Workshop objectives

Main purpose of the workshop is to share state-of-the-art knowledge and build mutual understanding and cooperation in the field of agroforestry between agricultural and forest sector with the aim to increase ecological resilience at the landscape level.

The workshop will focus on searching for possible options for further joint work and formulating recommendations on further steps in the pan-European region, namely at policy level, to promote agroforestry as a tool for adaptation of landscape to climate change, combating land degradation and desertification, biodiversity protection, forest fragmentation, improving water regime and soil fertility etc.

Target audience includes representatives of the forest and agricultural sectors, as well as other related sectors, where agroforestry stands for one possible way for sustainable land-use management. The workshop will establish a common platform for both agriculture and forest sectors, policy makers, researchers, representatives of academia and education with the aim to build bridges among various stakeholders searching for application of agroforestry towards increasing landscape resilience and promoting adaptation to climate change.

Specific objectives

• To explore benefits and potentials of AF to contribute to strengthening landscape resilience, adaptation to climate change as well as to well-being of societies;

• To exchange experience, share expertise and examples of successful implementation of agroforestry approaches across pan-European region;

• To discuss main drivers and barriers for agroforestry in order to formulate recommendations for its further promotion;

• To exchange views on how to promote interplay, cross-sectoral cooperation and partnerships between relevant stakeholders in the policy development to support adaptation to climate change;
**Program Overview**

**9 October 2018**

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**10 October 2018**

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Plenary Session: Benefits of agroforestry and its potential contribution to climate change adaptation increasing resilience of landscape

Tuesday, 9 October 2018, 9,30 - 11,00
Chair: Tamas Szedlak, Moderator: Mercedes Rois Diaz

9,30 - 10,00 Agroforestry as a tool to increase resilience and food security
Simone Borelli - Food and Agriculture Organisation of the United Nations

10,00 - 10,30 Why do we need agroforestry for our landscape to be resilient?
Mercedes Rois Diaz - European Forest Institute

10,30 – 11,00 Adaptation and decision support in agroforestry
Attila Borovics - NAIK Forest Research Institute, Hungary

Plenary Session: Policies and governance needed to enhance agroforestry

Tuesday, 9 October 2018, 11,30 – 13,00
Chair: Tamas Szedlak, Moderator: Mercedes Rois Diaz

11,30 - 11,45 Policies and governance needed to enhance agroforestry
Maria Rosa Mosquera Losada - University of Santiago de Compostela, Spain

11,45 - 12,00 Policies and governance needed to enhance agroforestry: the case of Quebec, Canada
Alain Olivier - Université Laval Quebec, Canada

12,00 - 12,15 Forests and agroforestry in the CAP
Tamas Szedlak - DG AGRI, European Commission

12,15 - 12,30 Agroforestry development in France: from local to national level (and beyond...)
Fabien Balaguier - French Agroforestry Association (AFAF), France

12,30 - 12,45 Agroforestry Policy in Ireland
Eugene Curran - Forest Service, Ireland

12,45 - 13,00 Q&A
Plenary Session: Countries’ experiences and perspectives: Learning from case studies

Tuesday, 9 October 2018, 15,00 - 16,30
Chair: Tamas Szedlak, Moderator: Mercedes Rois Diaz

15,00 - 15,10 Advances in Agroforestry in Germany
Dirk Freese - Brandenburg University of Technology, Germany

15,10 - 15,20 Current state of agroforestry research in Hungary
Zsolt Keserű - NAIK Forest Research Institute, Hungary

15,20 - 15,30 Dehesa and Montado: Challenges and Opportunities af Two Historic Agroforestry Systems in a Changing Context
José Ramón Guzmán Álvarez - Regional Ministry of Environment, Andalusia, Spain

15,30 - 15,40 Windbreaks as a part of agroforestry systems in Ukraine
Natalie Vysotska, Ganna O. Lobchenko - National University of Life and Environmental Sciences of Ukraine

15,40 - 15,50 Agroforestry in Austria – different from history
Nikolaus Lienbacher - Chamber of Agriculture, Salzburg, Austria

15,50 - 16,00 Harvesting of non wood forestry products in Turkey
Özgür Balci - General Directorate of Forestry, Turkey

16,00 - 16,30 Q&A
Parallel sessions: **Main barriers and drivers for the further development of agroforestry**

**Parallel session I: Agroforestry in Mediterranean region**  
*Tuesday, 9 October 2018, 17,00 - 18,00 & Wednesday, 10 October 2018, 9,00 - 9,30*  
*Moderator: Anastasia Pantera*

**Parallel session II: Agroforestry in Temperate region**  
*Tuesday, 9 October 2018, 17,00 - 18,00 & Wednesday, 10 October 2018, 9,00 - 9,30*  
*Moderator: Robert Borek*

Parallel sessions: **How to promote agroforestry to support climate change adaptation?**

**Parallel session I: Discussion on potential recommendations for strengthening cross-sectoral cooperation, education and training, research and innovation, communication**  
*Wednesday, 10 October 2018, 9,30 - 11,00*  
*Moderator: Ludmila Marušáková*

**Parallel session II: Recommendations for strengthening policy and legal framework**  
*Wednesday, 10 October 2018, 9,30 - 11,00*  
*Moderator: Maria Rosa Mosquera Losada*

**Plenary Session**  
*Wednesday, 10 October 2018, 11,30 - 12,45*  
*Chair: Tamas Szedlak, Moderator: Mercedes Rois Diaz*

- 11,30 - 12,00 Reports from sub-groups and general discussion on the outputs
- 12,00 - 12,30 General discussion at the plenary
- 12,30 - 12,45 Conclusions and closing remarks
How can policy foster agroforestry towards climate change adaptation?

Abstracts of Presentations

Agroforestry as a tool to increase resilience and food security

Simone Borelli

Food and Agriculture Organisation of the United Nations

Climate change is a growing threat to the agriculture sector and its negative effects on agricultural and forestry production are already being felt in many places. Unless climate change is addressed, agricultural productivity will decline with serious implications for food security.

Agroforestry is a key approach for the integration of climate change adaptation and mitigation objectives, generating significant co-benefits for local ecosystems and biodiversity. Integrating crops with trees and/or livestock, it provides diversified production that can increase farmers’ resilience to market fluctuations and failures that may result from the impacts of climate change. Farmers often respond to climate variations by progressively modifying their farming practices and integrating trees on farms. The adaptive capacity of farmers is influenced by the nature and extent of trade-offs between the components of the farming system, and their degree of integration. Therefore, successful integration rests on the flexibility to reduce trade-offs and competition between the various production components of the farming system. Agroforestry, offers farmers a greater number of risk management strategies and options to adapt to climate-induced disturbances than specialized systems as farming systems that allow for the substitution of component parts are less vulnerable. Agroforestry plays a key role in building resilience and can play a role in mitigating greenhouse gases from agriculture, as their emission intensities are typically lower than the sum of those from specialized systems.

Of course, not all tree, crop and livestock species positively interact when integrated in an agroforestry system. Foreseeing whether the interactions among components will remain positive or negative in an evolving climate requires understanding of the direct and indirect impacts of climate change, the trade-offs among the components of the farming system, and the capacities to minimize negative interactions and maximize the benefits of integration.

In addition to providing technical support and testing different options through field projects, FAO coordinates its adaptation activities through the FAO-Adapt Programme. FAO-Adapt is an umbrella to all our adaptation activities, including short-term and long-term adaptation measures and aims to enhance coordination, efficiency and visibility of FAO’s adaptation work.

Core principles of the Programme are:

- Mainstream climate change into development
- Support country-driven processes
- Build synergies between adaptation and mitigation
- Promote ecosystem approach
- Design participatory, gender-sensitive and location-specific adaptation activities
- Deliver through partnerships and as ONE UN
- Support transboundary collaboration
- Develop a long-term programmatic approach

A wide range of publications, capacity development activities and tools complements the work of FAO-Adapt.
Why do we need agroforestry for our landscape to be resilient?

