



## Initial Stakeholder Meeting Report Alley Cropping Systems in Germany

**Work-package 4:** Integrating trees into arable systems

**Specific group:** Alley cropping systems in Germany

**Date of meeting:** 28 August 2014

**Date of report:** 19 September 2014

**Location of meeting:** Peickwitz, Senftenberg, Brandenburg, Germany

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### Contents

1. Context.....	2
2. Description of the system .....	2
3. Participants .....	2
4. Introduction session.....	2
5. Field visit .....	5
6. Ranking of positive and negative aspects .....	7
7. Qualitative written responses.....	8
8. Next steps .....	9
9. Acknowledgements.....	9



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](http://www.agforward.eu)

## **2. Description of the system**

Agroforestry for arable farmers is not yet common practice in Germany. Recently, alley cropping systems for woody biomass production came into focus in the country due to its high potential to concurrently provide biomass and agricultural crops. In Germany, alley cropping systems combine rows of fast growing trees, for example, poplar or willow, with agricultural crops. However, this system currently only exists at the experimental field level. The aim of the meeting was to discuss the limitations and potentials for establishing an alley cropping system at the farm visited, which was to be conducted in the spring of 2015.

## **3. Participants**

The meeting was attended by 18 stakeholders in total and presentations were given by six of them. The meeting was organized jointly with the project AUFWERTEN of the BTU Cottbus-Senftenberg, and focused on facilitating the implementation of agroforestry in Germany. There were three representatives from BTU Cottbus, two from Biomasse Schraden e.V., two from a tree nursery (P&P Baumschule), two from the Ministry of Environment, Health and Consumer Protection, three from farmer associations in Brandenburg, two from a nature protection organization (NABU), three farmers, and one administration representative.

## **4. Introduction session**

The meeting comprised an initial introduction session (Fig. 1) and a field visit (Fig. 2 and 3). The meeting was hosted by Mr. Thomas Domin at his farm in Peickwitz, Brandenburg and organised by Biomasse Schraden e.V. The meeting started at 9.30 am and ended at 2.00 pm.



**Figure 1.** Photo of the initial discussion in the morning session

The morning included presentations by Thomas Domin, Christian Böhm (BTU Cottbus-Senftenberg), Jaconette Mirck (BTU Cottbus-Senftenberg), Rudolf Vögel (LUVG (the Ministry of Environment, Health and Consumer Protection)), Ulrich Böhm (LBV (Farmer Association of Brandenburg)), and Katrin Lutze (Neuholland), and was followed by a brief discussion.

**Thomas Domin** introduced his farm, which has been in operation since 1993 and managed by himself since 1997. The size of the farm is 277 ha of which 24 ha is pasture land and 30 ha is managed as forest. The quality of the soil is very low, classified with 20 points according to the German index for soil productivity (maximum is 100 points). There is a biogas plant on the farm, and the main crops planted including cereals, corn, sunflower, are used in the biogas plant. These crops are used as forage as well, which has stimulated the farmer's recent interest in agroforestry specifically with respect to ecological benefits such as microclimate improvement and erosion reduction.

**Christian Böhm** gave a presentation including a definition of agroforestry, the importance of the interactions between the components of the system and the positive effects of the trees. Some examples of agroforestry systems were shown including traditional silvopastoral systems typical for the region of Spreewald, but also extending to modern alley cropping systems with strips of fast growing trees for energy production. Afterwards the current legal conditions were described and the limitations for establishing alley cropping systems were discussed. Some examples were shown where establishing agroforestry would be meaningful like areas prone to erosion or cleared landscapes. Subsequently, results of annuity based on Christian's calculations were shown suggesting that planting fast growing trees can generate some profit for the farmers in the region even if the yield of trees is low. Finally, the goals of the AUFWERTEN project were briefly presented.

After the presentation more information was required regarding the density of the trees planted which was set at 10000 trees ha<sup>-1</sup>. A representative of Biomass Schraden e.V. suggested that before a farmer considers planting fast growing trees for biomass production it is crucial to get in contact in order to obtain the necessary information regarding actual costs and to be linked with potential buyers. A subsequent question was about the duration of the project, which was funded for four years. This is one of the problems for agroforestry; most research projects are only for the short-term (3 or 4 years), but a comprehensive agroforestry study requires long-term funding.

**Jaconette Mirck** introduced the AGFORWARD project: the main goals, the partners involved and provided several examples of agroforestry systems across Europe. The aim of the Participatory Research and Development Network (PRDN) was outlined and the different sectors introduced. A question was raised whether the planting costs for establishing new systems for research purposes was funded by the project. Another point of discussion was the reasons why in some EU countries, like France, agroforestry is more successful than in other countries e.g. Germany.

