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**Organic Animal Husbandry systems –  
 challenges, performance and potentials**



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## OK-Net EcoFeed: working towards 100% organic and regional feed for monogastrics in Europe

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### Abstract

*For pigs and poultry, achieving fully organic diets from regionally grown feedstuffs is problematic. The major difficulty is sourcing protein that satisfies specific amino acid requirements. Overfeeding of protein to correct amino acid levels leads to environmental pollution and underfeeding of amino acids can cause welfare problems such as cannibalism as well as poor growth and egg production. To test potential solutions, the OK-Net EcoFeed project is working with farmers and industry partners in 12 Innovation Groups in eight European countries. The Innovation Groups (IGs) first identified current gaps and barriers which include gaps in knowledge of protein quality and amino acid content in all feedstuffs and a lack of knowledge about the specific nutritional requirements of animals managed in organic systems. Adequate and optimal storage of feedstuffs as well as a lack of land for growing crops were issues and poor collaboration with regional arable growers and feed companies were also seen as barriers. Organic regulations state that feed should be produced in the same region in which animals are kept, but the word 'region' has several meanings. IGs were therefore asked for their understanding of what was 'regional'. Farmers considered it to mean closer to the farm than advisors or feed companies who both accepted 'region' to be up to EU level for difficult-to-source feed components. IGs have all identified potential solutions to be tested including like-for-like replacements for soya such as camelina, canola and sunflower; sprouting seeds to optimise protein and palatability; 'green protein' from grass/clover leys; on-farm processing of regionally-grown soya; silage from brewer's yeast and straw; management methods for feeding silage; and the development of an annual ration plan using in-season forage and fodder. All IGs will produce videos and factsheets to be placed on the Organic Farm Knowledge platform: <https://organic-farmknowledge.org>.*

### Introduction

For organic animals, the goal is to offer balanced diets that are fully organic and from regionally sourced feedstuffs. For monogastrics, a major problem is sourcing quality protein that satisfies amino acid (AA) needs - particularly methionine, lysine and cysteine. To correct AA levels, overfeeding protein leads to nitrogen pollution and underfeeding AAs risks welfare problems and poor production. Several protein sources are also part of human diets and can be imported from other continents, such as soya from China, increasing both feed competition and pollution associated with food miles. Currently, five percent non-organic feed is permitted in organic regulations until EU legislation changes in 2021. To investigate potential solutions, the OK-Net EcoFeed project is working with farmers and industry partners in 12 Innovation Groups (IGs),

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in eight European countries, by sharing and adapting existing knowledge and translating selected texts. Knowledge is also being created with the development of a ration planning tool and with IGs conducting trials to test potential regional solutions.

## Results and discussion

### ***Innovation groups***

There are up to three IGs in each country (UK, Sweden, Spain, Italy, Germany, France, Denmark and Austria who is working with farmers in Serbia). IGs are facilitated by a project member and consist of farmers, organic advisors and organic feed companies. They represent the many different organic monogastric systems including low-input and extensive and both small- and large-scale, single species and mixed species farms.

### ***Gaps and barriers***

Identifying current gaps and barriers was an important step towards considering potential solutions. IGs identified a lack of knowledge of protein quality and AA levels in all current and potential feedstuffs, not just traditional sources. A further gap was understanding the specific nutritional requirements of animals managed in organic systems. For on-farm production, barriers included a shortage of land, organic seed and field equipment and, for some, unfavourable weather, steep terrain, poor soils and a lack of appropriate soil inputs. For on-farm feed management, there is a lack of appropriate processing and storage equipment as well as a gap in knowledge about optimal storage techniques. Poor or absent relationships with local arable farmers and feed companies or mills where home-grown feed can be processed and returned were also identified. Finally, organic monogastric farming is heavily influenced by the conventional industry which, by its sheer comparative scale, exerts a control over breeds and feedstuffs available to organic farmers.

### ***Regional solutions***

IG members were also invited to consider potential solutions and their responses highlighted just how important is the focus on regional conditions. For example, Serbia enjoys good growing conditions for soya whereas in Denmark, silage and protein cake from grass/clover leys are considered to offer more promising solutions. In the Dehesa system in Spain, where limited land is available for growing crops, one solution is to use by-products from the human food processing industry. Taking the long view, IG members suggested a threefold approach that could help farmers reach a sustainable and regional solution to rearing pigs and poultry on 100% organic feed. This approach would be based on the careful selection of breeds suitable to each region and system, an in-depth knowledge of their nutritional requirements at each stage of life and production and a greater knowledge of the nutritional value of all feedstuffs available to them including that which is present in the range.

### ***What is regional?***

Organic regulations state that feed should be produced in the same region in which the animals are kept but there is no accompanying definition of what is a region. To confuse matters, the word 'region' is legitimately used to mean several things relating to, e.g., climate, geography and administrative districts. IG members were therefore asked to consider what they thought constitutes regional production of feed. Responses differed depending on the identity of respondent, with farmers generally considering it to mean closer to the farm (up to 50 km) compared to advisors (up to 250 km) and feed companies (up to 300 km), who both accepted a wider definition. Responses also differed depending on the value of feedstuffs, depending on

how difficult it was to source, so that several advisors and feed companies accepted Europe as regional for protein and one farmer also thought it '*OK to consider EU as a region*' if there was a lack of available protein in a given year. For farmers who were part of a local cooperative, the definition of region was most restricted, for example, to the '*maximal distance for a farmer to deliver to another by tractor*'.