Mercedes Rois1, Christos Damianidis2, Anastasia Pantera2, Sonja Kay3, Felix Herzog3, Michael den Herder1

1 European Forest Institute
2 Faculty of Forestry and Natural Environment, Aristotle University of Thessaloniki, Greece
3 Agroscope, Switzerland

Agroforestry is considered by FAO as a sustainable land use and listed as one of the top 10 innovations for adapting agriculture to climate change. Agroforestry systems are resilient and can contribute to reduce the impacts from extreme events such as heat waves or floods, thus it is a suitable measure for climate change adaptation and mitigation: it contributes to reduce forest fire risk and intensity, increases shadow for animals and pasture, reduces fertilizer inputs, increases productivity, favours short supply chains, increase carbon sequestration, and enhances landscape heterogeneity.

Based on the LUCAS database (Land Use and Land Cover Survey), it is estimated that agroforestry covers 15.4 million hectares in the EU27, i.e. 3.6 % of the total area or 8.8 % of the Utilized Agricultural Land. The main type are silvopastoral systems, both grazed broadleaved forests and open forests like ‘dehesas’ and ‘montados’, as well as permanent crops such as olive groves and fruit orchards. The main motivation for European farmers to implement agroforestry have been family or regional traditions, as well as knowledge about the management of such systems and the diversification of the products they can obtain. More knowledge leads to a higher interest in using agroforestry.

While large parts of the European farmland suffer from several environmental problems (soil erosion, water pollution from nitrates, low biodiversity, etc.), converting farmland into agroforestry could markedly reduce greenhouse gasses emissions, depending on the type of agroforestry introduced. This shows the potential to introduce agroforestry systems in vulnerable areas across Europe. Furthermore, fires are less likely to occur in agroforestry land in comparison to forest, shrublands or grasslands and when they occur, they are often less intense in agroforestry areas.

One of the objectives of the project AFINET ‘Agroforestry Innovations Network’ (H2020) is to search for innovations in the different regions across Europe. In total, 88 innovations were identified together with the stakeholders across Europe. For instance, in Finland, three innovations have been top rated: 1) alley cropping initially introduced to reduce erosion but it helped to reduce also the impact of the recent droughts, 2) mushroom cultivation in logs as a forest management tool, and 3) sheep grazing in young forest stands reducing the need for pre-commercial thinning.
Adaptation and decision support in agroforestry

Borovics Attila¹
¹ NAIK Forest Research Institute, Hungary

“We are shooting a moving target” when we talk about the effects of climate change, therefore timely solutions are necessary for constantly changing conditions. It cannot be forgotten that in solving the problems of climate change affecting agriculture, there is only one key player apart from intelligent people, the living plant itself from which the community of trees that are the basis of the agroforestry system plays a special role. In doing so, we must recognize the adaptation processes of our tree species and introduce new farming and planting practices in line with the speed of the human-induced climate change.

Researchers are responsible for collecting and evaluating available information. All these data, which had been accessible separately for a long time, had to be made easily available for some sites of actual intervention using only the toolkit provided by GIS and applying new evaluation methods. Accepting the month average rainfall and temperate data of given sites by climatologists, the future development of climatic conditions can be determined, using the newly developed forestry aridity index. So it is a realistic idea that future sites are predictable and, therefore, we can make suggestions about the target stocks, tree species and even the origins and sources of propagation materials from tree species safe to apply.

Conscious and well-established propagating material management can therefore be an immediate response to climate change problems. The essence of selecting propagation material for adaptation is that separation of sources of propagation material is done solely on an ecological basis instead of traditional geographical areas of origin. In this process, pre-adapted propagation material resources are determined on the basis of a preliminary estimation for future climate conditions for planting agroforestry sites. The web-based application helps the farmers to find the best sources of propagation material for their own stocks required to be restored for the 2050 planning periods, with a warmer and drier habitat than the site of use, considering the whole Carpathian Basin and the Balkans. If they are applied in a documentable way, financial recognition is obtainable according to current Hungarian regulations.

How can policy foster agroforestry towards climate change adaptation?
Policies and governance needed to enhance agroforestry

María Rosa Mosquera-Losada¹

¹ Crop Production and Project Engineering Department, Universidad de Santiago de Compostela

The Common Agricultural Policy (CAP) is one of the most important drivers of farming systems in Europe, that, therefore should promote agroforestry as a sustainable land use system that can be implemented in any type of land use: arable, permanent grasslands, permanent crops and forest lands. Agroforestry EU policy should provide a global framework to include agroforestry practices (silvopasture, silvoarable, forest farming, homegardens and riparian buffer strips) in any type of this land use to foster diversification of products coming from the land and resilience of farming systems against extreme events. A clear definition, supported by the FAO, should be adopted to create a comfortable and adaptable framework for all EU Member states: “the deliberate integration of woody vegetation (trees and/or shrubs) as an upper storey on land, with pasture (consumed by animals) or an agricultural crop in the lower storey. The woody species can be evenly or unevenly distributed or occur on the border of plots. The woody species can deliver forestry or agricultural products or other ecosystem services (i.e. provisioning, regulating or cultural)”. Furthermore, the recognition of the agroforestry at plot, farm and landscape level should be awarded and directed to farmers and cooperation among farmers.
Although the rate of adoption of agroforestry is still low in the province of Quebec, Canada, a growing interest toward agroforestry is observable among various stakeholders of the agricultural, forestry, environment and territorial planning sectors. Such an interest led to the creation, in 2008, of an Agroforestry Committee supported by the Quebec Reference Center for Agriculture and Agri-Food (CRAAQ), a network of experts and organizations aiming at sharing of information and knowledge management and dissemination. The mandate of the Agroforestry Committee, which comprises representatives from farmers’ and foresters’ unions, agricultural and forestry advisory groups, universities, research centers and ministries (agriculture, forestry), is to contribute to the development of agroforestry systems offering solutions to the issues of rural territories in Quebec by fostering networking, sharing of information and knowledge transfer. In the last years, the Agroforestry Committee organized various events whose participants identified the absence of recognition at the political level and the lack of technical and financial support as some of the most important constraints to adoption of agroforestry. Thus, a working group stemming from the Agroforestry Committee was set up in order to draw up a document about the strategies to put in place to stimulate the adoption of agroforestry practices. The study identifies the possible contribution of agroforestry to the resolution of six main issues of the agroecosystem: soil health, biodiversity, water quality, climate change, rural landscape and profitability. The current extent of agroforestry systems in the agricultural landscape is described, and an inventory of the resources available to farmers and landowners who wish to use agroforestry practices is made out: availability and accessibility of practical knowledge, advice, technical services, materials, training and education resources, research, and institutional and policy support. An analysis of the current situation in view of the challenges faced by the agroecosystem brings the working group to make six recommendations: the recognition by the public authorities of the potential of agroforestry systems; an increased technology transfer through the setting up of networks of agroforestry advisors and demonstration sites; the provision of financial support to producers through a program specifically dedicated to agroforestry; the creation of new knowledge through research activities; the development of adapted plant material; and an increased dialogue between the various actors of the agriculture, forestry, environment and rural development sectors. The implementation of these recommendations should help the scaling-up of agroforestry in Quebec.
Forests and agroforestry in the CAP

Tamas Szedlak

1 European Commission, DG Agriculture and Rural Development

The Common Agricultural Policy (CAP) is one of the most important policies funded by the EU. The EU has promoted agroforestry in both the previous (2007-2013) and the current (2014-2020) budgetary period. This presentation reflects on the evolution of this measure over the time, and provides some insights on lessons learnt.

**CAP 2007-2013**

Agroforestry was introduced for the first time as a "new" topic supported by the CAP 2007-2013, and it formed part of the forestry measures, labelled as "Measure 222: First establishment of agroforestry systems on agricultural land." The measure supported 275 beneficiaries, establishing 2904 ha of new agroforestry systems.

