



# Initial Stakeholder Meeting Report

## Free-range pigs integrated with energy crops in Denmark

**Work-package group 5:** Agroforestry for livestock farmers

**Specific group:** Free-range pigs integrated with energy crops

**Date of meeting:** 30 June and 4 July 2014

**Date of report:** 4 Sept 2014

**Location of meeting:** With organic pig producer Brian Holm at Brørup, Denmark on 30 June, and organic pig producer Bertel Hestbjerg at Holstebro, Denmark on 4 July

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## 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. Introduction

Integration of trees with crops and/or livestock production (agroforestry) has been identified as a sustainable way to increase the productivity of land and to provide other ecosystem services and environmental benefits compared to disaggregated agricultural and woodland systems (Smith et al., 2011). We have previously found indications of a reduced risk of nutrient leaching from integrated production of free-range growing pigs and energy crops compared to the current pasture-based system (Sørensen et al., 2013). This is possibly caused by the deep root system of energy crops with large nutrient uptakes across a long growing season (Jørgensen et al., 2005). Additionally, the system seems to have some clear animal welfare benefits because the crops provide the pigs a more natural and stimuli-rich environment with good possibilities for shadow seeking in hot seasons as well as shelter in cold seasons (Horsted et al., 2012). A few Danish organic pig producers have already established energy crops (willow and poplar) in paddocks for lactating sows, but knowledge and experience in relation to practical management and designs of such integrated systems are still very sparse and sporadic (Serup, 2012). The objective of these initial stakeholder meetings was to identify important challenges in terms of implementing integrated free-range pig and energy crop production in practice.

## 3. Description of system

In Denmark there are two large-scale pig producers who have established energy crops in paddocks for free-range pigs. The two producers were interviewed separately since a joint meeting was not possible.

**Brian Holm** is an organic pig producer with 180 sows. Lactating sows are kept outdoor all year round in individual paddocks. All weaners are finished on the farm. Piglets are weaned at 8 weeks and afterwards moved indoor in a stable with access to a small outdoor concrete run.

In 2009 Brian Holm established willow and poplar on an area of 1 hectare of grass which is used as paddocks for the lactating sows. Each paddock contains four rows of willow (*Salix* spp) (Figure 1, 2 and 3). In 2011, poplar was established on a grass clover area of 6.8 hectares with two 'zones' of poplar; each 'zone' comprising four rows of poplar. From spring 2015 and onwards, this area is going to be used for lactating sows. Each paddock will be organised so it includes two rows of poplar in addition to an area with grass clover.



Figure 1. Rows of poplar at Brian Holm's farm

Figure 2. Sow and piglets in willow coppice



Figure 3. Rows of willow and the grass clover crop

**Bertel Hestbjerg** is an organic pig producer with one of the largest organic sow herds (approximately 900) in Denmark. Lactating sows are outdoor all year round in individual paddocks. Piglets are weaned at 8 weeks and 65% of all weaners are finished on the farm. After weaning pigs are moved indoors to a stable where they have access to a small outdoor concrete run.

In total, there are 63 hectares in use for paddocks for lactating sows, where 13 hectares are used to grow poplar. Each year, half of the area is used for sows, whereas the other half is used to grow barley undersown with grass clover. The following year, the rotation is reversed and so forth. Each paddock include three rows of poplar. So far, only the piglets have access to the trees. However, in 2015, when the poplar are four years old, the plan is to allow the sows access. Recently a few Sitka spruce were planted in between the poplar in order to provide increased diversity and improved aesthetics (Figure 5).



Figure 5. Paddocks for lactating sows integrated with poplar and areas of grass clover

Brian Holm and Bertel Hestbjerg are partners in a Danish national project called 'Pig production in eco-efficient organic systems' (pECOSYSTEM). One objective of this project is to quantify expected positive effects on productivity, animal health and environment of a new production system based on: a) integrated production of free-range pigs and tree biomass for energy production and b) prolonged weaning age in organic pig production

([www.icrofs.dk/Sider/Forskning/ORG\\_RDD2\\_pECOSYSTEM.html](http://www.icrofs.dk/Sider/Forskning/ORG_RDD2_pECOSYSTEM.html)).

