that decisions on trees are often in the hands of local administration units, it is necessary to supporting training of local officials on all policies relevant to trees. Another important aspect mentioned was establishing pilot projects demonstrating AF experiments belonging to research units or AF practices on farms allowing farmers visits to the objects and knowledge exchange. All participants agreed to create a Decision Support Systems for farmers interested in agroforestry.

Policy support of agroforestry was considered as one of the most crucial to tackle. Most of participants agreed that there is urgent need to clarify the rules of EU CAP to reduce limitations as allowed number of trees on agricultural land unit and introduce financial support for the establishment and maintenance of AF systems. However, a change of Polish Acts on Forest and Nature Protection are also necessary, in the first case due to the fact the document does not allow grazing animals in the forest, and the second includes comprehensive rules on cutting trees by farmers or municipalities. Indeed, local authorities are responsible for spatial planning on their territory and in practice often decide about land use, sometimes in opinion of stakeholders don't respecting the property rights of the landowner. Hence, lobbying activities at the level of municipalities are necessary to facilitate tree planting on farmland. Municipalities should develop systems of tree strips of shelterbels in collaboration with farmers within the framework of Local Spatial Development Plan. Some farmers said they need to increase the freedom of wood production outside forest but they feel high-quality wood sell is restricted by competitive products of the larger forest supplier. Stakeholders highlighted stable policy for profitable woody biomass production on farms is necessary i.e. positive incentives for prosumers being small producers of renewable energy on the domestic market. Management plans for agroforestry are suggested to be set up, following Forest Management Plans measures in force for a period 10 years for all forests in Poland.

All participants stated the need to develop guarantee instruments for origin of AF products or AF awarding system. The development of local market of woody products is connected to creating direct sells models, requiring diagnosis of local societies and simplifications and facilitations in Polish law. Database of producers selling agroforestry products and direct selling systems of agroforestry products are mentioned also. The support for AF systems should be particularly targeted on organic farmers, hence linked to organic agriculture policy. Stakeholders agreed to promote AF and take education activities considering environmental threats and role of trees to mitigate them.

Table 1: Strategic solutions recommended by RAIN stakeholders to tackle problems of AF development in Poland.

Recommended solution (number of stakeholders votes in %)	Activities recommended by stakeholders
Developing and dissemination of the best AF practices of design, management, species selection/combination (43.7)	<p>Knowledge dissemination through:</p> <ul style="list-style-type: none"> <li>- farmer networks,</li> <li>- collaboration between advisory centres and local authorities;</li> <li>- adapting university curricula.</li> </ul> <p>Conducting dissemination activities towards advisors and farmers through Innovation Rural Network and Regional Advisory Centres:</p> <ul style="list-style-type: none"> <li>- workshops, trainings, field trips, website.</li> </ul> <p>Trainings for officials representing local authorities.</p> <p>Publishing scientific results on efficiency of good AF practices and best species combinations.</p> <p>Developing AF demonstration farms and experimental sites, including developing efficient silvopastoral systems on problematic agricultural areas (including LFA).</p> <p>Designing locally efficient systems of tree vegetation in combination with apiary sites.</p> <p>Decision Support Systems on costs and benefits of agroforestry; software with AF design modules.</p>
AF policy support (31.2)	<p>Developing financial support systems for agroforestry farmers to encourage them to plant trees on a farm, maintain and protect them.</p> <p>Introduction of "agroforestry" term into the Polish legislative framework.</p> <p>Establishment of regulations to facilitate use of forestry and agricultural lands for agroforestry in terms of given conditions.</p> <p>Including trees policy into Local Spatial Development Plans of municipalities</p>
Supporting innovativeness of organic and "integrated" (i.e. combining food and non-food production) farms (16.9)	<p>Developing the diagnosis of local societies.</p> <p>Certification of agroforestry technologies.</p> <p>Building a regional consolidated and trustworthy brand of agroforestry products.</p> <p>Development of local AF value chains through social cooperatives, direct sells model etc.</p> <p>Setup of internet database of agroforestry producers.</p> <p>Development of local models to use woody residues from trees in a sustainable way.</p>
Supporting trees for biodiversity (2.5)	Educating farmers, advisors, educators, teachers, students how to manage and take care of trees.
Protection against water and wind erosion (2.5)	Strengthening collaboration between researchers, local authorities, NGO and farmers towards AF promotion on agricultural areas susceptible to drought and on lands with intensified production (5.6)
Protection of local water balance (1.2)	
Micro-climate regulation trough AF (1.2)	
Water quality protection (0.6)	