**CAP 2014-2020**

Based on the experience from the preceding programming period, the legal framework for Rural Development, laid down in Regulation (EU) 1305/2013, includes a revised agroforestry measure. Amendments introduced by Regulation (EU) 2017/2393, the so-called Omnibus regulation, provided for the possibility to support the regeneration or renovation of existing agroforestry systems under the title "Measure 8.2 Establishment, regeneration or renovation of agroforestry systems." This amended measure covers; a) 80 % of the costs of establishment, regeneration and/or renovation, and b) the annual premium per hectare to cover the costs of maintenance for a maximum period of 5 years.

**Post 2020 CAP**

The Communication "Future of Food and Farming", issued by the European Commission in November 2017, and the proposal for a regulation2 provides orientations for the CAP post-2020. The Communication underlines to need for giving more flexibility and responsibility to Member States as regards the design of their CAP support schemes, laid down in national CAP Strategic Plans. The EU will establish the common EU objectives to be pursued by all national CAP Strategic Plans in order to ensure “common” achievements of this common policy. The EU objectives address, among other, the contributions of agriculture to climate-change mitigation and adaptation, improving resource efficiency, and increasing competitiveness of EU agriculture. The EU will also define only broad types of interventions, which are to be fine-tuned by Member States according to their needs. The proposal for a regulation is under consultation process both in the European Council and in the European Parliament.

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Agroforestry development in France: from local to national level (and beyond...)

Fabien Balaguer

French Agroforestry Association (AFAF), France

Over the past two decades, France has seen a gradual (re)development of agroforestry practices, in a wide range of forms and contexts. This shift in focus, initially born “on the field”, was strengthened from 2007 onwards with the creation and launch of the French Agroforestry Association, which connected stakeholders together from the local to the national level. This set the groundwork for collaborative initiatives from multiple actors, including farmers and practitioners, technical experts from the agricultural and forestry sectors, decision makers, and researchers.

In 2011, the European Agroforestry Federation (EURAF) was created at the French Ministry of Agriculture in Paris.

As one of the key results of all this work, in 2015 a national agroforestry development plan (2015-2020) was launched by Stephane Le Foll, then Minister of Agriculture. The objective of this plan, one of the keystones of the Agroecological Project for France, is to officially “encourage development and sustainable management of agroforestry systems in France”. Within this framework, 5 goals are given priority to guide development and research work across the country: 1) to better understand the diversity of agroforestry systems and their functioning principles, 2) to improve the regulatory and legal framework and strengthen financial support of the agroforestry transition, 3) to develop technical advice, and training of agroforestry, 4) to improve the economics and marketing of agroforestry products in a sustainable way, and 5) to disseminate agroforestry internationally.

Also in 2015, the “French rural network for agroforestry” was launched, led by the French Agroforestry Association. A consortium of 18 national and regional partners was established, thus allowing improved knowledge exchange across the 13 regions of France and paving the way for policy adaptations at multiple scales. Today, an extensive network of partners from practice, research, and the teaching sector work together on a range of projects and initiatives, benefitting from both a strong local anchoring and a national coherence, thus optimising results, and continuously creating new opportunities for cooperation. Key actors from the natural resource and environmental management (eg. river conservationists, landscapers, regional park officers, hunting associations) are now involved in what is becoming a societal transition at landscape level, engaging much more than just the farming “experts”. Consumers are also an increasingly important target through the involvement of major actors from the agri-food sector in farmer-led marketing initiatives such as the national challenge “For an agriculture of life”.

How can policy foster agroforestry towards climate change adaptation?
The level of tree cover in the Republic of Ireland (RoI) is the second lowest in Europe at 11 %, in Northern Ireland (NI) it is only 6 %. The EU average tree cover is 38 %. Ireland has 62 % grass cover and the 4th largest cattle herd in the EU. Agricultural intensification has raised concerns in Ireland over the level of emissions and other possible negative environmental impacts.

Trees are seen as a good way of sequestering carbon and ameliorating the harmful effects of siltation run off and nutrient leaching into vulnerable watercourses. The Republic of Ireland has an afforestation programme with a variety of tree planting options on offer to land owners. In 2010 the Department of Agriculture Food and the Marine decided to investigate the potential of agroforestry in the South of Ireland. Based on an assessment of AFBI (Agri-Food & Biosciences Institute) agroforestry research trials in Loughgall in Northern Ireland a number of demonstration plots were established in the South of Ireland. It was decided to concentrate on silvopastoral systems as these systems appeared to work in the Northern Ireland trials. The demonstration plots were considered a success and a grant aided agroforestry measure was introduced to the afforestation programme in 2014. A target of 195 hectares of agroforestry planting was set for 2020. Currently there are 54 hectares at various stages of approval. The Republic of Ireland is probably unique in Europe, in that the funding comes from the forestry sector as opposed to the agricultural sector. In addition Irelands forestry measures are paid from the Irish exchequer as opposed to EU pillar II funding.

Due to the environmental, economic and aesthetic benefits that accrue to agroforestry enhancing landholdings in environmentally sensitive areas, using agroforestry has great potential. The benefits to animal welfare are becoming increasingly obvious too.

Northern Ireland is a separate jurisdiction and the funding is from the Environmental Farming Scheme (under priority 4, EU pillar II) and is administered from the agricultural sector. Currently 24 applicants have applied for the scheme with 32.5 hectares.

Both jurisdictions (NI & RoI) have different approaches and both are successful.
Agroforestry systems are traditional land management systems that are recently under development in the temperate zone. These systems are defined as sustainable ways of land use which integrate both agricultural and forestry practices on the same land and at the same time. Agroforestry systems are able to contribute to the ecological but also to the economic revaluation of agricultural production areas, especially in regions with marginal land, representing an alternative to land abandonment and afforestation.

However, despite numerous advantages in modern agricultural practice, agroforestry systems have so far hardly been implemented. The project AUFWERTEN (Environmental services of Agroforestry for value-added and energy) offers the opportunity to develop contacts with practitioners, associations and other research institutes in order to illuminate the topic of agroforestry scientifically more profound and to promote the attention for this sustainable form of land use in practice. In this context, project participation allows learning processes to be more innovative and more focused in communicating research results into practice, thereby improving the perception of and the incorporation of scientific findings into practical work.

The second project introduced here is called SIGNAL (Sustainable intensification of agriculture through agroforestry). The overall goal is the evaluation of existing long-term experimental agroforestry systems in Germany and comparison with conventional agricultural systems. It will be scientifically proved that innovative agroforestry systems are ecologically and economically more sustainable. To achieve the goal natural science-based analyses of agroforestry systems will be carried followed up by socio-economic evaluations.

Agroforestry systems improve the efficiency of utilisation of natural resources, improve microclimatic conditions within the system, mitigate severe soil erosion problems and nutrient losses, enhance landscape biodiversity, lead to an overall high biomass production for valuable timber or energetical conversion (fuelwood), and thus matching the increasing demand for a self-supply with bioenergy in rural decentralized areas.
Current state of agroforestry research in Hungary

Zsolt Keserű¹
¹ NAIK Forest Research Institute, Hungary

Hungary was the first country in Central Europe that started the implementation of the EU’s 222 measure (First establishment of agroforestry systems on agricultural land). Its aims to provide opportunities for establishing wooded pastures and maintain and develop the mosaic landscape structure.

Agroforestry used to be a widespread technology of land use in Hungary during the past century. However during recent decades it has disappeared from large areas of the Hungarian countryside. The negative effects of climate change urge us to address and find ways to adapt or to mitigate it.

In Hungary, agricultural land (including crop and grasslands) occupy cca. 60 % of the land area. Of the arable land 85% can be found in agro-environmentally sensitive areas. In these areas the nutrient content is very low and floods and drought periods are very frequent. Consequently we have to find the suitable growing technology that can provide the sustainable and profitable management under unfavourable site conditions. To achieve these goals agroforestry can be an effective solution.

