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Instituut voor Landbouw-, Visserij- en Voedingsonderzoek

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Verantwoordelijke uitgever Joris Relaes

Coördinatie en eindredactie Nancy De Vooght
Greet Riebbels
Ellen Claeys
Nele Jacobs
Marijke Aluwé
Sandra Leroy

Foto's ILVO

Vormgeving Nancy De Vooght

Hoe bestellen

Mail ilvo@ilvo.vlaanderen.be
Telefonisch +32 9 272 25 00
Schrijven Burg. Van Gansberghelaan 92
9820 Merelbeke
België
met vermelding 'Activiteitenverslag 2023'

Te raadplegen op www.ilvo.vlaanderen.be

Voor informatie, vragen of suggesties

T +32 9 272 25 00

ilvo@ilvo.vlaanderen.be
www.ilvo.vlaanderen.be

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Foreword

Dear Reader,

With the recent farmers protests, agriculture has featured regularly in the news. Uncertainty about the future has been a source of discontent among many farmers.

ILVO has the important task of helping to shape that future through research. We do this of course by performing numerous research projects, many of which are featured in this annual report. But we also shape the future by participating in the social debate. A variety of media sources regularly contact ILVO so we can shine our light on current and future agriculture on the basis of our scientific expertise.

This is why ILVO can regularly be found on various media channels. In 2023, for example, a ten-part TV series on Kanaal-Z presented the possibilities of technological innovation for agriculture and food to a wide audience. Our self-propelled electric tractor Djust-e stole the show in the seven o'clock news. Unexpectedly, it even popped up in more recreational programs afterwards.

At ILVO, we strongly believe in precision agriculture as a groundbreaking revolution to make our agriculture more sustainable. We are therefore proud to have been designated by Europe as a Test and Experiment Facility 'AgrifoodTEF' since 2023. This to help companies accelerate their business applications of AI, robotics and data.

In fundamental research, we were very fortunate to commission the HYDRAS platform, a unique facility to stimulate drought in full-field conditions. This should yield groundbreaking results in the quest for more drought-resistant crops.

In Food Pilot, we were able to inaugurate our new investments to create proteins and fats via microbial fermentation. The intention is to further test such fundamental products along the way to introduction as either new food products, ingredients of food products or as a replacement of certain feed ingredients. Regarding the latter, we are looking forward to the realization of the Feed Pilot at ILVO, an installation for precision feed. We have finally obtained the necessary permits and investment funds after years of preparation. The cornerstone will be laid during 2024.

This also applies to the investment of a new ultra-modern chicken shed for which a permit could be obtained within the nitrogen framework of the Flemish government. This was a special case because ILVO is located in the vicinity of a so-called Habitat Nature Reserve.

ILVO tries to create a world where agriculture and nature can live in harmony as much as possible. This is also the reason why we have developed a Nature Management Plan for a number of ILVO hectares in the Habitat area. The realization of that dream has already started in practice. During a tree planting session in early December, many ILVO employees could be spotted in rubber boots and outdoor clothing.

Availability and affordability of agricultural land was also one of the important demands of the farmer protests of 2023. ILVO research into the evolution of agricultural land in public or semi-public ownership in the province of East Flanders already opens the way to solutions in this area. And we are already looking forward to the exhibition on this same theme, starting in spring 2024 at STAM, the Ghent city museum.

In 2023, the our ILVO colleagues active in marine research focused heavily on everything to do with data. By the end of 2023, more than half of Belgian vessels were equipped with a real-time fully automatic data collection system. This creates unprecedented possibilities for highly accurate fish stock estimates and catch prediction models. This will help take the next step toward a full ecosystem approach to fisheries.

As you can see, ILVO remains committed to performing relevant applied research and continues its mission to share these new insights with society. I would like to thank all of the ILVO staff members for their tireless commitment.

Enjoy your read.

Joris Relaes

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Mission & Vision

Research for a world in change

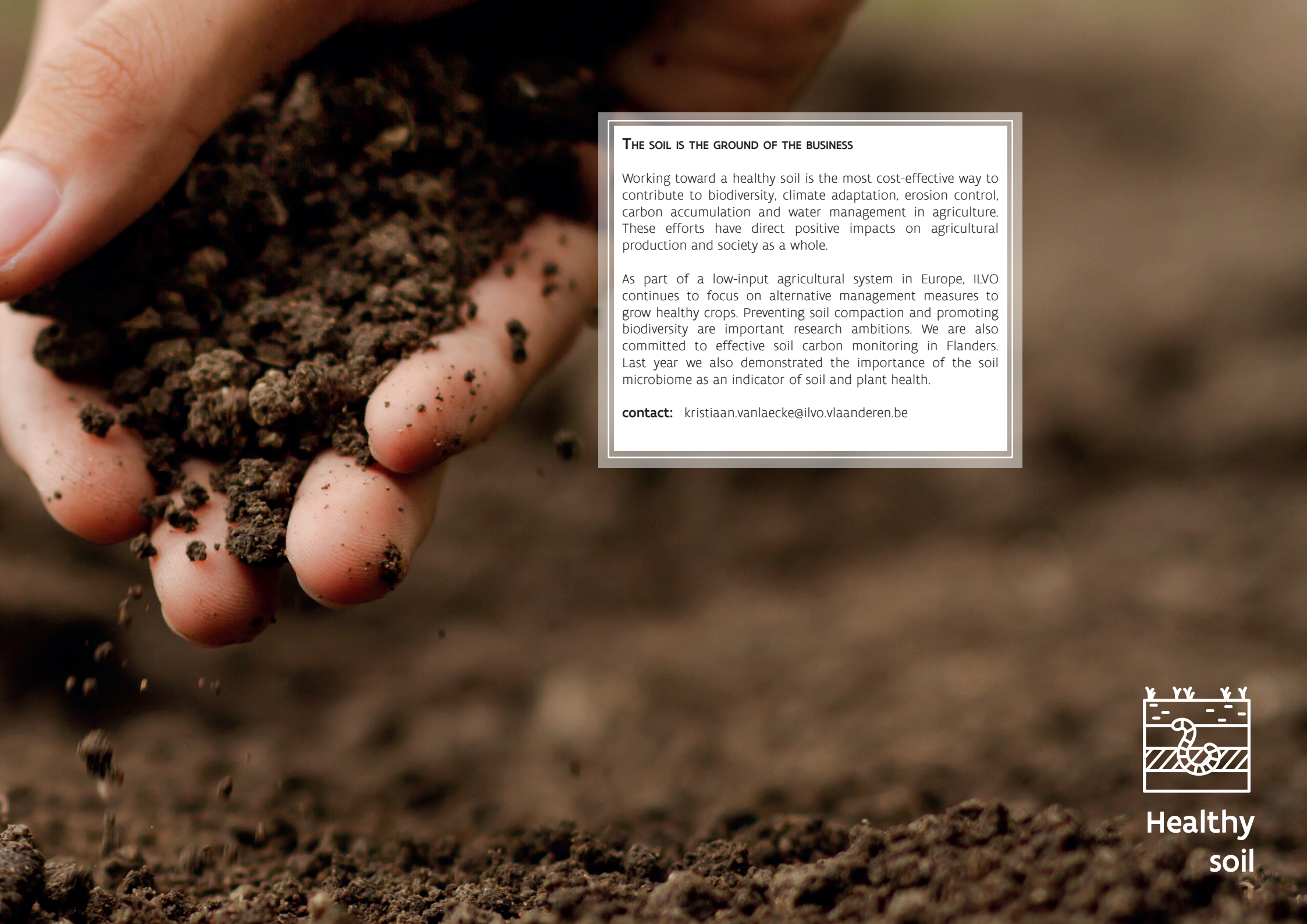
ILVO wants its research to be a useful foundation for the world in change.

Globally, challenges are emerging that put pressure on the planet, our health and also the food supply. We focus our research on these shifts.

In its vision document, ILVO shows concern for the essential needs and values of society.

The full text can be found at
www.ilvo.vlaanderen.be

Research 2023



The soil is the ground of the business

Working toward a healthy soil is the most cost-effective way to contribute to biodiversity, climate adaptation, erosion control, carbon accumulation and water management in agriculture. These efforts have direct positive impacts on agricultural production and society as a whole.

As part of a low-input agricultural system in Europe, ILVO continues to focus on alternative management measures to grow healthy crops. Preventing soil compaction and promoting biodiversity are important research ambitions. We are also committed to effective soil carbon monitoring in Flanders. Last year we also demonstrated the importance of the soil microbiome as an indicator of soil and plant health.

contact: kristiaan.vanlaecke@ilvo.vlaanderen.be

Healthy soil

RESULT

Phosphorus in the soil

Reduced phosphorus fertilization standards, high phosphorus stocks in many Flemish plots and increased fertilizer prices present a major challenge to all agriculture and specifically to organic farming. Commissioned by VLM, researchers from ILVO, UGent, Inagro, pcfruit and the Soil Science Service of Belgium conducted a series of trials, a literature review and benchmarking with foreign countries. From that research came 8 good practices for sustainable soil management: Use green cover crops with leguminous plants, sow temporary grass clover in the rotation, consider leguminous plants as the main crop, custom-fertilize while considering the nitrogen mineralization potential of the soil, and in orchards, apply the cut of the green cover crop to the topsoil and incorporate compost or champost, integrate vegetable and animal production and reduce soil tillage.

contact: koen.willekens@ilvo.vlaanderen.be

RESULT

Could soil health eventually be determined through the microscopic soil life indicator?

An extremely diverse community of micro-organisms such as bacteria and fungi is present in soil (the soil microbiome). There is a link between this microbiome and soil health, but the full picture has not yet been fully elucidated. During a PhD study, ILVO-UGent researcher Lisa Joos analyzed a large series of soil samples using both chemical and DNA- and RNA-based methods. The time, depth and location of a sample within a field strongly influenced the composition of the soil microbiome. It did not appear to be possible to immediately indicate the degree of soil health based on the composition or presence of certain types of microorganisms, but the magnitude of the microbiome response to an administered stress may provide the basis for an indicator of soil health.

contact: jane.debode@ilvo.vlaanderen.be
bart.vandecasteele@ilvo.vlaanderen.be

RESULT

Beneficial microorganisms in peat alternatives may boost plant growth and health

The microorganisms naturally present in peat alternatives such as compost and (natural) management residues can stimulate plant growth as well as naturally suppress plant diseases, often with even better results than peat. Moreover, various methods (e.g. fertilization and the addition of artificial root exudates) can strongly influence these same microorganisms to stimulate plant growth and health even more. That is the conclusion of the doctoral research of Steffi Pot at KU Leuven Campus Geel, performed in collaboration with ILVO and PCS. Growers welcome this good news as it brings them another step closer to high-performance peat substitutes.

contact: jane.debode@ilvo.vlaanderen.be

RESULT

Compaction of agricultural soils: recipes for prevention

Soil compaction affects about one-third of the arable land in Belgium. Throughout Europe, the phenomenon is considered a serious threat to agricultural production. Agricultural machinery has become heavier in recent decades and continues to drive over already weakened soils. Yet there is still insufficient awareness about soil compaction among farmers, and techniques for prevention and cure are still too little known and not studied enough, according to the doctoral research of Adriaan Vanderhasselt (ILVO and UGent). Many field experiments and measurements revealed the measures that work best to reverse the soil compaction process. But prevention really remains the better option. And there are smart recipes for that too.

contact: tommy.dhose@ilvo.vlaanderen.be

RESULT

Investigating the possibility of thermal treatment of residual soil before returning it to farmland

How can nematodes and yellow nutsedge get killed off in contaminated residual soil? Together with UGent, BDB and Flanders' Food, we investigated how to rid residual soil of viable potato cyst nematodes and the persistent weed yellow nutsedge. The aim is to eliminate the risk of contamination between fields. Spread of these pests occurs passively, mainly through contaminated soil that comes with harvested potato tubers and root vegetables. The soil is removed at the processor or packer and then disposed of. Different temperatures and effect of residence time of residual soil were investigated and tested in a pilot plant at a potato processing plant.

contact: nicole.viaene@ilvo.vlaanderen.be

RESULT

Sustainable soils through quality compost with defined properties

The aim of this project, carried out in collaboration with VLACO vzw, PSKW, PCA and PCS among others, was to develop qualitative, tailored composts with clearly mapped properties and effects. These should cope with the rapid soil degradation that can occur in intensive agricultural systems typical of the North Sea region. The focus was on both local developments (farm composts) and commercial composters working on a regional scale. The effects of compost application on soil and crop are clearly positive. A comprehensive set of compost properties was developed and applied to dozens of composts. This gives both producers and users a clear picture of compost quality. There was also a focus on legislation, including a focus on a legal framework for cooperative farm composting.

contact: fien.amery@ilvo.vlaanderen.be

Provincie Antwerpen
provincie Oost-Vlaanderen
Interreg North Sea Region SOILCOM European Regional Development Fund
EUROPEAN UNION

RESULT

Flemish carbon monitoring network shows importance of correct sampling

One year after the kick-off of the large-scale Flemish soil carbon monitoring network C-mon, coordinated by VPO, ILVO and INBO, 8% of the monitoring sites have been sampled. These limited results already clearly indicate that permanent grasslands, similar to forests and natural areas, contain on average the highest organic carbon stocks. In contrast, croplands can be found at the bottom of the list. It is also important to note that samples from the topsoil (up to 30 cm deep) contain only 50-60% of the carbon stocks versus those measured 1 meter deep. The current shallow measurements may therefore provide only an incomplete picture.

contact: fien.amery@ilvo.vlaanderen.be

NEW

Business models with positive impact on soil health

Carbon is one of the key indicators of healthy soils. But which soil health indicators are actually best to start using in practice? What is the relationship between specific agricultural practices and ecosystem services that provide soil health? And how should we build a business model with stakeholders or interested parties around this issue? These are some of the questions at the heart of the SoilValues project. This project examines the technical, economic, social and ecological preconditions within which these revenue models can change to achieve better soil health.

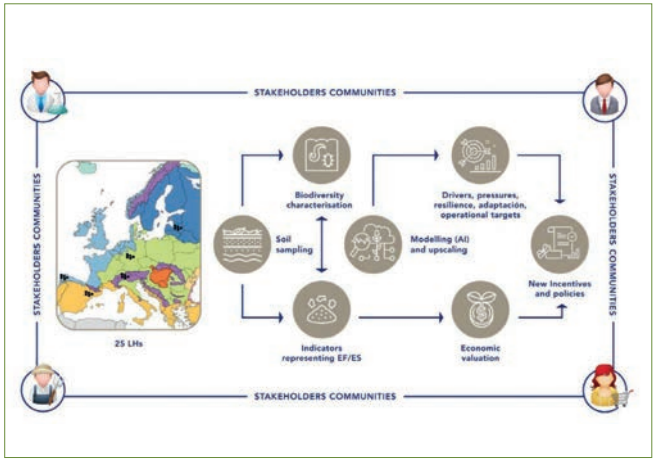
More info: www.soilvalues.eu

contact: lene.cillen@ilvo.vlaanderen.be

Funded by the European Union

SoilValues

NEW



Relationship between soil biodiversity, ecosystem functions and services at diffrerent land uses

In what precise ways are soil organisms involved in the functioning of certain ecosystem services? The BIOSERVICES project is working to further elucidate external influences that stimulate or suppress biodiversity, relationships between key soil organisms, soil structure, other ecosystem functions and climate change. Soil samples from different management intensities will be collected at 25 sites across five European biogeographic regions. BIOservicES will
1) generate new knowledge about key soil organisms or indicators related to ecosystem functions and services and climate change,
2) create digital decision support tools and models, and
3) provide recommendations for decision makers and policy makers to more easily select the best strategies for ecosystem service delivery in a changing climate - for monitoring and ecosystem restoration programs, for private and public investments in soil health, and for implementation by landowners.

contact: lieven.waeyenberge@ilvo.vlaanderen.be

BIOSERVICES

Funded by the European Union

NEW

Soil structure, soil climate–robust management

What is the (beneficial) effect of adapted soil management practices, particularly mulching and reduced tillage, on the soil water balance, as an adaptation mechanism against extreme weather conditions, in the Flemish agricultural context? Both persistent drought and excessive precipitation can decimate crop yields and can be detrimental to soil structure, resulting in worse crop development. We expect to be able to estimate the influence of poor soil structure on climate resilience. This research question will be answered in the Soilstruct project. The target group of this project is the arable crop and vegetable sector, both organic and conventional. Drought-sensitive crops that will be included in the research are potato and celery (plant and root).

contact: maarten.deboever@ilvo.vlaanderen.be

NEW

A healthy soil, a healthy plant … with a touch of plastic?

How many microplastics (small particles of plastic) are found in field soils? How do they affect the health of soil and crops? And is there a solution lying right under our feet in the form of bacteria and fungi that can break down plastic? To answer these questions, researchers from UGent, ILVO and NIOO are working with farmers to sample 240 arable soils in the Benelux. This project is one of the first to paint a picture of the current microplastic contamination in agricultural soils, indicating the possible effects on our food production and investigating whether plastic-degrading organisms can be used on purpose, for example in soil remediation.

contact: jane.debode@ilvo.vlaanderen.be

erc
European Research Council

NEW

Scaling agricultural sensor data for improved monitoring of agri–environmental conditions

Het Europese JRC (Joint Research Centre) is, in het kader van de The European JRC (Joint Research Centre) is setting up a Soil Observatory to broadly monitor the state of soils across Europe in terms of soil health. This is organized within the framework of the objectives of 'Soil Deal for Europe'. The Horizon 2020 project SoilWise, coordinated by ILVO, is designing, programming and delivering an important knowledge and data platform - a so-called repository - to support this Observatory. This platform should be open, modular, scalable and expandable. It will facilitate data and knowledge sharing. The designers will use existing and new technologies while respecting data ownership, access policies and privacy. Artificial Intelligence and Machine Learning techniques will be used to connect scattered scientific articles and datasets, to automate processes, to derive new knowledge and to realize the FAIRness principles (Findability, Accessibility, Interoperability and Reusability). SoilWise thus starts from an infrastructure mindset rather than a project-based approach to design a repository that works and grows usefully for at least a decade.

contact: panos.ilias@ilvo.vlaanderen.be
radu.giurgiu@ilvo.vlaanderen.be

Sustainable and robust plant cultivation

ILVO's involvement in Integrated Pest Management (IPM) includes research on various diseases, pests and quarantine organisms that pose potential threats to crops in greenhouses and on Flemish soils. Our Diagnostic Center for Plant Diseases and Plant and Soil lab worked intensively and conducted numerous analyses in 2023.

In addition to research and monitoring, ILVO also has decades of expertise in breeding and uses modern breeding tools to develop crops that are not only better adapted to growing conditions, but also meet consumer and market demands. The holistic approach to crop improvement and soil health and illustrates ILVO's commitment to sustainable and robust plant breeding for an increasingly demanding society.

contact: johan.vanhuylenbroeck@ilvo.vlaanderen.be

Healthy crops

RESULT

Potato: new aproach in the figth against *Phytophthora infestans*

Researchers at ILVO/VIB have succeeded in using CRISPR/Cas9 technology to modify several genes all at once that are potentially involved in the susceptibility of potatoes to the potato disease, *Phytophthora infestans*. In the classical approach used so far, several resistance genes were combined in the genome of potato. In contrast to this strategy, Ania Lukasiewicz, in her doctoral research, detected 87 putative S (sensitivity or susceptibility) genes in potato and modified one or more of these genes using CRISPR/Cas9. For this, she first had to set up a protocol to use this technique with potato protoplasts and then let them grow into plants. With success, because for the variety 'Spunta' 28 shoots with a maximum of 5 mutated Sgenes grew in this way. The next step is to grow out the shoots and test their resistance to the dreaded fungus.

contact: tom.eeckhaut@ilvo.vlaanderen.be

RESULT

Greenhouse cultivation: disinfection protocols successful against plant viruses

For the greenhouse horticulture sector, the DISVIR project has done important work around preventing the spread of highly transmissible and persistent plant viruses and viroids. The tomato brown rugose fruit virus (ToBRFV) and a pospiviroid (CLVd) were used as models. Based on an extensive literature review, it appears that the disinfection of tools and of whole greenhouse surfaces is a reliable way to prevent the spread of such viruses and viroids in horticultural production units. Especially viruses belonging to the potexvirus and tobamovirus groups, as well as pospiviroids that are easily mechanically transmissible and highly persistent due to their survival on all kinds of surfaces, require efficient hygienic measures to prevent their introduction and further spread within greenhouse facilities. A standardized disinfection protocol is now available for these target organisms.

contact: kris.dejonghe@ilvo.vlaanderen.be

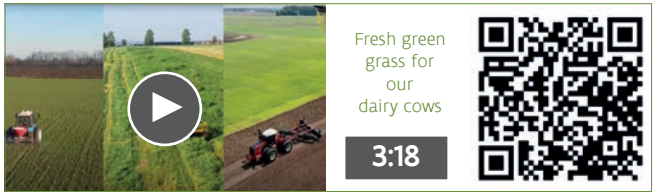
Volksgezondheid
Veiligheid van de Voedselketen
Leefmilieu

IN THE SPOTLIGHT

Fresh green grass is tasty and robust

How can farmers feed their dairy cows fresh green grass without having to use kilos of fertilizer? At ILVO we are working on a new ration for the cow, with clovers and narrow plantain on the menu in addition to grass. By also sowing these plants in their grassland, farmers can significantly reduce the use of fertilizer and better cope with drought, as Thijs Vanden Nest explains in this video from Wetenschap Uitgedokterd (SciMingo).

contact: thijs.vandennest@ilvo.vlaanderen.be



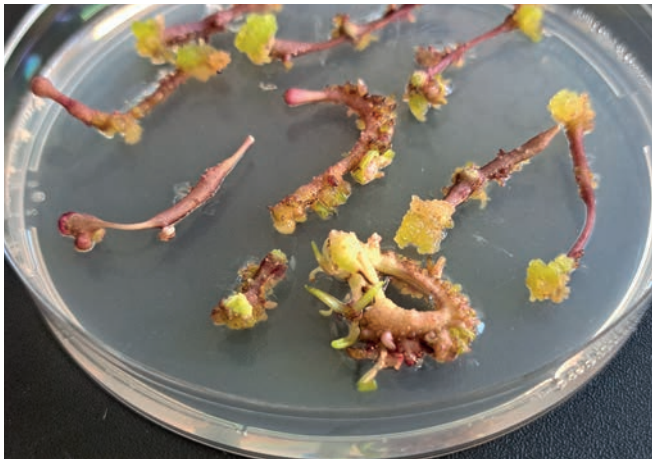
RESULT

PhD research shows potential of crop rotation and choice for nematode control in outdoor vegetable production

Vegetable growers can greatly reduce the economic damage caused by nematodes in their soil by choosing resistant vegetable and green cover crop cultivars. This is evident from the doctoral research of Lirette Taning (ILVO and UGent) on integrated control (IPM) of *Pratylenchus penetrans* and *Meloidogyne chitwoodi*, the two main plant-damaging nematodes in vegetable cultivation. With the results of this VLAIO study run in collaboration with Inagro, PCG and PSKW, the ILVO Diagnostic Center for Plants can give reliable advice to growers and the government can formulate an effective control policy for *M. chitwoodi*, a quarantine organism. With the knowledge accumulated about the resistances present and their sources, breeders also have an important key in their search for new, resistant cultivars.

contact: lirette.taning@ilvo.vlaanderen.be

RESULT



Removing bottlenecks of Ri technology for ornamental horticulture

Within this Baekeland post-doc project, the bottlenecks that needed to be removed to apply the Ri technology in a commercial breeding context were examined at the farm level. In Ri technology, the soil bacterium *A. rhizogenes* transfers part of its DNA into the plant. As a result, the phenotype of the plant may change. Sometimes a more compact growth habit is created. This offers great potential for ornamental cultivation as no growth regulators need to be used. However, the success of the technique is strongly genotype-dependent and regeneration remains the biggest bottleneck. Once an Ri plant is obtained, it is perfectly possible to continue working with it within a company's breeding program.

contact: ellen.dekeyser@ilvo.vlaanderen.be

RESULT

Quinoa fits into Flemish farmer's cultivation plan

Within the VLAIO 'Quinoa local' (QUILO) ILVO, together with Inagro and Praktijkpunt Landbouw, set up the basic knowledge of quinoa cultivation without using pesticides and/or herbicides. Locally grown quinoa is a high quality product that can be profitable for the farmer. The agronomic and quality data were collected in the quinoa cultivation guide in order to get more farmers interested and to help them to cultivate this pseudo-grain. This will help to grow the cultivation of quinoa in Flanders. Simulation of a possible future scenario via contract cultivation showed the economic feasibility of quinoa, at 4.5 tons gross yield per hectare and at a selling price of € 500 per ton.

More info:
cultivation guide 'Quinoa in Vlaanderen'

contact: gerda.cnops@ilvo.vlaanderen.be

RESULT

Mapping the risks of crop protection products to pollinating insects

Does the ban on the use of glyphosate and neonicotinoids and the subsequent use of other herbicides and insecticides lead to increased risks to humans, animals and the environment or not? Decalpe examined this for 5 specific contexts. At ILVO, the impact on pollinators was examined. An EFSA calculation tool was used to model whether or not alternative control schedules pose a lower or higher risk to honey bees, bumblebees and solitary bees. This showed that application of the neonicotinoid imidacloprid as a seed coating in beet crops poses a risk to bees many times higher than the alternative foliar sprays. Also, when controlling with the neonicotinoids imidacloprid and thiacloprid in apple cultivation with glyphosate in weed control on railroad tracks and pome fruit, the risk to bees appears high. In contrast, control with acetamiprid poses a similar risk to the alternatives. Overall, the risk to solitary bees was highest. The model used for the above case studies was incorporated into a policy support grid.

Funder: FPS Health, Food Chain Safety and Environment

contact: wim.reybroeck@ilvo.vlaanderen.be

RESULT

Verticillium in flax: monitoring and varietal sensivity

Flax cultivation in northern France and the Belgian regions of Wallonia and Flanders is responsible for a full 80% of the world's high quality flax fiber. Together with several partners, ILVO searched for innovative and environmentally friendly strategies to control the plant fungus *Verticillium dahliae*. ILVO helped develop a detection method for the pathogen in both soil and flax seed, which was then deployed for 2 years to monitor the disease. The disease was found to be present in France, Wallonia and Flanders at times at very high levels, especially in dry years. Soil texture and the presence of potato in the rotation also appeared to be important risk factors. However, no clear link could be established between pathogen content in the soil and the presence of symptoms in the field. Finally, field trials identified fiber flax varieties more or less susceptible to the presence of *V. Dahliae*.