## Creating a map of existing knowledge

In order not to reinvent the wheel and to value what has already been learned in each country, project partners gathered existing knowledge (called tools for the purposes of the project), in the form of reports, research papers, on-farm trials and extension material to put into a mapping library. In addition to the collection of these tools, more than 30 of them have been selected, and shorter user-friendly 'Tools' are currently being created in English and placed on the Organic Farm Knowledge platform.

### **Translating existing knowledge for use in different countries**

From the mapping library, the IGs have been given the opportunity to identify tools that are of particular interest to their farming systems and to translate this work into their own language. All eight countries have taken the opportunity to do so for various topics under the two main themes of 1) feeding and ration planning and 2) processing and handling of harvested feed (Table 1).

**Table 1: Tools selected for translation by the Innovation Groups in OK-Net EcoFeed**

Topic	Translation from	Translation to	Tool type	Pages
Improving range use and foraging behaviour in poultry	Danish	French/English	Booklet	24
Substituting soya with oil seed rape and sunflower seeds	English	Danish	Report	14
Dehulled legumes for broiler chicks	English	Italian	Report	14
Protein sources and feeding strategies for organic broilers	French	Danish	Technical Note	9
Homegrown fibre and forage for organic pigs	French	Spanish	Technical Note	4
Feeding organic pigs, an overview	French	Spanish	Manual	40
Report on feeding regimes, protein sources and rations	French	Swedish	Booklet	40
Feed values of and how to grow faba beans	French	Swedish	Technical Note	12
Improving the health and welfare of pigs	English	Serbian	Manual	94
Soya bean processing	German	French	Handbook	29
Organic concentrates for pigs	English	French	Technical Note	4
Organic roughage and forage for pigs	English	French	Technical Note	4

## Testing potential solutions

Each IG is testing a potential solution in a practical trial. Some of the trials are entirely novel for the systems in which they are being tested, whilst others build on knowledge gained from previous trials (Table 2). For example, previous research looking at individual sources of feed and forage in France will be integrated into a year-round ration plan for pigs. Most trials are farmer centred with a few being driven by other industry partners although, in all cases, farmers are part of the trial process.

An example of the latter is the trial in Serbia where a non-profit organisation from Austria is supporting farmers to learn more about on-farm soya processing using a small-scale toaster. In Spain, the trial will focus on the use of brewer's yeast for growing pigs in the Dehesa system. Brewer's yeast is difficult to conserve and feed on-farm and, with a small local organic brewery, availability is sporadic. The Spanish IG will therefore experiment with making a silage of brewer's yeast, straw and other potential by-products. These trials are expected to be completed by October 2020.

**Table 3: Practical tests to be carried out by Innovation Groups in each country.**

Country	Innovation Themes	Group	Test
Denmark	Broilers		'Green-protein' from grass/clover leys
France	Broilers		Replacing soya with camelina, canola and sunflower
UK	Broilers		Nutritional value of tailings and weed seeds from grain
Denmark	Layers		Fermented silage and lactic acid on intestinal health
France	Layers		Replacing 5% non-organic with available organic feedstuffs
Germany	Layers		Nettle cultivation
Germany	Layers		Nettle feeding
Germany	Layers		Choice feeding clover and alfalfa varieties
Italy	Layers		Growing and using camelina to replace soya in feed
UK	Layers		Sprouting seeds to optimise protein and palatability
France	Pigs		Ration planning using in-season forage and fodder
Spain	Pigs		Brewer's yeast and straw as silage
Austria	Pigs		Nutritional analysis of soya grown in European countries
Sweden	Pigs		Forage turnips for non-lactating sows and growing pigs
Sweden	Pigs		Methods of feeding silage to growing pigs
UK	Pigs		Small-scale toasting of Field beans

## Videos and practice abstracts for the Organic Farm Knowledge platform.

For every trial, the IGs will produce a short video illustrating the process capturing results and key moments along the way. They will also produce at least one practice abstract for each trial and these, along with the videos, will be added to the Organic Farm Knowledge platform. This platform is designed to be a long-term hub for different projects and news items that help to enhance organic farming through knowledge exchange (<https://organic-farmknowledge.org>). For further details of the Innovation Groups, a report entitled “Synthesis report on Innovation Group Framework” is available at: [https://ok-net-ecofeed.eu/wp-content/uploads/2019/03/OK-Net-EcoFeed\\_Description\\_of\\_Innovation\\_Groups.pdf](https://ok-net-ecofeed.eu/wp-content/uploads/2019/03/OK-Net-EcoFeed_Description_of_Innovation_Groups.pdf)

The knowledge synthesis report produced from the mapping library is available at: <http://orgprints.org/34560/>

## Improving organic animal husbandry

Gaps, barriers, tools and solutions identified in the project can be used to encourage the industry to adopt best practice that ultimately enables farmers to access appropriate breeds and feed for organic systems along with improved knowledge of the nutritional content of regionally available foodstuffs and the needs of animals at different life and production stages in organic systems.