The Hungarian National Agricultural Research and Innovation Centre’s (NARIC) Forest Research Institute (FRI) Department of Plantation Forestry started to study agroforestry systems and constructed its first trials in 2014. Since then further experiments have been set up and the institution has started to spread the knowledge of agroforestry, its characteristics and specialities, through agricultural and forestry forums and conferences, based on international literature, and examples. The aim is to establish trials across the whole country, to be able to study different sites where profitable plantation forestry and agroforestry technologies can be tested under the ecosystem of Hungary, providing models, and options to forestry and agriculture in marginal areas. In these experiments we investigate mainly soil moisture, carbon cycle, light capture and root growth, as these factors are remarkable in researching and mitigating climate change.

It is important to investigate and determine the relation between the trees and the companion crops including agroecology, yield (production) and economy. The results of our research project will be most likely applied mainly by private agricultural land owners, local governments and their joint organizations, furthermore by private forest owners and forestry companies owned by state.
How can policy foster agroforestry towards climate change adaptation?

Dehesa and Montado: Challenges and Opportunities of Two Historic Agroforestry Systems in a Changing Context

José Ramón Guzmán Álvarez

Regional Ministry of Environment, Andalusia, Spain

The dehesa, named montado in Portugal, is largely known as a characteristic landscape located on the south-western area of the Iberian Peninsula. Dehesa and montado are as well historic agroforestry systems (AF), in fact, one of the more extended AF in all Europe.

“Dehesas” are commonly identified as a type of open oak forest pastureland that can be found in Spain and Portugal. However, it has not been a legal concept till recently; its difficulty to be defined is one of its weaknesses.

Dehesas and montados have shifted considerably in the last decades. From 1960 onwards, the management style has intensified and a number of severe problems have arisen as the lack of tree layer regeneration and the effect of tree decline, commonly named as “seca”, due to factors as increasing temperatures and fungi diseases.

When thinking about protecting the dehesas against their major threats, policy measures in the form of public investments and incentive programs based on the explicit or implicit recognition of the public services they provide are tools to be considered. As most public incomes depend on subsidies under European Union agriculture policies, there is a need to be well understood in the EU regulation framework in order to obtain good results in the implementation of the policies.

At present, there is a remarkable interest in promoting agroforestry systems as a sustainable type of farmland. The dehesa and montado paradigm, with their mixed design (far over the general tendency to simplification) and their set of economic products and non-commercial environmental services, may play an important role as an example of making things differently: “adehesar”, making dehesas, would be a promising tool for managing lands.

Above all, one of the major challenges of XXI century dehesas and montados is to enhance their adaptation capacity to global warming, reducing their vulnerability. Dehesa and montado are agroforestry systems coming from the past with the need of updating its management practices. However, a deeper conclusion emerges when the diagnosis is made taking into account the loss of context stability due to variation in the environmental variables: a non-equilibrium system which was steady under certain circumstances has to cope in the present, and more in the future, with increasing stressing factors that may overcome its resilience.

What European collaboration projects as Life bioDehesa, Life Montado and POCTEP Prodehesa Montad are showing (and working in) is the need of the system to be redefined in order to lead it the chance of accommodating to changes. In other words, it is more that just a matter of climatic adaptation: we have to work in the adaptation of the whole socio-economic and ecological system.
Windbreaks as a part of agroforestry systems in Ukraine

Ganna O. Lobchenko¹
¹ Forest Restoration and Meliorations Department, National University of Life and Environmental Sciences of Ukraine

Positive influence of the forest on the agricultural fields is used since XIX century on the territory of Ukraine. Ukraine has more than 200 years history of protective afforestation and agroforestry systems. First prototype of agroforestry systems with windbreaks on agricultural fields was created by V. Lomykovskyy in 1809-1837 and the result of these measures was improved and more stable crops yield in protected margins in between of windbreaks. On the first stage windbreaks afforestation had occasional and unsystematic character. Drought of 1892 in Steppe zone caused activation of scientific researches and it was organized expedition leaded by V. Dokuchaev. In the second half of the nineteenth century Steppe afforestation planning became national scale project. Since the early 30th of the XX century, it was carried out on a regular basis in frames of the five-year plans for the development of the national economy of the Soviet Union. Nowadays the total area of windbreaks is about 440 thousands ha with protection of 13 mln ha of arable lands, but this figure is twice as low as optimal.

Windbreaks are placed on agricultural lands in flat terrain and slopes of less than 2-3 degrees, where the main damage to crops is brought with dry winds. Effect of windbreaks on crop fields’ microclimate depends on stands construction, causing different wind transmission. But in general effective agronomic influence of windbreaks spreads on distance of 25-30 heights of the stand and provides decreasing of wind speed for 40-60 %, temperature decreasing during summer season and increasing during winter for 1-3 degree, humidity increasing for 3-5 %, soil moisture evaporation decreasing for 20-25 %, snow retention and as a result 10-20 % higher annual yields of agricultural crops. Importantly, economic benefits from using windbreaks start since 10-15 years old, including the covering of the cost of creation.

At the same time ecological potential of windbreaks with features of forest biogeocenoses is significant in its multifunctional use as ecological corridor for regional ecological networks. Windbreak also has climate change mitigation value via carbon sequestration. The average compactness of the fractions biomass of windbreaks oak trunk is 5-11 % higher than for massive forest plantations. Thus ecological-economical efficiency of agroforestry systems is 20-25 % higher than open agricultural lands with loosing 3 % of arable area only for creation of windbreaks.
How can policy foster agroforestry towards climate change adaptation?

Agroforestry in Austria – different from history

Nikolaus Lienbacher

Chamber of Agriculture, Salzburg, Austria

Austria is not a good example for agroforestry. A major part of the Austrian national territory is covered by the Alps. Due to the high share of mountainous areas there are only small areas available for agricultural production. 75 % of the area is less-favoured area. This makes it more challenging to ensure the environmental compatibility of the economic development. The priorities of the Austrian regional policy are among other things the strengthening of innovative power of enterprises and the increase in resource and energy efficiency.

In 2016, Austria featured 162,000 agricultural and forestry holdings, which are still small-scaled (45 ha of total area per holding, 19.8 ha of utilised agricultural area and 19.3 ha of arable farming area). In 2017, Austria featured 1.3 million ha of arable land. Austria has again the highest share of utilized agricultural area under organic management in the EU. Roughly 20 % of the holdings are managed in an organic way. 90 % of the area is managed under agri-environmental schemes. The production of regional food with high quality gets more and more important for consumers.

Domestic family-run farms tend to our unique cultivated landscapes, supply the population with high-quality food and are committed to mitigating climate change. Dynamic rural regions are the cornerstones of a high quality of life and a guarantor of food security. The output of the agricultural industry accounted for 7.3 billion euros in 2017. 49 % came from livestock production and 41 % were delivered from plant production. There is a high dependency on common agricultural policy payments for the farm holdings. More then 80 % of the farm holdings manage agricultural land as well as forests.

Forests in Austria are versatile multi-talents and an important economic factor. Forests provide us with wood, give habitats to animals and plants and offer humans a place for recreation. Forests supply the energy of the future. This makes sustainable forest management all the more important. About half of the Austrian territory is covered with forests, the most important tree species is spruce, which accounts 51 %, followed by beech with a share of 10 %. More than half of the forest area is for private forests covering less then 200 ha. More then 80 % of the Austrian forest is privately owned.

There is an increasing importance of forest management for mixed farming and forestry holdings. Austria has a special legal framework, the Austrian Forest Law, with specific management regulations. A clear and stable property law ensures long-term land tenure. Inheritance law and inheritance taxes ensure a smooth handover of forest holdings to the next generation without endangering economic viability. The importance of agricultural services and non-agricultural secondary activities is increasing.
Non-wood forest products management and development studies in Turkey. The studies on the sustainable utilization of forest ecosystems from natural sources that can be used for food, medicinal aromatic purposes, and the development of these products in forest areas. Not be available culture wood products are harvested from the wild in Turkey. The amount of utilization is determined by the inventory methods developed by the General Directorate of Forestry. Thus, sustainable use is provided. In addition, the cultivation of some cultured products in natural ecosystems is contributing to the welfare of the local population. All these studies are managed with special action plans. These action plans are Truffle, Laurel, Gum tree, Blueberry, Resin action plans. In addition, regardless of the action plans, a large number of non-wood forest products are offered as a raw material to the national economy and external trade. Currently 210 plant and tree species are used economically in our country. The studies and the results will be shared with the participants at a workshop.
How can policy foster agroforestry towards climate change adaptation?