More info:
Project retrospective – Pathoflax (interreg-pathoflax.eu)

contact: jane.debode@ilvo.vlaanderen.be
kurt.heungens@ilvo.vlaanderen.be

Interreg France-Wallonie-Vlaanderen
PATHOFLAX

IN THE SPOTLIGHT

Online toolbox for integrated pest management launched by European agricultural network demonstrates and promotes cost-effective IPM strategies

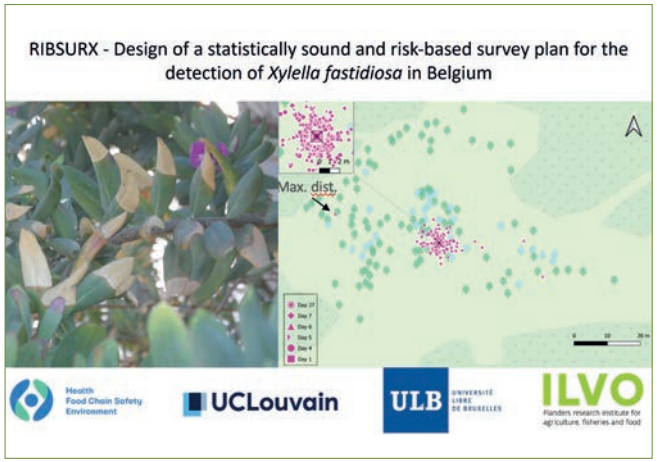
The goal of IPMWORKS is to obtain a significant reduction in pesticide use in European agriculture by promoting IPM (integrated pest management) strategies. Currently, groups of 10 farmers are meeting to test out IPM measures and learn from each other. The ambition is to reach a wider group of farmers and horticulturists through demonstrations on the pioneer farms and show how IPM can indeed work. IPMWORKS trains advisors in building IPM demonstration networks, using a toolbox of IPM decision support tools (https://ipmworks.net/toolbox/en/#/) and organizing local demonstration activities. IPMWORKS was also invited to a public hearing at the European Parliament in Brussels on May 23 to present its operation, results and policy recommendations to members of the European Parliament.

contact: simon.lox@ilvo.vlaanderen.be

IPM works
An EU-wide farm network demonstrating and promoting cost-effective IPM strategies

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 101000339

RESULT



Development of a statistically based monitoring plan based on risk analysis fpr the detection of *Xylella fastidiosa* in Belgium

Xylella fastidiosa (Xfas) has been a known plant pest in the Americas for more than a century, but only gained notoriety in Europe in 2013 when the bacterium caused significant damage in southern Italian olive groves. Xfas is regulated in the EU as a quarantine organism. Each member state is required to organize annual surveys to detect possible presence according to published EFSA guidelines. Within the RIBSURX project, ILVO, in collaboration with UC Louvain and ULB, examined how the EFSA methodology could be adapted for Belgium. All potential host plants were mapped, risk factors and relevant epidemiological units were identified and the sensitivity of sampling and detection methods was evaluated. This information was used to build different scenarios for calculating sample size and allocation of samples among epidemiological units on Belgian territory.

contact: jolien.venneman@ilvo.vlaanderen.be

Volksgezondheid
Veiligheid van de Voedselketen
Leefmilieu

RESULT

Phytosanitary status of organisms harmful to plants and plant products

Plant diseases and pests present in nearby or further afield do not stop at our borders. The proper phytosanitary status of eight potentially new threats in Belgium were studied in the project HARMSTAT through a monitoring survey during two growing seasons. In addition, literature reviews provided additional information on their biology, geographical distribution, host plant spectrum and their potential for introduction and establishment. Three of the pests studied were found to be present in Belgium to a limited extent: *Curtobacterium flaccumfaciens* pv. *poinsettiae* and *Sirococcus tsugae* and Tomato Brown Rugose Fruit Virus. Not present were root knot nematodes *Meloidogyne ethiopica* and *Meloidogyne luci*, pompom beetles *Agrilus fleischeri* and *Agrilus bilineatus*, longhorn beetle *Xylotrechus chinensis*, spider mite *Tetranychus mexicanus*. These results allow the federal government to implement strategic actions if necessary. At this point only Tomato Brown Rugose Fruit Virus is under official surveillance by the FASFC.

contact: jochem.bonte@ilvo.vlaanderen.be

Volksgezondheid
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Leefmilieu

RESULT

Phytosanitary status of beech leaf blight in Belgium and Europe

Beech leaf disease occurs exclusively on beech trees and has so far only been identified in the US and Canada. Since the first reports in 2012, the spread there has increased sharply. Especially American but also European beeches are affected. Recent studies confirm the association of the disease symptoms with the leaf nematode *Litylenchus crenatae* subsp. *mccannii*. During our extensive survey in Belgium, in collaboration with PCS for Flanders, CARAH and OWSF for Wallonia, neither the disease nor the nematode was identified in forests, parks, nurseries and arboreta. This project also focused on public awareness of beech leaf blight and recognition of symptoms. This research was done analogously in 5 other countries, so that we now have a better overview of the status of the nematode and the disease in Europe (Euphresco project FAGUSTAT). With the obtained information, better advice can be given for an adapted policy on *Fagus* species.

contact: nicole.viaene@ilvo.vlaanderen.be

Volksgezondheid
Veiligheid van de Voedselketen
Leefmilieu

RESULT

© Joseph Berger, Bugwood.org

Developing an effective monitoring program for non-European borer flies on Belgian territory

Non-European borer flies are important crop pests that could also cause a lot of damage in Belgium. In collaboration with the Royal Museum for Central Africa, we developed an effective monitoring program for these flies. A total of 53 non-European borer fly species, including the apple fly, were considered for monitoring in Belgium. Possible import routes were mapped, focusing on introduction of borer flies via air passengers and crew coming from non-EU countries. Three specific monitoring programs were established and it is recommended to implement them and evaluate their effectiveness after two years. It is also recommended that the Belgian population be involved (in the form of *citizen science*) in the development of a general monitoring program for non-European borer flies.

contact: wannes.dermauw@ilvo.vlaanderen.be

Volksgezondheid
Veiligheid van de Voedselketen
Leefmilieu

RESULT

Development of a monitoring strategy for native and exotic *Agrilus* spp. in Belgium

What is the best way to catch Agrilus predatory beetles? The larvae of these Agrilus weevils can cause lethal damage to (fruit) trees by digging tunnels in the bark and sapwood. The aim of the Euphresco project AGRITRAP was to consolidate the European studies carried out so far and, in collaboration with North American researchers, to work out an optimal trapping method. Based on our results, it appears that yellow fluorescent traps are more efficient for monitoring European Buprestidae living in deciduous forests, although green Lindgren funnel traps are more suitable for Agrilus biguttatus. Furthermore, an easy to use identification key was created with the aim of enabling foresters, fruit tree growers, researchers and FAVV/AFSCA inspectors to distinguish native species with limited damage from highly damaging species.

contact: jochem.bonte@ilvo.vlaanderen.be

Volksgezondheid
Veiligheid van de Voedselketen
Leefmilieu

RESULT

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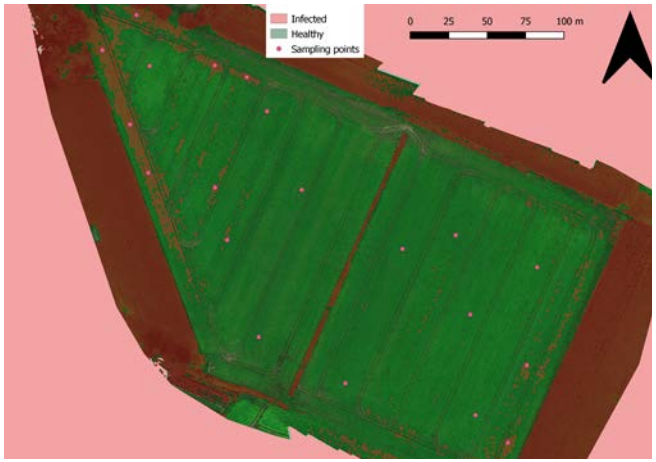
Genetics of Robusta coffee in the Congo basin

The FWO project on the conservation genetics of Coffea canephora in the Congo basin was a joint project of KU Leuven, ILVO, Botanische Tuin Meise and UNIKIS (DR Congo). It mapped the genetic diversity of wild Robusta coffee and examined the potential threats of human disturbance to its natural habitat, the rainforest. The project showed the geographic population structure of the wild coffee population in Yangambi. Genetic characterization of the Yangambi coffee collection at the local INERA field station identified three genetic groups that form the basis of the breeding program. Wild genetic resources are used to increase genetic diversity. There is relatively limited genetic exchange between wild coffee and nearby cultivated material. Our results provide further insights for ongoing conservation initiatives.

contact: tom.ruttink@ilvo.vlaanderen.be

RESULT



Non-destructive detection of quarantine plant diseases using image processing

Plant-parasitic nematodes have a major impact on global agricultural yields. Currently, this detection is mainly done by looking with the naked eye at underground biomass. The NemDetect project investigated whether infections in potato by nematodes could be automatically detected by image analysis using hyperspectral cameras. This research commissioned by EFSA was done in collaboration with partners in Slovenia (KIS). Infestations by root knot nematodes (*Meloidogyne chitwoodi* and *M. fallax*) and potato cyst nematodes (*Globodera pallida* and *G. rosochiensis*) were examined. Through pilot studies, the effectiveness of remote sensing in detecting nematode infestation was evaluated. This was done in two ways: via the detection of infected tubers for early warning and management and by using pot tests to examine the possibilities of distinguishing between biotic and abiotic stress. The results showed that remote sensing techniques have potential for nondestructive detection of plant-parasitic nematodes and provided views of other types of stress.

contact: nicole.viaene@ilvo.vlaanderen.be
jonathan.vanbeeck@ilvo.vlaanderen.be

RESULT

European cooperation accelerates sustainable crop production

SusCrop was an ERA-Net co-funding action under FACCE-JPI (Horizon2020), aimed at strengthening the European Research Area (ERA) in the context of sustainable crop production through better cooperation and coordination of various national and regional research programs. Europe's broader focus concerns agriculture, food and nutrient security and climate change. ILVO coordinated all communication tasks in this network and helped ensure broad dissemination of research results; organized a workshop on sustainability and resilience assessment methods; and co-organized the SusCrop and FACCE-Surplus project and outreach seminar on sustainable crop and agricultural production for the future. The research activities and network from the SusCrop project that ended in 2023 will continue in the Green ERA-Hub, a broad thematic initiative of 15 European networks related to agri-food and biotechnology.

contact: nikki.declercq@ilvo.vlaanderen.be
hendrik.deruyck@ilvo.vlaanderen.be

SusCrop – ERA-NET
Cofund on Sustainable Crop Production
FACCEJPI

IN THE SPOTLIGHT

ISO 17025 and ISO 14001 certified laboratories and reference operation of the Diagnostic Center for Plants

ILVO's Diagnostic Center for Plants (DCP) is the leading laboratory for plant health in Flanders. DCP has an important policy support task. We perform analyses for the government for the certification of propagation material, for the detection of regulated pathogens and for compliance with European regulations on plant health in general.
Much of the laboratory analysis is done in certified laboratories. These ISO certifications guarantee a quality and correct service, with attention to the environmental impact of all these activities. Also, ISO 17025 accreditation provides a basis for operation as a National Reference Laboratory for Plant Health and European Reference Laboratory for Plant Health for bacteria and nematodes.
DCP performed over 18,000 analyses in 2023, a variety of both conventional and molecular testing methods were applied and developed in-house.
To inform the industry about new problems and techniques, short popularized 'Plant Pests' articles are published regularly, including contributions on the difficult to control '*Candidatus Phytoplasma Solani*', yellowing viruses in sugar beet cultivation and *Phytophthora* root rot.

contact: annemie.hoedekie@ilvo.vlaanderen.be

IN THE SPOTLIGHT

Five new nematode-resistant leaf radish varieties

ILVO breeds several green cover crops. One of them is fodder radish. As of summer 2025, 4 new varieties will be on the market. And they are special! These fodder radish varieties are able to purify the soil of two types of parasitic nematodes: The beet cyst nematode and the root knot nematode. Up to 90% of these pathogenic nematodes get eliminated from infected soil after successful cultivation of fodder radish as a green cover crop.

contact: tim.vleugels@ilvo.vlaanderen.be

NEW

Acceptance of IPM by gardeners and farmers

Crop protection is a broad term that includes both chemical pesticides and Integrated Pest Management (IPM) measures. The former of course ensures crop yields but may also represent risks to biodiversity, the environment and human health. With IPM, the perception among some horticulturists is just the opposite. However, IPM, if properly designed, can play a role in reducing dependence on chemical pesticides. But then users need to become more confident, knowledgeable and experienced with that new approach. SUPPORT contributes to the wider adoption of IPM and other low pesticide-input technologies by developing relevant scientific knowledge that can be used in stakeholder and policy strategies.

contact: erwin.wauters@ilvo.vlaanderen.be

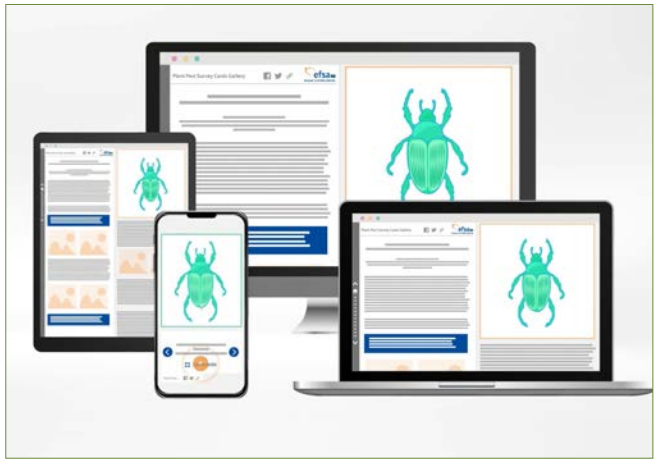
NEW

Pear and cherry get improved control of Pseudomonas infections

In Flemish pear and cherry production, the difficult to control bacterial disease *Pseudomonas syringae* causes major losses almost every year. All above-ground parts of the plant can be affected. This VLAIO project, conducted in cooperation with pcfruit, is looking for a curative control method as none yet exists. The researchers are therefore mapping all the factors that play a role in infection. Research questions include 'What is the diversity and virulence of the pathogenic strains? Which conditions such as inoculum pressure, phenological stage and weather conditions give rise to infection? And finally, how do the experimental potted trees in the greenhouse respond to testing with new Pseudomonas control methods?'

contact: bart.cottyn@ilvo.vlaanderen.be

NEW



Fruit trees in the EU: new tools for inspection of quarantine pests and diseases

With this project, ILVO is commissioned by EFSA (Plant Health Monitoring) to prepare descriptive Pest Survey Cards for certain quarantine plant diseases and pests that may occur specifically on fruit trees. In order to monitor the so-called quarantine organisms in all member states, preparations for inspection rounds are needed so that everyone can act with up-to-date and equal knowledge, and in accordance with international standards and current EU regulations. ILVO and CSIC (coordinator) are assisting the EFSA Plant Health Monitoring team in developing tools to prepare and schedule the crop-based inspections for the targeted regulated organisms in fruit trees (pome fruits and stone fruits).

contact: jane.debode@ilvo.vlaanderen.be

NEW

SynBioS – Sustainable solutions for diseases and pests in strawberries

In the new FWO-SBO project SynBioS, KU Leuven, Antwerp University and ILVO work together to develop alternative control strategies for diseases and pests in Flemish strawberry cultivation. For this purpose, the project exploits synergistic interactions between various biological control strategies. ILVO will investigate the implementation of these and other biological control strategies. Socio-economic advantages and disadvantages will be studied within the entire crop protection chain. The insights obtained will serve as building blocks to optimize, together with stakeholders, the crop protection chain and associated revenue models in function of the new generation of crop protection products. Finally, efforts will also be made to transfer knowledge between advisors and strawberry growers to promote the effectiveness, and thus adoption, of pest control strategies.

contact: kaat.peeters@ilvo.vlaanderen.be

NEW

Limiting the impact of cucurbit aphid-borne yellows virus on Flemish cucumber cultivation

Growers of cucumbers and related species have been facing a new virus threat in their greenhouses for several years, namely CABYV, the cucurbit aphid-borne yellows virus. Through an Operational Group of all stakeholders, scientists (ILVO, PSKW and Inagro) and practitioners (growers, auctions, seed houses), we aim to tackle this virus disease quickly. We gather knowledge and ensure exchange of practical experiences between each link in the chain within the sector. We also establish a control protocol that is adaptable to each farm-specific situation. This gives growers the tools to reduce the risk of infection and spread and to apply a more targeted control approach.

contact: fauve.maertens@ilvo.vlaanderen.be

NEW

Identification of quarantine wood-boring beetles based on droppings and borer meal

Wood-boring beetles cause damage to forests worldwide. However, this damage goes unnoticed when the beetle larvae are living in the trunk. Together with CRA-W and INBO, ILVO will develop an identification protocol that will allow identification of wood-boring beetle larvae on the basis of their droppings and borer meal (*frass*). Such a protocol would enable rapid detection of wood-boring beetles and also facilitate more efficient measures against these beetle pests. Specifically, this project focuses on three quarantine beetles: *Agrilus planipennis*, *Aromia bungii* and *Pityophthorus juglandis*.

contact: wannes.dermauw@ilvo.vlaanderen.be

Volksgezondheid
Veiligheid van de Voedselketen
Leefmilieu

NEW

The entry of *Curtobacterium flaccumfaciens* pv. *flaccumfaciens* in the emerging CEREAL LEGUME sector – a real threat?

The bacterium Cff is known to cause "bacterial wilt" in a number of legume crops, including Phaseolus bean, field bean and soybean. In the EU, it is regulated as a quarantine organism. Because the cultivation of protein crops is on the rise, ILVO and CRA-W want to gain more insight into the phytosanitary status of Cff in Belgium. In CurtoALERT, we are therefore conducting a survey in grain legumes to collect more data at the national level. Moreover, new or existing tools for the detection and identification of Cff in plant material/seeds will be developed or validated. The ultimate goal is to support the National Plant Protection Service in the implementation of their phytosanitary procedures, and to make seed companies aware of the importance of Cff-free products.

contact: jolien.venneman@ilvo.vlaanderen.be

Volksgezondheid
Veiligheid van de Voedselketen
Leefmilieu

NEW

Are there new risks to plants and plant products in Belgium?

In the framework of the EMPHYPEST project, together with CRAW and pcfruit, we investigate the presence or absence in Belgium of six quarantine plant harmful fungi and five insects. The fungi under study are *Colletotrichum fructicola* and *C. siamense* in apple, pear and strawberry, *Phytophthora pluvialis* in Douglas fir, *P. nemorosa* and *P. hibernalis* in ornamentals and *P. austrocedrae* in wild juniper. The targeted insects include three that live on pine, namely *Chionaspis pinifoliae* (scale insect), *Crisicoccus pini* (mealybug) and *Toumeyella parvicornis* (pine tortoise scale), as well as the moth *Garella musculana* on walnut and the polyphagous winged cicada *Pochazia shantungensis*. To determine the status of plant-damaging fungi and insects, we conduct targeted surveys in each specific case at the host plants and the sectors (fruit, ornamental, forest, wildlife) in which they might occur.

contact: kurt.heungens@ilvo.vlaanderen.be
jochem.bonte@ilvo.vlaanderen.be

NEW

Flower4Trees: flower mixtures as a win-win situation for biodiversity and grower at outdoor tree nurseries

Within this operational group, HOGENT, ILVO and PCS are joining forces to make optimal use of the potential of Flemish tree nursery plots in the context of biodiversity, without the growers having to sacrifice plant quality and growth of outdoor tree nursery crops.
Tree growers task this operational group to compose floral mixtures with a positive impact on both outdoor tree nursery crops (nitrogen fixation, soil carbon build-up, nutritive attraction, pest suppression, soil moisture retention) and biodiversity in Flanders (wide range of blooms, diverse flowers, with attention to native flora).

contact: jochem.bonte@ilvo.vlaanderen.be

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

IN THE SPOTLIGHT

CRISPR-Cas: technology of the future?

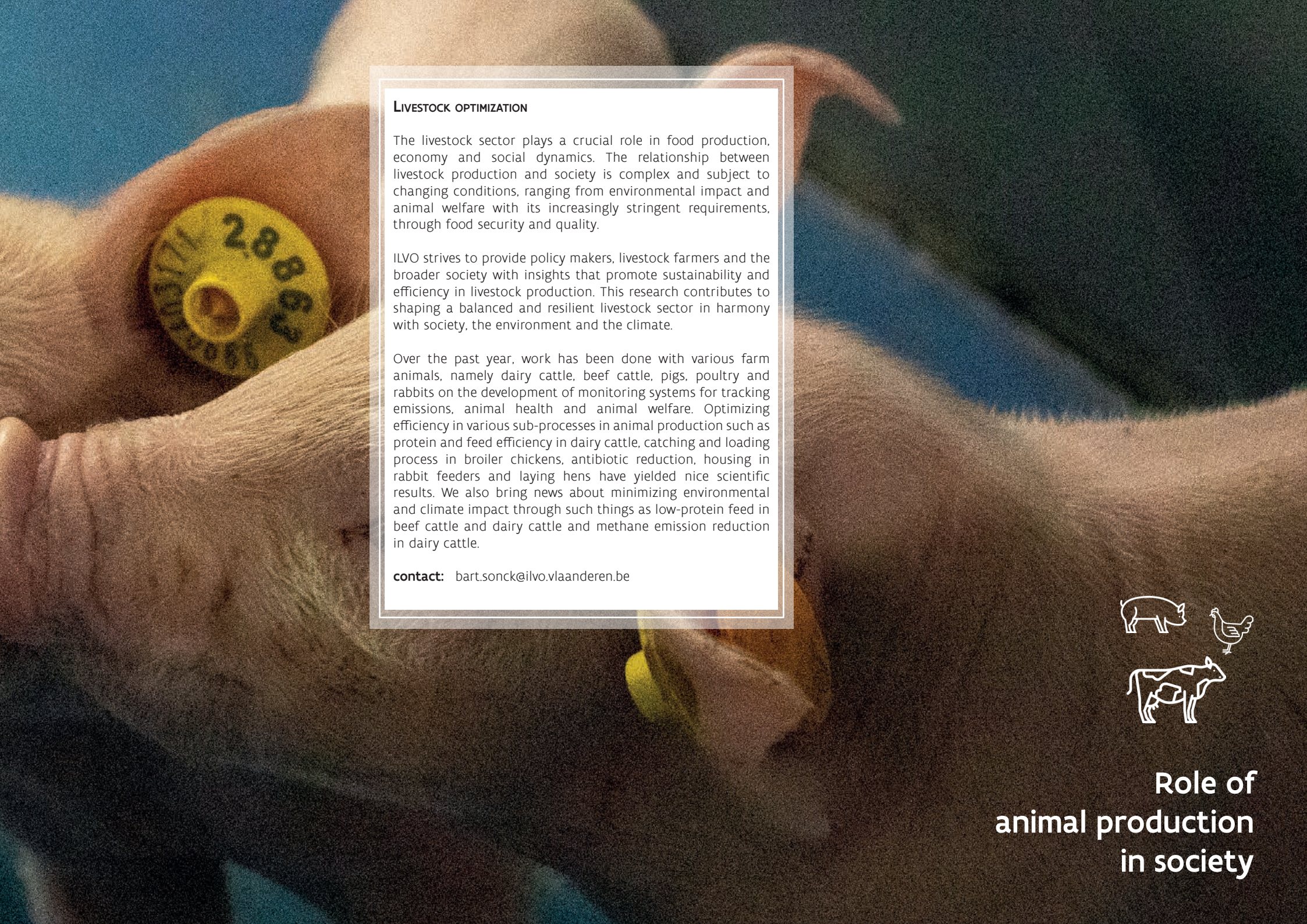
Classical plant breeding process can take 10 to 12 years. Thanks to the innovative gene editing technique CRISPR- Cas,
This process can be shortened by a third. This new technique accelerates research into e.g. drought-tolerant crops or fiber-rich food.
ILVO researcher Katrijn Van Laere testifies in this video about her experiences with the revolutionary gene editing technique CRISPR-Cas.

contact: katrijn.vanlaere@ilvo.vlaanderen.be

The video below was made after the annual Festival of the Future, which highlights innovation in East Flanders.

Katrijn Van Laere explains CRISPR-Cas out

1:33



Livestock optimization

The livestock sector plays a crucial role in food production, economy and social dynamics. The relationship between livestock production and society is complex and subject to changing conditions, ranging from environmental impact and animal welfare with its increasingly stringent requirements, through food security and quality.

ILVO strives to provide policy makers, livestock farmers and the broader society with insights that promote sustainability and efficiency in livestock production. This research contributes to shaping a balanced and resilient livestock sector in harmony with society, the environment and the climate.

Over the past year, work has been done with various farm animals, namely dairy cattle, beef cattle, pigs, poultry and rabbits on the development of monitoring systems for tracking emissions, animal health and animal welfare. Optimizing efficiency in various sub-processes in animal production such as protein and feed efficiency in dairy cattle, catching and loading process in broiler chickens, antibiotic reduction, housing in rabbit feeders and laying hens have yielded nice scientific results. We also bring news about minimizing environmental and climate impact through such things as low-protein feed in beef cattle and dairy cattle and methane emission reduction in dairy cattle.

contact: bart.sonck@ilvo.vlaanderen.be

Role of animal production in society

RESULT

Making beef cattle farming more sustainable through BovINE

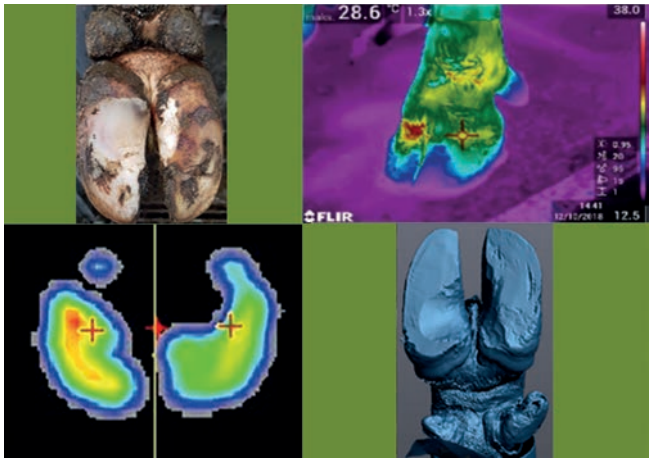
The goal of BovINE, an EU-funded project, was to make the European beef cattle sector more sustainable by making existing knowledge and information more accessible to livestock farmers, thus promoting implementation in practice. The BovINE project focused on 4 themes: Socio-economic resilience, animal health & welfare, production efficiency & meat quality, and environmental & climate impact. To achieve this goal, a freely accessible knowledge platform was created: The BovINE Knowledge Hub, where all collected information can be consulted per theme and topic. To promote knowledge acquisitions by livestock farmers, visual outputs were created, including animations, webinars and practical information sheets. For European bodies and institutes working on the sustainability of European cattle farming, a Policy Brief is available that links the results of BovINE with the Farm-to-Fork Strategy. The project was coordinated by Teagasc; ILVO and Boerenbond were Flemish partners.

The project was coordinated by Teagasc, ILVO and Boerenbond were Flemish partners
More info: https://hub.bovine-eu.net/

contact: karen.goossens@ilvo.vlaanderen.be

Funded by the European Union

RESULT



Claw care in dairy cattle based on thermal imaging

Claw problems are among the most important health disorders in dairy cattle, with a negative impact on cow welfare and severe economic consequences. In the CLAWCARE VLAIO-LA project, UGent (coordinator), ILVO, Inagro, Hooibeekhoeve and HoGent investigated the possibilities of using thermal camera images to reduce claw problems in dairy cows. A claw injury often turns out to be detectable via the thermal camera, before it can be detected by the naked eye. The game changer is that claw health of all cows in the herd can be monitored automatically to detect claw problems earlier. A database of infrared images and color photographs was built to train a self-learning algorithm. Deep learning techniques were used to investigate whether the timing of necessary curative claw care could be predicted and whether certain types of claw injuries could be detected automatically. To this end, the researchers worked closely with dairy farmers, claw health providers and veterinarians. We expect that the approach will contribute to the general increase in knowledge and awareness around the importance of claw health, and that the prevalence of claw problems will decrease over time through automated monitoring.

contact: stephanie.vanweyenberg@ilvo.vlaanderen.be

IN THE SPOTLIGHT

OPTImalizing protein in the cow to reduce N and P excretions.

To the environment in an economical way

In the VLAIO-LA EKOPTI project, ILVO and Inagro worked to improve protein efficiency in cattle by improving the protein quality of locally grown feeds, developing strategies to save protein through precision feeding and improving nitrogen efficiency in the rumen. In parallel, it examined how the measures could contribute economically to limiting nitrogen excretions and -emissions to the environment. Grass-clover fields scored well because of their more efficient use of nitrogen and ability to achieve similar yields with less fertilizer. The use of hydrolyzable tannins as a silage additive for fall grass did not prove successful, but did highlight the importance of this protein-rich fall cut. Toasting field beans improves protein and starch resistance. The use of rumen resistant amino acids in low protein rations is challenging at the current level of knowledge on forage-based amino acid delivery. The use of concentrate feed could be successfully reduced on field farms. A feed additive with essential oils shows potential to improve nitrogen efficiency for dairy cattle in low protein rations.

More info: EKOPTI | RUNDVEELOKET

contact: tine.vandenbossche@ilvo.vlaanderen.be

RESULT

Ideal rearing of a heifer calf to dairy cow

The VLAIO-LA project JongLeven gives Flemish dairy farmers practical tools for rearing young livestock that is simultaneously more sustainable and financially beneficial. There are 4 themes:
1) Establishing the ideal growth trajectory and identifying the critical control points during the rearing of heifer calves.
2) Identifying critical nutritional factors during the first months of life that affect rumen development, rumen function and feed efficiency.
3) Protocols around biosecurity & hygiene management, colostrum management and milk management for optimal health.
4) Preparation of an updated practical guide on the feed intake, energy, protein, mineral and vitamin requirements of dairy heifers during rearing.
The knowledge gathered was compiled into a practical guide and a ration tool for young stock. Livestock farmers can now more easily reduce the calving age of their heifers.

contact: maryline.lamerand@ilvo.vlaanderen.be

Rearing: Growth and Monitoring - Practice

9:01

RESULT

The transition period as a monitoring window for the nutritional and metabolic resilience of dairy cattle

Milk production per cow continues to increase, but this can sometime present challenges for the animal. In particular, the period of 60 to 90 days around calving, the transition period, can be critical for some cows. The objective of this VLAIO project (ILVO, KU Leuven, UGent, Hooibeekhoeve, Inagro) was to develop tools to identify at-risk animals faster. Based on a single method that analyzes a number of well-chosen, easily measurable telltale components in milk, livestock farmers can easily and quickly monitor the metabolic health of cows and predict a bit themselves. It's an important breakthrough, because the sooner cows with health problems are detected, the earlier and better they can be treated. Still, it proved challenging to predict status for the next three weeks as early as the third day after calving, based exclusively on milk parameters. Predictions are improved by also taking into account feed intake and body conditions of the cow before calving.

contact: leen.vandaele@ilvo.vlaanderen.be

RESULT

Coolpigs confirms double benefit of selenium as feed supplement

Coolpigs looked for strategies to manage heat stress in pigs on hot summer days. Selenium and vitamin E are powerful antioxidants that play a crucial role in the body and potentially help prevent a whole range of health problems in both humans and animals. ILVO and UGent tested these feed additives as one of the possible measures to reduce heat stress in pigs. Pigs on the supplemented feed with extra vitamin E and organic selenium did not react differently in terms of respiratory rate and body temperature during heat stress. But they did achieve better feed conversion under hot conditions as compared to pigs in the same barn that received no supplements. Moreover, this enrichment appeared to add value to the pork: We found that the number of people with a deficient intake of selenium was significant. In 100 grams of pork steak from the supplement-fed pigs, people would eat as much as 30% of the daily recommended amount of selenium.

contact: lotte.deprekel@ilvo.vlaanderen.be

RESULT

Sows in free-range stall pens: How feasible is this?