**Rudolf Vögel** presented a short review of the historical wooden cultural elements in the German landscape and implied that it was important to preserve the knowledge from the past. It was stressed that next to the multiple production function secondary production of ecological benefits like soil protection, habitat creation and landscape is provided by these elements. Some characteristics of the modern agroforestry systems were also discussed. Challenges for agroforestry systems with short rotation coppice are high establishment costs due to herbicides and pesticides and fertilizer, low biodiversity, short rotation cycles, one-sided orientation for production of energy wood utilization, no possibility for multiple uses. Technical problems with existing machines were discussed. Moreover, the systems are planted now but in 20 years other technical advances will be made. It is still unclear which distance between tree rows is optimal. Possible compromises can be made in terms of reducing expenses through shorter transportation distances, also long-term utilization of the system should be allowed. Additionally multiple clones are required to reduce the risk of crop loss, and the competition between the system components (woody and crop) should be minimized.

After the presentation the concern was raised that due to a lack of knowledge some discrepancy was observed between actual practice and nature protection goals; therefore, it is urgently necessary to improve farmers' awareness. Also it was noted that while the multiple usage was shown as a priority for agroforestry, it is currently not allowed by the existing regulations and the focus should be set on changing them.

**Ulrich Böhm** explained briefly the funding possibilities for agricultural areas in the region. The support from EU had been reduced in recent years and it was advisable for farmers to follow the market closely to assess the impacts on profits. Since August 2014 there is a new regulation for renewable energy of which the positive and negative sides were discussed.

In the discussion that followed, there was some concern raised around if the allowed tree species under current regulations were planted, then would financial support be guaranteed. It was noted by someone that in Germany there are only seven tree species that were allowed as part of supported agroforestry systems. Another question was if the planting period can be longer than 20 years (Note: the fast growing tree species are usually harvested in 3-6 years rotation cycles for a period of 20 years before the yields start to decline).

**Katrin Lutze** provided a presentation on her farmland consisting of 1380 ha of agricultural area and 850 ha of pasture land. A brief history of the area was given where a biogas plant has been in operation since 2006. In 1968, 61% of the area was classified as erosion sensitive and in 1970-77 windbreaks were established. They were afterwards not maintained, which led to the current situation of having an old system with the total length of 22 km with gaps in the tree row. Another problem is that the system is located in a nature protected area. The consent of land owners was already secured for 11 km of this area where currently a discussion with BTU Cottbus is in progress for system rejuvenation. Furthermore, the provision of ecosystem services was mentioned.

In the discussion that followed, the factors for the greening measures were discussed with respect to agroforestry systems. It was noted that probably the establishment of windbreaks are easier because they are outside of the agricultural area. However, the establishment of agroforestry systems allowance from all land owners is necessary, which would be difficult to obtain as many farmers rent their land. The concern was raised whether after 20 years the roots of trees can be taken out without any problem. The windbreaks in Neuholland are not acknowledged as agroforestry systems, but as nature protection elements. It was stressed that long-term thinking is very important. Also the landscape near Berlin has high cultural value and attracts tourists for which it is important to have aesthetically pleasing structures. The problem was that in the past when the erosion risk was recognized the goal was to plant fast growing trees to ensure the quick establishment of protection. There was an expectation from the original plan that long-lived trees would be planted, but there were inadequate funds at the time.

## 5. Field visit

The participants then visited the field of Thomas Domin and a discussion followed regarding alley cropping, which was expected to start in the spring of 2015. A map of the area was used to discuss a potential development and associated constraints; printed examples of agroforestry were distributed (Fig. 2 and 3). The comments are summarized below.



**Figure 2.** Photos of the workshop conducted at the agricultural field in Peickwitz



**Figure 3.** Schematic plan of the proposed system

**Lease agreements:** a difficulty was that landowners have to be contacted and an agreement should be obtained in order to plant trees on their land. This is a very time consuming process. Therefore the farmer suggested planting agroforestry systems in locations where you have to deal with as few landowners as possible. The white lines in Figure 3 indicate the borders of land owned by different people. Planting on former roads is often a good solution.

**Regulation difficulties:** in order to comply with the greening measures it is important that the planted hedgerows occupy an area of at least 0.3 ha. When planting trees near water bodies no pesticides application is allowed up to 5 m near the water body, and only one-sided planting is permitted. Another problem is that the regulation for trees species allowed does not cover all species that are most suitable and sometimes even allows species that are not the best choice (seven trees are allowed: black locust, poplar, willow, birch, ash, oak and alder).