Agroforestry in Mediterranean Region

Anastasia Pantera

1 Department of Forestry and Natural Environment Management, TEI of Central Greece

The Mediterranean basin is characterized by a variety of bioclimates, species and farming systems adapted to local needs and environments with agroforestry being one of the most ancient land uses. Agroforestry is the practice of deliberately integrating woody vegetation (trees or shrubs) with crops and/or animal systems to benefit from the resulting ecological and economic interactions (Mosquera-Losada et al, 2018). Silvopastoralism has been one of the older agroforestry land uses, as mentioned by many ancient writers. In silvopastoral systems there is a joint wood and animal production. The forests component in the Mediterranean region may be coniferous of Pinus sp., Abies sp., Juniperus sp., or broadleaved mainly of Quercus sp., depending on the location and environmental conditions. Livestock production systems may be sedentary with a permanent base throughout the year or transhumant with seasonal movement of the animals. Major “High Nature and Cultural Value” agroforestry systems prevail in the Mediterranean such as the Dehesa in Spain and the Montado in Portugal (Moreno et al 2018). Another distinct agroforestry category is the “High-value tree agroforestry systems” which involves the intercropping or grazing of orchards or groves of fruit trees or plantations of trees grown for high value timber (Pantera et al, 2018). The systems can be combined with agricultural or grass grazed by sheep. Pollarding is still a living practice throughout the Mediterranean. Chestnut and walnut agroforestry are also traditional land uses system in mountainous areas. There are various combinations of olive agroforestry such as grazed by chickens or intercropped by crops or species such as asparagus and flowers. The intercropping of high value tree systems can help to reduce cultivation costs, while the use of understorey nitrogen-fixing crops can reduce fertiliser needs for the tree crop and maintain or increase tree yields. Grazing can reduce mowing costs and provide an additional source of revenue. A series of selected agroforestry systems are introduced in the innovation and best practice leaflets, produced under the “AGFORWARD” project (Burgess et al, 2018).

The Mediterranean basin is the place that has and still further needs to face main environmental challenges, being one of the more vulnerable areas of the globe due to changing climate, under sustainable management. Additionally, existing research indicates that appropriate application of agroforestry principles and practices is a key mean by which the European Union might achieve more sustainable production methods whilst producing both profits for farmers and environmental benefits for society.
Understanding the Contribution of Agroforestry to Landscape Resilience in Europe

Agroforestry in Temperate region

Robert Borek

1 Institute of Soil Science and Plant Cultivation – State Research Institute (IUNG-PIB), Puławy, Poland

The potential of agroforestry as a sustainable land-use system has not yet been fully realised in temperate regions. Silvopasture being the most common agroforestry (AF) practice in Europe is particularly important in UK, Ireland, France, Sweden, Finland and hilly regions of Poland, Czech Republic, Slovakia, Hungary and Romania, but is often present in landscapes of Baltic countries as well. In Switzerland and partly Austria, traditional fruit orchards grazed or intercropped are still quite common. The fragmented structure of farms and diverse topography favour the presence of small groups of trees on agricultural land of Poland, western Ukraine, Romania and Bulgaria. Alley cropping systems for short rotation woody biomass production are receiving increasing interest in Germany. The most advanced temperate European countries in terms of development of modern AF systems and support level are France (with National Plan for the Development of Agroforestry), UK and Belgium. Important types of traditional AF practices that are still present in central and northern France include grazed orchards, the “bocages”, and fruit trees or poplar plantations intercropped with field crops. In UK pollarding, pannage practices and hedgerows are popular. Hungary is the only country in Central Europe implementing RDP agroforestry measures. Intercropping of forest trees, alley cropping systems and windbreaks can be found also there, the first two in Czech Republic as well. The main AF systems in Romania are shelterbelts, riparian buffers, taungya (kind of silvoarable system) and wooded pastures. Bulgaria has achieved good results in the establishment of AF practices, such as windbreaks, riparian buffers, forest farming and silvopastoral areas. Windbreaks network is common type of agroforestry in former Soviet Republic countries – apart from Russia, in Belarus, Ukraine and Moldova. Probably large parts of smallholders there still manage traditional silvoarable and silvopastoral systems in traditional fruit orchards.

AF practices and systems are not fully recognized as agroforestry and main challenges of AF development are linked to a better technical and economic knowledge. Agroforestry in EU is promoted by several measures in RDP 2014-2020, however most of the countries of Central and Eastern Europe have not adopted agroforestry-related measures. One should mention the problems outside EU – for instance in Ukraine, the main problem is lack of legal status of shelterbelts, blocking their transfer to private owners or communes. Intersectoral actions are needed to legalise agroforestry and strengthen its position in Europe.
How can policy foster agroforestry towards climate change adaptation?

Agroforestry in the EU Common Agricultural Policy - Past, Present and Future

Patrick Worms¹, Gerry Lawson²

¹ International Centre for Research in Agroforestry (ICRAF), Brussels
² Centre for Ecology & Hydrology (CEH), Edinburgh

In the Rural Development Regulation (1305/2013) of the current CAP (2014-20), “agroforestry” is defined as a “land use systems in which trees are grown in combination with agriculture on the same land”. Grants are available in 35 Rural Development Plans (under CAP Pillar II) to establish and maintain agroforestry, or one quarter of all RDPs. In the previous CAP (2007-2013), agroforestry establishment was available in only 5 of them.

The 2018 Omnibus Regulation expanded agroforestry options still further by confirming that the agroforestry submeasure can support the natural regeneration of trees in existing silvopasture. This Regulation also announced an optional change in the definition of permanent grasslands eligible for direct payments to “include shrubs or trees that produce animal feed but are not directly grazed by animals”. Today, tree planting outside forests is confusingly supported through a range of Pillar II measures, and EURAF asks for their consolidation.

72,529 ha of agroforestry would be established in 2014-2020 at a cost of 123.3 million € should the submeasure be implemented in full. But Member States may not fully release the funds. Farmers may be sceptical. Only 6.5 % of the planned spending and 4.3 % of the planned area actually materialised under the previous CAP. Many farmers are concerned that they may lose their direct payments should remote sensing count too many trees on their land, even if they can prove that “agriculture remains predominant”.

Yet agroforestry is gaining traction in next CAP (2021-2027), obliging national authorities to produce strategic plans which quantify how the CAP’s nine economic, environmental and social objectives will be met. The three most relevant to agroforestry are:

- climate change mitigation and adaptation, and sustainable energy;
- the sustainable development and efficient management of natural resources (water, soil, air);
- protect biodiversity, enhance ecosystem services and preserve habitats and landscapes.

The new CAP emphasises developing indicators to measure the impact of policies in meeting these objectives. From the agroforestry perspective, these could include:

- minimum percentages of “landscape features” (including tree features) to be met by all farmers under Pillar I;
- tree planting using GIS-based “farm nutrient sustainability tools” that codify soil characteristics, terrain and field boundaries, and predict GHG budgets under Pillar I; and
- developing participative agroforestry agri-environment-climate schemes under Pillar II.
Speakers Background

Simone Borelli

Simone Borelli holds a first degree in Forest Science from the Università della Tuscia, Italy, an M. Sc. in Watershed Management from the University of Arizona and Postgraduate Diploma in Public Management from the University of London. He has worked for the Food and Agriculture Organization of the UN (FAO) for over 20 years in different positions and is currently responsible for the Agroforestry and Urban Forestry programmes in the Forestry Department. In this capacity, he provides technical support to FAO field projects, provides policy advice to member countries and develops technical publications. In addition to FAO, he has also worked for WWF, IPGRI (now Bioversity) and as a consultant for public institutions and the private sector.