During and after farrowing, sows are normally housed in farrowing crates. That system is under social pressure in Europe. In Flanders, there is relatively limited research and practical knowledge available on free-range farrowing pens. In an operational group, ILVO sought pioneer pig farmers using a free-range farrowing system where the sow can walk around among the newborn piglets. Their experiences were shared with interested pig farmers who might also want to invest in free-range pens in the near future.
During farm visits and discussions with experts, the advantages and disadvantages of each of the systems were weighed to evaluate the possible added values, losses and profitability of the various alternatives. The higher cost of construction and lack of higher price for the new housing proved to be a major bottleneck with each system, as did the lack of clarity about farrowing pen requirements in possible future animal welfare legislation. The potential for increased piglet mortality also appears to be a concern.
Five technical docu-films have been made on the different types of free range sow farrowing pens.

More info: https://www.varkensloket.be/haalbaarheid_vrijloopkraamhokken

contact: sarah.desmet@varkensloket.be

RESULT

Towards a monitoring system for measuring welfare of laying hens at the slaughter line

An objective monitoring system is essential to properly evaluate farm animal welfare. At the request of the Flemish government (Animal Welfare Department), a ready-to-use welfare monitoring and benchmarking system for Flemish laying hens at the slaughterhouse level was developed. For this purpose, in a first step, a set of potential indicators and a corresponding objective scoring system were compiled to measure the welfare of laying hens at the slaughter line. These indicators were then used to map the welfare of Flemish laying hens from the layer farmer to the slaughterhouse. The slaughterhouse questionnaires were further optimized, taking into account the practical feasibility for implementation at the slaughterhouse. A total turnaround time of 1 to maximum 1.5 h for the complete monitoring of a flock was targeted. The newly developed Legmoni application ensures that all this data can be collected and reported quickly and efficiently.

More info: www.legmoni.be

contact: anneleen.watteyn@ilvo.vlaanderen.be

RESULT

Research on catch and load process in broilers and reform laying hens

Different trapping methods (upright, conventional and machine) were compared in the same shed with the same trapping crew to compare animal welfare, labor efficiency and load, and cost. Seven flocks of laying hens (±3000 hens/couple/catch method) and 12 flocks of broilers (± 5000 hens/couple/catch method) were monitored during catching and loading at the farm and at the slaughterhouse. With upright catching, fixation duration was shorter (for both layers and broilers) and for layers, there were fewer bruises on the wings compared to conventional catching. The fewest injuries were found with machine trapping (broilers). Duration of catching with the same number of catchers took longer than conventional loading, resulting in costs for catching and loading layers that were 1.8 times higher and for broilers, 1.5 times higher. An ergonomics expert considered both methods too stressful, while the catchers found upright catching more stressful. In addition, practical guidelines were also established for selecting chickens that are not suitable for transport.

contact: frank.tuyttens@ilvo.vlaanderen.be

RESULT

Pilot project provides insight into best practices for alternative cage-free egg production

The EU pilot project 'Best Practice Hens' (DG SANTE) aimed at a critical comparison and evaluation of egg production systems as they exist today in different European countries. The aim was to obtain reliable data and practical knowledge on best practices in uncaged housing for laying hens. Since the EU ban on battery cage systems in 2012, only two types of indoor housing systems are still allowed for laying hens: Enriched cages and non-cage systems (including the aviary system). Enriched cages still limit the layers' possibility to express highly motivated behavior. Based on the project results, best practices for the use of non-cage systems were distilled and then intensively communicated to the European laying hen industry.

contact: liesbeth.vandamme@ilvo.vlaanderen.be

RESULT

Part-time group housing in (rabit) feeders can be done, but under conditions

Female rabbits - feeders - should eventually be housed in groups in Flanders just like meat rabbits, so that they can exhibit natural and social behavior. Because aggression towards each other and each other's young is part of that social behavior in the period around littering, this can only be done part-time and under conditions. At 22 days (no later) after littering, placing three feeders (no more) together with their young produces the least amount of skin lesions and aggression. Distraction materials in the barn can further reduce aggressive behavior. There are also signs that dominant and submissive behavior are stable traits in a proportion of feeders, which would allow genetic selection toward less aggression. More research should shed light on this. With following these recommendations, there will still be aggression in the groups, the job is not done.

contact: liesbeth.vandamme@ilvo.vlaanderen.be

RESULT

Study shows link between bacteria in mother's and calf immunity

Calves rely entirely on the very first mother's milk, called colostrum. The antibodies they receive in it protect the calf during the first weeks of its life against infections that can cause illness such as diarrhea and respiratory problems. Classically, quality colostrum is seen as colostrum with lots of antibodies. But not only the amount of antibodies in the very first colostrum determines how well calves are protected against infections. The bacterial composition of the milk is also important: the more good bacteria the colostrum contains, the more antibodies a calf absorbs. So only pasteurize colostrum only if too many bad bacteria are present. To simultaneously increase antibodies in colostrum, it is enough to add more rumen-resistant protein to the rations, particularly for young mother cows at the end of their pregnancy. These are the surprising new insights from the doctoral research of Ilke Van Hese (UGent - ILVO - FWO).

contact: karen.goossens@ilvo.vlaanderen.be

IN THE SPOTLIGHT

Airborne emissions from livestock housing

ILVO is conducting research on emissions to air from livestock housing on behalf of the Environmental Policy Area.
In 2023, the measurement campaign at four Flemish dairy houses got up to speed. The goal of this measurement campaign is to determine the ammonia emission factor (expressed in kg ammonia/animal place/year) for traditional dairy houses using a new measurement method developed by ILVO. On behalf of the Dutch Ministry of Agriculture, Nature and Food Quality, the ammonia and methane emissions of these four dairy cattle houses are also measured according to the Dutch measurement method. By autumn 2024, the measurement campaign will end and results are expected.

As part of a feasibility study on continuous monitoring of ammonia emissions in livestock housing, low-cost ammonia sensors are also being investigated on behalf of the Environmental Policy Area. In 2023 ILVO started working with seven types of ammonia sensors. After a series of experiments in lab conditions, the sensors were also briefly tested in chicken, pig and dairy housing. Results are expected in early 2024.

contact: eva.brusselman@ilvo.vlaanderen.be

RESULT

Interest in legume crops for poultry grows

The VLAIO-LA project "Optimal cultivation of protein crops for poultry feed" aims to provide tools for the cultivation, processing and use of leguminous crops as an alternative source of protein in poultry feed. Within the project, various processing techniques (such as ensiling, toasting and extrusion) are being tested and examined as well as the effect of incorporating such crops in poultry feed and ultimately, the feasibility for the farmer.
This project attracted considerable interest and a strong effort was made to disseminate the results through various avenues. Popularized publications were written, presentations were made and farmers were taken out by participating in various agricultural meetings. Various farmers could thus be helped with specific questions concerning the most optimal (alternative) feed composition for their poultry.

contact: marta.lourenco@ilvo.vlaanderen.be

NEW

Emission reduction research

As part of the search for ammonia-reducing measures, several trials were conducted in manure containers and in the ILVO barns. For example, the use of zeolites as bedding was tested through funding from Boerenbond, first in manure containers and then in practice in littered young cattle barns and with fattening pigs. Zeolites were found to absorb ammonia in the lab and in the manure container tests. However, this uptake is subject to environmental conditions, such as humidity, so the results in the practical trials were variable.
Within the Horizon 2020 project Econutri, the effect of rapid manure removal in fattening pigs, where the manure pit was emptied daily, was investigated. This daily manure pit emptying was found to have an effect mainly on methane emissions from the barn, but not on ammonia.

contact: jonas.vandicke@ilvo.vlaanderen.be
chari.vandenbussche@ilvo.vlaanderen.be

BOERENBOND trouw aan land- en tuinbouw
econutri
Horizon2020 European Union Funding for Research & Innovation

NEW

Ammonia reduction through source-oriented and flanking solutions in conventional and organic pig and poultry farming

Pig and poultry farmers will face very strict emission standards in the coming years. The RAMBIO project (Interreg Flanders Netherlands) is looking for innovative reduction measures and techniques that can also be applied in existing pig and poultry houses. Various measures are being evaluated at test and demonstration sites both in terms of ammonia emission reduction and the effects on animal performance, animal welfare and health.
Decision tools will support livestock farmers to make a conscious, farm-specific choice. In turn, the RAMBIO project, commissioned by the Department of Agriculture & Fisheries, is finding out which measures organic poultry, pig and goat farms can take to reduce their ammonia emissions. These should fit into a system approach and are preferably source-oriented through e.g. animal management, litter materials, and design of the enclosure. For the most promising measures, the working principle, results of emission measurements already carried out and the conditions around their application to guarantee effectiveness are further explored.

contact: chari.vandenbussche@ilvo.vlaanderen.be

Interreg Vlaanderen-Nederland
Gefinancierd door de Europese Unie

NEW

Measuring current welfare trends as a function of nitrogen emissions in broilers

Poultry farmers face societal demands for animal welfare and must comply with a wide range of environmental regulations. Advice for improvement is sometimes contradictory, with optimization for one aspect possibly meaning deterioration for another. In this project, ILVO, Proefbedrijf Pluimveehouderij, Boerenbond and Landsbond Pluimvee are investigating the possibility of integrating emission reductions and the promotion of animal welfare into farm operations by better mapping the impact of specific interventions. This allows the farm manager to make informed and strategic choices for certain barn measures or genetic traits of the animals. The impact of two current animal welfare measures, namely lower stocking densities and keeping slower-growing breeds, is evaluated in this project on both total ammonia emissions and other aspects of farm management.

Coordinator: Poultry Breeding Pilot Farm
Partners: ILVO, Boerenbond and Landsbond Pluimvee

contact: evelyne.delezie@ilvo.vlaanderen.be

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

NEW

Sustainability scan as a stepping stone to more sustainable pig and broiler farming

How can we advise pig and broiler farmers to make their farms more sustainable in all ways, including animal welfare, while taking the trade-offs for other parameters into account? We hope to achieve this by drawing up a sustainability scan that can indicate the possibilities of an individual farm in terms of social, ecological and economic sustainability and animal welfare.
The result of the scan is thus a proposal of well-chosen possible measures at farm level. In a test phase with 10 farms per animal species and a validation phase with 30 farms per animal species, we evaluate and optimize the scan to successfully implement it in practice. Besides farm-specific support, this project also aims to provide new insights into generic points of interest regarding sustainable production in the entire pork and broiler sector.

contact: eline.kowalski@ilvo.vlaanderen.be
annatachja.degrande@ilvo.vlaanderen.be

NEW

LIFT LAYS THE FOUNDATION FOR POSITIVE ANIMAL WELFARE

The traditional approach to animal welfare is to avoid suffering. This leads in animal welfare science this leads to a one-sided focus on the study of negative experiences. Increasingly, importance is also being given to positive experiences. This COST Action 'LIFT' provides a framework to add 'positive farm animal welfare' to the assessment of farm animal welfare.
The main objectives are to:
1) define positive farm animal welfare using clear cut concepts,
2) identify valid approaches to achieve positive animal welfare assessments, and
3) select the most appropriate methods for application at the livestock farm level and
4) formulate recommendations to incorporate aspects of positive welfare into protocols to assess farm animal welfare.

contact: frank.tuyttens@ilvo.vlaanderen.be

NEW

MORE EFFICIENT PIG FARM MANAGEMENT, REDUCED PIGLET MORTALITY AND IMPROVED TRACEABILITY

Two new VLAIO-LA projects aim to support pig farmers in their farm management. The PigID project (ILVO, DGZ and PVL) works with pig farmers to investigate which individual data and analyses are crucial for animal-technical, financial and lab-related improvements. The overall goal is to optimize farm management by identifying opportunities through traceability from birth to slaughter. Additionally, the PIGLIFE project (ILVO and UGent) offers insight into the main risk factors and causes of piglet mortality and links appropriate reduction measures to them. Innovative PLF tools, such as automatic image analysis of piglet and sow behavior in the farrowing house and evaluation of the eating pattern of weaned piglets based on an antenna system and electronic ear tags are being developed to better identify the main causes of piglet mortality.

contact: jarissa.maselyne@ilvo.vlaanderen.be
marijke.aluwe@ilvo.vlaanderen.be

NEW

Alternative iron supplementation for organic piglets

How can piglets' iron requirements be met naturally and organically, without iron injections? This research question arose from a potentially stricter approach to organic certification. In this CCBT project, research partner Inagro is conducting a literature review looking for iron-rich materials that are safe, local, inexpensive and available to organic pig farmers. ILVO is comparing three powdered iron-rich materials that are made available to piglets without restriction to the current method of iron injection. In addition, a specific dose of one of the three iron sources will be administered orally to compare voluntary absorption of the product with controlled absorption. With the outcome of this project, we hope to provide organic pig farmers with tools for an alternative strategy whereby they can still provide their piglets, without iron injection, with their iron needs in a natural and organic manner.

contact: sophie.goethals@ilvo.vlaanderen.be

NEW

Low protein diet as ammonia-reduction measure for beef and dairy cattle

How can livestock producers provide substantiated evidence for their correct application of low protein nutrition to cattle in a user-friendly and efficient way, as an ammonia emission reduction measure? Previous research has shown that reducing protein in rations has a significant impact on ammonia emissions. For the beef cattle sector, this is a promising way to achieve the targeted 15% reduction at the sector level. Two new studies are looking into this. The objective of ELP-BEEF (European Agricultural Fund for Rural Development) is to get low protein feed recognized as a source-oriented, effective and verifiable ammonia-reduction measure for Flemish beef cattle farms. It has also been shown for dairy cattle that a 1% decrease in the crude protein content of the ration can reduce NH3 emissions by 10%. The VLAIO-LAVOEDERPAS project focuses on developing a low-cost and reliable assurance tool to monitor the protein content of rations on dairy farms.

ELP-Beef is funded by the European Agricultural Fund for Rural Development. FeedPAS is funded by VLAIO.
Partners: ILVO, Boerenbond ISP and MCC.

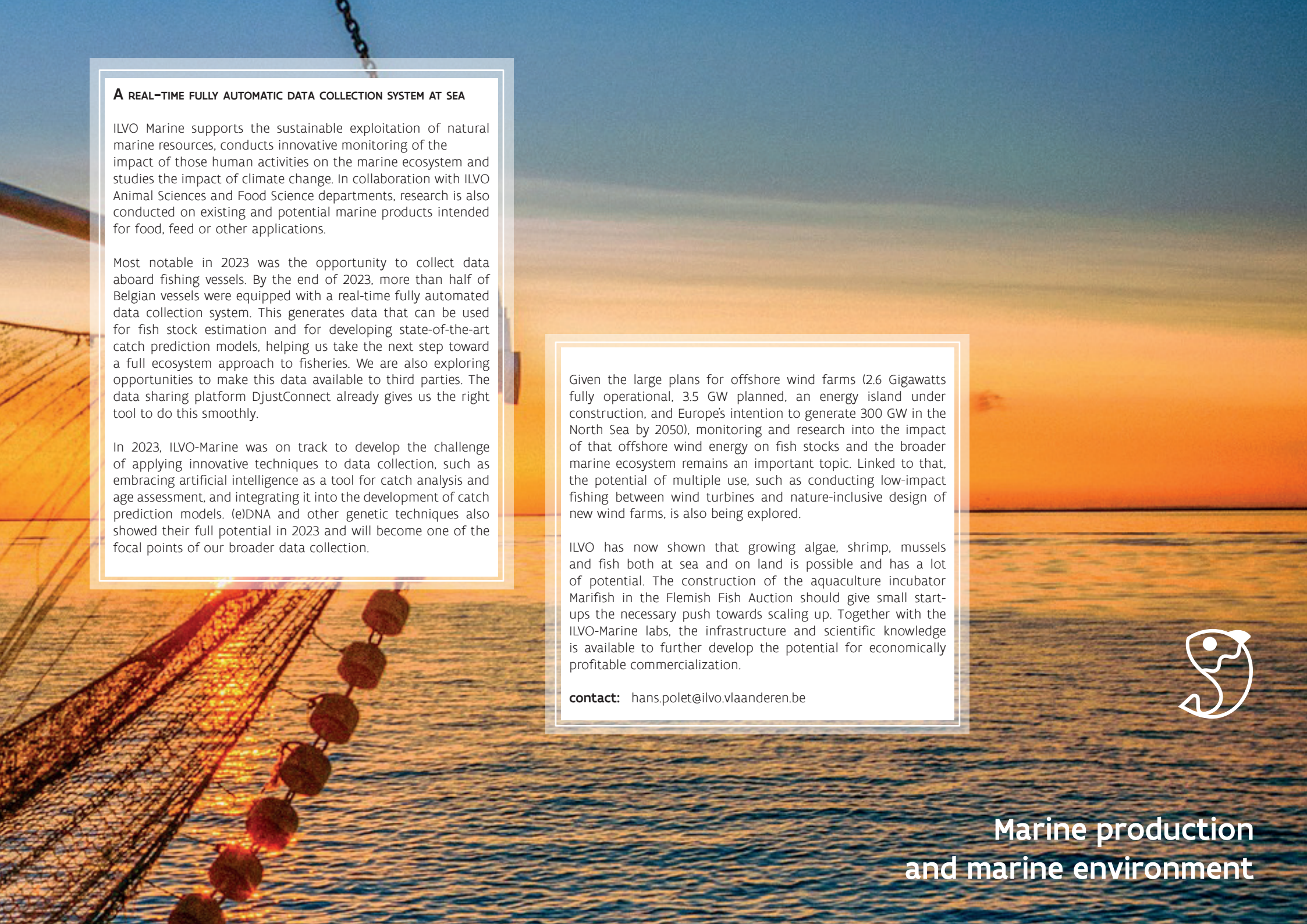
contact: karen.goossens@ilvo.vlaanderen.be

NEW

Best practices to reduce pig tail docking

European and Belgian legislation prohibits routine tail docking of piglets. Commissioned by Animal Welfare Flanders, ILVO is studying tail biting in pigs more closely over the next three years. The research is part of the transition to a pig husbandry system where no tail docking of piglets would be allowed. The project should identify the various risk factors for tail biting and suggest possible control measures for each. Actions planned include observations and small-scale experiments at a number of pilot pig farmers. The goal is to then present the actions to the industry to reduce routine tail docking and encourage pig rearing with intact tails. In time, the approach should lead to additional actions to complement the previously prepared Action Plan on tail docking submitted to the European Commission.

contact: anneleen.watteyn@ilvo.vlaanderen.be



A real-time fully automatic data collection system at sea

ILVO Marine supports the sustainable exploitation of natural marine resources, conducts innovative monitoring of the impact of those human activities on the marine ecosystem and studies the impact of climate change. In collaboration with ILVO Animal Sciences and Food Science departments, research is also conducted on existing and potential marine products intended for food, feed or other applications.

Most notable in 2023 was the opportunity to collect data aboard fishing vessels. By the end of 2023, more than half of Belgian vessels were equipped with a real-time fully automated data collection system. This generates data that can be used for fish stock estimation and for developing state-of-the-art catch prediction models, helping us take the next step toward a full ecosystem approach to fisheries. We are also exploring opportunities to make this data available to third parties. The data sharing platform DjustConnect already gives us the right tool to do this smoothly.

In 2023, ILVO-Marine was on track to develop the challenge of applying innovative techniques to data collection, such as embracing artificial intelligence as a tool for catch analysis and age assessment, and integrating it into the development of catch prediction models. (e)DNA and other genetic techniques also showed their full potential in 2023 and will become one of the focal points of our broader data collection.

Given the large plans for offshore wind farms (2.6 Gigawatts fully operational, 3.5 GW planned, an energy island under construction, and Europe's intention to generate 300 GW in the North Sea by 2050), monitoring and research into the impact of that offshore wind energy on fish stocks and the broader marine ecosystem remains an important topic. Linked to that, the potential of multiple use, such as conducting low-impact fishing between wind turbines and nature-inclusive design of new wind farms, is also being explored.

ILVO has now shown that growing algae, shrimp, mussels and fish both at sea and on land is possible and has a lot of potential. The construction of the aquaculture incubator Marifish in the Flemish Fish Auction should give small start-ups the necessary push towards scaling up. Together with the ILVO-Marine labs, the infrastructure and scientific knowledge is available to further develop the potential for economically profitable commercialization.

contact: hans.polet@ilvo.vlaanderen.be

Marine production and marine environment

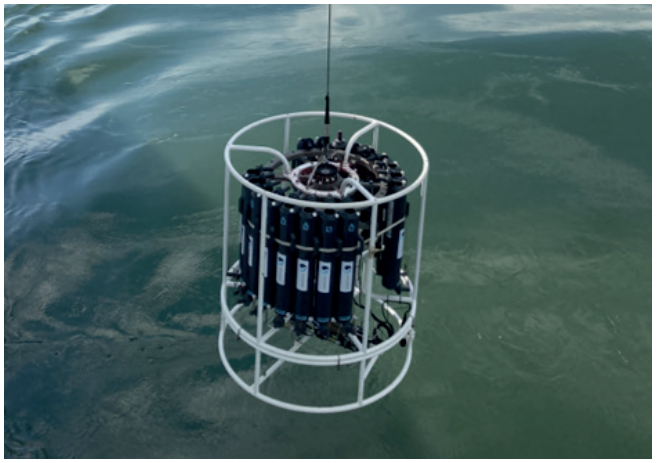
RESULT

Sole in British waters: distribution and migration

The completed project 'BARFISH' analyzed the spatial distribution areas, migration patterns, stock structure and biomass of sole (*Solea solea*) in and near UK waters. This knowledge is crucial for post-Brexit negotiations on redistribution of fishing rights between the UK and the EU. The research also provided insight into the negative impact of Brexit on the economy and social viability of the Flemish fisheries sector, where sole is a commercially important species. The project brought together various data sources, including scientific survey, commercial catch data, mark-recapture data, genetic data (SNPs and eDNA), and environmental data for modeling. A reallocation of quotas or closure of fishing grounds in British territorial waters would directly affect the Belgian fleet, highlighting how relevant and valuable these research findings are to fisheries practice.

contact: sarah.maes@ilvo.vlaanderen.be

RESULT



Detecting the presence of marine species based on 'environmental' DNA in seawater

Within the ZERO impact project (EFMZV), ILVO and the Institute of Natural Sciences have developed an innovative,
sustainable and automatic method to reliably detect marine species and the biodiversity present in the sea. The method based on environmental DNA (eDNA) provides a non-invasive alternative to, for example, typical beam trawl sampling to investigate spatial and temporal patterns in fish communities. Furthermore, initial steps were taken toward automated sampling of eDNA in seawater.
This eDNA technique has many advantages:
1) because only seawater is collected to detect the presence of species, the organisms themselves need not be killed,
2) only one sampling method is needed to study different groups of organisms (fish, invertebrates, plankton,...), and
3) using automating sampling, continuous time series for marine biodiversity and fish populations can be built.

contact: sofie.derycke@ilvo.vlaanderen.be

RESULT

SoleDNA: characterization of a data-poor sole stock via DNA and eDNA

The sole stock in the southern Celtic Sea and southwestern Ireland (ICES areas 7hjk) has recently been characterized by low positive advice and declining TACs, mainly due to a lack of data on size and genetic identity. The SoleDNA project (EFMZV/FIVA) sought to clarify this and found that the current delineation of sole stocks does not match genetic results. Five groups were distinguished, with the data-poor sole stock 7hjk no longer considered one fish stock. Five groups were distinguished, with the southern Celtic Sea (7h) clustering with the rest of the Celtic Sea and southwestern Ireland having unique characteristics to be considered as a separate group. In addition, sole and plaice could be shown to be indirectly detectable and quantifiable based on environmental DNA or free DNA that remains in seawater, for example via the scales. ILVO is working with policy, industry and international colleagues to integrate the project results into the current advisory process for the relevant sole stocks.

contact: lies.vansteenbrugge@ilvo.vlaanderen.be

RESULT

European marine observation and data network enters fishing phase

Marine biodiversity data are essential to determine and monitor ecosystem health in marine areas (e.g. North Sea, Baltic Sea). The fragmentation of marine data (by institute, country, etc.) makes it very difficult to make assessments on a larger scale. An umbrella data portal with biological data offers obvious added value for policy. It is also useful in function of the European environmental directives, which try to evaluate the health status of all ecosystems. The European Marine Observation and Data Network EMODnet unlocks marine data according to international standards for researchers, governments and private companies. In this fifth phase of the EMODnet process, continuity is being provided in the expansion and maintenance of the portal, new biological data products are being developed, and cooperation with regional marine conventions is being strengthened. ILVO provides access to ecological marine data on the Belgian part of the North Sea and is the EMODnet biology ambassador within OSPAR.

More info: https://emodnet.ec.europa.eu/en

contact: gert.vanhoey@ilvo.vlaanderen.be

RESULT

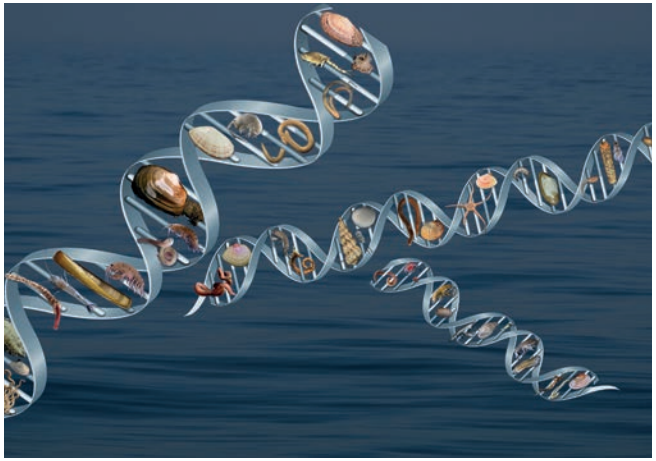
New SmartDots modules for determining fish maturity and counting fish eggs and larvae

The SmartDots platform is a set of specialized software tools for the determination and quality control of biological parameters on marine species as input for stock assessments. SmartDots includes software that allows age determination by annotation of photographs. It also includes a module for setting up calibration exercises and R scripts for smooth and standardized reporting of data. The SMARTDOTS@ICES project developed additional modules for this platform for additional biological parameters, namely for determining fish maturity and for performing counts, measurements and identification of fish eggs and larvae. New R-scripts were also developed for easy reporting of results and training was provided for users of the new modules. The open-source SmartDots software was initially developed by ILVO and is available on the website https://github.com/ices-eg/SmartDots/blob/master/README.md#getting-started. The SmartDots software was adopted by ICES and a platform was developed for organizing international calibration exercises. Under the impetus of ICES, additional software modules were developed in collaboration with DTU-Aqua, ILVO, Wageningen Marine and IPMA.

Funding: EU-DGMARE, UK-DEFRA

contact: karen.bekaert@ilvo.vlaanderen.be

RESULT



Better assessment of marine health using DNA (GEANS)

The Interreg North Sea Region project "GEANS" focused on the development of efficient, cost-effective genetic techniques for assessing marine health in the North Sea region. Instead of time-consuming, manual counts of benthic animals, GEANS introduces DNA-based methods as faster alternatives. By 1) developing an open-access DNA sequence library, 2) establishing validated and standardized protocols, 3) setting up pilot studies that show that the method is not only 40% cheaper and 66% faster, but also detects more species and gives similar results as the traditional method, and 4) providing a decision framework for selecting the most appropriate DNA technique, GEANS has paved the way for a rapid, accurate monitoring and sustainable management of the North Sea ecosystem.

