

Work-package group 4: Agroforestry for arable farmers

Specific group: Alley cropping in Hungary

Date of meeting: 29 Aug 2014

Date of report: 23 Oct 2014

Location of meeting: Fajsz, Bács-Kiskun County, Hungary

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AGFORWARD (Grant Agreement N° 613520) is co-funded by the European Commission, Directorate General for Research & Innovation, within the 7th Framework Programme of RTD. The views and opinions expressed in this report are purely those of the writers and may not in any circumstances be regarded as stating an official position of the European Commission.

1. Context

The AGFORWARD research project (January 2014-December 2017), funded by the European Commission, is promoting agroforestry practices in Europe that will advance sustainable rural development. The project has four objectives:

- 1) to understand the context and extent of agroforestry in Europe,
- 2) to identify, develop and field-test innovations (through participatory research) to improve the benefits and viability of agroforestry systems in Europe,
- 3) to evaluate innovative agroforestry designs and practices at a field-, farm- and landscape scale, and
- 4) to promote the wider adoption of appropriate agroforestry systems in Europe through policy development and dissemination.

This report describes one of about 40 initial stakeholder workshops to address objective 2. Further details of the project can be found on the AGFORWARD website: www.agforward.eu

2. Description of arable agroforestry systems in Hungary

Protective tree systems (shelterbelts and buffer strips on farmsteads or between arable lands) have been common practice in Hungary over recent centuries. The number of shelterbelts increased significantly in the 1960-70s, they fell in the following 30 years. The total registered area of shelterbelts in Hungary in 2001 was about 16 000 ha (Frank and Takács, 2012).

With the exception of traditional systems such as wood pastures and wood meadows, agroforestry technologies are not widely known in Hungary. Although there is significant interest in the benefits of agroforestry, there is a lack of basic knowledge about agroforestry practice and little information about stakeholders who have established systems. It is evident that there is a need for a national agroforestry network in Hungary to disseminate information and facilitate cooperation between agroforestry stakeholders. The extent of alley cropping in Hungary is not known, but it seems that it has not been widely adopted in Hungary, except in small gardens and orchards. Modern alley cropping systems seem limited to small farms or newly established pilot systems.

One example demonstration site of alley cropping is in Fajsz, Bács-Kiskun County, in the Hungarian Great Plain (46°40'51.41"North, 18°92'71.98"East). The agroforestry system consists of *Paulownia tomentosa* var. *Continental E*. in rows and alfalfa as intercrop. The total area of the experimental and demonstration site is 2 hectares, one hectare of which is alley cropping, and one hectare of alfalfa managed as a monoculture (Figures 1 and 2).



Figure 1. The location of the experimental alley cropping system in the map of Fajsz



Figure 2. The on-site discussion of arable agroforestry systems took places at the experimental alley cropping system at Fajsz

3. First Hungarian Agroforestry Forum

The initial stakeholder workshop, described here, was organised alongside the First National Agroforestry Forum in Hungary. The workshop provided an introduction to the concept of agroforestry and an overview on the state and potential of agroforestry in Hungary and across Europe. This was followed by discussions on a wide range of agroforestry issues, and on-site demonstrations.

About 17 stakeholders (not including presenters) originally registered for the meeting and the field trip, but the final number attending was higher (Figure 3). Sixteen stakeholders completed a survey

form, nine of them indicated that they were involved in arable agroforestry management and five said that they were already managing an agroforestry system. There was a broad age range with four people aged 20-35 years, seven aged 35-50, and five aged 50-65 years. The gender mix was three women and thirteen men. The stakeholders represented most of the regions of the country. The area of the systems represented are relatively small, typically 1-2 ha with native tree species (mainly poplar) and maize or vegetables such as carrots and potatoes as intercrops. Some of the participants were managing other types of agroforestry systems such as wood pastures, wooded meadows, or multipurpose orchards. The positive feedback from participants and fruitful discussions at the workshop suggest it was a successful start of cooperation on agroforestry within Hungary.



