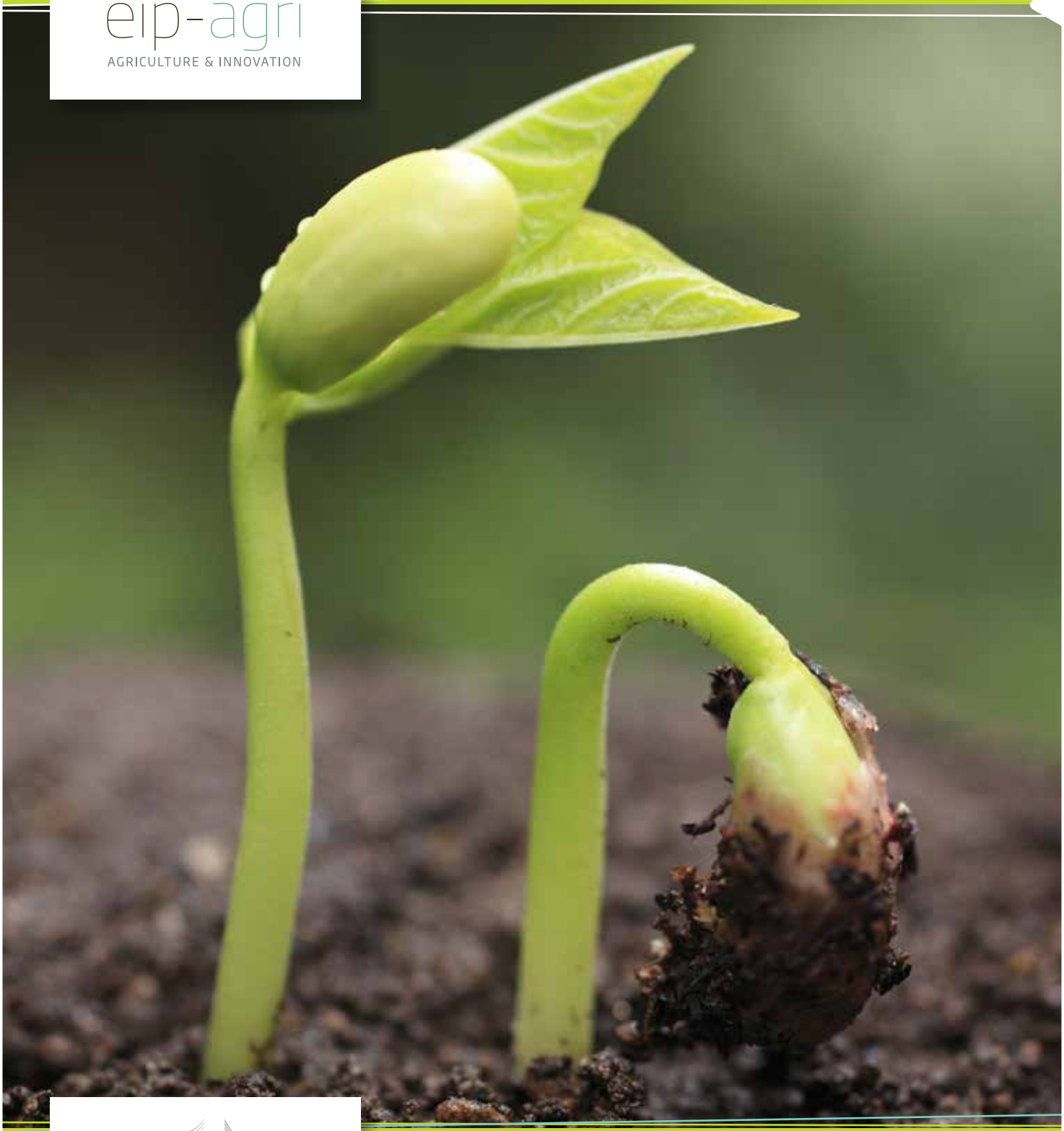
eip-agri
AGRICULTURE & INNOVATION

Competitive protein crops

Why Europe needs a value chain



funded by European Commission

Protein crop production and yield in the European Union (EU) can be increased. This has been demonstrated through several research projects and from practical farm experience. Making the most of these additional yields will only be possible if innovative improvements are made at all stages from the field to feed and food, from feed to animal, and right through to milk and meat. Intense cooperation between breeders, producers, and processors is needed to make the most of all opportunities. This brochure highlights the current challenges and provides examples of cooperation between the key players.