Mercedes Rois Diaz

Mercedes Rois Díaz (M.Sc. in Forest Sciences, 2000) is a researcher in the Bioeconomy Unit at the European Forest Institute. Currently she works in the AFINET project (Agroforestry Innovation Networks, H2020), which aims at taking up research results into agricultural practice, improving knowledge exchange between scientists and practitioners, with a special focus on silvoarable and silvopastoral agroforestry systems design, their management, production and profitability. In the past she worked in the AGFORWARD project (Agroforestry that will advance Rural Development) focusing on the driving factors for the farmers implementing agroforestry or not, and the analysis of policies influencing the uptake of agroforestry across Europe. Further, she was involved in the VALERIE project (VALorising European Research for Innovation in Agriculture and Forestry, FP7) which aimed at boosting the uptake of innovations by facilitating knowledge exchange between farmers, foresters and researchers to improve the uptake of research outputs. She also worked on developing indicators on forest biodiversity in the framework of the European Environment Agency, and the application of sewage sludge on silvopastoral systems.

Attila Borovics

Attila Borovics (Hungary), director of NAIK Forest Research Institute and strategic deputy director-general of NAIK (National Agricultural Research and Innovation Centre). Main field of activity: strengthening the integrative cooperation between agricultural research institutes, strengthening international cooperation (agribusiness, knowledge transfer, science diplomacy), developing practical solutions to adapting to climate change, development of tree plantations and agroforestry systems, evolutionary and ecological research in forestry, decision support for farmers, foresters, regulatory authorities and policymakers.
How can policy foster agroforestry towards climate change adaptation?

Maria Rosa Mosquera Losada

Dr María Rosa Mosquera-Losada, Distinguished Professor of the Crop Production and Project Engineering Department of the University of Santiago de Compostela. Current President of the Spanish Agroforestry Federation. Chair of the Arable Crop working group of the Global Research Alliance (official IPPC observer) and of the “Enabling Environment working group” of the Global Alliance for Climate Smart Agriculture (FAO). Editor of the books “Silvopastoralism and Sustainable Land Management” (CAB International) and “European Agroforestry Federation” (Springer). Author of over 400 peer reviewed papers, 70 of which are indexed in the JCR (90 % of papers in the first decile) about the subject of agroforestry. Main responsible of the reports of “Biodiversity indicators on silvopastoralism across Europe” written for the European Environmental Agency and “Current status of Agroforestry EU policy” and “Agroforestry Policy recommendations for EU” as leader of the Policy section of the AGFORWARD Project. She is the current coordinator of the most important Agroforestry Network in Europe: AFINET.

Alain Olivier

Alain Olivier is a Full-Time Professor in Agroforestry in the Faculty of Agricultural and Food Sciences at Université Laval, Québec, Canada. He holds a BSc in Agronomy and a PhD in Plant Biology. He is director of the Interdisciplinary Group of Research in Agroforestry as well as of the Chair in International Development of Université Laval. His research program focuses on analyzing the constraints and incentives to the implementation of agroforestry systems, in an interdisciplinary perspective, including insights on technical, ecological, social, economic and policy aspects. He is also interested in the contribution of agroforestry to food security and to the mitigation of and adaptation to climate change.

Tamas Szedlak

Tamas SZEDLAK graduated as a forester in 1978, and then he received an MSc on forestry in 1987. In 1992, he wrote his thesis on agroforestry and got his second degree on tropical agriculture and forestry. After working more than 10 years in forests at the Hungarian State Forest Service, he became an official of the Ministry of Agriculture in Budapest, and he contributed to the country’s preparation to the accession to the EU. Since 2004, he works for the European Commission in the Directorate General Agriculture and Rural Development. He deals with various forestry related issues, in particularly related to forestry in rural development and practical aspects of forestry under the changing climate. He follows the forestry and agroforestry related policy development, including the preparation of the legislative background for the CAP post 2020 period.
**Fabien Balaguer**

Fabien graduated from France as an agronomist and holds an MSc in agroforestry from Bangor University (UK - 2011). His MSc. thesis was done at the World Agroforestry Centre - ICRAF on local agro-ecological knowledge of tree cover change in the Blue Nile Basin, Ethiopia. He then served as an agroforestry project officer for development NGOs across the Sahel, primarily in Senegal, Burkina Faso, and Ethiopia. He is now the director of the French Agroforestry Association where he works on developing partnerships at all geographical scales to strengthen and encourage the transition towards a more sustainable agriculture that creates “fertile soils in fertile landscapes” He is also a member of the European Agroforestry Federation (EURAF).

**Eugene Curran**

Eugene studied forestry in University College Dublin . After graduating he worked for the Forest and Wildlife Service in the area forest management. He then worked with Coillte and spent most of his time in research. In 1994 he moved to the Forest Service, Department of Agriculture Food and the Marine, and is working as District Forestry Inspector in the South West of Ireland. His main duties include processing applications for grant aided forestry plantations, processing felling licences, monitoring tree health and promoting agroforestry in Ireland.

**Dirk Freese**

Dirk works at Brandenburg University of Technology Cottbus-Senftenberg as head of Multifunctional Landuse Group; acting head of chair Soil Protection and Recultivation. He holds PhD in Agricultural Science, habilitation in Soil Science, both from Humboldt University Berlin. His research is focused at sustainability assessment of land use systems, sustainable soil management strategies, foresight and scenario development in agriculture, research impact assessment.

**Zsolt Keserű**

Zsolt Keserű is a senior scientist and Head of department at National Agricultural Research and Innovation Centre, Forest Research Institute, Püspökladány Experimental Station, Department of Plantation Forestry, Hungary. His main activities and responsibilities are in plantation forestry and agroforestry. He is member of the Public Body - Hungarian Academy of Sciences, president of Hungarian Academy of Sciences-Regional Committee in Debrecen, Working Committee of Forestry, Nature Conservation and Game Management and Honorary Associate Professor, at University of Debrecen, Faculty of Agriculture.
How can policy foster agroforestry towards climate change adaptation?

José Ramón Guzmán Álvarez
Forestry Engineer, working at the Regional Ministry of Environment in Andalucía (Spain). Phd in Agronomy studying the History, Geography an Ecology of Olive landscapes in Andalucia. Dealing with mediterranean Agroforestry system as technician involved in the application of Andalusian law for dehesas and as Director of Life bioDehesa (LIFE 11/BIO/ES/000726), taking part as well as representative in projects Life MONTADO ADAPT and POCTEP SUDOE PRODEHESA MONTADO.

Ganna O. Lobchenko
PhD in agriculture sciences (2015), topic of the PhD thesis is “The Phytoindication of Windbreaks of The Right-Bank Forest-Steppe zone of Ukraine”. Assistant professor of Forest Restoration and Meliorations Department at National University of Life and Environmental Sciences of Ukraine (Kyiv, Ukraine). Co-founder and Secretary of NGO “Ukrainian Agroforestry Association”.

Nikolaus Lienbacher
He studied forestry at the University of Natural Resources and Life Sciences in Vienna, has a PhD in law sciences, and an MBA in public management. Nikolaus works at the chamber of agriculture since 1985, which he is directing now for 20 years. His background offers him a wide knowledge in forestry, agriculture and agricultural policy. Main tasks of the chamber of agriculture are to represent the interests of the members and giving advice in production and business economics. As a national expert he published a monograph about legal restrictions of forest property. Nikolaus is founder of the initiative “Resources Forum Austria”. Their goal is to raise awareness for resource efficiency in industry and economy.