More info: https://www.geans.eu/

contact: annelies.debacker@ilvo.vlaanderen.be

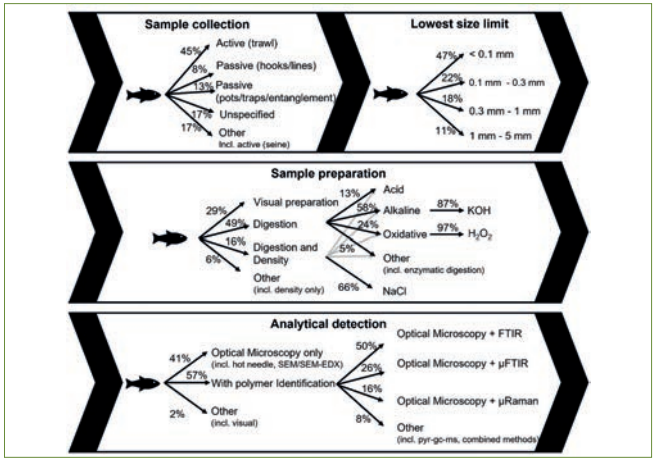
RESULT

Automatic collection and reporting of high-resolution fisheries data – expanding and scaling u the VISTools-system

The VISTools system has potential to make high-resolution, real-time information accessible to various end users (skippers, vessel owners, researchers and policy). To achieve this goal, technical improvements need to be implemented and tested on multiple vessels, database infrastructure built and data made more easily accessible to different end-users. The ambition is to have a reliable system after this project that can be used by the entire Belgian fishing fleet.
The scale-up of the VISTools system was prepared in this project by
1) the technical scale-up of the VISTools system to four pilot vessels,
2) the experimental extension of the VISTools system to the Z.483 (fishing vessel) and
3) Legal preparation for scaling up the VISTools system to the entire fleet.

contact: lancelot.blondeel@ilvo.vlaanderen.be

RESULT

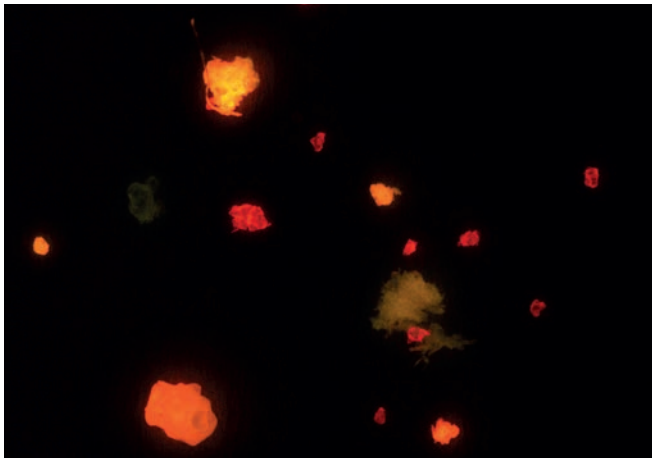


Standardized method for measuring plastic pollution

Plastic contamination is very diverse and can be classified in different ways: According to the size of the plastic, the matrix where the contamination is found, or the type of polymer. This great diversity is accompanied by a wide variety of methods to measure plastic pollution.
Harmonization of these methods is essential to generate comparable and reproducible data and to achieve consistent monitoring. Monitoring is also necessary to take effective measures to reduce contamination or to evaluate the impact of measures taken.
Within the EuroQcharm project, current methods for measuring plastic pollution in water, soil, biota or air were listed and evaluated by means of a systematic review. A ring test was used to evaluate the performance of methods and formulate recommendations for future monitoring and policy, particularly in support of the Marine Strategy Framework Directive.

contact: bavo.dewitte@ilvo.vlaanderen.be

RESULT



Cost-effective methods to measure microplastics in the marine environment

Current methods for measuring microplastics can be divided into cost-effective methods, which allow the analysis of a wide range of microplastics, and advanced methods, which aim to measure even the smallest microplastics. Within the Andromeda project, ILVO-VLIZ research focused on optimizing a cost-effective method to identify microplastics after staining with Nile Red. The developed method uses an image recognition technique to not only recognize plastic from non-plastic particles, but also to distinguish the most common polymers from each other. The method was optimized for diverse matrices such as water, sediment and marine biota (mussels, fish stomachs). In addition, extensive method validation was performed, unique within microplastic analysis, using both non-weathered and weathered plastics.

Funding: Belspo (through JPI Oceans)

contact: bavo.dewitte@ilvo.vlaanderen.be

RESULT

Wind farms provide good habitat for plaice

The concrete blocks at the base of wind turbines create artificial reefs and hiding places for fish and other marine animals that like to reside on stony bottoms, such as cod and North Sea crabs. For the first time, wind farms have also been shown to have a positive effect on flatfish such as plaice. PhD student Jolien Buyse (ILVO, UGent, KBIN) observed a significantly greater increase in plaice within a wind farm compared to outside. Diving expeditions in the Belwind farm confirmed that the fish specifically dwell in the sand between the rocks around the turbines. From there, they hunt for abundant prey living on the rocks and wind turbine poles. By 2050, wind farms are estimated to occupy 10% of the entire North Sea space. Therefore, understanding the impact of wind farms on the marine ecosystem is an important scientific task. As a scientific research center, ILVO has experience in studying the impact of economic activities such as fishing, dredging, sand and now energy extraction on marine life.

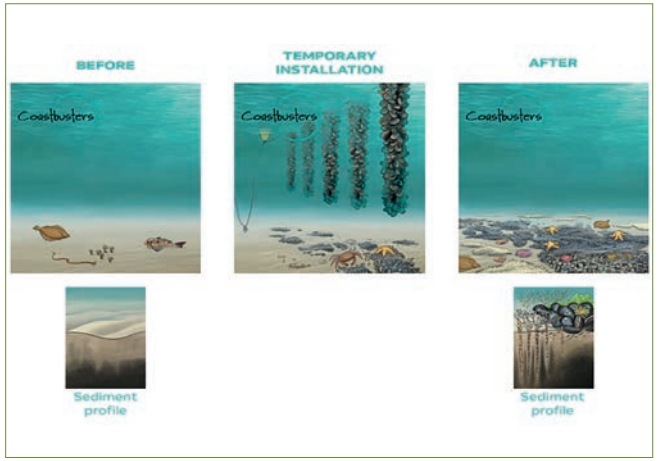
contact: jolien.buyse@ilvo.vlaanderen.be

EURO CHARM

Horizon2020
European Union Funding
for Research & Innovation

ANDROMEDA

RESULT



Coastbusters: mussel reefs as nature-based application for out coastal defenses

Increasing climate changes and the associated rise in sea level, intensification of storms and beach erosion, mean that effective coastal protection measures are needed more than ever. Current engineering approaches to coastal protection are not efficient or cost-effective enough. Therefore, nature-based applications must be part of our coastal protection. After 6 years of experimentation and scientific observation at sea, a new nature-based coastal protection technique is on the table as a result of the COASTBUSTERS VLAIO project. This tested the creation of mussel reefs on our coast, based on aquaculture longline systems and the innovative mussel shaker. Both systems provide mass capture and growth of mussels on ropes, after which some will fall to the bottom. In sufficient numbers, a mussel reef will form on the bottom, which can contribute to sediment stabilization and an enrichment of biodiversity in our coastal zone. In this way, in the future this technique can function as a biologically-reinforced dune-for-dike located underwater, as the first hurdle against storm surge. Beaches and dunes then become the second line of defense.

More info:
https://www.blauwecluster.be/verslag-coastbusters-oktober-2023

contact: alexia.semeraro@ilvo.vlaanderen.be

RESULT

The right sorting: innovative processing of shrimp catches aboard shrimp fishing vessels

The research project "The Right Sorting" brought together machine builder de Boer RVS, ILVO and skipper Jan-Jurie van Eekelen in a study of an innovative processing line aboard shrimp fishing vessels. The key question was the optimization of shrimp processing using image recognition. The detection line, based on camera images and automatic image recognition, sorts catches into marketable shrimp, undersized shrimp and other bycatch. The project includes knowledge sharing, tuning of the camera detection track, and evaluation of sorting accuracy compared to traditional methods. The success of this new sorting gives four main advantages: More accurate sorting, increased bycatch survival, improved working conditions, and more efficient data collection for fisheries research.

contact: mattias.vanopstal@ilvo.vlaanderen.be

Synergy between mariculture and passive fishing

With a globally unique experimental design, this project sought out synergies between mariculture of mussels, oysters and seaweeds, and passive fishing. Both cultivation and harvesting techniques for mussels and oysters were further improved and several SMART farming modules were developed. For example, models were developed to predict conditions in the Westdiep for five days, to ascertain when spat of mussels and flat oyster will fall, and to predict hydrodynamic changes within a sea farm. Because the sea farm attracted a multitude of species, it was also possible to increase the catch with passive gear. The catch efficiency of these passive gears was further improved by adding light to the pots or using luminous net material. The bioeconomic analysis indicated that combining the two activities could lead to a synergistic effect, reducing logistical costs and increasing production.

Partners: Brevisco, Colruyt Group, Flemish Fish Auction, KBIN and ILVO
Funding: The Blue Cluster/VLAIO

contact: daan.delbare@ilvo.vlaanderen.be

IN THE SPOTLIGHT

Growing fish and salt-loving vegetables in one container

The purpose of this feasibility study was to examine whether
1) fish farming can be coupled with saline vegetable farming in a circular aquaculture production,
2) residual streams (heat & CO2) from industry (biosteam) can be used in fish and saline vegetable farming,
3) and how fish and saline vegetable farming can be made engaging and biosecure open to the general public. These research questions were addressed.

A container was placed on the site of Biostoom Oostende to carry out experiments with the cultivation of four species of saline or salt-loving vegetables: sea beet, glasswort, Japanese glasswort and icewort. This cultivation was done in a rack equipped with a watering system (ebb and flow) and LED lighting, testing various light intensities, salinity levels and CO2 concentrations. Furthermore, a study was made on heat utilization in the containers for the cultivation of saline vegetables and fish, as well as CO2 capture from the smoke of the incinerator for use in the cultivation of the saline vegetables. Experiments with fish on the optimal density and feeding rate were necessary for calculating the nitrogen and phosphorus balance and their use as fertilizers for the saline vegetables, where both crops were also linked in practice. An economic feasibility study was conducted for tourism (various scenarios) and the use of various multimedia techniques to enhance the experience at the nursery.

The project was carried out by the consortium BGC, Biostoom Oostende, The Outsider Coast and Poppr, with ILVO as subcontractor, and served as the basis for the development of a pilot farm for saline vegetables and marine/ brackish water fish in combination with tourism and the use of waste heat from industry.

contact: daan.delbare@ilvo.vlaanderen.be

RESULT

Reduction of muddy taste in recirculation aquaculture

A muddy taste in farmed fish is a worldwide problem. Currently, the muddy taste is reduced by flushing it away just before harvest, called 'swimoff'. The objective of this project was to reduce the molecules that produce a muddy taste in the water and optimize the swimoff procedure by:

- adjusting the swimming speed
- blowing in ozone after the biofilter
- removing phosphate (very expensive for commercial nurseries)
- adding plant extract from INVE (did not produce good results)
- using zeolite Y pellets. Geosmin and 2MIB removed the taste but this is not currently economically feasible
- adding a Merus ring. Effect on biofilm reduction appeared minimal but may affect the composition of the bacterial community.

Partners: UGent, ILVO, KU Leuven, Kingfish Zeeland, INVE Aquaculture, AquaBio - Joosen-Luyckx.

contact: daan.delbare@ilvo.vlaanderen.be

Europees Fonds voor Maritieme Zaken en Visserij

RESULT

Breeding kelp for efficient and sustainable use of marine resources

In addition to its use for food, feed and valuable biochemicals, cultivation of sugarweed contributes to carbon sequestration in the oceans. This project, led by NMBU (Norway), with ILVO as a partner, studied opportunities to improve traits such as higher growth rate and biomass production through breeding to maximize the enormous potential for value creation from sugarweed cultivation. One strategy to prevent genetic exchange between cultivated sugarweed and natural populations is to make chromosome-doubled lines first and then triploids that are sterile.
We have developed methods for genome duplication and ploidy measurements, and a biobank of gametophyte cultures for future research. Genetic diversity and population structure of 150 natural accessions were partly explained by geographic distance and ocean currents. In a derived breeding population, we studied allele transmission and genetic control of important growth traits, such as yield.

More info: Breed4Kelp2Feed | NMBU

contact: tom.ruttink@ilvo.vlaanderen.be

NEW

Can we make offshore wind farms even more sustainable? New research project looks at how to reduce chemical emissions

Offshore wind energy offers many benefits: Besides the primary purpose of renewable energy production, offshore wind farms (OWFs) also provide opportunities for multiple uses with nature conservation and aquaculture activities, and have beneficial effects on the marine ecosystem. The environmental impacts of OWFs in the North Sea are routinely monitored in terms of the effect of the introduction of new habitats, underwater noise or the exclusion of fisheries. However, the potential chemical contamination of wind turbines by organic and inorganic substances and particles, for example coming from corrosion protection systems, remains largely unknown. The Anemoi project, funded through the Interreg North Sea program, aims to:
1) identify relevant chemical emissions from OWFs,
2) assess the impact on ecosystems and aquaculture activities,
3) review current regulations, and
4) propose sustainable solutions and opportunities to reduce chemical emissions from OWFs.
Within the Anemoi project, researchers from 11 European institutes will work closely with policy makers and the OWF industry.

contact: bavo.dewitte@ilvo.vlaanderen.be

Anemoi | Interreg North Sea | Co-funded by the European Union

NEW

Sustainable use of sand in nature-based solutions

The Blue Cluster project SUSANA (with financial support from VLAIO) aims to develop a long-term strategy for the sustainable use of marine sand in nature-based solutions (NBOs) to address societal challenges such as climate change and flooding linked to coastal safety. A tension exists between the important need for sand needed for large-scale application in nature-based coastal safety (e.g., Dune-by-Dike) and the finite nature of sand resources at sea and the potential negative impacts of such sand extraction on the marine ecosystem. To date, there is no integrated method by which to balance sand extraction at sea and the use of that sand on land or the development of natural coastal protection systems. Within SUSANA, that linkage will be made by developing an ecosystem services model that will allow the ecosystem services of the NBO to be assessed and compared with changes in ecosystem services at sand extraction sites. The model developed will be the first to enable a systems perspective over the entire NBO impact area.

contact: annelies.debacker@ilvo.vlaanderen.be


ilvo

Towards climate-smart food production

Climate change, viewed globally

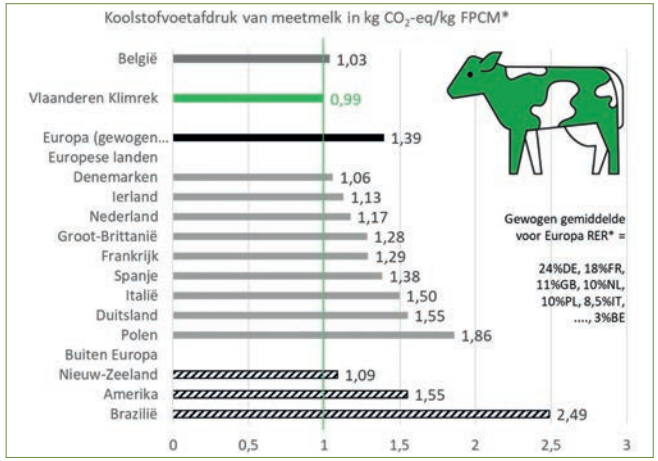
ELK, ILVO's Center of Expertise for Agriculture & Climate, brings together experts from different disciplines and supports sector and policy towards a climate-friendly and climate-robust agri-food chain. Climate research is based on two pillars: Reducing the impact of agriculture on the climate (mitigation); and how agriculture can adapt to the consequences of climate change (adaptation). Looking through a systems lens makes for a broad approach. We keep the sustainability of the entire agri-food chain in mind by focusing on social actors, economic and environmental factors. After all, it makes no sense to propose a measure that is good for the climate, but scores poorly for the farmer's profitability, for example, or increases nitrogen emissions.

Within ELK, we have eight overarching themes: Animal Production, Plant Production, Soil, Energy, Marine Environment, Landscape, Climate Smart Management, and Water. This last theme in particular has been in the news in recent years, due to the successive droughts and floods faced by Flanders and the world. This theme is therefore becoming increasingly important within ELK as well.

Yet ELK's strength lies not in prioritizing specific themes, but rather precisely in collaboration between different research groups across themes. This is best expressed in the Klimrek project. In the coming years, Klimrek will be further developed and elaborated and of course rolled out on more and more farms. In the future, we want to launch more of this kind of multidisciplinary research, often with an international character. In this way we will put Flemish food production even more on the map as 'climate smart'.

contact: sam.decampeneere@ilvo.vlaanderen.be

RESULT

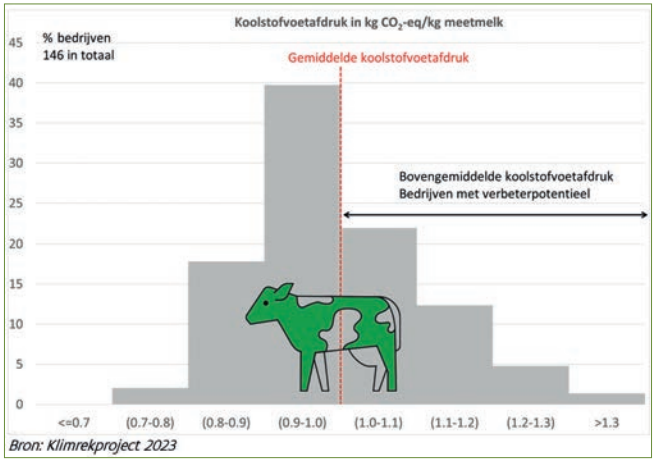


Most climate-friendly milk comes from... Flanders

A worldwide comparison of the ecological footprint of milk, carried out by ILVO, shows that nowhere is milk produced as climatically efficient as in Flanders. The study was conducted within the framework of the recently completed VLAIO research project KLIMREK, which aimed to clarify where Flemish farms stand in the climate story, and how they can become more sustainable, step by step, in a well-considered way. Detailed climate scans on some 150 Flemish dairy farms show that one liter of Flemish milk is on average associated with only 0.99 kg of CO_2 equivalents. This is lower than the score of all other milk producing countries.
ILVO did searches of climate data in the specialized AgriFootprint 6.0 database. These obtain their figures by calculating an LCA of milk from a fictitious average farm, representative of the country in question, according to a uniform method. Everyone also calculates in the same standardized "measuring milk" (FPCM or Fat & Protein Corrected Milk). The international database already placed Belgian milk in the leading group, close to climate-friendly milk producers Denmark and New Zealand. The top 10 includes almost only European countries. Belgium scores remarkably better than the weighted European average.

contact: veerle.vanlinden@ilvo.vlaanderen.be

RESULT



Klimrek in Flemish dairy farming: large first group of farms scanned

Until today, 146 dairy farms have been screened with the KLIMREK climate scan. Footprints range between 0.74 and 1.53 kg CO2 equivalents per kilogram of milk measured. The average is 0.99 kg CO2 eq. The spread around the average shows that improvements remain possible. Veerle Van linden: '*It is remarkable that we could not relate typical farm characteristics (large or small-scale farm, organic or conventional, with or without grazing, ...) to the better or worse climate performance of the farms. Climate efficient milk production is typology-independent. This also means that a tailored scan, with tailored measures, makes sense!* Tinkering with the cows' rations yields the greatest climate improvements. Up to one-tenth of the footprint of milk from Flanders can be eliminated this way. Feeding beer draff and rapeseed meal to cows has a methane-inhibiting effect on digestion. There are feed supplements with a proven, significant methane lowering effect. Replacing overseas soy with local protein sources also makes a big difference. Spreading less fertilizer on grassland and switching to grass-clover can again reduce several percent CO2 equivalents. Keeping fewer young stock by increasing the longevity of lactating cows is an option for some farmers. ILVO promises to continue to maintain the KLIMREK calculation tool and to incorporate continuous updates based on new products or climate improvement techniques.

contact: veerle.vanlinden@ilvo.vlaanderen.be

IN THE SPOTLIGHT

Klimrek provides tips for more climate smart and climate-robust farming

The best demonstration of how the multidisciplinarity of how ILVO's Expertise Center for Agriculture & Climate (ELK) can lead to great results, is the Klimrek project. In this project, climate pathways were developed that offer farmers tools to make their production more climate-smart and climate-robust. Through a climate scan, the climate impact of the farm is mapped, after which the farmer is supported by a climate consultant in choosing and implementing the climate measures that best fit that farm. Originally started as a four-year project for arable, dairy and pig farmers, it has since been extended for dairy farming through the Klimrek Plus project and extended to fruit and outdoor vegetable growing within the follow-up project Klimrek-T.
A preliminary highlight of Klimrek was the study day in September 2023, where the results of the scans of 146 dairy farms, 15 arable farms and 15 pig farms were presented.

contact: veerle.vanlinden@ilvo.vlaanderen.be
anne-sophie.sacre@ilvo.vlaanderen.be

CURRENT

Climate measures and smart water management with economic opportunities on the horticultural farm

The Klimrek project has also inspired growers to develop customized climate pathways for their sector. With this in mind, the Klimrek-T project was launched in early 2023, in which climate pathways for fruit and outdoor vegetable growers are being developed, giving horticulturists insight into the climate impact of their products and into measures to make their businesses more climate-smart. The great importance of water and the complexity of always having sufficient and qualitative water available is an additional challenge for the horticultural sector. That is why this project (financed by the Blue Deal) puts extra emphasis on water via a water scan with related advice on measures that can increase the climate-robustness of the farm.

More info: https://www.klimrekproject.be/

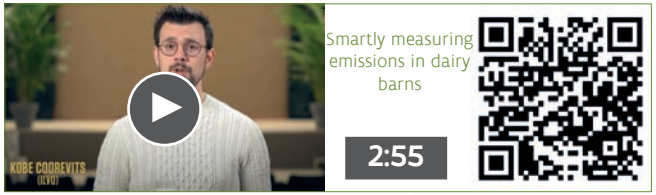
contact: veerle.vanlinden@ilvo.vlaanderen.be
anne-sophie.sacre@ilvo.vlaanderen.be

RESULT

Measuring greenhouse gases and other emissions at the barn level

The MilKey project aimed to successfully measure and mitigate greenhouse gas emissions in European and Flemish dairy farming. The research, under the banner of several H2020 ERA-NETs, focused on two main areas: Dissemination of region-specific information through online platforms, and the development of a real-time monitoring system (OTICE) for barn climate. This system, developed by ILVO, monitors barn climate and emission parameters and has already been tested in Flanders, with ongoing implementation on field farms in partner countries. From the MilKey project, several follow-up projects were started, including a PhD study on emissions at the barn level and a pilot study on the use of affordable sensors for emission measurements in dairy houses, to increase the applicability and reliability of the OTICE System.

contact: kobe.coorevits@ilvo.vlaanderen.be



ICT-AGRI era-net ICT and robotics for sustainable agriculture

ERA-NETSUSAN

FACCE ERA-GAS MONITORING & MITIGATION OF GREENHOUSE GASES FROM AGRI- AND SILVI-CULTURE

RESULT

Promoting carbon agriculture through an online carbon tool, systems analysis and roadmap

Through carbon farming, agriculture not only contributes to climate change mitigation, carbon accumulation in soil usually improves soil health and resilience to weather extremes. The LIFE CarbonCounts project developed a carbon tool, an online tool connected to the e-desk's digital Soil Passport to simulate the evolution of carbon in soil and woody elements under unchanged and adjusted management practices. Carbon farming is also a revenue model. To this end, ILVO made a system analysis and developed a roadmap aimed at scaling up carbon farming in Flanders, in collaboration with a wide range of stakeholder groups. The first steps for rolling out the roadmap were taken at the Flemish carbon farming discussion forum on November 6, 2023 in Brussels.

contact: greet.ruysschaert@ilvo.vlaanderen.be

RESULT

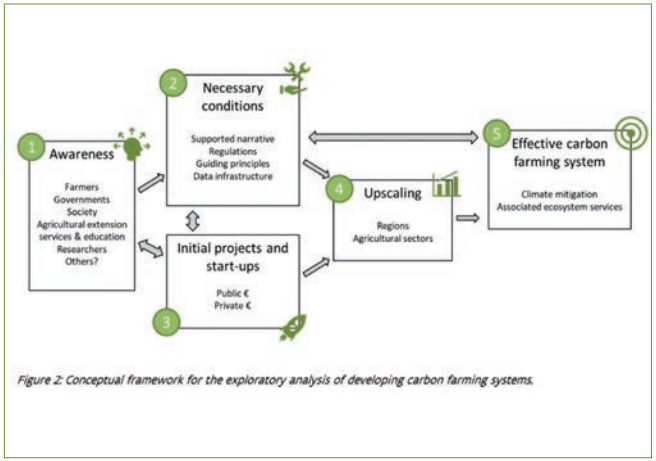


Figure 2: Conceptual framework for the exploratory analysis of developing carbon farming systems.

Roadmaps for carbon agriculture across the EU

Within the Road4Schemes project, part of the European Joint Program Soil (EJP SOIL), experts in carbon farming from several EU member states (Denmark, the Netherlands, Belgium, France, Germany, Austria, the Czech Republic and Italy) as well as Switzerland and Turkey are working on the design and implementation of carbon farming policies. ILVO examined policymaking in several case studies with the aim of comparing policy development in the individual countries, defining common challenges and developing a roadmap for further policy work on carbon farming. This drew on knowledge gathered within the earlier LIFE CarbonCounts project.

More info, system analysis and roadmap: https://lv.vlaanderen.be/beleid/klimaat-milieu/energie-en-klimaat/koolstoflandbouw-onderzoeksproject-life-carboncounts

contact: ennio.facq@ilvo.vlaanderen.be

RESULT

Biochars show promise in manure and biomass processing, substrate cultivation and even open field cultivation

The completed FWO project BASTA investigated biochar production and use in various applications such as manure processing, anaerobic digestion, composting, substrate crops and soil improvement. It offered insights into reducing greenhouse gas and ammonia emissions in manure processing, improved process efficiency, peat replacement in substrate crops, reduced use of plant protection products, reduced nutrient loss, and increased water retention. The study also highlighted the role of biochar in sustainable soil use, including metal-contaminated and drought-prone soils. The multidisciplinary data collected show the potential of biochar. Companies showed interest in further development and a strategy for commercial valorization.