#### 4. Ranking of positive and negative aspects of free-range pigs integrated in energy crops

The two producers were asked to complete a brief questionnaire which sought to highlight the key positive and negative aspects of integrated free-range pig and energy crop production.

**Positive aspects:** the most positive aspect, identified by both producers was animal health and welfare. The effects on landscape aesthetics (2<sup>nd</sup> and 6<sup>th</sup>), biodiversity and wildlife habitat (3<sup>rd</sup> and 5<sup>th</sup>) were also highly ranked as well as the expected positive effects on environment (nutrient leaching and ammonia volatilisation) (2<sup>nd</sup> and 7<sup>th</sup>) and global climate (6<sup>th</sup>). Finally, originality (4<sup>th</sup>) and interest along with farmer image (3<sup>rd</sup> and 10<sup>th</sup>) were also selected (Table 1).

Table 1. Positive aspects of free-range pigs integrated with energy crop production

Aspect	Ranking by the 2 respondents		Comments from the respondents
Animal health and welfare	1	1	
Landscape aesthetics	2	6	
General environment		2	Especially nutrient leaching and ammonia volatilisation
Biodiversity and wildlife habitat	3	5	
Farmer image	10	3	
Animal production	4		
Originality and interest		4	
Other	5		The farmers welfare (joy in work)
(Global) climate moderation	6		
Protection of ground water	7		Reduced nutrient leaching
Income diversity		7	
Complexity of work	8	8	Prefer to call this 'variation in work' (sounds more positive)
Soil conservation/quality	9		

**Negative aspects:** the primary negative issues were the administrative burden and regulation (1<sup>st</sup> and 2<sup>nd</sup>), labour (burden of labour) (1<sup>st</sup> and 2<sup>nd</sup>), and management costs (3<sup>rd</sup>).

Aspect	Ranking by the 2 respondents		Comments from the respondents
Administrative burden	1	2	One farmer considers administrative burden and regulation as two sides of the same coin
Regulation		2	
Labour (burden of labour)	2	1	
Management costs	3		
Mechanisation	4		Machinery capable of harvesting energy crops 1.20 m above ground is, to his knowledge, non-existent
Subsidy and grant eligibility	5		It is (partly) negative if subsidies drive the development instead of 'the market'.
Originality and interest	6		A change takes time. Courage, willingness to change, willingness to take risks, and money is necessary.
Inspection of animals	7		
Losses by predation	8		

## 5. Qualitative written and oral responses

The two respondents raised the following as the most important constraints and challenges when combining free-range pigs with production of energy crops:

- Fencing of paddocks (more challenging/time consuming due to the trees)
- The area where it is possible to drive with machinery (e.g. transport of water and feed) is reduced due to the trees
- Difficult to catch the pigs/performing inspection and treating animals are more difficult
- Some sows collect branches and carry them inside the farrowing hut (nest building). This may increase the risk of piglet mortality
- Harvesting of energy crops at a 'tree-height' appropriate in a system with pigs (probably higher than 'normal') may be a challenge
- Reduction in crop yield (not possible to grow cereals on the area with trees)
- Insecurity regarding the economy of the system: is the gain/profit of the trees large enough to compensate for the lower crop yield? Is there a future market for organic wood chips (e.g. for use in stables as litter/bedding), which may increase the revenue of the energy crops?
- Subsidy: The area with trees may only be included in the mandatory area requirement for animal production (Danish legislation) the first ten years after establishment

## 6. Potential solutions, research themes and next steps

The respondents expressed the following in terms of potential solutions or research and development themes.

Development of machinery suitable for harvesting energy crops 1.20 m above ground (this height is needed to avoid pigs eating the new sprouts after harvesting)

Trial tests of 'funny/exciting' wood species with nutritional value for the pigs and which are possibly to grow in between energy crops

Both farmers indicated that they would be interested in supporting research related to the project AGFORWARD and interested in being part of a network regarding agroforestry in pig production.

## 7. References

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## 8. Acknowledgements

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