Table of contents

Protein crops for profitable and sustainable farming in Europe 3
European livestock consumption in figures 4
How long will it take to make protein crops competitive? 4
Increased yields: a key issue from farm to shop 5
Transition needs cooperation 5
Looking for inspiration? 6
Developing quality soybean in the Danube region 6
Developing collective knowledge on Protein Crops in France 7
Cooperation and innovation for protein crops in Germany 7
Strategic cooperation for soybean production in Northwest Europe 10
Infographic: Improving the protein crops value chain 12

EIP-AGRI Focus Group sparks increased cooperation

This document has been produced within the framework of the European Innovation Partnership 'Agricultural Productivity and Sustainability' (EIP-AGRI), which was launched by the European Commission to promote innovation in the agricultural and forestry sectors and bring research and practice closer together.

The EIP-AGRI Focus Group on Protein Crops brought together 20 experts (scientists, breeders, farmers, advisers) in 2013-2014 to make recommendations on transferable innovative solutions. The group shared knowledge and experiences and carried out two field visits. In fact it provided some of the experts with the opportunity to visit a large scale compound feed factory for the first time. Following the EIP-AGRI Focus Group on Protein Crops, several of the experts are now preparing new projects based on their experience and findings. This brochure is based on their report, which can be found online: www.eip-agri.eu.

This is an EIP-AGRI Service Point publication
Brochure Competitive protein crops - Why Europe needs a value chain, February 2015
pictures: EIP-AGRI Service Point, Shutterstock
more information: www.eip-agri.eu

▶ Protein crops for profitable and sustainable farming in Europe

Today, producing protein is mainly profitable for European farmers when it is used for their own on-farm consumption or when it is sold to local or added-value markets (food, export,...). Concerning the feed industry bulk market, protein crop yields such as faba bean, soybean and peas are too low and, compared to other crops like maize and wheat, the income they generate for farmers is often also too low. Additionnally, this market which is one of the largest potential markets for protein crops in Europe is based on a largely available commodity, soybean, produced in North and South America.

However, increasing protein crop yields is possible. Substantially increasing soybean and sunflower yields so that they are as competitive as other crops (eg. wheat or maize) has been shown in practice, although some changes will need to be made for this to be successful on a large scale. These changes include breeding better varieties of different protein crops (ie. not just soybean), enhancing cropping systems and increasing knowledge at farm level.

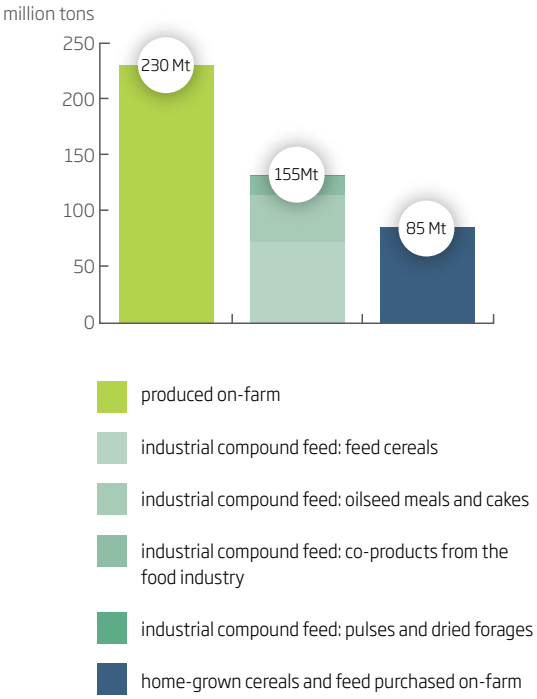
European livestock consumption in figures

470 million tons (Mt) of total feed is consumed every year, of which:

- 230 Mt is roughage is **produced on-farm**
- 155 Mt is **industrial compound feed**:
  - feed cereals (48%)
  - oilseed meals and cakes (28%)
  - co-products from the food industry (11%)
  - pulses 1% and dried forages 1%
  - any others: (10%)"
- 85 Mt is **home-grown and locally purchased feed**

Import:
Almost 70% of the EU's protein rich feeds are imported, and for soybean meal this figure is over 97%.