Figure 3. The “agroforestry system for arable farmers” field visit

4. Introduction session

The meeting commenced with an initial introduction to agroforestry systems, followed by a field visit and discussion. The introductory session was hosted by Kek Duna from the Agricultural Cooperative at Fajsz, located in the Great Hungarian Plain. The meeting was held on 29 August 2014 between 10.00 and 13.00 and included five presentations. These were given by Prof. Béla Marosvölgyi (University of West Hungary, KKK and AGFORWARD project), Zolt Keserű (National Agro-Innovation Centre), Norbert Frank (Institute of Silviculture and Forest Protection, UWH), Tamás Decsák (Ministry of Agriculture, Department of Forestry and Wildlife Management), and Andrea Vityi (NyME, KKK).

To open the meeting, Andrea Vityi and Prof. Marosvölgyi described the state of agroforestry in Europe and in Hungary, and outlined the objectives of AGFORWARD project including the intention to set up a national network of stakeholders and the purpose of the stakeholder workshops (Marosvölgyi, 2014; Vityi, 2014) (Figures 4 and 5a).

Zolt Keserű, Head of the Agroforestry Research Department of the National Agro-Innovation Centre (NAIK), provided the audience with a comprehensive discussion on agroforestry systems in general and outline the role of NAIK in promoting agroforestry in Hungary (Keserű, 2014) (Figure 5b).

Figure 6. a) Norbert Frank described the role of shelterbelts, and b) Tamás Decsák describes the currently planned agroforestry measures, from the perspective of the Ministry of Agriculture

Norbert Frank from the University of West Hungary summarised the past and current state of shelterbelt systems explaining how windbreaks and forest belts work as natural protection and yield enhancing systems. He introduced the ongoing AGFORWARD research project and suggested that the applied methods could renew and improve the domestic shelterbelt system (Frank, 2014) (Figure 6a).

Tamás Decsák from the Ministry of Agriculture gave an overview on agroforestry related policy measures and support schemes. He spoke about the planned maximum aid intensities, but highlighted that preparation of the National Rural Development Plan and related support system are still in progress, though calls for the establishment of agroforestry systems should open in the following year (Decsák, 2014) (Figure 6b).

Stakeholders present in the plenary session and during discussions gave their opinions, described their experiences and made suggestions on the next steps. The content of these oral discussions - mostly matched the written responses in the questionnaires and are summarised in this report.

5. Field visit

The field visit and on-site discussions around arable agroforestry occurred in the afternoon at the newly established experimental alley cropping system near to the ranch of the local cooperative which is in the southern part of the village (Figure 1). The leader of the local cooperative, Istvänné Vityi, introduced the system and summarised the aims and expected outcomes (Figure 7).



Figure 7. Leader of Kék Duna Agricultural Cooperative, Istvänné Vityi, (on the left) hosted the AGFORWARD workshop at the experimental agroforestry site of the local cooperative

From the site discussions it was evident that a number of the participants had not seen such a system before. Shelterbelts on arable lands were widely known, but alley cropping systems were not, therefore several questions arose concerning its technical/technological aspects, along with management and economic issues.

Some of the participants were interested in the motivation of our choice as the used tree species in this demonstration plot is not a native one (*Paulownia tomentosa* var.). The presenters explained that this variety was selected because of the Hungarian climate conditions, and because of the high yields and good resistance shown in earlier bio-energy experiments. The principal purpose of the experimental site was to test the effect of the agroforestry system on microclimatic conditions, and the effect on crop yields compared to a control area of single crop management. The selected *Paulownia* var. has shown fast growth under local conditions, thus test results can be expected in a shorter period.

Although shelterbelts and wind breaks are common on arable land in Hungary, other types of arable agroforestry systems are uncommon. Cooperation between specialists, interest groups, and stakeholders with an interest in arable agroforestry systems could help promote agroforestry. The national forum created through the AGFORWARD workshop was recognized by participants as the first step towards establishing a national stakeholder community of agroforestry.