## Conclusion

The first results, originating from AFINET RAIN surveys point that there is much to do in the area of agroforestry in Poland. The development and implementation of agroforestry systems is blocked at the level of legislative acts. Renewable energy support systems including bioenergy crops need significant changes. Regulations regarding trees outside forest primarily relate to protection orders for individual trees, and the responsibility for trees in spatial plans is in the hands of municipalities, who are not aware of opportunities for agroforestry. More knowledge about agroforestry, and collaboration between experts, local decision makers and practitioners is needed in order to develop local markets of innovative AF products. Support programs for AF technologies/products and introducing guarantee instruments for origin or awarding system could make AF development easier. All partners agreed that education, promotion and DSS systems concerning AF are crucial. Moreover, a set of good agricultural practices in agroforestry should be developed for Polish conditions.

## Acknowledgements

We acknowledge support of the European Commission through the AFINET Horizon2020 project (contract 613520). The views and opinions expressed in this report are purely those of writers and may not in any circumstances be regarded as stating an official position of the European Commission.

## References

- Borek R (2015) Agroforestry systems in Poland. A preliminary identification. *Papers on Global Change* 22: 37-51.
- Borek R (2016) Agroforestry in Poland - the current state and policy perspectives. 3rd European Agroforestry Conference, Montpellier, France, pp: 439-441.
- EC (2015) Direct payments post 2014. Decisions taken by Member States by 1 August 2014. State of play on 07.05.2015. Information Note.
- FER (Eco-Development Foundation) <http://aleje.org.pl/en/> (accessed 22/04/2018).
- Kędziora A, Olejnik J, Eulenstein F (2001) Water balance in agricultural landscape and options for its management by change in plant cover structure and landscape. In: Ryszkowski L (ed) *Landscape ecology in agroecosystems management*, CRC Press, pp. 57-110.
- Kędziora A, Kujawa K, Goldyn H, Karg J, Bernacki Z, Kujawa A, Bałazy S, Oleszczuk M, Rybacki M, Arczyńska-Chudy E, Tkaczuk C. (2012) Impact of Land-Use and Climate on Biodiversity in an Agricultural Landscape, Biodiversity Enrichment in a Diverse World Gbolagade Akeem Lameed, IntechOpen, DOI: 10.5772/48653. <https://www.intechopen.com/books/biodiversity-enrichment-in-a-diverse-world/impact-of-land-use-and-climate-on-biodiversity-in-an-agricultural-landscape> (accessed 22/04/2018).
- Kujawa K, Orczewska A, Kras M, Kujawa A (2017) Importance of trees and bushes on non-forest land. Are we allowed to liberalize trees and bushes cutting? Technical Report (in Polish). <https://www.researchgate.net/publication/313854238> (accessed 22/04/2018).
- Klub Gaja <http://swietodrzewa.pl/> (accessed 22/04/2018).
- Lawson GJ, Balaguer F, Palma JHN, Papanastis V (2016) Options for agroforestry in the CAP 2014-2020. Book of abstracts. 3rd European Agroforestry Conference, Montpellier, France, pp. 424-427.
- Olejnik J, Kędziora A, Eulenstein F (2001) Mitigation of radiation and heat balance structure by plant cover structure. In: Ryszkowski L ed. *Landscape ecology in agroecosystems management*. CRC Press, pp. 29-56.
- Orłowski G, Nowak L (2007) The importance of marginal habitats for the conservation of old trees in agricultural landscapes. *Landscape and Urban Plan* 79: 77-83.
- Ryszkowski L ed. *Landscape ecology in agroecosystems management*. CRC Press, pp. 29-56.
- Zajączkowski J, Zajączkowski K (2009) Farmland afforestations: new goals and guidelines for Poland. *Folia Forestalia Polonica* Vol. 51: 5-11.