Özgür Balci
In 1999 he graduated at Istanbul University, Department of Forestry Engineering. In 2002 he started to work as a chief of operation in the local organizations of the General Directorate of Forestry. In 2011 he was appointed to the Directorate General of center Herbal Products Branch Manager. He still work on this mission and he is also a board member of the Chamber of Forest Engineers.
Anastasia Pantera

Anastasia Pantera is professor at the Department of Forestry and Natural Environment Management, TEI of Central Greece, at Karpenissi, Greece. She has a Doctoral diploma on Agroforestry from Aristotle University of Thessaloniki and a M.Sc. diploma from Purdue University, USA on Forest Ecology and Biology. She has worked as a forested for the Hellenic Forest Service. She served as the Head of the Research Sections “Environmental Pollution Control” and “Forest Genetics and Development”, of the Technological Research Center of Central Greece. She has organised six (6) stakeholders groups meeting throughout Greece on agroforestry. She has coordinated 8 research projects on agroforestry, forest ecology, ecology and vegetation, environmental education, long-distance learning and participated in 12 as team member on climate change, land rehabilitation after forest fires and on environmental education. She has taught courses on agroforestry, forest soils, forest ecology, and forest vegetation. She has over 120 publications in scientific journal, conference proceedings and books. She acts as scientific editor in two international scientific journals. She was invited speaker in 14 conferences. She had a scholarship from the National Scholarships Institution (IKY) for postgraduate study abroad. Since 1993 she is a member in the Honorary Scientific (Honorary Society) American Company “Xi Sigma Pi”

Robert Borek

Robert is agronomy engineer working in Institute of Soil Science and Plant Cultivation - State Research Institute (IUNG-PIB) in Pulawy, Poland. Since 2014, he is involved in policy-making in agroforestry, working for European Agroforestry Federation (elected national delegate). He initiated Polish movement of agroforestry, that resulted in establishment of Polish Agroforestry Association in June 2015, which he is the chair of. He is working in different transdisciplinary research projects involving farmers and advisors, related to climate-smart agriculture (LCAgri), agroforestry (SustainFARM, AFINET) and bio-economy strategy (BioEcon). On behalf of IUNG, he is involved in EIP-AGRI Operational Group “Agroforestry in the Zielava Valley” funded by Polish RDP Programme. The research activities in Poland are carried out jointly with works and expertise being performed for Ministry of Agriculture and Rural Development, supervising IUNG-PIB.
How can policy foster agroforestry towards climate change adaptation?

Patrick Worms
Patrick Worms trained as a molecular geneticist and is the Senior Science Policy Advisor of the World Agroforestry Centre, the world’s premier research institution studying the roles of trees in agricultural landscapes. He serves as President of the European Agroforestry Federation, as a member of the steering committee of Initiatives for Land, Lives and Peace, and as a Trustee of AFS Magyarország, among others. Patrick’s work sits at the nexus of land restoration and human security; the evidence is mounting that the clever marrying of traditional and advanced knowledge is the most promising pathway to a resilient rural prosperity, a giant help to mitigate our impact on biodiversity and the atmosphere and, tantalizingly, peace in a warming world.

Ľudmila Marušáková
As the head of FOREST EUROPE Liaison Unit Bratislava and a Policy Advisor, she is responsible for developing pan-European forest policy under the ministerial process known as FOREST EUROPE. Formerly she was working in the field of continuing education and training of forestry professionals, forest communication and forest related environmental education at National Forest Centre in Slovakia where she as a deputy director of the Institute for Forest Consulting and Education, coordinated international activities.
Practical information

Venue
The venue of the meeting is the Ministry of Agriculture of Hungary located in the city centre of Budapest, near river Danube. The session will take place in a conference room Darányi Ignác on the ground floor of the ministry. Registration desk and information point will be located near the entrance to the conference room. Guidance to the room will be provided in the entrance of the Ministry. For security reasons please take your identification document with you.

Address:
Ministry of Agriculture (Agrárminisztérium, see on map)
Kossuth Lajos tér 11
1055 Budapest
For more details, visit http://www.kormany.hu/en/ministry-of-agriculture
Language & Documents
The meeting will be conducted in English. The documents for the meeting will be provided in English and delivered in due time.

Meals
There will be coffee breaks and lunch during the meeting offered by the organisers. Dinner will be provided by the organisers on Tuesday, 9 October 2018 at 19:00 in the Ministry of Agriculture.

Arrival Details

Budapest Airport
The Ministry of Agriculture is situated cca. 22 km from Budapest Airport. Information about several transport options to the city centre can be found at the following website: https://www.bud.hu/en/passengers/transport

A direct bus line (100E) connects the airport with the city centre to Deák tér (Passengers can only use the front door to get on the bus). The first bus leaves from the airport each morning at 05:00, and the last one at 0:30. Bus 100E stops at the BKK bus stop at the airport between the two terminals on the arrival level. Passengers may get off the bus going to Deák tér at Kálvin tér and at Astoria. Going to the airport from the centre, the bus leaves from Deák tér every thirty minutes from 04:00 to 23:30. Bus 100E going to the airport only stops at Kálvin tér, but the first two in the morning will also stop at the Astoria M bus stop.

Tickets for public transport
A special ticket must be purchased for bus 100E for HUF 900 - other tickets or season tickets are not valid for this service. Tickets for public transportation priced 350 HUF are available at the airport from BKK at its customer service points, from the post office, the newsagents (Relay) and from ticket machines at the bus stop. It is also possible to purchase a ticket from the bus driver for 450 HUF. The post office is located on the mezzanine level of Terminal 2A, where 24 and 72-hour, weekly and monthly travel passes for Budapest public transport are also available. Newsagents only sell single tickets, 10-piece ticket booklets and short section tickets. The easiest way to approach the Ministry of Agriculture by public transport is to take Metro line 2 (M2) and get off at Kossuth Lajos tér (Kossuth Lajos square). The Ministry of Agriculture is right in front of the Parliament. We can also recommend to call Főtaxi (+36 1 222 2 222). A ride to the city centre should typically cost around 7500 HUF (25 EUR) depending on traffic conditions.
The Western Railway Station in Budapest (Nyugati Pályaudvar)
The closest railway station to the Ministry of Agriculture is situated just 1 km (12 minutes by walk) from The Western Railway Station (Nyugati Pályaudvar). The easiest and fastest way to approach it is on foot.

The Eastern Railway Station in Budapest (Keleti Pályaudvar)
In case of arrival to this train station, the centre is easily accessible by Metro line M2, from the stop Keleti Pályaudvar. M2 stops at Deák tér (centre) as well as Kossuth Lajos tér, where the Ministry of Agriculture is located. The ride takes about 10 mins.

Travel by car
There is a garage available close to the Ministry of Agriculture, called Liberty Square Parking (Lipót Garázs). The garage is situated below ground at Szabadság tér. The fee is 250 HUF / 30 min (Daily Maximum HUF 6 000, cca 20 EUR). The ministry is only 400 m away (5 mins walk).

Visa Information
Participants are responsible for checking visa requirements and making their own visa arrangements before departure, including visa for transit or stopover. For further information regarding to visa requirements please visit the website of the Consular Services of the Ministry of Foreign Affairs: http://konzuliszolgalat.kormany.hu/en

Currency
The official currency in Hungary is Forint (HUF). Foreign currency can be exchanged in banks or exchange offices (1 EUR = about 320 HUF). Credit and debit cards (Visa, Visa Electron, Eurocard/Mastercard, Maestro, American Express, Diners Club) are widely accepted.

General Information
For general information about the city and the country, please visit the following webpages: http://www.visithungary.com/

Weather Forecast
How can policy foster agroforestry towards climate change adaptation?

Field trip to visit agroforestry demonstration plots in Hungary
13,30 - 15,30 Agroforestry experimental area
Bus transfer from the Ministry of Agriculture to the demonstration plots

Agroforestry experimental area
NARIC Institute of Agricultural Engineering (NARIC MGI)
2100 Gödöllő, Tessédik Sámuel 4.