Participants raised several questions during and after the introductory session of the workshop. Although many questions were answered, there were some uncertainties and skepticism among farmers and other stakeholders on issues including legislative burdens, the technical/technological feasibility, and return on investment. A need for further discussion and dissemination of information was recognized.

The discussions indicated that the operation of arable agroforestry systems is impeded by legal provisions which in many cases prevent and prohibit indirectly establishment of this kind of farming. According to current regulations, where a farmer has arable land, he can only apply for government support for agroforestry if the land is also converted to grassland. It is then practically impossible for the land owner to then return the agroforestry land back to arable cropping, which is a large disincentive. The regulations concerning common agricultural policy (CAP) subsidies also appeared to discourage farmers from managing agroforestry systems.

6. Written responses

The participants were asked to complete a brief questionnaire, which sought to highlight the key positive and negative aspects of arable agroforestry systems. Eleven persons filled out this part of the questionnaire. One person who did not complete felt that it was too simplistic. In the end, only one participant completed the form in a consistent way. He ranked the positive aspects as: 1) climate moderation, 2) crop production, 3) income diversity, 4) soil conservation, and 5) subsidy and grant eligibility. The negative aspects according to this respondent were ranked as: 1) disease and weed control, 2) project feasibility, 3) labour, 4) tree regeneration/survival (protect trees against wild animals), and 5) mechanisation. The rankings provided by the respondents were difficult to interpret, but it was still possible to sum up the “ticks” that respondents apportioned to positive and negative aspect.

Fourteen respondents gave a written answer to the question: “what constraints and challenges could be addressed by changes to an existing agroforestry system or establishing a new agroforestry system”.

Legal and administrative background

One respondent stated that one of the most significant barriers to the establishment of a new agroforestry system or change to an existing one is the recent legal background. As mentioned by Marosvölgyi (2014), agroforestry systems can be 'ex-lex' (lawless) since they are not defined clearly by the law. One respondent highlighted the fact that it is difficult for farmers to interpret the law. Therefore stakeholders are uncertain about the rules concerning the establishment/management of agroforestry systems, and consequently are afraid of the consequences of inadvertently unsatisfying the legal requirements. One stakeholder indicated that agroforestry systems are automatically declared as forest by the forestry authority because of the high density of trees. However Andrea Vityi commented that current national regulations allow arable land to remain agricultural if the tree density is less than 150 tree/ha but it was likely that the arable land would need to be converted to the grassland/pasture land.

Technical/technological issues

Nearly half of the respondents suggested there are a number of technological barriers. Some felt it is difficult to find the most effective technologies for harvesting (where finding agricultural harvesters in agroforestry systems and employing farm workers may be problematic), plant protection, cultivation and weed control. The fact that farmers need to check for the compatibility of species and site conditions makes it even more complicated. Purchase of propagating material, selection of planting structure/ method of cultivation/maintenance is also considered complicated by farmers. Last, but not least, agroforestry technologies required a new systems approach.

Ownership of the land, land use conflicts

Four respondents indicated that land conversion and ownership issues may restrict changes to an existing agroforestry system or establishing a new agroforestry system. It was felt that in some areas, property rights were unclear or the area required for agroforestry systems belonged to many individual owners or has joint ownership. Likewise land-use conversion, say between arable land and pasture, may halt agroforestry practices. One respondent felt that the existing large-scale farming system currently presents a barrier.

Conflict of interests

Two respondents mentioned that another constraint could be the conflicts of interests between nature conservationists/foresters and farmers on ecological target territories. This presents a barrier that is very difficult or sometimes impossible to overcome.

Financial support

The lack of financial support or proper support schemes was mentioned in two responses. The uncertainty and relative short duration of agroforestry regulations and grants could result in an unprofitable and unsustainable system in the long term.