More info: https://biochar.solutions/

contact: bart.vandecasteele@ilvo.vlaanderen.be

RESULT

Interregionale knowledge exchange on climate-robust water management in the polders

What's in a name? Italians do not speak of "polders," but of "piani di bonifica," or the "plains of land improvement". At the invitation of the Province of Ferrara and the Consorzio di Bonifica Pianura di Ferrara, the Province of West Flanders and the West Flemish coastal polders debated together with their Italian colleagues what 'land improvement' means in times of climate change. ILVO facilitated these discussions and led the search around shared challenges and knowledge needs. The strength of this interregional consultation lies in sharing ideas and reflecting on past, present and future. The main challenge for Europe's polders is to find a balance between wet and dry: Drainage of excess water and water storage for use during droughts.

contact: jeroen.dewaegemaeker@ilvo.vlaanderen.be

RESULT

Carbon storage in soil seen from space

The Horizon 2020 project ENVISION developed and tested innovative Earth Observation (EO)-based and Machine Learning (ML)-based technologies for the continuous, large-scale and continuous monitoring of agricultural management activities related to sustainability, in line with the agri-environmental objectives of the Common Agricultural Policy (CAP). Within the project, ILVO developed cloud services that enable large-scale soil quality monitoring using satellite data and AI technology. These services were tested in Flanders for the development of a map of organic carbon in topsoil covering the Flemish region. A soil organic carbon campaign was conducted for the development of the AI models, taking into account the pedoclimatic conditions of the soil. Flemish farmers can access the results through a software application demonstrated in collaboration with the Department of Agriculture and Fisheries.

contact: panos.ilias@ilvo.vlaanderen.be
tuna.coppens@ilvo.vlaanderen.be

Funded by the European Union

RESULT

EJP SOIL
STEROPES

From sattelite image to organic soil carbon content corrected according to soil condition

Traditional detailed soil maps are static and often based on outdated data relative to use. STEROPES is an EJP SOIL project that aims to overcome these limitations by bringing forward the use of satellite time series to test their potential to predict the organic carbon content of soils at different pedoclimatic conditions and cropping systems across Europe. First, models will be constructed from the reflectance spectra of optical satellite time series, particularly Sentinel-2 (ESA), based on several diversified areas for which soil organic carbon samples are already available. The second phase of the project will be devoted to analyzing the influence of different factors on the prediction performance of soil organic carbon (SOC): soil moisture, texture, dry vegetation due to management practices, and salinity. Then, for those locations where satellite information may not allow acceptable predictions, we will consider other additional data at a more detailed level, using geophysical proxies to reduce the uncertainty associated with these predictions. ILVO's goal is to improve the identification of disruptive factors (hyperspectral satellite images) and support the implementation of a soil survey campaign.

contact: panos.ilias@ilvo.vlaanderen.be
mohammadmehdi.saberioon@ilvo.vlaanderen.be

Funded by the European Union

NEW

Monitoring, reporting and verifying carbon and greenhouse gas balances in European soils

MARVIC, a Horizon 2020 Soil Mission project coordinated by ILVO, focuses on developing a guideline framework for harmonized and context-specific monitoring, reporting and verification (MRV) of carbon stocks and greenhouse gas balances of European soils and woody biomass. This project supports the new European regulations for certifying carbon removals in public or private carbon farming systems. For monitoring, MARVIC uses data, models and remote sensing. This takes into account cost, accuracy, and the risks of non-permanence due to climate change for example. The project focuses on four land uses (cropland, permanent grassland, managed peatland and woody crops/ agroforestry) in 12 European countries, and establishes criteria that should lead to high-quality carbon storage certificates.

contact: greet.ruysschaert@ilvo.vlaanderen.be

MARVIC
MRV for carbon farming

NEW

Credible: building a reliable carbon market and policy

Credible coordinates the discussions taking place within 11 technical focus groups, each of which addresses one or more of the many challenges to the further dissemination and implementation of carbon agriculture. These focus groups are structured around three main themes, namely 'which practices', 'which standards' and 'how to monitor'. ILVO is leading the focus group on using data from long-term field trials and monitoring networks in the context of carbon agriculture. The main goal is to increase the discoverability, accessibility, interoperability and reusability (FAIR) of both experimental and metadata from these field trials and networks so that they can be useful in supporting regional carbon agriculture programs.

contact: tommy.dhose@ilvo.vlaanderen.be

CREDIBLE
EU carbon farming

NEW

Low-carbon and energy-efficient innovations for a more climate-neutral greenhouse industry

IWith the Interreg project ENERGLIK, ILVO and several research partners and companies aim to unite climate neutrality and economic profitability within Flemish greenhouse horticulture. The project comprises four innovation tracks, including energy-balancing screens, a vapor heat pump, CO_2 storage and a mold sensor. Through practical trials, the environmental sustainability and economic feasibility will be calculated and evaluated, resulting in a roadmap for climate-neutral greenhouse horticulture by 2050.

In the first year of ENERGLIK, several innovative screens were tested (UGent and WUR). The best candidate screens were selected and a new set of day and night screens is now being tested in sweet bell pepper (PCH) and tomato (PSKW). ILVO is directly involved in measuring heat exchange in the trials and is responsible for assessing the environmental sustainability of the technology implementation.

contact: veerle.vanlinden@ilvo.vlaanderen.be

Interreg Vlaanderen-Nederland

Gefinancierd door de Europese Unie

NEW

Soja-avoiding and methane-reducing feeding on organic dairy farms

The operational group SOMEBIO with project partners BioForum, ILVO, Inagro, W. Govaerts & Co, UGent-Lanupro and for organic dairy farms focuses on reducing the climate impact of organic dairy farms in Flanders through improved feed composition. The central question is: Can medium- and high-yielding organic dairy farms become more autonomous in their ration composition without increased methane emissions and in an economically and commercially feasible way? The project investigates in vitro alternatives to soy, assesses them for feasibility and total carbon footprint, and integrates them into rations. The EIP project will provide a list of practical methane reduction measures relevant specifically to Flemish organic dairy farming.

contact: tine.vandenbossche@ilvo.vlaanderen.be

CLIMATE SMART ADVISORS

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

NEW

REDUCING WATER CONSUMPTION IN LIVESTOCK PRODUCTION AND COMMITTING TO ALTERNATIVE WATER SOURCES

To prevent future water scarcity in livestock production, the Blue Deal project WAVE focuses on water conservation and alternative water sources. The goal is to collect accurate data on water consumption, make livestock farmers aware of conservation opportunities, and share knowledge about alternative water sources and treatments. We monitor water use at livestock farms by water type and by consumption item, and use this data to recommend cost-saving measures. The project promotes investments in alternative water sources and communicates quality water from these alternative sources. With these initiatives we want to inspire and motivate livestock farmers to be more conscious of their water consumption.

Funding: Flemish resources Blue deal
Partners: Inagro, ILVO, Hooibeekhoeve, PVL, Proefbedrijf Pluimveehouderij

contact: karen.goossens@ilvo.vlaanderen.be

NEW

IMMEDIATE COMMITMENT TO IMPLEMENTING METHANE-REDUCING FEEDING STRATEGIES IN DAIRY CATTLE

The EIP demo project METHEEN aims to promote the application of the approved feed measures from the Covenant Enteric Emissions in Cattle (CEER) on practical farms. Through guidance and farm visits, feasible rations are being developed on 10 dairy farms using one of the covenant feed measures. Practical bottlenecks and experiences of the dairy farmers will be captured and used to update the ILVO ration tool, among other things, and through a 'before' and 'after' Klimrek company scan the impact on the carbon footprint will be monitored. Through communication campaigns we want to reduce reluctance among dairy farmers and demonstrate that these methane-reducing feed measures are practical and economically feasible, especially with the recent eco-regulations within the CAP.

contact: leen.vandaele@ilvo.vlaanderen.be
jonas.vandicke@ilvo.vlaanderen.be

NEW

Advisors as drivers of transition to climate-resilient agriculture

ClimateSmartAdvisors aims to support agricultural advisors to better play their role in accelerating the adoption of climate-smart agricultural practices. This ILVO-coordinated project establishes an EU-wide network of 260 advisor groups (CoPs), supported by training and knowledge exchange activities at national and European levels, and an interactive knowledge database that brings together relevant practices and methods. Through an EU-wide consortium of 74 partner organizations, we are directly engaging with at least 1,500 advisors who will be trained partly as Climate Smart Coaches (CSCs) (±10%), and partly as Climate Smart Advisors (CSAs) (±90%). This will significantly expand the knowledge base of climate-related practices.

contact: lies.debruyne@ilvo.vlaanderen.be

THIS PROJECT HAS RECEIVED FUNDING FROM THE **EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME** UNDER GRANT AGREEMENT N. 101084179

NEW

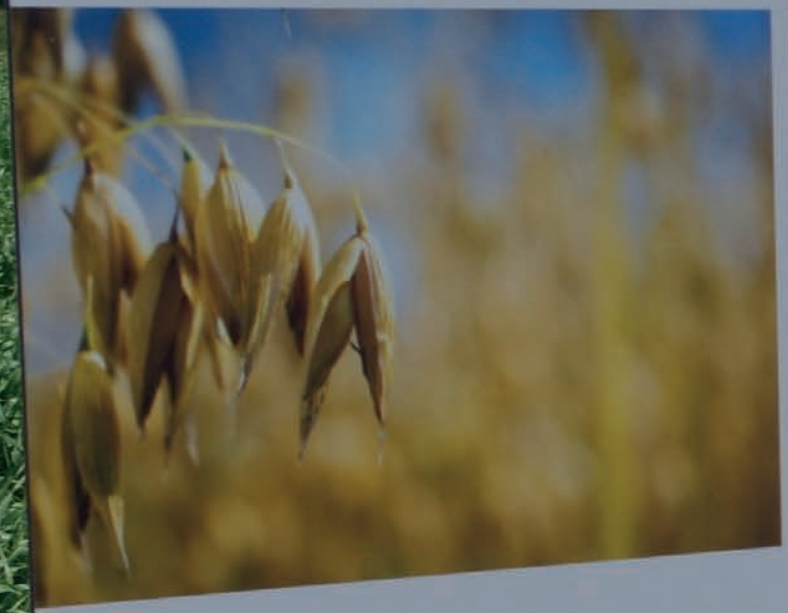
Examining the impact of promising agricultural practices on sorghum yields under current and future climate in Mali

About 80% of local food consumption in Mali is produced by "smallholder farmers," which are highly dependent on climatic conditions, mainly precipitation, which has now become very variable and unpredictable. How can we help find the best working climate-adaptive cultivation method of sorghum in Mali using agricultural modeling and analysis capabilities developed in Flanders? That is the challenge in the STRATADAPTMALI project. Here, we are building the capacity of local researchers to apply existing crop yield-predictive modeling tools to the agricultural production system in Mali and other countries in West Africa. We are mapping site-specific climate impact indicators in Mali in terms of agriculture using CLIMTAG and identifying promising climate adaptation management practices for sorghum. We are creating, with our partners VITO and ICRISAT and all stakeholders, a climate vulnerability dashboard for sorghum.

contact: tom.deswaef@ilvo.vlaanderen.be

HAVER

Avena sativa



KENMERKEN

- Afkomstig uit het noordoosten van Europa en op plateaus van Ethiopië en China, maar intussen wijdverspreid over alle regio's met een gematigd klimaat.
- Nood aan 40-50 eenheden N, 110 kg K_2O/ha, 70 tot 80 kg P_2O_5/ha.
- Oppassen voor *Rhizoctonia cerealis*, *Fusarium*, echte meeldauw, strepenziekte, kroonroest, stuifbrand, kafjesrood, gerstevergelingsvirus, de grote graanluis, vogelkersluis, roosgrasluis, fritvlieg, graanhaantje, graanmineervlieg, graantrips, havercysteaaltje, stengelaaltje *Ditylenchus dipsaci*.

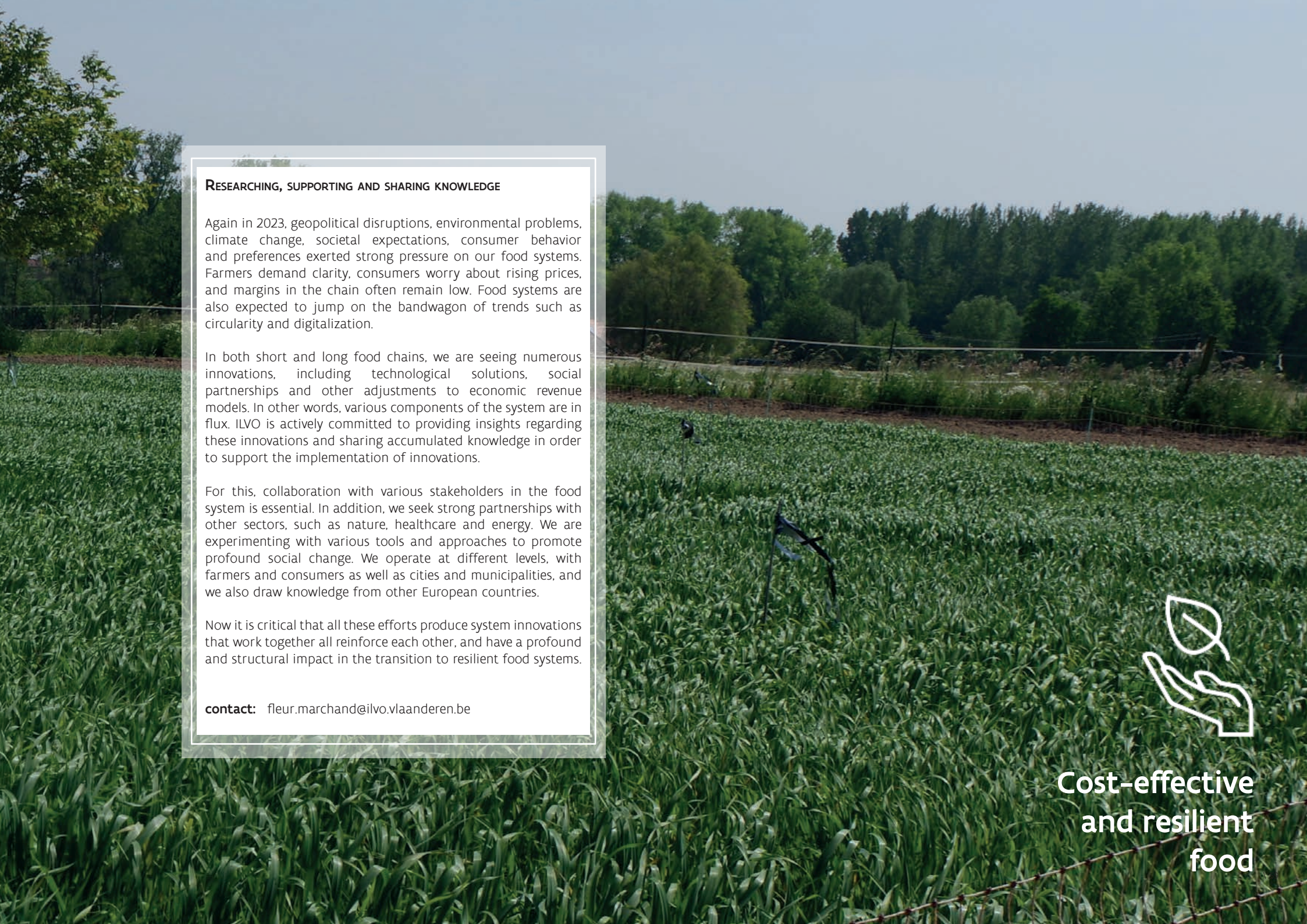
TOEPASSINGEN

- Bakkerij.
- Glutenvrije voeding.
- Havermout, haverdrink.
- Haverkoekjes, haverbrood, crackers.
- Haverroom, yoghurt, tortilla's.
- Shampoo, ...

NUTRITIONELE KENMERKEN

- Gekend eiwitrijk oergraan met een eiwitgehalte van 11-15%.
- Rijk aan mineralen en vitamine B.
- Zeer sterk gelerend vermogen.
- Aanwezigheid van beta-glucanen.
- Verlaging cholesterol (bij min 3 g).
- EFSA claim.
- Bevat trypsineinhibitoren en anti-schimmelpeptiden.

Hoeveelheid per 100 g	
Energie (kcal)	374
Water	12.2 g
	12.6 g



Researching, supporting and sharing knowledge

Again in 2023, geopolitical disruptions, environmental problems, climate change, societal expectations, consumer behavior and preferences exerted strong pressure on our food systems. Farmers demand clarity, consumers worry about rising prices, and margins in the chain often remain low. Food systems are also expected to jump on the bandwagon of trends such as circularity and digitalization.

In both short and long food chains, we are seeing numerous innovations, including technological solutions, social partnerships and other adjustments to economic revenue models. In other words, various components of the system are in flux. ILVO is actively committed to providing insights regarding these innovations and sharing accumulated knowledge in order to support the implementation of innovations.

For this, collaboration with various stakeholders in the food system is essential. In addition, we seek strong partnerships with other sectors, such as nature, healthcare and energy. We are experimenting with various tools and approaches to promote profound social change. We operate at different levels, with farmers and consumers as well as cities and municipalities, and we also draw knowledge from other European countries.

Now it is critical that all these efforts produce system innovations that work together all reinforce each other, and have a profound and structural impact in the transition to resilient food systems.

contact: fleur.marchand@ilvo.vlaanderen.be

Cost-effective and resilient food

RESULT

The financial numbers behind short-chain meat processing

Although the short chain is gaining in importance, financially it too often remains a black box. This is why Steunpunt Korte Keten, together with ILVO, has spent the past year studying the financial figures of meat processors in the short chain. Not only does it give a picture of how meat processors are doing, but it also gives direction to interested farmers. The economic figures behind short-chain meat processors paint a diffuse picture. On average the figures are rather negative, but mainly the farm butchers can present a very positive result. They offer a total range of products and achieve higher margins, even though they have a higher cost structure.
For many meat processors, the one-to-one accounting analysis was a relief. Many had a limited view of their figures and thus were steering blind. This offers a better understanding of their own economic parameters.

contact: olivier.guiot@ilvo.vlaanderen.be

RESULT

Soy2Grow: towards a more sustainable, profitable soybean crop in Flanders

In the VLAIO project Soy2Grow, ILVO's Plant Sciences and Social Sciences research units joined forces with Inagro and KU Leuven to investigate the sustainability of Flemish soybean cultivation. A value chain was developed for arable farmers, with soy production for human consumption as the ideal scenario. In a second chain, dairy farmers formed a partnership for soy production, processed locally into animal feed with a mobile grating or crushing machine. Together with experts, factors influencing the adoption of soybean production were identified. A selection of scenarios were simulated with agent-based modeling to understand the role and importance of these factors. This showed that in addition to subsidies, improved cooperation and investments in breeding are crucial for soybean adoption in Flanders.

contact: siavash.farahbakhsh@ilvo.vlaanderen.be
kaat.peeters@ilvo.vlaanderen.be

RESULT

Resilient farms: who are they, what do they do?

A farmer is used to adapting to weather conditions, possible pests or fickle prices, i.e. the good and bad farming years. But more than ever, they must also deal with unexpected challenges and sharply changing social expectations. Dealing with this resiliently can theoretically be done in 3 ways: Being 'robust' (absorbing shocks), adapting or transforming. The doctoral research of Isabeau Coopmans (ILVO-KU Leuven) shows that it is difficult for many farms to either adapt or transform. They work with living matter, and often it is difficult to respond quickly to changing conditions or high long-term investments are underway. However, support measures until now placed so much emphasis on building in robustness that the adaptability of the agricultural sector suffered. We must avoid that in the future. Solutions include giving new business models a chance and establishing learning networks.

contact: isabeau.coopmans@ilvo.vlaanderen.be

THIS PROJECT HAS RECEIVED FUNDING FROM THE **EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME** UNDER GRANT AGREEMENT N. 727520

RESULT

Incubator for start-ups in aquaculture – Fish auction in Ostend

Flanders has a great deal of academic expertise in aquaculture, but has few successful start-ups and growers in this economic activity. Risk money and good infrastructure are often lacking in the start-up phase, making it difficult to achieve economically sound production. Marifish facilitated start-ups with isolated spaces, seawater supply and scientific support, giving them a realistic chance to grow into profitable businesses. ILVO built a shellfish watering facility at the site, which can serve to purify shellfish and keep them for long periods of time. The facility can make a significant contribution to the success of established and new shellfish producers. Clustering knowledge and networks of partners created synergies between existing and new activities. This project thus contributes to the further development of aquaculture in Flanders and across Europe.

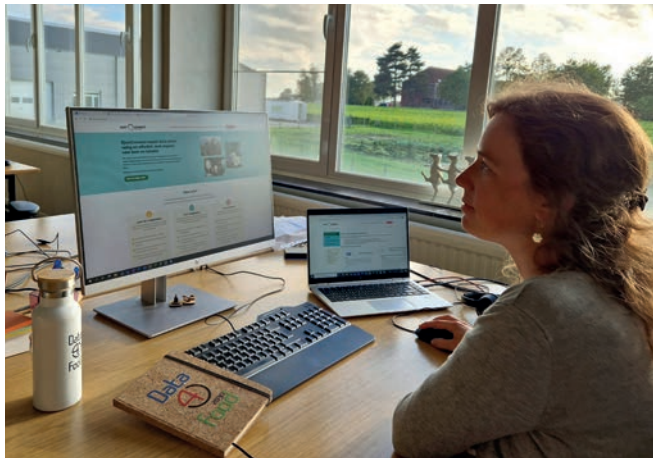
Partners: European Food Center, UGent and ILVO

contact: daan.delbare@ilvo.vlaanderen.be

EFRO EUROPEES FONDS VOOR REGIONALE ONTWIKKELING

Europese Unie

RESULT



Connecting people in the Agrifood industry

Agri-food companies face a lot of performance demands. Organizing digital chain collaboration through better and more efficient data sharing throughout the chain is one solution. There are many technical possibilities, including using data-sharing platforms like DjustConnect. But how do agri-food companies organize this chain collaboration? What makes digitalization successful? What impact does it have on the workability of work? Within this research project, financed by the European Social Fund (ESF), ILVO, Worktitecs, Flanders' FOOD and Alimento set to work to develop a working guidance path and to bring people together digitally and socially in the data sharing ecosystem within the agri-food industry: 'Connecting Humans in the Agrifood INdustry' (CHAIN). The result is a roadmap that aims to efficiently organize the collaboration between the different partners in the production chain, so that each company gets a win out of it and more workable jobs are created.

contact: stephanie.vanweyenberg@ilvo.vlaanderen.be

workitects

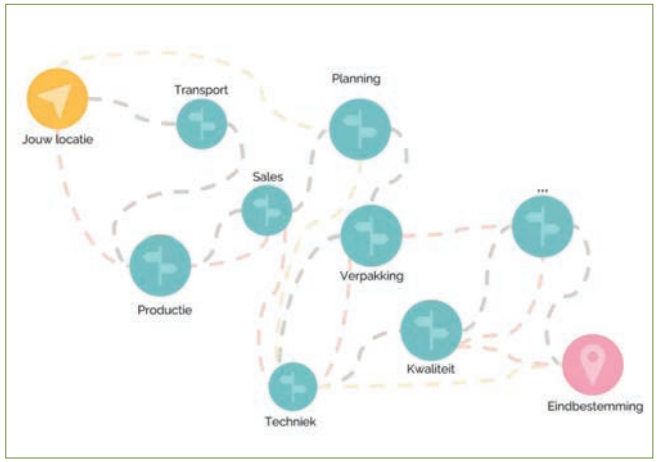
FLANDERS' FOOD

ESF INVESTEERT IN JOUW TOEKOMST

Europese Unie

AI VLAANDEREN BOUWEN AAN JE DIGITALE TOEKOMST

RESULT



Valorizing the API economy for the Flemish agri-food environment

Within this VLAIO-COOCK project, the agri-food sector focused attention on the integration of the data economy or API economy. The project aimed to demonstrate concrete opportunities of the API economy to agri-food companies and provided technical and organizational support. The approach included informative and inspiring sessions on API economy, such as DjustConnect's series "We produce food … and data". Companies were guided in creating a digital business strategy and building their API ecosystem. The developed canvases serve as practical tools to identify opportunities, even after the project. This project clarified the urgency and for many Flemish companies meant a first introduction to the possible economic win for providers and users. An awareness has grown that by sharing data, for example, one can valorize domain knowledge and set up new services based on data.

Manuals and canvases can be found on the DjustConnect-website.

contact: stephanie.vanweyenberg@ilvo.vlaanderen.be

RESULT

Introsect: a push to introduce insect breeding as an agricultural activity in the primary sector

Breeding insects is considered a new, challenging agricultural activity. But what is possible on an existing farm? Which insect thrives in an existing space? What adaptations are needed and what difficulties are experienced? In this VLAIO-LA project 'Introsect', partners Inagro, ILVO, VIVES, KU Leuven/ Thomas More and Nationale Proeftuin voor Witloof guided a number of farmers interested in a partial or full conversion to professional insect farming. Video lessons and in-person classes were organized, accompanied by well-written and clear breeding manuals and feasibility tools. Interested farmers can use these to make an initial assessment of the production costs involved in growing the insects that best suit their farms.

contact: evelyne.delezie@ilvo.vlaanderen.be

RESULT

Dairy farming losses due to heat waves quantified

Agricultural economists juxtaposed long-term production figures from all Flemish dairy farms with recorded weather events to assess the economic damage caused by heat. Heat can have a clear negative impact on the amount of milk produced and on milk composition. There is quantifiable economic damage that can reach € 1,500 and more per month per farm. The effect of hot summer days on the cow and her milk production is not linear. Clearly, however, economic damage gets heavier at 76 points on the so-called "Temperature Humidity Index" scale. Based on this study, it is known from which heat duration and -severity yield losses occur, and up to which heat point dairy farmers can manage or reduce the risk of negative effects with current anti-heat stress techniques. ILVO collaborated with the Agricultural Economics and Policy Group at ETH Zurich for this study.

contact: erwin.wauters@ilvo.vlaanderen.be

RESULT

Foodcare: an economic approach to food in health care

Within the VLAIO project Foodcare, on the subject of healthy food in care contexts, ILVO investigated the economic side (sourcing, labor, logistics, energy and investments) of the care kitchen through in-depth interviews at care institutions. These were mainly about analysis of central versus decentralized kitchens and the use of a hot versus decoupled line. On average, they prepared 1500 hot meals per day and 40 to 70 FTEs are employed directly and indirectly in the care kitchen. Most care centers know the food cost, but do not have a view of the total cost. The allocation of labor, logistics, energy and depreciation are difficult to estimate, especially with a decentralized kitchen. In terms of labor, almost 1/3 of the total cost, a decoupled line is more efficient, especially in terms of weekend work. The study uncovered a number of opportunities and pain points that healthcare institutions can work on in the future.

contact: olivier.guiot@ilvo.vlaanderen.be

RESULT

Decision systems on antibiotics in animal production

This European research project focused on a more responsible use of antibiotics in animal production systems, specifically on how to efficiently manage and adjust the transition to such use in order to reduce the risk of antibiotic resistance. The ROADMAP project examined the social, economic and institutional aspects of animal health in general and antibiotic use in particular. We mapped the influence of social, institutional and economic factors, using a wide range of methods such as focus groups, surveys, in-depth interviews and comparative analysis. This phase flowed into a solutions phase, in which solutions were developed in a highly participatory manner using living labs and were implemented and tested on a small scale. In the final phase, we examined the broad impact of these solutions, and roadmaps were drawn up for implementation.

contact: erwin.wauters@ilvo.vlaanderen.be

Horizon2020
European Union Funding
for Research & Innovation

RESULT

How do you build a strong network of food change agents?

The Horizon 2020 project Cocoreado seeks to connect farmers and consumers and improve the farmer's position in the food chain. To achieve this, we selected 40 young European food changers and organized three trainings. We made them think about the current system, what they want to change in it and gave them tools to initiate the necessary changes together. Their dreams extended beyond the horizon of the Cocoreado project, so we organized a workshop in which we immersed them in the world of interactive innovation, courtesy of I2Connect. The non-profit organization CocoreadoX has now been born.

More info: A strong network - Cocoreado

contact: lisa.vandenbossche@ilvo.vlaanderen.be

COREADO
connecting consumers and producers to rebalance farmers' position

Horizon2020
European Union Funding
for Research & Innovation

RESULT

Final result FoodShift2030 project: making food strategies more sustainable in European cities

In the Foodshift project, living labs were established in nine European cities in their guidance towards implementing food strategies and strengthening innovations in the food system. ILVO guided the cities in setting up an action plan in which a specific innovation focus was worked out with local stakeholders. Topics such as sustainable school meals, setting up food hubs, using food tech, and scaling up short chain agriculture are just a few of the different innovation paths that were worked out. The project developed a methodology to involve citizens in the food system.
ILVO also played a facilitating role in Ostend in developing the food policy, and creating a dynamic around the Tuinen Van Stene agricultural park.

contact: maarten.crivits@ilvo.vlaanderen.be
louis.tessier@ilvo.vlaanderen.be

RESULT

FABulous farmers for better adoption of functional agrobiodiversity

In this project, ILVO supported regional networks of farmers who wanted to engage in functional agrobiodiversity (FAB) measures. In these networks, we mapped their needs and based on that, knowledge was provided to implement FAB measures. In addition, other actors in the landscape (managers of public green spaces, landowners, knowledge institutions) were also involved to support farmers in FAB measures or to implement measures themselves to strengthen agrobiodiversity in the landscape. Finally, ILVO supported the project partners in organizing various activities to connect farmers and citizens.

contact: lies.messely@ilvo.vlaanderen.be

RESULT

New tools help dairy farmers make faster yet reasoned operational changes

In the Operational Group 'Milk Tools' some practical calculation tools were developed that support Flemish dairy farmers in operational decisions that have to be made frequently. A first calculation tool 'Inseminate with the right tube' was launched in the spring of 2022. This tool calculates the additional yield when using sexed semen and crosses in a well-considered way. The tool "When is my cow no longer profitable?" helps dairy farmers determine the right time to let go of a reformed cow. After all, depending on market conditions, milk production and the availability of a heifer to calve, this tipping point can vary greatly. Finally, the "Feed Profit Tool" calculates the cheapest composition of a ration based on some specified conditions and a list of available feed materials.

contact: matthieu.frijlink@ilvo.vlaanderen.be

RESULT

WeideWijs: future-oriented grazing in Flanders

During the EIP project WeideWijs, eight Flemish dairy farmers, two advisors (CowCoach and Obs'Herbe) and two research institutions (Hooibeekhoeve and ILVO) worked together to increase support for grazing in Flanders. After all, among other things, successful grazing is a major challenge due to the rise of milking robots and changing climate conditions. However, motivation is high from the side of the buyer and the farmer. During the project, meetings were organized with the objective of breaking down the obstacles and broadening the view towards solutions. One clear finding was that under suitable preconditions, many farmers are positive about including grazing in their business model.

contact: thibault.cloet@ilvo.vlaanderen.be

RESULT

Preparing a European network of Living Labs and research infrastructures around agroecology

The objective of the European project ALL-Ready, coordinated by INRAE, was to prepare a European network of living labs and research infrastructures working on agroecology. This network will be set up within the framework of the European partnership on agroecology starting in January 2024. The purpose of this network is to connect, support and facilitate knowledge exchange among the living labs. In ALLReady, a first inventory of existing initiatives was made. Their challenges were visualized and we got a better idea of what added value such a European network could bring. The project relied on strong involvement of various stakeholder groups to gain insight into the current role of agroecology in European agriculture.

contact: jo.bijttebier@ilvo.vlaanderen.be

Horizon2020
European Union Funding
for Research & Innovation

RESULT

Levers for organic and sustainable food systems

The goal of FOODLEVERS was to identify levers to further develop and scale up existing innovative organic and sustainable food systems. To do so, FOODLEVERS took a systems view focusing on products, production technologies, marketing practices and actors. It used a "deep levers" framework, which seeks to reconnect, re-structure and re-think the existing system. Eight case studies (in seven EU countries) were examined and identified potential new practices such as farm-level circularity, networking between farms and a more market-oriented approach (i.e. collaboration with public kitchens) that could be adopted by other farmers and new farmers. On the consumption side, the need for a positive attitude toward organic food consumption was emphasized, which can be seen as a lever. Moreover, perception of price seems to have a strong effect on organic consumption, with less effect than positive attitudes toward organic.

contact: siavash.farahbakhsh@ilvo.vlaanderen.be

RESULT

Publication on the Nature–agriculture debate and policy: Denmark, Germany (Lower Saxony), Flanders and (Northern) France

At the request of the Netherlands Planning Office and Radboud University Nijmegen, ILVO wrote a report chapter examining four comparable countries/regions. Their common denominator a dense population as well as lots of livestock. How are they looking at the relationship between agriculture and nature, and how does that translate into policy and political debate between those involved? In Flanders, we looked at how agriculture-nature relations unfold in three specific cases: nitrogen policy, the CAP and the development of national parks.
In each case we examined which actors have a core function, which narratives prevail and which political means were deployed. The conclusions point to the presence of a strong polarization between agriculture and nature, and the potential of a more integrated or area-based approach.

contact: maarten.crivits@ilvo.vlaanderen.be

FOODLEVERS

The author/editor acknowledges the financial support for this project provided by transnational funding bodies, partners of the H2020 ERA-NETs SUSFOOD2 and CORE Organic Cofund, under the Joint SUSFOOD2/CORE Organic Call 2019.

