OK-Net EcoFeed: Organic Knowledge Network for Monogastric Animal Feed

When feeding organic farm animals, the goal is to offer balanced diets that are fully organic and from home-grown or regionally-sourced feedstuffs. For monogastrics, pigs and poultry, updated European legislation will come into force in 2021 which will require that "at least 30% of the feed shall come from the farm itself or, if this is not feasible or such feed is not available, shall be produced in cooperation with other organic or in-conversion production units and feed operators using feed and feed material from the same region." (Regulation EU, 2018). Achieving diets containing 100% organic feed for monogastrics is problematic, and current EU Regulations acknowledge this difficulty by allowing the use of 5% non-organic feed. However, this will cease when the updated legislation comes into force. Senior Livestock Researcher ***Lindsay Whistance*** *reports on progress being made by the OK-Net EcoFeed project to address the issues.*

The major stumbling block in achieving fully organic feed for pigs and poultry arises from the difficulty in sourcing quality protein that also satisfies specific amino acid requirements for different ages and production targets. For monogastrics, the amino acids in focus are cysteine, lysine and methionine. Feeding the correct amount of each amino acid is important not only for healthy growth and egg production but also for animal welfare. For example, low levels of methionine in poultry diets can lead to feather pecking and cannibalism. Additionally, when amino acids levels are low, protein is overfed, leading to environmental pollution through excessive nitrogen excretion.

A further complication is that several sources of protein currently used for monogastrics, such as wheat, are also part of the human diet and are regularly imported from other continents such as soya from China (Table 1).

Innovation Groups

There are between one and three Innovation Groups in each country and these can consist of single themes (pigs, layers or broilers) or be mixed, since problems and solutions are similar for all themes. Being a member of an Innovation Group is voluntary and each group is open to new members joining throughout the project. Every group is facilitated by a project partner and each year, the groups all have an official meeting where topics, appropriate to the stage of project, are formally discussed. During the first year, groups were also invited to attend a Science Bazaar where selected material contained in the mapping library was presented and discussed by the groups. Meetings during the testing phase will be more flexible and will depend on the test design and process. Innovation Group members are also welcome to join the annual project meetings, where their input and feedback is an important component considered at each key phase in the project.

OK-Net EcoFeed

OK-Net EcoFeed is a three-year, European-funded project (2018-2021) which aims to address issues currently limiting the level of organic and regional feed being produced by monogastric farmers and their associated industry partners in Europe. The project aims to do this by:

- Identifying current gaps and barriers to achieving fully organic and regional feed
- Creating a mapping library of existing knowledge to share between countries
- Translating some of this knowledge for use in different countries
- Testing potential solutions in each country
- Producing videos and fact sheets, and
- Adding all knowledge to the Organic Farm Knowledge Platform.

To do this, the OK-Net EcoFeed project (coordinated by IFOAM EU) is engaging with farmers and other industry partners in eight different European countries. These are UK, Sweden, Spain, Italy, Germany, France, Denmark and Austria, who is also working with farmers in Serbia. Innovation Groups have been established in each country and represent many different organic systems including low-input and extensive and both small- and large-scale, single species and mixed species organic farms.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773911.

The information contained in this communication only reflects the author's view.

Table 1: Origins of feedstuffs in organic monogastric diets in UK

Imported feed*	Pigs	Poultry	Origin
	%		
Cereals and by-products	60+	60+	UK/EU/Russia/Australia/Ukraine/Kazakhstan
Processing waste	<10	<5	Anywhere
Pulses	<10	<5	UK/EU
Soya and soya products	10-25	15-25	S.America/China/EU
Minerals and supplements	<4	<4	Africa/S.America/Germany
Fats		<5	EU
Limestone (layer birds)		7-10	UK/Africa

**(organic and non-organic components)* *(Soil Association, 2010, modified)*

Laying hen on grass/clover ley

Photo: Jo Smith/ORC

Identifying gaps...

In the early part of the project, each Innovation Group identified the existing gaps and barriers to feeding 100% organic and regional feed to their pigs, layers and broilers. The identified gaps include a lack of knowledge about the quality of protein and levels of amino acids in all current and potential feedstuffs, not just the traditional sources of, e.g., cereals and soya. They also included a lack of knowledge about the specific nutritional requirements of breeds of animals, at different ages and stages of production, managed in organic systems.

A further gap, in some countries, is a poor or absent relationship with feed companies or mills where home-grown feed can be processed. For on-farm feed management, there is a gap in knowledge about optimal storage techniques. A particular gap identified by some Innovation Group members is that arable farmers, rather than growing superior cereal varieties grown specifically for animal feed, focus instead on the growing of grain destined for human feed from which the lower quality grain is then redirected to animal feed.