Total feed stuffs consumed every year



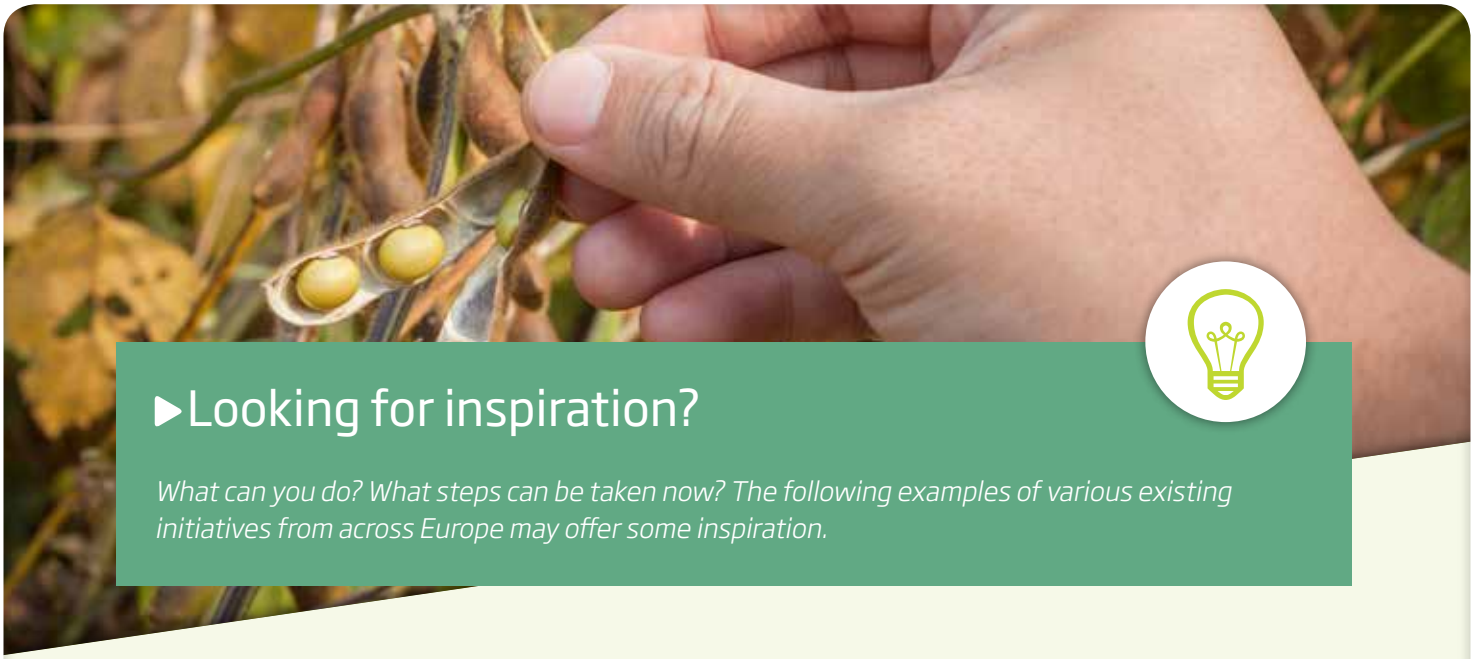
Increased yields: a key issue from farm to shop

It isn't just about yield quantity, protein crop yields are also more variable than those of cereals and this needs to be taken into account. Improved varieties, enhanced cropping systems and better knowledge at farm level are therefore key to improving yields.

Europe lacks the processing infrastructure needed to increase the volume due to the fact that most of its protein consumption by livestock depends on imports. So, investing in higher protein crop yields without developing an infrastructure to process it into sustainable compound feed will not be enough. But how can this infrastructure be set up?