IN THE SPOTLIGHT

VerdienWijzer: this farm decision support tool ramains popular

In 2023 the VerdienWijzer tool was tested by no fewer than 700 new users. In 2021 ILVO launched this VerdienWijzer as a decision-support tool and first step in establishing or adjusting the earning model. In 2023, the tool was evaluated to identify deficiencies and needs from the sector. The evaluation shows that further refinement is needed to analyze the entire business model. In addition, more transfer of knowledge about elements of the business model and value is encouraged. To this end, an extra element will be developed in 2024 in which a specific change to the earning model can be analyzed.

contact: thibault.cloet@ilvo.vlaanderen.be

NEW

Real and fair prices of food and agricultural products

Societal debates all find it obvious that a 'real' and fair price for food is the solution to farm(er) problems. But there is no clear answer to the more technical question of how to determine and achieve such a price. By the end of 2023, ILVO will start strengthening agricultural economic research, including on this hot topic. We will look at both economic and policy aspects, as well as the international dimension. We will also examine what sustainability reporting brings about in the sector. We often see the demand for products from regenerative agriculture coming to the fore in the larger farms However, this term is not precisely defined. There is also a need for analysis here: which actors are reaping the commercial benefits and what pressure is created among farmers who provide more ecosystem services and perhaps less biomass?

contact: erwin.wouters@ilvo.vlaanderen.be

NEW

ToVerLandbouw: Future revenue models for agriculture in vulnerable areas

For two years, ILVO, together with project partner Inagro, will work in the ToVerLandbouw project with 4 farmers active in vulnerable areas. Each case covers practical research into a new or alternative business model or an addition to the existing business model for the farmer, aimed at a sustainable agricultural transition. The objective is to take two years to find out which model offers perspectives for the farmer and can also offer opportunities for a future-proof agricultural model in other similar geographical areas.

contact: thibault.cloet@ilvo.vlaanderen.be

Agriculture and rural areas in an urbanized society

ILVO's approach to studying the countryside has many aspects.

Trends and phenomena are quantified and mapped. This year we did this, among other things, for public land ownership in the province of East Flanders. An objective view of these figures immediately provided food for thought. So much so that it inspired an exhibition that will be on display at the Stadsmuseum Gent (STAM) from March 2024.

In addition to identifying trends, we continue to actively engage with rural actors. There were specific projects in West Flanders, a province that lends itself very well to rural initiatives. We used the 12 profiles of the "farmers of the future" to set up a debate on the future of the countryside. We also engaged in dialogue at the village level, where our researchers sat down to map the DNA of the village and, on that basis, reflect on the future together with the villagers.

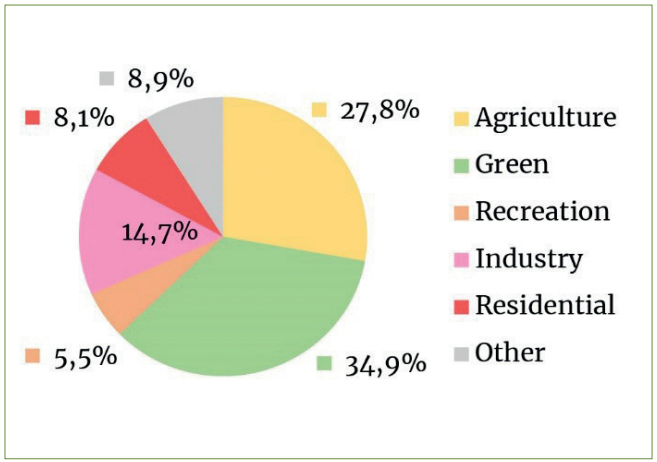
But we do not shy away from challenges outside the province of West Flanders either. A study on the legal status of nature in agricultural areas can hopefully contribute to a constructive debate on the sometimes tense relationship between agriculture and nature.

These are just a few examples of studies in which we continually seek to connect with rural and broader society. Each time, we strive to contribute to social dialogue with evidence-based data. In 2023, we did this on a variety of topics ranging from mental resilience and farmer-citizen relations to digital transformation.

contact: elke.rogge@ilvo.vlaanderen.be

Agriculture and rural areas in an urbanized society

RESULT



Evolution of public land ownership mapped for the first time

Together, municipalities, OCMWs, churchwardens and government bodies own a lot of public land. In East Flanders this represents more than 10% of the surface area, or almost 28,000 ha. Over the last 10 years, this public land ownership has evolved strongly through extensive purchases and sales. The reasons behind this are developments for nature, industry, recreation, housing, water management and infrastructure works or income generation. The conspicuous absentee in the land policy of public administrations are agricultural objectives. The doctoral research of Hans Vandermaelen (UGent-ILVO) brings this reality into sharp focus. His research on agroecological urbanism argues that public land ownership can support farmers in their quest for land conservation.

contact: hans.vandermaelen@ilvo.vlaanderen.be

RESULT

Towards a resilient, livable and productive countryside in West Flanders

The province of West Flanders is working on a new navigation plan for the countryside. Together with IDEA and Atelier Romain, ILVO worked on an environmental analysis of the West Flemish countryside. To set out the outlines for a productive and resilient agricultural sector in the West Flemish countryside, we were inspired by the JRC study "Farmers of the future". We started from these 12 defined profiles of farmers of the future and entered into a dialogue with West Flemish agricultural actors about what these 12 profiles could mean for West Flanders. The discussions showed that a diversity of profiles is already present or has opportunities for development in the province and that the face of agriculture will be more diverse in the future.

contact: lies.messely@ilvo.vlaanderen.be

RESULT

The village of Abele is more than just a crossroads

Commissioned by the Province of West Flanders, ILVO is working with MAARCH and Createlli to draw up a master plan for the village of Abele in Poperinge. Through literature, interviews and group discussions, ILVO conducted a village analysis. We identified a number of places of significance in the village and a number of typical characteristics that shape the specific DNA of Abele. To synthesize and present the results from the village analysis, we worked with user personas. We let the personas dialogue with each other on the identified places of meaning and on the DNA of Abele. Based on this, challenges and opportunities for the village were formulated, which the design team continued to work with.

contact: lies.messely@ilvo.vlaanderen.be
anna.verhoeve@ilvo.vlaanderen.be

RESULT

Are we moving forward together? Knowledge and innovation co-production partnerships in European agricultural and food systems

The European agricultural and food system faces a wide range of challenges. This PhD looked at how agricultural and rural actors from diverse professional backgrounds work together to produce knowledge and innovation to achieve solutions. To do so, we compared European partnerships that have used the same approach. This research led to a better understanding of how such partnerships operate and how a balanced and equitable representation of the whole spectrum of actors can be supported within the partnerships themselves and from the policy framework.

contact: evelien.cronin@ilvo.vlaanderen.be

RESULT

Striving for a shared digital and social transition

Building on the principles of Responsible Research and Innovation, DESIRA aimed to better and more easily assess the impact of digitization on agriculture and rural areas. The emphasis here was on principle-sustainable digitization, where technology development is framed in a fair social context. In Flanders, we explored the effects of company-specific monitoring of emissions. ILVO also ensured the development of an ethical code, in which values and principles were identified to guide innovation policy, technology development and evaluation and policy evaluation.

contact: lies.debruyne@ilvo.vlaanderen.be

THIS PROJECT HAS RECEIVED FUNDING FROM THE **EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME** UNDER GRANT AGREEMENT N. 818194

RESULT

Steering (re)use farms to better realize rural ambitions

Due to abandonment, farmsteads and other built agricultural real estate have become vacant in our Flemish countryside. Consciously steering the redevelopment of such buildings is an important lever for the realization of various rural ambitions. This study elaborates concrete policy choices for a more effective strategy. Central is a proposed 'consideration framework' to support the assessment of the local desirability of permit applications for zoned function changes. A 'wraparound policy' should supplement and flank the consideration framework when the requested function proves undesirable. Examples include a demolition fund, a framework for financial charges to fuel this demolition fund, an agricultural reconversion policy that brings together young farmers and retiring farmers, etc. The ILVO-Voorland project team presented the final report to the client Province of West Flanders as an inspiration to further shape the policy on zoned function changes and the (re)use of farmsteads.

contact: anna.verhoeve@ilvo.vlaanderen.be

RESULT

Exploration for more flexible legal status of nature in agricultural areas

To achieve nature goals, people want to see more ecological infrastructure in agricultural areas. To get this done, the agricultural sector needs to have less protection of created or existing nature in agricultural areas. To find a way out of this impasse, ILVO, UGent and Voorland were commissioned by the Agency for Nature and Forest to investigate the opportunities and obstacles in the legislation for developing a separate legal status or framework for nature in agricultural areas. Three concrete solution directions were elaborated, being Temporary Nature in Agricultural Areas, an Agricultural Nature Management Plan, and a conceptual elaboration of a programmatic approach.

contact: marlinde.koopmans@ilvo.vlaanderen.be

RESULT

Citizens and farmers

This operational group brought farmers together around the question of "how to strengthen cooperation between farmers and citizens?" The accompanying research showed that there is a demand among Flemish farmers for more cooperation with citizens. Increasing support and image, long-term commitment and connection, and the possibility of new partnerships are among the expected benefits. Five types of farmer-citizen cooperation are explored, legally examined in more detail and elaborated: Volunteerism, welfare agriculture, agricultural education, internship and training and cooperatives. The project also launched a call where three farms were given the opportunity to explore new farmer-citizen relationships in their operations. The lessons learned will be communicated to policy.

contact: carla.mingolla@ilvo.vlaanderen.be

RESULT

Groeituin 5.0

The agri-food sector lists digitization, a more circular economy and the theme of energy & climate as major transition priorities, which will require many hands and heads working together. In that context, the VLAIO project Groeituin 5.0 developed 3 STEM tracks for young people around the themes of 'water', 'food' and 'living off the land'. The goal was to prepare the next generation of scientists and citizens to learn about and tackle these challenges. The first tracks took place in a picking garden in the Pajottenland and Zenne Valley region. The picking garden was an outdoor laboratory where young people combined science, technology, engineering and math at weekly STEM meetings. ILVO collaborated on the development of the STEM modules and the pedagogical approach. The pathways were written down in handy information sheets so that the activities could be repeated elsewhere.

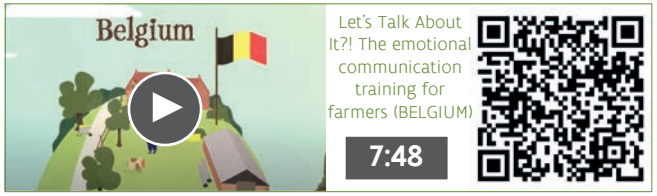
contact: sarah.garre@ilvo.vlaanderen.be

RESULT

Social innovations to work toward better well-being for farmers

The Farmwell project is a European thematic network that pooled knowledge around farmers' well-being and looked for innovative solutions in collaboration with farmers. On December 12 and 13, 2023, the final conference took place in Leuven. Together with 80 (inter)national partners from research, policy and practice, we visited the recreational farm Ravot where, after a farm visit, we took workshops on mental well-being. ILVO presented the synthesis of challenges to well-being challenges and entered into dialogue with other participants about similarities and differences in Flanders, Hungary, Poland, Ireland, Italy, Romania and Greece. ILVO engaged in a dialogue with national and European policy makers on the integrated approach to well-being and how it can be put into practice through different policy instruments.

contact: lies.messely@ilvo.vlaanderen.be



Funded by the European Union
FARMWELL

RESULT

New interweaving models for agriculture and nature in the landscape park Flemish Ardennes

The landscape park Flemish Ardennes responded to the call from the Flemish Government-VLM to establish Flemish parks for areas of great scenic quality. The landscape park is a partnership that pursues multiple goals from an integrated vision. In the landscape park candidacy of Flemish Ardennes, integrated ambitions are connected to three specific story lines: The restoration of the spring landscape, the interweaving of nature and agriculture, and vibrant villages. The landscape park engages to activate so-called "soigneurs" - farmers, nature associations, and other managers - in new interweaving models between agriculture and nature. New opportunities lie in redirecting the local, individual system to a collective system on a landscape scale. ILVO carried out a support assignment in the framework of the candidacy and drafting of the master plan. On October 13, 2023, the Flemish Government granted the status of Landscape Park to the Flemish Ardennes.

contact: anna.verhoeve@ilvo.vlaanderen.be

RESULT

Experimentation makes you learn: how insects and vegetable gardens can change people

Experimentation breeds learning, Frederik Gerits found in his doctorate after surveying the more than 100 volunteer citizen scientists from the gardening project in the provinces of East Flanders and Antwerp. What do we remember?
1) Citizen science is more than collecting mountains of data. Together with the volunteers, we can learn a lot, change opinions and put something in motion for our environment.
2) Frequent communication, both on paper and through friendly chats in the field, works best to encourage learning.
3) Performing experiments on your own within your own field lab (in our case a square-meter garden) makes you critically reflect on your own role in relation to the environment.

contact: lies.messely@ilvo.vlaanderen.be

RESULT

Seeds of happiness, a mental wellness learning pathway for agriculture and horticultue students

Seeds of happiness is an educational track on mental well-being tailored to the target group of young farmers and students in various agricultural and horticultural disciplines in higher education. This educational track was developed by the Flemish Institute for Healthy Living, in collaboration with ILVO, Groene Kring, Jong ABS and Boeren op een Kruispunt and responds to one of the needs ILVO identified during research into well-being of Flemish farmers. The educational track 'Seeds of Happiness' is composed of three parts: Group sessions, group assignments and magazines for with background information. The building blocks of the happiness triangle are the guiding principles throughout the sessions. The participants discover the different building blocks of mental well-being and how you can take your happiness into your own hands, even when you feel temporarily out of balance.

contact: lies.messely@ilvo.vlaanderen.be

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

NEW

ILVO INSPIRES NEW CURRICULA FOR SECONDARY AGRICULTURE AND HORTICULTURE EDUCATION

At the request of the Catholic educational organization, the education@ILVO working group organized an inspiration day for a number of curriculum writers. Colleagues from different units joined in. This happened at a time when the new curricula for students in their last 2 years of secondary education were being finalized, including those for agriculture and horticulture, whose content should be relevant for the coming years. Through this day and its follow-up, ILVO had a direct influence on the content that Flemish teachers put into their lessons for specifically those students who are tomorrow's farmers and horticulturists, but also the ILVO employees of tomorrow.

contact: hanne.cooreman@ilvo.vlaanderen.be

NEW

BINGO! ILVO RAMPS UP MOSAIC RESEARCH WITH KICK-OFF WORKSHOP ON DRIVERS OF LAND USE CHANGE

Over the next few years, the Mosaic project, funded by Horizon 2020, explores the drivers and motivations behind land use change and changes in land management practices. At the kickoff of the project, ILVO is drawing the debate on open space change with a Bingo workshop. During a first interregional exchange, research and practice partners from Belgium, Switzerland, Denmark, Hungary, Portugal and the European Union explained the changes in open space in their region and sought shared research ambitions.

contact: jeroen.dewaegemaeker@ilvo.vlaanderen.be

MOSAIC

Co-funded by the European Union

Protein research: state-of-the-art and local

More than 60% of the proteins in a typical Fleming's daily diet come from animal-based raw materials (milk, eggs, meat). The other sources (plants, algae, micro-organisms) deserve more attention, according to Flemish and European policy makers. This is a question of consumer awareness, but certainly also a question of research. Regarding the 'other' sources, there is a lot of scientific work needed in terms of nutrition, process and development.

ILVO is investing heavily in equipment and infrastructure to continue to conduct "state-of-the-art" research on protein diversification. We expect that in the future, microbial proteins produced through biomass and precision fermentation will partly end up as an alternative source of protein in food and feed applications. ILVO has invested in equipment to valorize microbial fermentation streams into high-quality food products or ingredients and animal feeds. These facilities also support companies in the agri-food sector through a process of co-creation in the ILVO Living Labs.

Providing the growing population with balanced, climate-conscious and tasty food remains an important challenge for the entire agri-food chain, to which ILVO can contribute by partly replacing animal protein with protein from other sources. Main research topics are functional and nutritional suitability for food applications, taste, chemical and microbiological food safety, allergenicity, digestibility, sustainability, etc. Applications in animal feed also receive due attention.

Finally, local cultivation of protein-rich crops in 2023 was also an important aspect of ILVO protein diversification research.

contact: geert.vanroyen@ilvo.vlaanderen.be

Protein diversification

RESULT

Chickpea: local Flemish protein

Chickpea is a new crop that is not yet well established in Flanders. During the Kik-Love project, ILVO worked with Inagro on local cultivation and the post-harvest steps of this crop. Together with pioneer farmers, both mainstream and organic, we explored cultivation techniques. Different varieties of chickpea were tried, we experimented with different inoculums were experimented and various harvesting techniques were tested. Chickpea yields are highly variable and seasonal. For example, yields up to 3.5 tons dry matter/ha were obtained but also crop failures due to wet June or September months. Further optimization of chickpea cultivation is necessary, including the identification of varieties better adapted to our climate (cold tolerance, being determined, disease tolerant). This will be further developed in the new KiKet project.

contact: hilde.muylle@ilvo.vlaanderen.be
elien.derooze@ilvo.vlaanderen.be

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

RESULT

Local legumes deserve boost

PEUL-CHAIN is a project carried out by the Flemish Institute for Healthy Living vzw, ILVO and VLAM, with the main objective of stimulating the local cultivation, processing and consumption of legumes in Flanders through knowledge sharing and consciousness raising. Through consumer research, Gezond Leven vzw and VLAM gained more insight into the thresholds and levers that determine the consumption of legumes. The results provided valuable input for a legume campaign to the general public. This resulted in the "Week van de Peul" campaign. The results from the consumer survey also provided input for other actions that could stimulate the consumption of legumes, such as the development of materials for caterers or schools. ILVO conducted interviews with local growers and processors of legumes. The results provided insight into the needs of growers and processors to further develop the local legume chain. They could also be used as input for the closing event organized at the end of the PEUL-CHAIN project for all actors involved in the legume chain.

contact: geert.vanroyen@ilvo.vlaanderen.be
hilde.muylle@ilvo.vlaanderen.be

RESULT

Field beans as a soy substitute in dairy cattle feed

To what extent are field beans a worthy, viable protein provider and soy substitute in the ration of dairy cattle? In the demonstration project MELKBOON, project partners ILVO, LCV, Hooibeekhoeve, Proefhoeve Bottelare, Inagro, PIBO-Campus and PVL researched and demonstrated this so that the sector can eventually realize a reduced carbon footprint. The project targeted growers/field farmers and cattle farmers, and stimulated cooperation between the two groups. In Flanders, field trials were conducted on demo fields to identify cultivation aspects of field beans, such as variety choice, mix cultivation, fertilization and sowing techniques. Nitrogen fertilization, even in limited amounts, produced no significant differences and thus no higher yields in field beans. As expected, toasting of field beans was found to have a positive effect on both protein and starch resistance. Importantly, the feeding trials show that it is possible to replace part of the soybean meal in a dairy ration with toasted field beans without significant impact on milk production results.

contact: tine.vandenbossche@ilvo.vlaanderen.be

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

Microalgae as protein ingredient for the food and feed of the future

As part of the so-called "protein transition," it is predicted and hoped that microalgae proteins will also contribute in the future to a sufficient, nutritious, safe and affordable food supply for a rapidly growing world population with changing dietary habits. The ProFuture project (www.pro-future.eu) aimed to prepare the market introduction of innovative, socially responsible, sustainable, protein-rich food and feed ingredients based on microalgae produced in and approved by the EU. The focus of the tasks assigned to ILVO within ProFuture was on the analysis of the microalgae, protein extracts and co-products provided by the algae-producing project partners. To this end, nutritional parameters, technical-functional properties, safety characteristics, organoleptic properties and interactions with food and feed matrices were analyzed. Furthermore, the spiral filter press was evaluated as an extraction method and spray drying and "agitated thin film drying" as drying methods.

contact: geert.vanroyen@ilvo.vlaanderen.be

IN THE SPOTLIGHT

First soybean field trials are successfull and show efficacy of Flemish soil bacteria

Researchers from ILVO, VIB, UGent and KU Leuven, have successfully conducted the very first field trials with soy based on new knowledge about the interplay between bacteria, soil and crop. Thanks to the citizen science project "Soy in 1000 Gardens," they were able to identify Flemish soil bacteria that live in symbiosis with roots of soybean plants. Through this symbiosis, nitrogen from the air is fixed by the bacteria and made available to the soybean plants. Local soil bacteria may be better adapted to Flemish soil conditions, e.g., cold soil temperatures in spring. With those local bacterial strains, coatings were developed to make soybean seeds to coat them so they would grow better on Flemish soil. Several test fields with coated soybean seeds were sown at ILVO earlier this year. The results seem promising. After coating with local bacterial strains, higher yields and protein contents are measured than without coating. Also compared to coatings with non-local, commercial bacterial strains, some Flemish candidates seemed to perform as well or better.

contact: joke.pannecoucque@ilvo.vlaanderen.be
margo.vermeersch@ilvo.vlaanderen.be

RESULT

Insect meal and whey powder: new potential protein sources for 100% organic laying hen feed

As of Jan. 1, 2022, stricter feed standards apply to organic livestock, requiring 30% of raw materials to be of regional origin. As of 2026, the exception for the use of up to 5% current high-protein feed in the ration of young poultry will expire. Within the CCBT research project LEGMEME, work is underway to develop an optimal local feed, with a specific focus on methionine and vitamin B2. Currently, two potential sources of protein, namely insect meal and milk whey powder, are underutilized in the organic poultry sector. This is partly caused by practical hurdles and recent changes in European legislation. However, these sources are interesting because of their high nutritional value and their contribution to the concept of circular economy, as they can be produced locally and serve as an alternative to soy. This project has evaluated the potential of these sources, with initial results encouraging further use of these sources as a potential source of protein. However, a number of stumbling blocks such as availability, legislative framework and cost were still identified.

contact: annatachja.degrande@ilvo.vlaanderen.be

RESULT

Chain-wide initiative for plant protein from Flemish cold greenhouses

VSeveral growers of head lettuce are struggling with growing greenhouse lettuce in the summer because of the soil fungus Fusarium. In addition, greenhouse growers are also looking to diversify with new crops. What if they could grow protein crops during the summer months in the (temporarily empty) cold greenhouses? In the KIPEi project, ILVO, PCG and Boerenbond investigated whether it is both technically possible and economically interesting for these growers to grow edamame, chickpeas, peanuts or dry beans. Through a grower's network, interested greenhouse growers, both conventional and organic, were helped to grow various protein crops. In the protein transition, food companies are also always looking for sources of plant-based proteins. Chain development was supported by discussions held with multiple buyers and channels. A better understanding of costs now provides the basis for new collaborations.

contact: hilde.muylle@ilvo.vlaanderen.be
elien.derooze@ilvo.vlaanderen.be

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

IN THE SPOTLIGHT

Soy-free pigs and chickens

The main objective of this project was to demonstrate that alternative European protein sources to replace soy can be used as raw materials in pig and poultry feed and that a profitable production story can be built around this. In consultation with the feed manufacturers, trial feeds were formulated using protein-rich raw materials available in Europe. We conducted a trial on piglets, fattening pigs and broilers. This showed that the growth performance of piglets and broilers fed a soy-free diet was similar to that of a conventional field diet, but broilers fed a soy-free diet performed less well. The soy-free feed was more expensive, the slaughter yield in the pigs was lower and the broilers achieved lower final weights. Thus, livestock producers need additional compensation to offset these additional costs. The advantage is that the impact of soy-free feed on the climate is considerably lower, which is not unimportant in a sustainable livestock industry with an increasing focus on its ecological footprint, among other things.

contact: sam.millet@ilvo.vlaanderen.be
marta.lourenco@ilvo.vlaanderen.be

NEW

How can we further improve the supply of meat analogues and make them more attractive to flexitarians?

A new 3-year VLAIO COOCK project aims to take major steps in the direction of meat analogues. ILVO, Flanders' FOOD and KU Leuven will work together with processors and suppliers of raw materials to build knowledge about ingredients (vegetable proteins and fats, hydrocolloids) and production processes. Special focus will be on taste and texture.
The overall objective of this project is to improve and implement knowledge about ingredients (vegetable proteins and fats, hydrocolloids) and production processes for quality meat analogues among the target group to make these products more attractive to flexitarians. The target group consists of suppliers and manufacturers of meat analogues and their ingredients and additives. Two generic model products are being worked on, namely analogues for emulsified sausage (product type 'sandwich sausage analogue') and minced meat analogues (product type 'hamburger analogue'). The focus is on two important quality attributes of meat analogues, namely texture and taste/aroma. Here ILVO will work mainly on the texture of different ingredients via high moisture extrusion, a technique for producing a fibrous texture.
The results of this project will contribute to the development and/or improvement of meat analogue products from the two abovementioned segments in the short term, as well as to the development of new meat substitute products in the long term, thus strengthening the competitive position of the (participating) companies.

contact: geert.vanroyen@ilvo.vlaanderen.be

NEW

Launch of the project FERM EIWIT – protein production through fermentation: towards innovative value

In the transition to a more sustainable food system, protein produced by microbial fermentation shows considerable potential. It is expected to eventually become a substantial part of our food and feed system. However, development, industrial implementation, as well as processing into food, feed and fine chemicals, in many cases still require a significant development pathway. With a grant of € 775,000, VLAIO is supporting the COOCK+ 'Ferm Protein' project that will bundle and disseminate knowledge to accelerate implementation of fermentation-based protein production and processing. The 3-year project started on December 1, 2023.
Founders of The ProteInn Club (www.theproteinnclub.eu) – UGhent, ILVO, Bio Base Europe Pilot Plant and CAPTURE – will implement the project. The ProteInn Club also has a strong industrial base with the 30 member companies in the Industrial Sounding Board.

contact: karen.verstraete@ilvo.vlaanderen.be

NEW

Refinement of European legumes for increased sustainability

The goal of BELIS is to increase the competitiveness of legume breeding in the EU and associated countries. The methodology and structure of the breeding sector are being tinkered with. The genetic progress that has been achieved via research is being brought more efficiently to breeders, as well as to seed companies and the other actors, such as registration agencies, extension services, feed and food industry, and finally to farmers. Specifically, the project focuses on seven forage and seven seed crops that are currently grown either to produce feed and food, or to provide ecosystem services. BELIS involves a total of 34 partners.
ILVO is particularly active for red clover and soybean.

contact: tim.vleugels@ilvo.vlaanderen.be

BELIS
Breeding European Legumes


ILVO
interreg

Active leadership role

ILVO takes a very active pioneering role within the field of precision agriculture and data technology, both in Flanders and in Europe. With a series of pioneering projects, ILVO shows the way to a sustainable, efficient, technologically advanced and data-driven food system, based on state-of-the-art digital technologies tailored to each actor in the agri-food ecosystem. The focus is on developing AI, data and robotics solutions that not only increase productivity, but also contribute to economic stability, all while respecting people, animals, plants and the environment.