Route of the field program

Speakers:
István Bácskai - head of department, NAIK Institute of Agricultural Engineering
Veronika Honfy - assistant junior scientist, NAIK Forest Research Institute
Zsolt Keserű - head of department, NAIK Forest Research Institute
Understanding the Contribution of Agroforestry to Landscape Resilience in Europe

The intercropping trial is located in the area of the NARIC Institute of Agricultural Engineering (NARIC MGI) in Gödöllő. From the Ministry of Agriculture (Budapest, Kossuth Lajos tér 11) it takes about 35 minutes to get there (34 km). The experiment was established in cooperation between the two institutes (NARIC MGI and NARIC ERTI).

The experiment formerly was an energy tree plantation with the species of hybrid poplar and black locust. The planting spacing was 3.0 x 0.5 m.

This short rotation energy tree plantation has been converted to an intercropping agroforestry trial for two years. Based on the existing stand we established the current row and in-row spacing:

- The planting spacing for black locust is the following:
  - row spacing: 9, 15, 21 meter; in-row spacing: 1, 2, 3 meter
- The planting spacing for hybrid poplar is the following:
  - row spacing: 9, 12, 15 meter; in-row spacing: 2, 4, 6 meter

In the experimental area triticale was sowed as companion crop in 2017.

In this experiment we will investigate mainly soil moisture, carbon cycle, light capture and root growth, as these factors are remarkable in researching and mitigating climate change. It is important to investigate and determine the relation between the trees and the companion crops including agroecology, yield (production) and economy.

The Hungarian National Agricultural Research and Innovation Centre's (NARIC) Forest Research Institute (FRI) Department of Plantation Forestry started to study agroforestry systems and constructed its first trials in 2014. Since then further experiments have been set up and the institution has started to spread the knowledge of agroforestry, its characteristics and specialities, through agricultural and forestry forums and conferences, based on international literature, and examples. The aim is to establish trials across the whole country, to be able to study different sites where profitable plantation forestry and agroforestry technologies can be tested under the ecosystem of Hungary, providing models, and options to forestry and agriculture in marginal areas.
16,00 – 18,00 Excursion – Pilis Park Forestry Company, Valko Forestry Unit

**Theme:**
According to the research, continuous cover forest management (CCF) can achieve at least the same economic efficiency as traditional rotation forest management (RF) in Turkey oak stands.

**Speakers:**
- Mr. Peter Csépányi - Chief engineer of production and nature conservancy, Pilis Park Forestry Company
- Mr. Ferenc Magyar - Leader of Valkó Forestry Unit, Pilis Park Forestry Company
- Mr. Bence Kiss - Forest manager, Valkó Forestry Unit, Pilis Park Forestry Company

The regeneration problems occurring in poor quality sites in Turkey oak stands made visible the economic differences between the two management systems investigated. Silvicultural regimes in the light of climatic changes.

- **RF in Turkey oak stands** (clearcut, artificial regeneration)
- **CCF in Turkey oak**

The assessment area in 4th yield class Turkey oak stands between CCF and RF systems was situated at the Valkó Forestry Unit in the Gödöllő Hills, 150-250 m above sea level. The annual mean temperature here is 10.2 °C and the annual precipitation is 540 mm. Severe heat and drought occur here annually in July and August; artificially planted seedlings are often scorched at this time. The six subcompartments were in the administrative area of the Dány settlement and the total area was 43.4 ha. The RF system in the clearcutting with artificial regeneration in the Dány 25B, 40A, 40C subcompartments has an assessment area of 15.1 ha. The RF system in regeneration cutting with natural regeneration has an assessment area of 16.3 ha in the Dány 11C, 44E subcompartments, and the CCF system has a 12.0 ha area in the Dány 28A subcompartment. The subcompartment data originate from the management plan of Valkó Forestry Unit 1990-2011.

**Turkey oak stands in RF system – clearcutting with artificial regeneration**

Subcompartments: Dány 25/B (4.59 ha), Dány 40/A (5.54 ha) Dány 40/B (4.37 ha) Dány 40/C (5.23 ha)

In the case of Turkey oak clearcutting, the regeneration was intended to start naturally, but the seedlings completely perished because of cockchafer grub damage. Therefore, a total soil preparation was done and artificial regeneration was initiated. The soil was sterilized with pesticide concurrently.
with a deep ploughing. A further goal of the total soil preparation was to improve the hydrology of the dry sand. Primary planting was done with one-year-old Turkey oak seedlings mixed with sessile oak and small-leaved linden. On top of this, grey poplar (Populus x canescens Sm.) was planted as a shading layer because practice showed that grub damage ends after the closure of the regeneration. Due to the faster growth rate of grey poplar and interrow discing, the shading layer became established in the second year, which prevents the sand from heating up lessening the damage of heat demanding grubs. Soil sterilization was done in a part of the area in the fourth year; during the replacement of grub damaged seedlings, pesticide was applied to the root zone. Root development of the rapid growing poplars is more intensive as well, so they can provide an alternative food source under the ground, thereby protecting the target species of the stand from total destruction. The shading layer of grey poplar is gradually cleaned out during the development of the reforestation; the grey poplar can also disappear completely by the age of 15–20 years. Continuous soil cultivation between the rows of the reforestation is important as it aids the growth of trees by supressing weeds. Establishment regeneration cost values in the case of RF systems exceed the national average on a bigger scale in the case of artificial regeneration because of the site conditions and different damage types (Nagy 2013). Based on the references, the establishment cost value of reforestations on terrain accessible with machines was 522,000 HUF/ha in case of acorn planting (7th year). In our examination the cost of artificial regeneration with seedlings was 1,680,000 HUF/ha (in 7th year). These values can be found elsewhere as well, mainly in cockchafer grub damaged areas (Babics 2014).

**Turkey oak stands in RF system – regeneration cutting with natural regeneration**

*Subcompartments: Dány 11/C (6,66 ha), Dány 29/B (16,56 ha) Dány 39/A (13,32 ha)*

In the Turkey oak regeneration cut with the shelterwood system, seedlings disappeared after the completion of the first preparatory cut (resulting in a 70-75 % closure). A grub exploration was done; sample ditches showed a high number of larvae (2-4 pcs/m2). An artificial replacement was also essential with acorn and seedlings, as well as soil sterilization. The first preparatory cut was done very early compared to the time of the final cut (normally 3-5 years); the reason for this was the annual development and recession of the regeneration layer. This experience showed more mother trees in a shelterwood system had to be maintained as they are necessary until the regeneration layer reaches high closure; otherwise, it is possible that the seedlings disappear due to cockchafer grubs. Accordingly, the harvesting of the mother stand was carried out in several steps considering the development of regeneration. Establishment regeneration cost values in the case of RF natural regeneration is higher than the national average in a smaller scale (Nagy 2013), which in the case of natural regeneration was 510,000 HUF/ha in the 9th year old regeneration. For natural regeneration, we got a reduced initial cost of 721,500 HUF/ha (in 9th year) due to the extremities of our sites.
Turkey oak stands CCF system

Subcompartments: Dány 26/C (2.74 ha), Dány 28/B (11.96 ha)

The Turkey oak CCF management at the beginning of the 1990s was started as a natural regeneration with the shelterwood system. Afterwards, however, the regeneration under the stand disappeared almost completely in more opened up areas due to drought and cockchafer grub damage, in more closed spots it became thinner, so the natural seedling cover decreased significantly. Due to these conclusions in the early 2000s, the continuation of further operations used CCF principles in order to minimize risks. A few years later, new seed produce appeared and regeneration patches in smaller openings showed improvement and development. A regeneration patch is only opened up fully if a dense, well developed, and closed Turkey oak regrowth is present. Nursing of the regeneration patches and cleaning-like intervention in more developed groups, removal of wolf-trees, or non-native and invasive tree species like black cherry (Prunus serotina) are only required in some parts of the area. In the CCF system, trees in the upper layer were harvested gradually one by one or in small groups (2-3 trees) of single-tree and group selection, which results in spontaneous establishment of natural regeneration. It can be proved that by using this method the high additional costs caused by cockchafer grubs and drought damage can be avoided in the permanently present shelter of the mother stand, which provides protection through shading and seed production.
How can policy foster agroforestry towards climate change adaptation?

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