Transition needs cooperation

Cooperation is needed between breeders, arable farmers, feed industry, livestock farmers, food industry and retailers. This process will take some years as both the production and supply chain need to be scaled up simultaneously. It is very important that breeding companies and the food and compound feed industry also take part in the dialogue. The process will need to be sufficiently supported by public research institutions for pre-breeding activities. Farmers should also be actively involved in the process as they produce the raw materials for the industry. Finally, non-governmental organisations as well as governments need to increase support for protein production and processing in the EU.



Looking for inspiration?

What can you do? What steps can be taken now? The following examples of various existing initiatives from across Europe may offer some inspiration.

Developing quality soybean in the Danube region

Who: Danube Soya Association
What: Multi stakeholder platform
Where: Danube region
More info: www.donausoja.org

Creating a foundation for high quality, safe, non-genetically modified (GMO) food and feed production for the Danube region and the Western European market. This is the focus of more than 150 organisations from 14 countries working together through the Danube Soya Association. Stemming from a necessity to expand infrastructure, this association was established in 2012 and is open to any company, organisation or institution which provides products or services for soybean crops.

GMO-free food for the Danube region

The Danube Soya Association promotes and strengthens regional, GMO-free soybean cultivation by using quality criteria. The main aims are to become less dependent on soybean (meal) import, to boost the regional economy, contribute to Europe's protein supply and improve climate protection. It is organised as an independent, international, non-profit, multi-stakeholder association. The region offers great potential - the Austrian Chamber of Agriculture has estimated that soya cultivation in the Danube region can be extended significantly. Apart from the prospects for an 'Europeanisation' of the protein supply, the project also includes various other aspects including investments in storing capacity, logistics and oil mills that benefit central European economies.

Ensuring a continuous supply of GMO-free soya seeds

The association developed the Danube Soya label and set minimum standards for its use. These define the origin and quality of raw material and seeds, guidelines for the use of plant protection products and fertilisers, and traceability criteria. Danube Soya uses GMO-free varieties from the EU to ensure a continuous supply of GMO-free soya seeds. A research programme for the further development of GMO-free soya varieties and suitable plant protection is also in the starting blocks.

Developing collective knowledge on protein crops in France

Who: Pole Agronomique Ouest, Rennes, France
What: SOS Protein - Multi-actor programme
Where: Western France
More info: www.pole-agro-ouest.eu

Fighting pests and diseases, increasing protein content, developing production and increasing digestibility are the main aims of the SOS Protein programme in the West of France. Initiated by the regional government, the Pole Agronomique Ouest has brought together farmers, research and industry and drawn up an action plan of interlinked projects to develop new knowledge collectively and to link it with national and European developments. This network focuses on improving protein production for on-farm and local market use.

The programme is divided into four main parts:

❶ **Grain:** Carry out experiments and research in the fight against diseases and pests related to pea, lupin and faba bean. The main aim is to incorporate a 35% rate of peas in ruminant and swine diets, and 20% of faba bean in poultry feed
❷ **Hay and silage:** Produce hay and silage with a high level of protein.
❸ **Oilseed and protein crops:** Develop soybean and sunflower production.
❹ **Increased digestibility:** Increase digestibility of the protein for animals.