For example, with its modern measurement infrastructure, ILVO collects and interprets unique data on the response of plants and their roots to drought conditions in order to develop drought tolerant crops that help the industry adapt to changing climate conditions. By using precision agriculture technologies combined with data from satellites and drones, ILVO helps farmers develop better management decisions to improve soil quality, among others. Smart monitoring systems reduce agricultural emissions and improve animal welfare. Virtual reality and smart glasses are being studied and improved to determine the ideal harvest time for tomatoes and support operators in greenhouses. Further along the chain, ILVO is using hyperspectral sensors and artificial intelligence to determine the quality of food products, a crucial step in ensuring food safety and quality. Finally, ILVO is working on an innovative European framework to share all these datasets in a decentralized manner within the European Agricultural Data Space, fully in line with the principles of the European Data Strategy.

ILVO combines its role as an interdisciplinary competence center in data technology with services through a Digital Innovation Hub to help bring technological innovations truly to the market. In doing so, the Living Lab Agrifood Technology as a co-creative platform ensures close interaction with the end user so that the final solutions work – not just in pretty demonstration videos but also in real agricultural practice.

contact: jurgen.vangeyte@ilvo.vlaanderen.be

Precision agriculture and data technology

IN THE SPOTLIGHT

World's first: HYDRAS field lab for development of drought-tolerant crops

First in the world, ILVO opened in 2023 a large state-of-the-art field lab that allows scientists to monitor the response of plants as well as their roots to drought. More than 8000 m2 experimental field is equipped with 6 mobile rain-out shelters, a network of 1400 electrodes and drones with advanced sensors. Pioneering is the large scale of the field lab but also the electrical network (ERT) that maps soil moisture and its uptake by plant roots. This combination gives ILVO the honor of being the world's first field lab of its kind. The strategic research infrastructure is open access for companies and knowledge institutions and serves to accelerate the development of drought-tolerant crops in Europe.

contact: waldo.deroo@ilvo.vlaanderen.be

RESULT

Spectral sensors for all phases of cultivation

The increasing demand for quality products means that the agri-food chain needs reliable and cost-effective solutions to determine quality during different phases of cultivation, i.e. in the field, during transport and during product storage. Within the European project SpectroFood, hyperspectral sensors and analytical techniques (including artificial intelligence) were used for robust estimation of relevant quality parameters. The hyperspectral sensors were used for this purpose during different phases of cultivation and linked to field information and storage parameters. The focus of the Flemish partners was mainly on leeks. For the European partners, the spectral measurements for quality determination were deployed in broccoli, apple, cherry and mushroom cultivation.

contact: jonathan.vanbeek@ilvo.vlaanderen.be

AGENTSCHAP INNOVEREN & ONDERNEMEN Vlaanderen is ondernemen

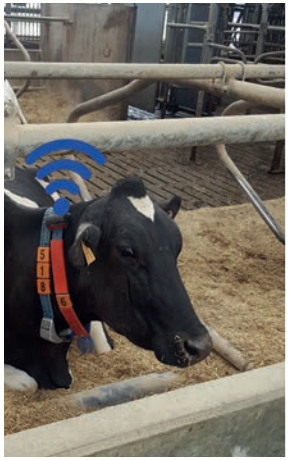
RESULT

Precision Livestock Farming (PLF) technologies to address greenhouse gas emissions in grazing cattle

Can methane emissions from cows in pasture be mapped using sensors and precision farming techniques? How can we then reduce those emissions through pasture management interventions? The VLAIO project Grastech sought answers to these questions. Grazing cows must also participate in the reductions of enteric emissions. Adapted and validated measuring techniques were developed, the barn ration was adjusted to a higher share of corn silage, and a methane-reducing feed additive was successfully tested. ILVO mapped the impact of each step in the milk production process on total greenhouse gas emissions through a life cycle analysis of the entire production chain up to the farm gate. The extension of the knowledge about the actual greenhouse gas emissions from grazing animals is important for Flemish climate accounting, because in this way greenhouse gas emission reductions from grazing animals can be taken into account.

contact: tim.vandegucht@ilvo.vlaanderen.be

RESULT



Internet of animals: tracking system for health and welfare of dairy cows

To manage livestock intensification in an economically efficient manner, modern dairy farms increasingly rely on automated systems that collect and interpret animal behavioral parameters. Current technologies and research focus on single applications for which a small number of specific parameters are monitored by a specific sensor (e.g. pH monitoring for disease, milk analysis for mastitis, activity monitoring for estrus). The main objective of this FWO project was to integrate different sensors (localization, accelerometers) to detect and monitor the various parameters, and their abnormal values at the animal (calving, estrus, lameness, heat stress, etc.).

Partners:
UGhent - Fac. Veterinary Medicine,
UGhent - Fac. Engineering and Architecture

contact: frank.tuyttens@ilvo.vlaanderen.be

Fonds Wetenschappelijk Onderzoek Vlaanderen
Opening new horizons

IN THE SPOTLIGHT

Artificial intelligence in tomato cultivation

Can smart glasses help to pick tomatoes at the ideal time? That is the key question of the VLAIO project HarvestAID. Learning when it is best to pick a tomato is quite time-consuming and labor-intensive. These smart glasses could provide a solution.

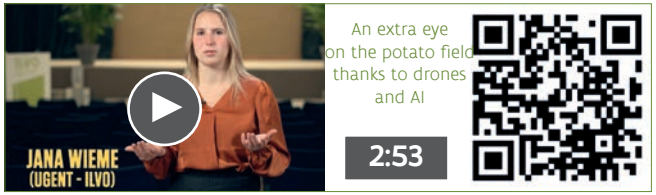
contact: olivier.guiot@ilvo.vlaanderen.be
jonathan.vanbeek@ilvo.vlaanderen.be

IN THE SPOTLIGHT

An extra eye on the potato field thanks to drones and AI

Potato plants are highly susceptible to diseases and pests. To better protect these crops, computer scientist Jana Wieme (UGent - ILVO - FWO) is deploying drones and artificial intelligence.

contact: jana.wieme@ilvo.vlaanderen.be



RESULT

Growing digitally: digital tools for agricultural consultants

FAIRshare, coordinated by Teagasc, aimed to support agricultural advisors in using digital advisory tools and services to support more productive and sustainable agriculture. ILVO guided 29 European agricultural advisory organizations in dealing with specific challenges through digital tools. This included workshops in which the business environment was assessed, a strategic direction was established and an action plan for their organization was developed. The consortium also compiled an inventory of 366 digital tools and services used internationally, and developed a series of videos explaining good practices for digital consulting tools, focused for example on user-centered design and more efficient consulting.

More info: www.h2020fairshare.eu

contact: lies.debruyne@ilvo.vlaanderen.be

THIS PROJECT HAS RECEIVED FUNDING FROM THE **EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME** UNDER GRANT AGREEMENT N. 818488

RESULT

Rice remote monitoring: resilience to climate change and crop management practices for regional adaptation

A quarter of Colombia's rice is grown in Tolima using irrigation water. Climate models there predict altered rainfall patterns, making irrigation increasingly important. Local farmers do not know the effective water demand of their crop adequately, so they often over-irrigate. This leads to water shortages during the growing season, but also leads to high emissions of methane, an important greenhouse gas. Together with UNIBAGUE and AGROSAVIA (Colombia), ILVO set out to build knowledge and apply targeted irrigation control to rice cultivation in Tolima.
We used drone and satellite imagery, machine learning and crop modeling. Through collaboration with growers and governments, we embedded these climate adaptation strategies locally. Moreover, we achieved a reduction of up to 50% irrigation water without yield reduction.

contact: tom.deswaef@ilvo.vlaanderen.be

RESULT

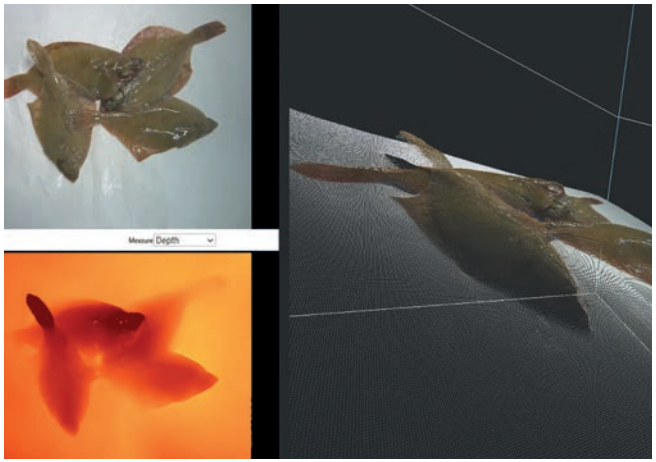
Drone-training for agriculture of the future

Within the DroneXperience project, five training courses on drones were set up as part of "Training for the Future," subsidized by ESF. The 5 sub-themes on which different partners worked together were
1) drones for precision agriculture
2) drones for construction
3) drones for offshore
4) construction and maintenance of drones and
5) drones and data protection.
Together with various stakeholders, within each theme we looked at the real-life applications in the field, what concerns and needs there are, what are the possible solutions, what preconditions must be built in, etc. This created a broad base of support for the drone training of the future. ILVO coordinated the agricultural theme and converted our drone expertise into relevant training for all parties.

contact: jonathan.vanbeek@ilvo.vlaanderen.be

ESF INVESTEERT IN JOUW TOEKOMST
Europese Unie
Vlaanderen is werk

RESULT



Commercial fish species recognition through automated self-sampling

Over the past two years, autonomous camera systems for data collection in fish auctions and on fishing vessels have been developed in the VISIMII project, funded by the former EFMZV. Machine Vision has thus been successfully introduced into Belgian beam trawling. The system now distinguishes autonomous 19 different commercial fish species with accurate length measurement and species recognition. In developing the system, aspects such as seamless integration into fishing processes, minimizing onboard impact and increased efficiency were carefully considered. These considerations played a crucial role in ensuring that the camera system operates effectively within the existing operational context of fishing vessels. The focus is on expanding the data flow, especially for less common species such as turbot and brill. This development aims to provide scientific assessments, prediction models and valuable insights for optimal fishing grounds and catch management. That goal that is still under development.

contact: sander.delacauw@ilvo.vlaanderen.be

NEW

Digital transformation of catch monitoring in European fisheries

EveryFish aims to develop technologies and strategies for fully automated monitoring and control of fishing activities, which are then accepted, trusted and used by societal and policy actors. With AI and machine learning, it becomes possible to map catch records with all the metadata around them in real time. This opens the way to economic and efficiency gains, sustainability paths, and more optimal, data-supported policy choices and enforcement opportunities. At the same time, this also brings a number of challenges, such as potentially competing interests or unfair competition and social debates. The project takes a holistic approach to the innovative fisheries monitoring system: In addition to the technological issues, researchers are also working to identify industrial, political and societal challenges. How do we achieve legitimacy and acceptability to both industry and policy makers? The plan is to approach the issue in an interdisciplinary way with in European cooperations, down to the level of ethics in the markets.

contact: els.torreele@ilvo.vlaanderen.be

NEW

CIWI, Integration of a digital tool for reasoned watering within the INERO and Care4Growing app

IDuring periods of drought, for some crops, irrigation makes economic sense. However, irrigation must be used intelligently so that the right plots are provided with the right amount of water at the right time. The approach is to link crop modeling to the clear and widely deployable application WatchitGrow. In the CIWI project we work together with Inagro and VITO on the crops (early) potato, cauliflower and spinach, provide irrigation quantity estimation, in addition to irrigation prioritization. Through the application WatchitGrow, farmers now get additional functionality to irrigate their crops in a more targeted way during periods of drought. In addition, WatchitGrow's functionality is linked to applications used by members of the INERO and LAVA cooperatives.

contact: tom.deswaef@ilvo.vlaanderen.be

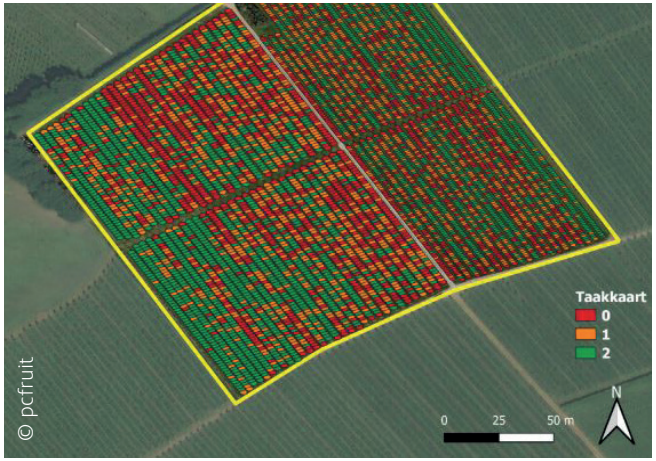
NEW

Precision agriculture and efficient data use in fruit growing and arable farming

This Interreg Flanders-Netherlands project targets the implementation of precision agriculture and the more efficient use of data streams in fruit growing and arable farming. Farmers face many challenges in their management. Sensors and associated data are used to support management, but the available data can often be used more broadly and efficiently. Using existing and newly developed sensors, data is generated and made applicable in the form of task maps and models. The various cultivation measures in the field are then intelligently translated into actions in the field using precision farming machinery. Adequate data management is required for the smooth (processing) of the collected data. The project partners are therefore working to expand the existing platforms in fruit growing and arable farming, with functions to optimize data interpretation and enable standardized data exchange.

Partners: Proefcentrum Fruitteelt (pcfruit vzw), Delphy, VITO, Munckhof Fruit Tech Innovators, UHasselt, Jacob van den Borne, VERVAET, Provinciaal Instituut voor Biotechnisch Onderwijs, Proef- en Vormingscentrum voor de Landbouw

contact: stephanie.vanweyenberg@ilvo.vlaanderen.be



Interreg Vlaanderen-Nederland

Gefinancierd door de Europese Unie

NEW

Using data for smart farming and agri-environmental monitoring

AgriDataValue is a Horizon 2020 project with 29 partners that aims to establish itself as the "game changer" in the field of digital transformation of smart farming and agri-environmental monitoring. The project aims to strengthen smart farming capabilities, improve competitiveness and ensure fair income within agriculture by introducing an innovative, open source, intelligent and multi-technology, fully distributed agri-environmental data (ADS) space. To achieve technological maturity and rapid and mass adoption, AgriDataValue adopts and applies a multidimensional approach that combines state-of-the-art big data and data space technologies with agricultural knowledge, new business models and agri-environmental policies. The intelligent platform leverages existing platforms, edge computing and networks/services. This platform should lead to the introduction of new concepts, methods, tools and pilot facilities that go beyond current knowledge, and lead to groundbreaking research and create sustainable innovation in scaling up agricultural sensor data.

contact: nico.peiren@ilvo.vlaanderen.be

Horizon2020
European Union Funding
for Research & Innovation

NEW

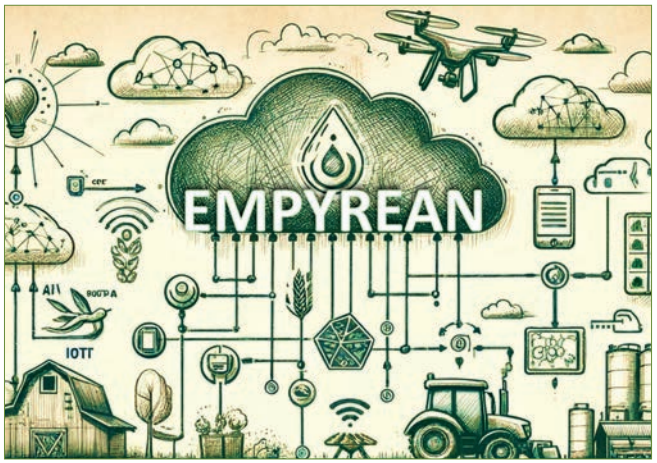
Europe scales up agricultural sensor data

The Horizon 2020 ScaleAgData project aims to advance smart agricultural and agri-environmental monitoring through innovative tools such as the use of hyperspectral sensors, satellite imagery, data sharing, edge computing, privacy protection and data integration technologies. These advances will be explored and implemented in six Research and Innovation Laboratories (RILs) addressing multiple identified challenges in six vertical areas: Water Productivity, yield monitoring, crop management, soil health, pasture and dairy. These laboratories will evaluate and demonstrate different models or approaches for scaling up and integrating data. ILVO leads the Soil Health RI Lab and aims to conduct research and validate innovative concepts that enable the development of EO-based products focused on soil health and quality assessment. This includes experimenting with sensor data and edge computing, leveraging federated AI and ensuring semantic interoperability to enable decision support in management applications related to soil fertility.

contact: panos.ilias@ilvo.vlaanderen.be
tuna.coppens@ilvo.vlaanderen.be

Funded by the European Union

NEW



Data mining gears up with smart farming as case study

The Horizon 2020 project EMPYREAN targets the so-called computing continuum and delivers a hyper-distributed computing paradigm. This paradigm is based on smart connections between heterogeneous IoT devices and resources from different providers and networks. So-called Associations emerge, which connect autonomously and effortlessly. They use distributed, cognitive and dynamic AI-driven decision making to accomplish computational tasks and data both within an Association and between Associations. This is done in a multi-agent manner and across central computing environments. Resources are optimized and scalability, resilience, energy efficiency and quality of service are achieved. EMPYREAN aims to demonstrate its advanced and innovative capabilities through three use cases. These are device and data-rich applications in three environments: A high-tech industrial product environment, a case involving smart agricultural tools and a warehouse automation. They focus on AI-driven value extraction from large and dynamic IoT data generated by multiple sources (e.g., robots) at the edge of the network. ILVO is leading the use case for smart agriculture and will develop services for soil health and crop protection.

contact: panos.ilias@ilvo.vlaanderen.be
theodoros.chalazas@ilvo.vlaanderen.be

Funded by the European Union

NEW

Precision agriculture and efficient data use in fruit growing and arable farming

The Horizon 2020 project OpenAgri aims to make digital agriculture accessible to all by creating affordable, energy-efficient software and hardware for agriculture that works well in areas with poor Internet connectivity. The plan is to achieve this by engaging farmers and advisors in developing these technologies with a community-based approach, and by offering open software services that support different computing environments. The project engages various stakeholders in 14 innovation pilots across Europe to collaboratively create solutions to agricultural challenges. OpenAgri is also developing a tool to help decisionmakers, farmers and advisors choose the best digital agriculture solutions based on specific needs, based on insights from European agriculture and pilot results.

contact: panos.ilias@ilvo.vlaanderen.be
theodoros.chalazas@ilvo.vlaanderen.be

Funded by the European Union

Closing loops and circular bioeconomy

Already 34% of the Flemish economy is bio-based. This share is growing. According to the latest 'Flemish Bio-Economy Monitor 2.0,' the Flemish economy is thus increasingly less dependent on fossil raw materials. Flemish and European policy initiatives such as Flanders Circular and the European Circular Economy Action Plan play an important role in this.

In 2023, ILVO also focused on research related to closing loops and circular bioeconomy. Maximum value creation in all links of the chain and sustainability are paramount. ILVO wants to accelerate this and makes its expertise, network and infrastructure available. Both on a technological, economic and social level, we work to remove obstacles: we conduct research on stabilization and processing of biomass streams, we characterize interesting molecules, research and evaluate new business models, look for partners and guide them together towards effective system innovation.

With the B2BE Facilitator, we are a matchmaker between the primary sector and the processing industry, seeking innovative valorization pathways for locally produced biomass streams. We aim at the reduction of fossil resources in favor of renewable resources to contribute finally to a low carbon economy.

contact: isabel.roldan@ilvo.vlaanderen.be

Circuits and bioeconomy

RESULT

Production of top Belgian chicory product gaining momentum

We are leaders in the production of inulin, and thanks to Belgian research, production of this healthy dietary fiber is hopefully gaining momentum. Thanks to pioneering developments in breeding F1 hybrids, the highly productive offspring of crossed inbred lines, researchers are about to revolutionize chicory inulin production. In her doctoral research, Evelien Waegneer (ILVO - KU Leuven) took a big step in making chicory inbred lines for making F1 hybrids at two years instead of eight years. Studies indicate that in chicory roots from F1 hybrids can increase inulin yield by 15%.

contact: evelien.waegneer@ilvo.vlaanderen.be

RESULT

RE-PEAT – reuse of cultivation substrates for circular horticulture

How can we successfully reuse peat, coir and perlite from substrate cultivation of strawberry, vegetable and ornamental crops? And how can we make reuse more widespread in practice? These were the main questions of the RE-PEAT project. Every cubic meter of reused peat reduces CO_2 emissions, so it's good for the climate. Also, the nutrients left in the substrate can be used circularly through an adapted irrigation scheme. Available residual streams on horticultural farms were inventoried and optimized for quality. Cultivation technical and economic questions were answered and the regulations for reuse were clarified. Professional organizations participated in this project to clarify the legislative issues. The amount of nutrients remaining in the substrate could be greatly reduced by replacing fertigation with pure water at the end of strawberry cultivation, with no effect on yield.

contact: bart.vandecasteele@ilvo.vlaanderen.be

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

RESULT

Valorizing flax blends

The first completed B2BE theme revolved around flax loams. Per hectare of flax, in addition to flax fiber, an average of 800 kg of seed and 3000 kg of shives are also harvested. In Flanders in 2021, this meant that in addition to 30,000 tons of long fiber, 22,000 tons of short fiber, 8 tons of flax dust, 2500 tons of rags and 20,000 tons of linseed, there were also more than 70,000 tons of flax loam produced. Demand for flax is growing strongly, which also implies increased production of by-products. At the matchmaking event with actors from various sectors (agro-industry, chemistry and construction), the B2BE team was able to realize new connections between suppliers and processors, and innovative valorization pathways emerged. A major bottleneck in the processing of flax loams appears to be logistics. Using the Moov model of VITO, possible new locations were identified where economically viable storage facilities could be created with sales to the three processing sectors. A notable side result was the production of short documentary videos on the various valorization possibilities of flax straw by the B2BE Facilitator and the Kortrijk flax museum Texture.

More info: Moov model

contact: hannavanrenterghem@b2be-facilitator.be

IN THE SPOTLIGHT

34% of Flemish economy is already bio-based. Pharma leads the way

The greening of the Flemish economy is accelerating. In 2020, 34% or one-third of the physical Flemish economy (i.e., without counting services) will be based on non-fossil raw materials. The pharmaceutical industry is leading the way with a bio-based share that is already close to 50% in 2020. Green chemistry is also growing strongly (+24%). In five years, the total biobased economy grew three times as fast (+21%) as the traditional, physical economy (+6%). So says the Flemish Bioeconomy Monitor 2019-2020, which was co-authored by ILVO researchers.
Flemish Minister of Economy, Innovation, Work, Social Economy and Agriculture Jo Brouns explained the figures at a press conference and pointed to opportunities for innovative farmers: 'Many farmers are looking for alternative earning models. They are willing to experiment with new crops that provide the biomass that industry needs to move away from fossil resources. That's how we create a win-win.' The bioeconomy monitor is an instrument in the bioeconomy policy plan with which the Flemish government is fully committed to that bio-based economy in which biomass and non-fossil raw materials are used to make products.

contact: yvana.vankerckhove@ilvo.vlaanderen.be
jasmineversyck@b2be-facilitator.be

NEW

Angelica root for fragrance industry: bioeconomy experiments

Angelica is an aromatic root crop with great potential according to Belgian processor Sotecna, a producer of essential oils with sales in the flavor and fragrance industry. This year, just under 10 ha of the crop will be harvested in our country but interest is growing among buyers and growers. For the B2BE, based within ILVO, this is one of the latest cases on which stimulus research is being released. The Flemish B2BE Facilitator is a contact and innovation platform developed by ILVO to strengthen the bioeconomy together with the EWI and LV departments and with federations, research centers and experts. The team works with an efficient flexible system approach: The B2BE Facilitator focuses on one theme per 6-month period. The economic ecosystem and actors, bottlenecks and especially valorization opportunities are identified, in order to then realize connections between companies, actors with primary bio-based flows and researchers/developers

contact: yvana.vankerckhove@ilvo.vlaanderen.be
jasmineversyck@b2be-facilitator.be

NEW

ALTERnatives to PEAT in soft fruit, mushroom and ornamental crops

Replacing peat with renewable alternatives is a major challenge for the horticultural sector. The objective of this VLAIOAgriculture project, a collaboration with Inagro, PCS, PCH and pcfruit, is to transition to low peat and sustainable crop substrates via 30-50% peat replacement, without a loss of competitiveness for the grower and substrate producer. This transition will be necessary to reduce dependence on peat, which is becoming scarcer and more expensive. This project should offer growers alternatives to peat that should ensure their long-term profitability. This will help to maintain the competitiveness of the Flemish sector and strengthen its resilience to geopolitical decisions. The ambition is to replace at least 30% peat in cultivation substrates for soft fruit, mushroom and ornamental crops by 2027.

contact: bart.vandecasteele@ilvo.vlaanderen.be

NEW

Marketing and product quality as keys to the success of marigold cultivation

Marigold cultivation is a niche crop that finds its outlet in various bio-economy sectors, ranging from food, cosmetics, textiles to pharmaceuticals for the flowers and applications in green chemistry for the seeds. The VLAIO project GOGO2.0 continues the earlier GOGO research project that succeeded in developing marigold cultivation in Flanders as a dual-purpose crop. By focusing on new cultivation systems (nematode control and mixed cultivation), improved cultivation techniques (mechanical weed control and (post)harvest techniques) and matchmaking for flower and seed sales, we want to improve the final profitability. It will lead to the introduction of more crop diversification and agroecological cultivation principles.

contact: jarinda.viaene@ilvo.vlaanderen.be

Gefinancierd door de Europese Unie
NextGenerationEU

IN THE SPOTLIGHT

B2BE Facilitator, matchmaker in bioeconomy

In 2023, the B2BE Facilitator covered the themes "Stabilizing and valorizing green foliage" and "Specialty chemicals from local biomass". In both themes, innovative applications were sought together with stakeholders from different sectors. Which opportunities and barriers arise in the use of local biomass? To better map this out, the B2BE Facilitator commissioned an economic feasibility study for biomass hubs from KU Leuven. The results of the study are available at www.b2be-facilitator.be. A second external study on specialty chemicals will be finalized in 2024. In the framework of the previous theme 'The primary sector biobased', UGent, commissioned by the B2BE Facilitator, worked on the study 'Biostimulants and biopesticides: Opportunities and challenges for the Flemish bioeconomy'. The study can be found in its entirety at www.b2be-facilitator.be https://ilvo.vlaanderen.be/uploads/images/Marktstudie-biopesticiden-stimulanten-Rapport-Versie-3-07-2023.pdf

contact: jasmineversyck@b2be-facilitator.be

b2be
BUSINESS TO BIOECONOMY

NEW

Horseradish, big angelica and lovage usable in bioeconomy

Horseradish, big angelica and lovage are three aromatic root crops. Both the fresh plant material and the extracted aromas of these crops can be used in numerous (non)-food applications. Despite the interest and demand from the processing industry, only a few pioneers are currently actively growing these crops in Belgium. These pioneers indicate that there are still quite a few bottlenecks in cultivation techniques that are hindering expansion of the acreage. In addition to providing solutions for these bottlenecks, ILVO, in collaboration with Flanders' Food, Praktijkpunt Landbouw Vlaams-Brabant and Boerenbond, wants to create more clarity about the sales opportunities within the Aroma-roots project. Researchers will work with pioneer farmers to explore the potential of these new crops in their crop rotation.

contact: gerda.cnops@ilvo.vlaanderen.be

FLANDERS INNOVATION & ENTREPRENEURSHIP
FF FLANDERS' FOOD
Clusters for Growth

Gefinancierd door de Europese Unie
NextGenerationEU

NEW

Cultivation information of alternative crops for the bioeconomy

The CropExplore for Farmers project enhances agricultural knowledge about atypical crops that farmers could grow in function of bio-economic processing, thus also for non-food applications. With this initiative, the 10 project partners want to unlock all available crop info in one user-friendly tool: Cultivation properties, yields, acreages, contents and marketing opportunities of at least 200 arable crops that offer potential for applications in the bioeconomy. A first version of the database is expected in early 2025. The processing industry will also be able to use the database to search for sustainable raw materials. For three specific crops (deder, yacon and hemp) knowledge and expertise is already available; there this project aims to expand the acreage and optimize the (multi-)valorization of the harvested biomass.

contact: jarinda.viaene@ilvo.vlaanderen.be

NEW

From residual stream to raw material: FLAXIT project valorizes flax seed

With the FLAXIT project, together with VITO, University of Antwerp and the Karel de Grote Hogeschool, we offer flax growers and processors the opportunity to optimize the value of their flax seed. In Belgium, 20,000 tons of flax seed are available annually. Until now, this was considered a residual stream used mainly for low-value technical applications.
Through a biorefinery process, FLAXIT wants to make industrially relevant products from the oil, carbohydrates and proteins present in flax seed. Setting up new value chains is central to this.
By using the various components from the flax seed as raw material, producers of cosmetics, personal care products, food ingredients and bio-based materials, among others, can offer their customers a bio-based, renewable and vegan alternative. A win-win for flax growers, processors and consumers alike!

contact: hilde.muylle@ilvo.vlaanderen.be
bart.vandroogenbroeck@ilvo.vlaanderen.be

fwo Fonds Wetenschappelijk Onderzoek Vlaanderen
Opening new horizons

The fight against malnutrition

The fight against malnutrition and the optimal physical and mental development and health of humans are inextricably linked to a nutritionally balanced diet. ILVO explores how the various links within the agri-food system can contribute to providing nutritionally balanced, safe and tasty food within a sustainable and economically healthy framework. The food scientists have the necessary infrastructure and knowledge at their disposal. ILVO continuously invests in further knowledge development, innovative and sustainable processing equipment, state-of-the-art analysis capacity both in the context of food quality and food safety as well as consumer appreciation. We capture needs and trends in a constantly evolving society and bring together the relevant actors and stakeholders for this purpose. Such an integrated and multidisciplinary approach is used within ILVO to consider and research the Nutrition and Health theme in its complexity.