Interest and knowledge

Two respondents suggested there is a shortage or lack of availability of knowledge. An additional two respondents felt that there is a strong need for more intensive communication and dissemination of information, which may require introducing agroforestry into the education system. Another respondent felt that the main problem is the lack of interest, entrepreneurial spirit and confidence in agroforestry systems as well as the loss of knowledge and forgotten experiences of the past.

High initial costs

One respondent highlighted that expenses can be high as the agroforestry system matures.

7. Potential research themes

Ten respondents gave written responses to what were potential solutions or research themes. Unless indicated, the solutions were indicated by one respondent.

Potential solutions

- Review and modify the legislative background, refine/modify regulations (2 respondents).
- Introduce new land-use categories and change the definitions.
- Regular share experiences among farmers, researchers and developers.
- Resolve of conflicts in interest.
- Direct payment not only for establishing, but also maintaining the system (Long-term).
- To foster sustainable management measures.

Proposed research areas

The potential research themes were grouped under environmental, technical, economic and “other” categories. Unless indicated, the research areas were indicated by one respondent.

Research on environmental issues were indicated by eight stakeholders:

- how to integrate agroforestry systems effectively in the given agricultural conditions (2 respondents),
- effects on biodiversity in general,
- crop combination tests for examining the effects on biodiversity, and
- how to increase yield security in a sustainable way.

Research on technical issues were suggested by two stakeholders:

- crop combination tests to increase yield security, and
- establish new agroforestry test systems for technology development for unirrigated land

Research on economic issues was suggested by three respondents:

- the need for research on economic aspects in general,
- the analysis of the economics of agroforestry systems with a focus on the implications of land conversion, and
- an economic and sustainability analysis of yield security.

The other two potential research areas mentioned were:

- development of technology register of agroforestry systems , and
- gaining experience by establishing and maintaining pilot agroforestry systems in different landscapes.

Conclusions of the qualitative written responses

The qualitative findings suggest the challenges to operating a successful agroforestry system are predominantly of a legal or technical nature. The main challenge is the lack of supporting legal background which presents a practical barrier. Operational and management issues play only a secondary role unless there is a lack of opportunity to legally establish or manage agroforestry systems. These legal barriers will remain unless there is change to the legislation, but so far there has been no strong national lobby to champion such change.

Some of the technical/technological challenges originate from the loss of traditional knowledge and the lack of information on best practice. Farmers consider agroforestry to be highly complex, which discourages establishment. Those who are already involved in managing agroforestry systems tended to focus on the opportunity to increase/improve yield security (on lands without irrigation or as a climate change adaptation strategy) and to effectively adapt to the local conditions in respect of issues such as crop mixes and plant protection.

8. Potential innovations

During the discussion with stakeholders some potential future innovations were suggested for Hungarian arable systems. These are expected to contribute to more effective system management and/or essential experiences useful for both farmers and researchers:

- Test and compare different methods of weed control to find out the best practice under local conditions/circumstances (e.g. covering by different natural and artificial materials available locally)
- Test the effect of different tree management methods (edging and pruning) on intercrop yields and quality
- Market analysis on potential products from arable agroforestry systems

9. Next steps

The First National Agroforestry Forum of Hungary was the initial step to building a national agroforestry network using the support of AGFORWARD project. Stakeholders present at the workshop were the founding members of this network. Additional stakeholders, who could not make the meeting, have also expressed their interest. Of the sixteen people that completed the questionnaire, thirteen indicated that they would be interested in supporting research related to agroforestry on arable lands, and all of them would like to receive information concerning the AGFORWARD project, and general or special issues on agroforestry systems. There is also high interest also in “best practices in agroforestry” from different countries across the EU. The Hungarian partners of the AGFORWARD project plan to actively engage stakeholders in the development of the project and promote close interaction among network members by disseminating relevant pieces of information in Hungarian language, and regularly organizing round-table discussions, farmers’ meetings, and on-site demonstrations.

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11. Acknowledgements

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