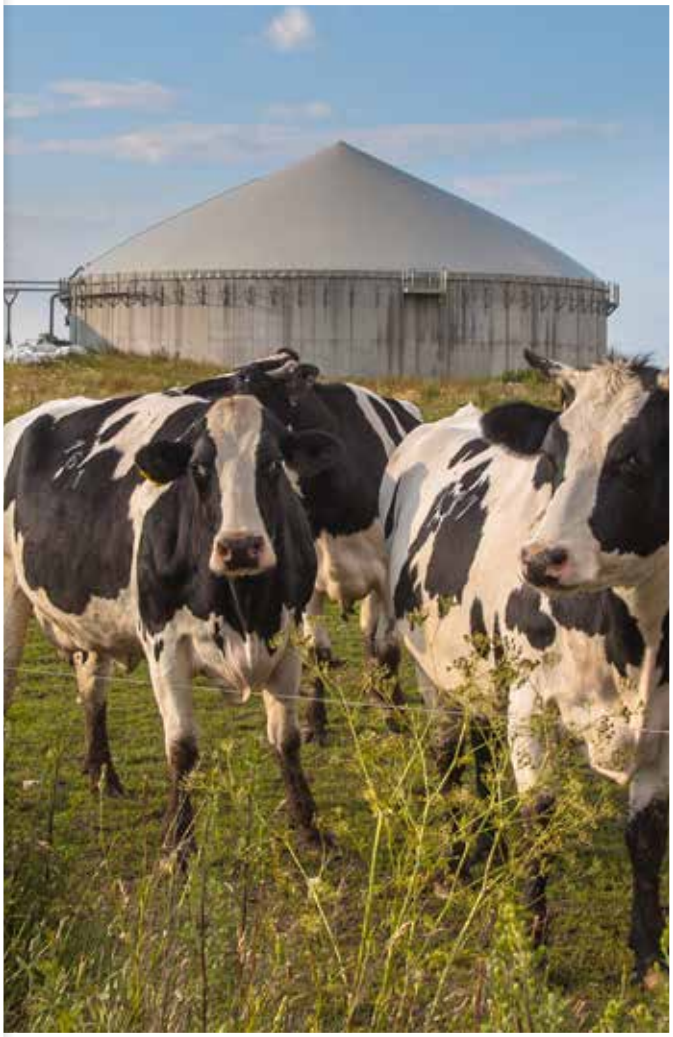
Projects within SOS Protein are focused on:

- Knowing, understanding and analysing agricultural practices.
- Setting up experimental farms and on-farm experiments.
- Conducting research on diseases affecting protein crops.
- Conducting research on weeds in lupine cultivation.
- Conducting research on pests affecting protein crops.

The people involved

Over 30 partners are involved in the network so far. It is in fact the researchers who developed the action plan and have suggested the related project activities. However, this is carried out after consulting cooperatives and farmers' organisations and then the knowledge is shared amongst the whole network: farmers, researchers, engineers and technicians. The programme is in its early stages, but Sébastien Baron, organic dairy farmer, from Allaire, France can already see its potential:

"Many diverse solutions have already been tested on organic farms and the working groups in the SOS Protein project can contribute to improving these experiences, exchanging what they discovered and setting up new solution testing with the help of researchers."
Sébastien Baron, organic dairy farmer



Cooperation and innovation for protein crops in Germany

Who: German Federal Ministry of Food and Agriculture
What: National Policy - Eiweisspflanzenstrategie
Where: Germany
More info: www.bmel.de - www.ble.de

Legumes and their contribution to soil fertility are an important component of sustainable agriculture. So when the German Federal Ministry of Food and Agriculture (BMEL) noticed a decline in legume-growing in Germany over the last decade, they decided to take action. A strategy which was put in place in 2012 has led to the establishment of a solid, operational network, bringing together people from the whole value chain to find and implement solutions to this issue.

Legumes and sustainable agriculture

Legumes are able to produce high-quality protein in the plant by hosting live bacteria called rhizobia in the roots. Rhizobia bind nitrogen from the atmosphere and this is what the plant needs to produce protein. This type of crop can be used both for human consumption and for animal feed. It also feeds nutrients back into the soil to improve soil fertility. Due to this cycle, legume-growing makes an important contribution to environmentally sound and resource-efficient land management. However, there is still a need to preserve and develop knowledge of their cultivation, processing and use. This is exactly what the German Federal Ministry of Food and Agriculture (BMEL) decided to work on.

Turning things around

To stimulate cooperation and innovation, the BMEL implemented a protein crop strategy in 2012 as part of the German charter for agriculture and consumers. This strategy aimed to reverse the considerable decline of legume-growing in Germany by reducing competitive disadvantages of domestic legumes, closing gaps in research and carrying out necessary measures to implement this in practice. They considered both conventional and organic farming.

From strategy to reality

Two years on, and the strategy is equipped with an annual budget of 3-4 million euros for 2014-2017 with exciting plans to bring people together from the whole value chain. Demonstration projects for knowledge transfer, the intensification of advisory services and the value chain development are all on the agenda. Thanks to support for research and development, innovative solutions have been - and will continue to be - created to enable an economically successful cultivation and use of legumes. A demonstration network for soybean of around 100 conventional and organic farms across Germany was set up in 2013 and one for lupins was set up in 2014. Furthermore, in the first year, numerous successful events bringing together farmers, consultants and companies were conducted nationwide. The initiative will continue to grow over the next few years. The next steps include a demonstration network for beans and peas and research projects on soybeans , lupins, beans and peas. In the future, a particular focus will be given to small-seeded legumes such as clover and alfalfa.