...and barriers

Barriers to growing more organic feed include a shortage of land, organic seed and field equipment as well as storage facilities. For some, it also includes unfavourable weather and geography (steep terrain), poor soils and a lack of appropriate soil inputs. Further issues are related to the processing of feedstuffs, including a lack of processing equipment on farm and local mills not returning feed to the farm where it was grown. For some farmers, a lack of knowledge/expertise and financial support are also considered barriers to seeking solutions.

Barriers at industry level also exist since organic monogastric farming is heavily influenced by the conventional industry which, by its sheer scale, exerts a control over breeds available to organic farmers. Additionally, breeds and cross-breeds that may be more appropriate to organic farming systems can be much less uniform in size and shape than modern breeds and crosses, which makes it harder to find slaughter houses that will accept them.

Regional solutions

Innovation Group members' responses highlighted just how important is the focus on regional conditions. For example, when considering soya, Serbia enjoys good growing conditions whereas in Denmark, soya is difficult to grow under current climatic conditions, where the plants produce a lot of foliage and few beans. 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 the by-products from the human food processing industry.

Further suggestions for solutions were harvesting sea creatures such as starfish in Denmark, using insects either by creating enriched environments in which pigs and poultry have increased access or by producing them as a feed source. Producing insect protein is currently not a legal option for organic pig and poultry producers.

During a round-table discussion at an early project meeting, Innovation Group members suggested a threefold approach that, in the long term, 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 and a greater knowledge of the nutritional value of all feedstuffs available to them including that present in the range.

Photo: L. Whistance

Growing pigs feeding on silage

What is regional?

The word 'region' is legitimately used to mean several things relating to, e.g., climate, geography and administrative districts. 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. Innovation Group members were therefore asked to consider what they thought was regional production of feed. Responses differed depending on the identity of respondent, with farmers generally considering it to mean closer to the farm compared to advisors and feed companies, who accepted a wider – up to EU – definition. Responses also differed depending on the value of feedstuffs, so that one farmer 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 more restricted, for example, to the 'maximum distance for a farmer to deliver to another by tractor'.

Creating a mapping library 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 Practice Abstracts are currently being created in English.

Translating existing knowledge for other countries

From the mapping library, the Innovation Groups 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, if required. 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 2).

Table 2: Tools selected for translation by the Innovation Groups in OK-Net EcoFeed

Topic	Translation from	Translation to
Technologies for processing soya beans	German	Serbian
Fodder in organic production	Swedish	French
Feed values of and how to grow faba beans	French	Swedish
Growing soya beans for animal feed	German	Serbian
Legume varieties for organic farming	French	Spanish
Feeding organic pigs, an overview	French	Spanish
Dehulled legumes for broiler chicks	English	Italian
Protein sources and feeding strategies for organic broilers	French	Danish
Substituting soya with oil seed rape and sunflower seeds	English	Danish
Report on feeding regimes, protein sources and rations	French	Swedish
Improving range use and foraging behaviour in poultry	Danish	French
Improving range use and foraging behaviour in poultry	Danish	English

Testing potential solutions in each country

In the next year of the project, each Innovation Group will be testing a potential solution in a practical trial. The focus of these trials has been identified (Table 3). 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. 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.

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

Country	Themes	Test
France	Broilers	Replacing soya with camelina, canola and sunflower
UK	Broilers	Nutritional value of tailings and weed seeds from grain
Denmark	Broilers	'Green-protein' from grass/clover leys
Italy	Broilers and Layers	Growing and using camelina to replace soya in feed
Denmark	Layers	Fermented silage and lactic acid on intestinal health
France	Layers	Replacing 5% non-organic with organic feedstuffs
UK	Layers	Sprouting seeds to optimise protein and palatability
Spain	Pigs	Brewers yeast as silage
Serbia	Pigs	On-farm toasting of soya beans
Sweden	Pigs	Forage turnips for non-lactating sows and growing pigs
Sweden	Pigs	Methods of feeding silage to growing pigs
France	Pigs	Development of an annual ration plan with in-season forage and fodder

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 a pig farmer to trial 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 the regional availability is sporadic. The Spanish Innovation Group will therefore experiment with making a silage of brewer's yeast, straw and other potential by-products.

Photo: L. Whistance

Sow grazing

Videos and practice abstracts (fact sheets)

For every trial, the Innovation Groups will produce a short video illustrating the process and 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.

The Organic Farm Knowledge platform.

The knowledge created in OK-Net EcoFeed will find a home on the recently launched Organic Farm Knowledge platform. This platform is designed to be a hub for different projects and news items that help to enhance organic farming through knowledge exchange: https://organic-farmknowledge.org.

Further information

https://ok-net-ecofeed.eu

Facebook page https://en-gb.facebook.com/oknetecofeed/

Twitter page https://twitter.com/ecofeed?lang=en

OK-NET EcoFeed (2018) Synthesis report on Innovation Group Framework (Feb 2018) http://tinyurl.com/OKNet-IG

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