**Tree species:** the tree species selected are predetermined as mentioned above. It was discussed whether tree stands should be of mixed or a single species, dependent on the production goals and available technology. It was important that the proposed project could be used to substantiate changes necessary in the list of allowed species.

**Planting design:** it was considered whether the structures planted should be linear or possibly other shapes. Linear structures are easier to manage with the available technology, but field corners are generally not accessible by the machines, where round structures were considered a possible alternative. Another issue was the distance between tree within the tree rows, which is also dependent on the available technology, and based on the experience (current equipment) should amount to at least 24 m.

**Technical limitations:** the limited availability of machinery to small farmers was discussed. Also, the available technology allows mostly planting rows of the same species, but it is not adaptable to mixed stands, which involves intensive manual labour.

## 6. Ranking of positive and negative aspects

The participants were asked to complete a brief questionnaire which sought to highlight the key positive and negative aspects of agroforestry. The results from the forms entered in a consistent way are shown in Tables 1 and 2.

**Positive aspects:** the most positive aspect, identified by three people, was crop or pasture production. The positive effects on the general environment, soil conservation, and project feasibility were ranked as the most positive aspect by one person each. In fact soil conservation was also ranked second by two people, probably because this region in Germany was classified as erosion sensitive. Crop quality was also ranked second by two people, and landscape aesthetics was ranked second and third by individuals.

**Table 1.** Positive aspects of agroforestry as ranked by six participants

Aspect	Ranking by 6 participants						Summary
Crop or pasture production	1		7	1	1	2	3x1, 1x2, 1x7
Soil conservation	6	1	2	2	6		1x1, 2x2, 2x6
Project feasibility	3					1	1x1, 1x3
General environment			1	7	7	6	1x1, 1x6, 2x7
Crop or pasture quality/food safety	2		9		2		2x2, 1x9
Landscape aesthetics		2	3	5		5	1x2, 1x3, 2x5
Carbon sequestration				3	4		1x3, 1x4
Biodiversity and wildlife habitat		5		6	3		1x3, 1x5, 1x6
Animal health and welfare			8			3	1x3, 1x8
Income diversity			4				1x4
Climate moderation				4	5		1x4, 1x5
Management costs	4						1x4
Complexity of work	5		9				1x5, 1x9
Animal production			5				1x5
Relationship between farmer/owner		9	6				1x6, 1x9
Water quality	7			9	8	7	2x7, 1x8, 1x9
Business opportunities		7		8			1x7, 1x8
Profit	8	8		10	10		2x8, 2x10
Control manure, noise, odour						8	1x8
Subsidy and grant eligibility	9		10			9	2x9, 1x10
Farmer image					9		1x9
Rural employment	10						1x10
Tourism		10					1x10

**Negative aspects:** three negative issues were ranked first: the administrative burden, the management costs, and difficulties with mechanisation. Labour and regulation were also ranked as negative. The regulation and administrative burden were also discussed extensively during the practical workshop.

**Table 2.** Negative aspects of agroforestry as identified by three participants.

Aspect	Ranking by 3 respondents		Summary
Administrative burden	7	1	1x1, 1x7
Management costs	1	8	1x1, 1x8
Mechanisation	1		1x1
Labour	2	7	1x2, 1x7
Regulation	4	2	1x2, 1x4
Originality and interest	2		1x2
Reduced groundwater recharge	3		1x3
Marketing premium		3	1x3
Market risk	8	4	1x4, 1x8
Complexity of work		5	1x5
Project feasibility	5		1x5
Tree regeneration/survival	6	9	1x6, 1x9
Cash flow		6	1x6
Change in fire risk		10	1x10

## 7. Qualitative written responses

Six 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”.

The issues raised include the following:

- difficulties in interpreting the concept of agroforestry
- selecting the appropriate tree species and the correct distance between tree rows
- the long term duration of the system
- the lack of knowledge and utilization of historical experiences
- the problems with maintenance and rejuvenation of existing systems

Five respondents gave written responses to what were potential solutions or research themes. The suggestions include the following:

- testing of different tree species and different systems
- research in material and energy use of woody biomass
- long-term solutions should be a priority
- public relation work and networking should be implemented
- nature protection regulations for utilization
- maintenance of hedges should be put in place



## **8. Next steps**

Of the ten participants that completed the form, all indicated that they would be interested in supporting research related to establishing agroforestry in Germany.

## **9. Acknowledgements**

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