Strategic cooperation for soybean production in Northwest Europe

Who: Agrifirm, Compound feed industry
What: farmers' network
Where: Northwest Europe
More info: www.agrifirm.com

Agrifirm, one of the largest compound feed manufacturers in Europe, has concluded that soybean from Europe is "the best crop to increase European protein production". In fact, in 2012 they had a major breakthrough when two soybean varieties applicable for the Northwest European conditions were approved for the European varieties list. This breakthrough is rare as soybean is recognised as a subtropical crop and very little research into its cultivation has been carried out in Northwest Europe. Agrifirm is working to change this mind-set with an ambition to achieve a sustainable production of raw materials for animal feed.

Platform for Dutch soybean growers and practical network

Agrifirm started to test varieties in practice through a network called Own Farm Protein Production. It gave the opportunity for farmers and researchers to work together. In 2013, there were 11 farmers involved, with the numbers of growers increasing to 35 in 2014, which represents 110 hectares of soybean cultivation in the Netherlands. Farmers, field advisors, and scientists are all connected via a Facebook group called 'platform for Dutch soybean growers'. Practical workshops have been organised where farmers exchange experiences about the crop and provide input for improving the scientific trials. An average yield of 2.8 ton per hectare was achieved in the first year which is comparable to the worldwide average yield but below the desired 4.3 ton per hectare.

Strategic cooperation between Belgium and the Netherlands

In 2012, Agrifirm, Wageningen University and ILVO agreed upon a strategic cooperation plan for cultivating soybean in Northwest Europe. The Flemish government has approved a proposal from ILVO Vlaanderen to start an intensive research programme for assessing the feasibility of growing soybeans in Flanders. Part of this programme is to test 12 varieties each year.

"It is important to note that the development of soybean in Northwest Europe is promising. However, a lot of research and evidence is still needed before large scale production can be used as input for animal feed production. Tests and projects should both contribute to scientific reasoning and raising awareness. We expect a positive scenario of substantial scale production to be feasible in 2020. On the other hand, we have to be aware of environmental impacts of shifting protein production to Europe: the end result should be a more sustainable production on a global scale."
Ruud Tijssens, Project Manager Agrifirm

Competitive protein crops

eip-agri
AGRICULTURE & INNOVATION

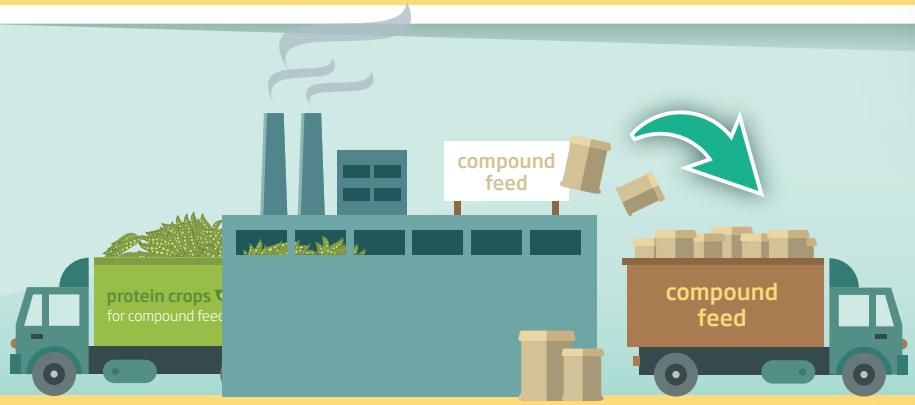
Improving the protein crops value chain

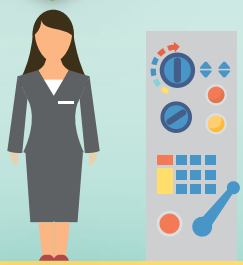
Cooperating

1

new varieties

2





changing infrastructure

3

demanding quality

4

demanding quality

funded by European Commission