(Further) deepening of aspects such as protein diversification, monitoring food intake in collaboration with the healthcare sector, studying the influence of processing on allergenicity, intestinal health in animals as a model for humans, ... these are just a few examples of research conducted over the past year

contact: lieve.herman@ilvo.vlaanderen.be

Nutrition and health

Malnutrition and food loss reduction in healthcare

Malnutrition appears to occur frequently among residents in the (elderly) care sector. The risk of this depends, along with a reduced meal experience, on certain disorders among other things. At the same time, it is estimated that about 40% of prepared meals are thrown away as food losses. The Food Loss in Care project, supported by the Flemish Government, sought ways to evaluate these food losses and malnutrition in residential care centers. Food data was collected in two Flemish residential care centers through focus groups and, in addition to hot food waste, plate scraps from 247 residents were mapped and the exact bottlenecks per WZC were uncovered. Improvement actions were then outlined and evaluated.
Several (digital) tools were designed within this project, including a mobile measuring rig that can weigh and photograph meal scraps by component, in order to identify and link meal components to weight via imagery in the future.

contact: nathalie.bernaert@ilvo.vlaanderen.be

How can the food and health sectors work better together for healthier consumers?

Working together for a healthier consumer. That's the challenge that brought numerous stakeholders,
researchers and policymakers across sectors together in Bruges on Nov. 23. The goal was to tackle the societal problem of nutrition related diseases such as obesity, type 2 diabetes and malnutrition. The inspiration day was organized by the NuHCaS partnership, which aims to bring the nutrition and health sectors together more to exchange knowledge, work databased, and initiate more collaboration. After all, the health challenges in society are significant, and significant health benefits can be achieved through balanced nutrition.

Hilde Crevits, Deputy Minister-President of the Flemish Government and Flemish Minister of Welfare, Public Health and Family, opened the event with a clear message:
"Stimulating people to healthy and sustainable nutrition and sufficient exercise is extremely important. The Department of Care will therefore continue to invest in prevention. NuHCaS today shows how collaboration can grow from the bottom up, and how we can build bridges across domains."

In early 2023, Flemish minister Brouns and Dutch minister Adema, both linked to the policy areas of agriculture, signed a Memorandum Of Understanding. Through the Memorandum, NuHCas will undertake to exchange experience and expertise with Dutch partners. As a first joint action, a description of the healthcare landscape in both regions was worked out in order to subsequently identify potential learning points.

Over the past four years, NuHCaS has already initiated several projects based on stakeholder consultations. This year we zoomed in on 4 specific food-related themes, including nutrition for oncology patients, people with chewing and swallowing problems, nutrition as health prevention, and cooperation between chefs and health care actors. The brainstorms provided nuanced situation sketches and a basis for further actions.

The FoodCare project emerged as one of the first knowledge building projects in the bosom of NuHCaS with the goal of improving meal quality in healthcare. To explore optimizations, variations in preparation methods of broccoli, chicken and breaded fish were tested and their effects evaluated on vitamins, color, moisture, texture or crispiness. This was substantiated scientifically with an experimental design, the results of which can be translated into practice. An economic approach to healthcare catering was also embedded. In addition, how a mashed potato can be enriched with protein to increase its nutritional value was explored.

NuHCaS is an initiative of ILVO, Flanders' FOOD, VIVES, POM.

contact: marc.deloose@ilvo.vlaanderen.be
karen.verstraete@ilvo.vlaanderen.be

RESULT

Building knowledge for exploiting new wheat types rich in arabinoxylan dietary fiber throughout the wheat value chain

The Flanders' Food project FIBRAXFUN aimed to increase the fiber content, i.e. arabinoxylate (AX) content in classic yeast-based and sourdough-based bread products, breakfast cereals, pastas and other pasta via improved wheat varieties. In the process, effects of location and seasons on fiber content were identified in wheat genotypes with high AX content (2.0 to 4.5%). Genetic markers linked to AX content in wheat, triticale and rye were also identified. Breeding companies were provided with tools for targeted breeding with this project. The structure and physicochemical properties of flour with high AX content was described with the beyond-state-of-the-art AX nuclear magnetic resonance (NMR) characterization technique. The effect of flour with high AX content on the production of bakery and other flour derived products was mapped and resulted in food products with higher fiber content.

contact: hilde.muylle@ilvo.vlaanderen.be

RESULT

New conservation technology opens culinary and economic opportunities for our brown shrimp

Until now, the European brown shrimp has always been sorted onboard and immediately cooked in seawater and then landed at ordinary refrigerated temperatures. Culinary processing with raw shrimp is therefore out of the question. From the catering industry and abroad, the demand for raw shrimp is increasing. In his doctoral work, Xavier Vermeersch (ILVO - UGent) went in search of a solution to bring uncooked shrimp on land and on the market that could be stored for a long time and without loss of quality or food. He did several experiments on Belgian shrimp cutters and in ILVO's labs. Storing shrimp unsorted and in water as cold as possible or immediately freezing them appeared to be the best solutions. Other treatments such as vacuum packing and glazing scored significantly less well.

contact: geertrui.vlaemynck@ilvo.vlaanderen.be

RESULT

A2A2 milk, a different question in terms of digestion and processing

From the moment a heifer calf is born, it is genetically determined whether it will later give A1A2 or A2A2 milk as a cow.
For two years Boerenbond, ILVO, UZ Gent and Steunpunt Korte Keten investigated the properties and possibilities of A2A2 Milk, which contains a presumably more easily digestible alternative of the milk protein. Besides a comprehensible overview of the potential advantages and disadvantages of this milk, the possibility of separate marketing was also investigated. All collected knowledge was compiled on the website https://www.a2a2melk.be/. This is of interest both to dairy farms - who might consider a segregated milk system - and to consumers. This EIP project was funded by the Flemish government and the European Agricultural Fund for Rural Development (EAFRD).

contact: barbara.duquenne@ilvo.vlaanderen.be
karen.goossens@ilvo.vlaanderen.be

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

RESULT

Valorization of algae for better taste

Seaweed and microalgae are still little known and accessible in Western Europe as a source of food and feed proteins. At the same time, with a rising food demand in the background, additional sustainable alternatives to agricultural and fishery products are being busily sought. There is a lack of knowledge about the taste of algae, reliable supply and knowledge of what European consumers like. The ValgOrize Interreg 2 Seas project addressed all these aspects.
The goal was to provide food producers with information on the conditions under which seaweed and microalgae can be grown if a particular taste and quality is to be obtained. One of the final results of the project was an extensive collection of flavor profiles of different algae, which allows producers to perfectly estimate how a processed algae species would fit into their product. This allows creation of nutritional as well as tasty new products.

contact: johan.robbens@ilvo.vlaanderen.be

Seaweed and algae surprisingly delicious and versatile

0:39

RESULT

Risc of spreading antibiotic resistence in the environment and vegetables?

Much of the antibiotics administered to animals end up in manure, which in turn is used (in part) to fertilize fields. The more antibiotics, the more antibiotic residues and thus the more resistant bacteria appear. For example, doctoral student Judith Huygens (ILVO, UGent) detected residues in soil samples two to three weeks after fertilization that were also detected in the manure used. There was also an increase in resistance genes in the soil, but these may have been introduced along with the residues when fertilized. But does human exposure to antibiotic residues increase risk of antibiotic resistance from consumption of vegetables from open field? An initial study suggests a small risk. In leeks, for example, Judith found no resistance genes and only a few antibiotic residues, in very low concentrations. Further research should focus on other vegetables with a shorter growing season.

Funding: FPS Health, Food Chain Safety and Environment
Partners: UGent, UCL

contact: geertrui.rasschaert@ilvo.vlaanderen.be

RESULT

What if irrigation water from lettuce, carrots and strawberries contains toxic microcystin?

The FPS for Public Health, Food Chain Safety and Environment commissioned research into the extent to which microcystins accumulate in lettuce, carrot and strawberry, resulting in a potential biosafety risk. Microcystins are related to stagnant water where sunny and hot conditions encourage growth of blue-green algae (cyanobacteria). When those bacteria die, microcystins are released. When this polluted water is used for irrigation, the toxin can reach the plants. The CYANTIR project organized tests under controlled conditions. Using irrigation water containing 100 g/L microcystin and for different irrigation methods, microcystin accumulation was demonstrated in all crops. In the edible parts of the crops, however, microcystin concentrations were sufficiently low and thus did not pose a health risk. The preliminary conclusion is that there is no immediate concern for Belgian public health from microcystin contamination via irrigation of raw consumed fruits and vegetables. However, additional experiments are needed to recommend a safe limit for microcystin in irrigation water.

Coordinator UGent and partners ILVO, Sciensano, Inagro, ULG

contact: bart.cottyn@ilvo.vlaanderen.be

Volksgezondheid
Veiligheid van de Voedselketen
Leefmilieu

RESULT

Understanding multispecies biofilms in the food industry is necessary for control of biofilm-related problems in food safety and quality

Microbial contamination in the food industry is a significant risk to food safety and quality. Despite cleaning and disinfection, food contact surfaces often remain laden with surface-adherent microbial communities called biofilms. These biofilms contain several bacterial species that synergistically interact with each other, making them more difficult to remove using routine cleaning and disinfection protocols. Most research up to now has been conducted on single species biofilms, which, does not reflect the reality of these multi-species communities. In a Marie Sklodowska Curie post-doc fellowship, we investigated interspecies interactions between different bacteria isolated from different food industries. This allowed us to find out which combination of species play an important role in biofilm formation and how these species interact with each other.

contact: koen.dereu@ilvo.vlaanderen.be
marc.heyndrickx@ilvo.vlaanderen.be

THIS PROJECT HAS RECEIVED FUNDING FROM THE **EUROPEAN UNION' HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME** UNDER THE MARIE SKLODOWSKA-CURIE GRANT AGREEMENT N. 101025683

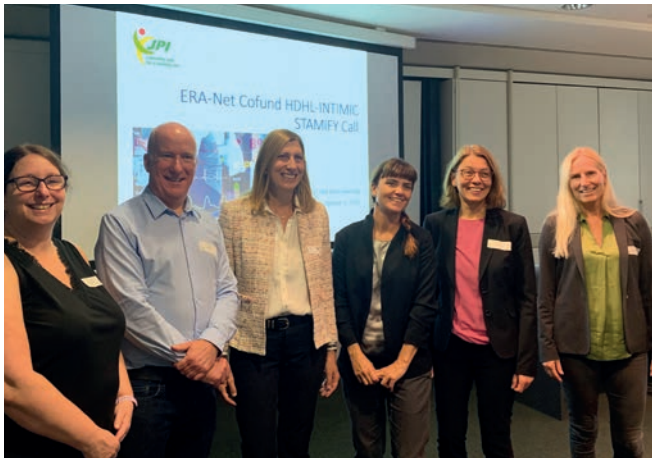
RESULT

Pig models of intestinal health, digestibility and intestinal wall integrity in humans

ILVO has developed pig models to investigate the interaction between nutrition and the important processes in the gut. These models can be used in research on food and food components that either disturb or promote intestinal health and intestinal wall integrity, as well as for the evaluation of new food products. For this purpose, several different methods were optimized to determine digestion, intestinal barrier function and inflammatory responses in pigs and mini-pigs. The pig, and especially the mini-pig, is a relevant model for humans in terms of nutritional requirements, dietary habits and functioning of the gastrointestinal system.
By quantifying the digestibility of new protein sources in the small intestine of mini-pigs, ILVO contributes to the development of new protein-rich food products with high nutritional value. This research is highly relevant in the context of protein diversification, which involves the search for quality food that can meet the growing protein needs of the human population. In addition, several methods were developed to assess intestinal wall health in pigs, with a focus on intestinal wall integrity and inflammatory responses. A loss of intestinal wall integrity means an uninhibited uptake of unwanted components from the intestinal contents, which can lead to chronic inflammatory responses. This occurs in several chronic, non-communicable human conditions such as inflammatory bowel disease, diabetes and obesity.

contact: evelien.vanrymenant@ilvo.vlaanderen.be

RESULT



European network investigates prevention of chronic intestinal flora-related diseases

In the H2020 ERA-Net Cofund HDHL-INTIMIC research network that ran through HDHL (Healthy Diet for a Healthy Life initiative), 14 European partners from 9 member states streamlined knowledge and jointly funded European research related to nutrients that can affect gut flora and consequently human health. The ultimate goal is to pursue a healthy gut flora for all. This network contributed to a coordinated research program around the triptych of nutrition, intestinal microbiome, and health. The research projects carried out increased the fundamental knowledge about the intestinal microbiome and its relationship with health, about the impact of nutritional components and about strategies for preventive and therapeutic applications. The "Intestinal Microbiomics" was knowledge platform also established within the framework of this network. ILVO's role was to guide some research calls, distribute background information, organize seminars and communicate the research results to stakeholders.

contact: nikki.declercq@ilvo.vlaanderen.be
hendrik.deruyck@ilvo.vlaanderen.be

HDHL healthy diet healthy life

Horizon2020 European Union Funding for Research & Innovation

RESULT

Operator 4.0: digitalization at work – impact and opportunities for supporting operators in the food industry

Digitalization is gaining momentum in the food industry. This brings with it all kinds of challenges. For example, digital transformation goes hand in hand with a so-called skills revolution. Skills are shifting and the combination between soft skills and digital know-how is becoming central. Operator 4.0, a collective research, development and dissemination project type of COOCK, focused on two crucial questions: What is the impact of digitalization on the job content and well-being of operators in the workplace? And how can we use digital tools to help short-skilled workers function optimally in an increasingly complex production environment? The goal was to inspire companies and provide methods to take the human factor into account in their digitalization journey.

contact: karen.verstraete@ilvo.vlaanderen.be

RESULT

Demonstration of intelligent decision support for pandemic crisis prediction and management within and across European borders

The Horizon 2020 project STAMINA aimed to develop lab and software tools that can support (crisis) policy around an outbreak of a pandemic. The focus was on influenza, covid-19 and foodborne pathogens such as antibiotic-resistant E. coli (ESBL). The tools are useful in both prediction and management of pandemics, both regionally and beyond EU borders. There are four main fields of application:
1) "real time web and social media analytics" that can monitor social trust and potential outbreaks,
2) prediction of pandemic outbreak and impact coupled with decision tools around optimally implementing mitigation strategies,
3) an early warning system and a "scenario generation tool" for training purposes and
4) 'smart wearables' and wearable 'point-of-care' testing devices for first-line screening. ILVO's responsibilities included optimizing and testing wearable PCR and LAMP tools for rapid detection of ESBL E. coli in food and environmental samples.

contact: ellen.lambrecht@ilvo.vlaanderen.be

Horizon2020
European Union Funding
for Research & Innovation

NRL (NATIONAL REFERENCE LABORATORY) OPERATIONS

As part of the NRL operation on toxins, two new methods were developed and brought into accreditation. The first method involves the determination of monacolin K in dietary supplements. These dietary supplements are used by consumers to lower cholesterol levels. The new method will enable ILVO to check the supplements for their safety in the context of new legislation that sets a maximum daily intake level.

The second method involves the determination of amygdalin and prunasin in almonds and apricot pits. Amygdalin and prunasin can be converted to hydrogen cyanide (HCN) which can be toxic at high concentrations. The new method can be used to determine amygdalin and prunasin and calculate the total HCN content via a conversion factor, ensuring consumer safety.

The pre-existing method for the determination of pyrrolizidine alkaloids (PAs) in tea and herbs was extended to food supplements and pollen grains. Pyrrolizidine alkaloids are toxic secondary metabolites mainly found in plants of the family of Asteraceae (genus Senecio and Eupatorium), Boraginaceae (including genus Heliotropium) and Fabaceae (genus Crotalaria). About 600 different PAs are described in the literature. The PA composition of plants is quite variable, depending on the plant species, chemotype, growth stage and environmental factors. Plants containing PAs may be present as contaminants in all types of plant-based foods and feeds, including herbs and herbal and livestock feed supplements as well as in grains of pollen. Maximum levels have been set for PAs at the European level to protect consumers. ILVO therefore now has a method that allows tea, herbs, food supplements and pollen grains to be analyzed for their safety regarding the presence of PAs.

The NRL for GMOs also continued to focus on food safety. Specifically, 10 new qPCR methods for monitoring the presence of genetically modified microorganisms (GMMs) in food and feed additives were accredited and approved by FASFC. In terms of formulations, new genomic techniques (NGTs) such as CRISPR-Cas applications, among others, took center stage in 2023. Both at national and EU level (EURL for GMOs), NGTs are high on the agenda.

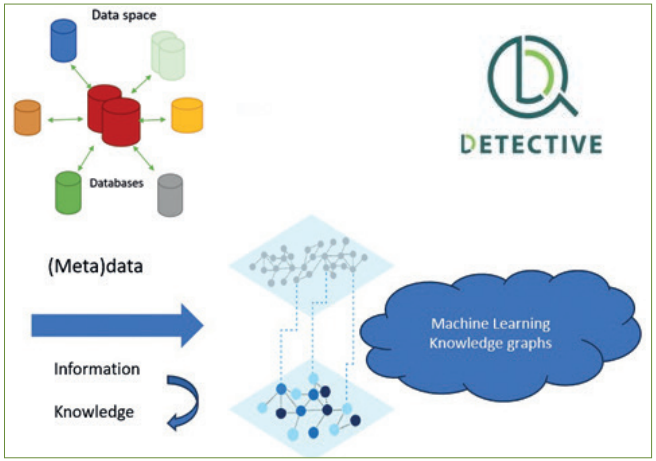
contact: els.daeseleire@ilvo.vlaanderen.be
isabel.taverniers@ilvo.vlaanderen.be

NEW

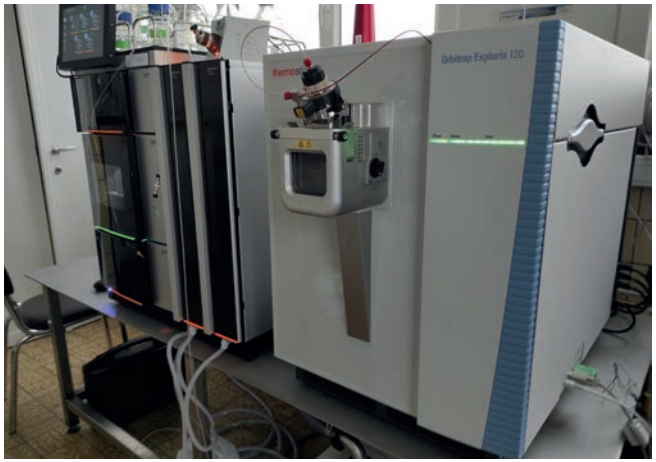
Detection, tracking and transparency of New Genomic Technique (NGT) products to promote innovation in Europe

NGTs play a crucial role in innovation in plant breeding and therefore tie in closely with the broader goals of the Green Deal and Farm to Fork Strategy. New regulations on the use of NGTs are currently being negotiated at the European level, with Flanders being an interested party and already involved in this discussion via the SOIA and CCIM consultations. As the National Reference Laboratory for genetically modified organisms, ILVO is active in this context on a daily basis. The outcomes regarding NGTs will have direct enforcement implications. Therefore, ILVO strives for a cost-effective, proportionate and realistic approach. Recent developments in the NGT research domain, e.g. from the EU GeneBEcon project, will be captured to contribute to a science-based framework for proper implementation with a broad societal interest in mind. Within DETECTIVE, we will specifically investigate how a data-driven approach, either complemented by laboratory analyses or not, can contribute to effective enforcement.

contact: isabel.taverniers@ilvo.vlaanderen.be



NEW



Non-targeted detection of allergens and other impurities in microbial fermentation products

Products of microbial fermentation products are frequently consumed, e.g. as dietary supplements. Consequently, their purity is extremely important, especially when they are ingested in their pure form. Currently, the industry is responsible for the quality of these commercialized fermentation products, but recently there have been reports of the risk of the presence of several unexpected impurities such as genetically modified microorganisms and allergens in such products. Current controls only allow for targeted searches for specific impurities. Moreover, controls are often time-consuming because of the various methods, techniques and expertise required. In ENSURED (FPS public health), we aim for a universal open strategy that detects various impurities in microbial fermentation products at once.

contact: christof.vanpoucke@ilvo.vlaanderen.be

NEW

Allerlist assesses allergenicity of new plant and alternative protein sources

As our consumption pattern of plant-based foods and the introduction of new plant-based protein sources changes, along with consumption of protein sources such as insects and algae, new food allergens may be introduced into our diet. This also increases the risk to the allergen consumer. Therefore, it is important to assess the allergenicity of these new proteins. The main goal of the Allerlist project is to develop a proof-of-principle approach to facilitate the assessment of whether new food ingredients should be added to the list of 14 ingredients for which labeling is mandatory. This approach is based on the construction of databases containing both results from in silico evaluations and experimental laboratory work..

contact: christof.vanpoucke@ilvo.vlaanderen.be


L76
L72

Services 2023

Plant & Soil Living Lab

as partner

for co-creation

and knowledge exchange

We are a platform for...

...open innovation and co-creation to facilitate collaboration between actors in the agri-food and ornamental horticulture sectors. We want to use the knowledge present in all parties for effective innovation. We use our extensive expertise and unique research infrastructure, which expanded further in 2023 with the Post Harvest Pilot and the HYDRAS infrastructure.

Whether you contact us with a small question or an ambitious research idea, we always strive for targeted flow of the knowledge present in our experts. Confidentiality is assured at all times. We are ready to be your partner in research!

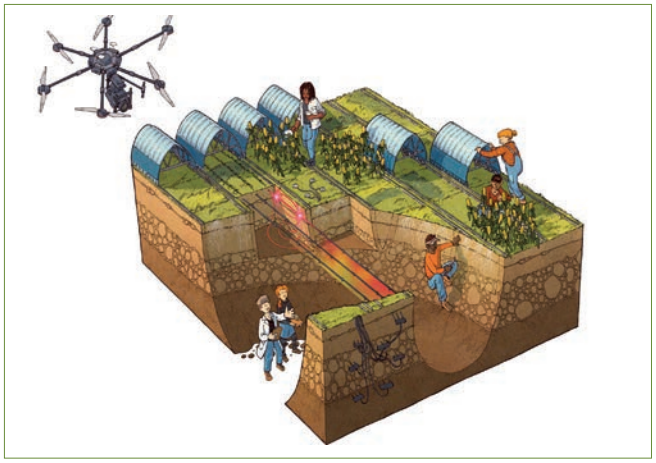
More info: www.livinglabplantbodem.be/en/

contact: livinglabplantbodem@ilvo.vlaanderen.be

Post Harvest Pilot

With our Post Harvest Pilot, we continue to build an innovation hub for harvesting, drying, cleaning and storing seeds, seeds/grains and various types of biomass streams. The focus is on food and non-food applications, in the context of a circular bioeconomy. We have three overall goals:
1) boost breeding programs and the cultivation of new crops, e.g., quinoa or chickpea;
2) doptimize the processing of locally grown crops (both organic and conventional) such as deder or horseradish; and
3) strive for the optimal valorization of by-products such as vegetable residues in innovative bio-economic applications.
To this end, we are setting up an open access infrastructure in which co-creation between private actors and knowledge institutions takes central place.

contact: livinglabplantbodem@ilvo.vlaanderen.be



HYDRAS

HYdrology, Drones & RAinout Shelters. This phenotyping facility for field research under drought-controlled conditions is a unique state-of-the-art research infrastructure, the first in the world. HYDRAS has the capability of both above- and below-ground phenotyping. This enables understanding of plant responses to drought in a realistic growing environment. HYDRAS is accessible to research institutions and companies through an open access model. Do you have questions about using the infrastructure or are you interested in a collaborative project? We are at your service!

More info: www.hydras.be

contact: hydras@ilvo.vlaanderen.be

Laboratory analyses Plant, Soil and Substrate

Our BELAC-accredited physicochemical lab performs chemical analyses on plant material, mineral soils, cultivation substrates and soil conditioners. The lab is also recognized by the Flemish Government for soil analyses within the framework of the fertilization decree. However, no fertilization recommendations are provided. Besides chemical analyses, rapid measurement with near infrared spectroscopy (NIRS) is also possible for many parameters; this application is now also possible for cultivation substrates and compost. In 2023, almost 14,000 samples were analyzed by the lab. ILVO researchers can come to the lab for analyses in the context of research projects or general operation, but in addition a part of the analyses (6%) is also requested by external parties. Don't hesitate to contact us!

More info: https://ilvo.vlaanderen.be/en/lab-analyses-plant-soil-substrate

contact: fien.amery@ilvo.vlaanderen.be

One of our realizations: participatory local hop breeding

Belgian hop growers are in need of new varieties suitable for local conditions. In 2017 within the HopBel project, ILVO started making the first crosses. The seed of the successful crosses was assessed for disease resistance by Vives Hogeschool. Finally, Inagro sorted the male and female offspring and did a first assessment of the seedlings. Currently, the first selections have already been evaluated under field conditions at a number of growers for 2 seasons.

'New hop varieties are necessary to preserve hop growing in Belgium. Through the HopBel consortium, the first steps have been taken and we are looking forward to the first harvests of the candidate varieties,' says Joris Cambie, hop grower in Poperinge.

Some of the new varieties will be evaluated by breweries for the first time in Hopbel2.0.

contact: livinglabplantbodem@ilvo.vlaanderen.be

Plant & Soil Living Lab: international reach

Our operation is not limited to cooperation within Flanders, but also extends far beyond our national borders. We received several requests for cooperation from other EU countries in 2023, even from stakeholders on other continents. A good example of this international cooperation is the visit in September of the Swedish Farmers' Union (LRF Trädgård) together with a delegation of 20 tree growers. They have limited opportunities in their own country to conduct applied research together and came here to see how we make that possible for our farmers and growers. The necessary avenues are now being considered for future collaborative projects with ILVO and our Living Lab.

contact: livinglabplantbodem@ilvo.vlaanderen.be

Livestock Living Lab

as a partner for co-creation and knowledge exchange

The Livestock Living Lab is your partner...

...for co-creation, innovation and research within the pig, small farm animal and cattle sectors. If you come from agribusiness, livestock farming, government, sector organization, research and educational institution, or are an interested citizen or consumer our open platform is available. Work out your ideas and identify ways to improve through knowledge exchange and performing experiments using our infrastructure. Together we work on customized solutions. Our up-to-date expertise, extensive research infrastructure and wide network of partners are available for you. The infrastructure for cattle, pigs and small stock, our labs and feed mill can be used for scientific research into feed evaluation and formulation, emissions, climate, animal welfare, behavior and health, animal performance and product quality, and the like. On the research and teaching stable Varkenscampus (ILVO, UGent and HoGent), 24 PVT panels and two heat pumps were installed in 2023, providing the stable with hot water for the piglets' floor heating, air heating, and hot water.

More info: www.ilvolivinglabveehouderij.be

contact: bart.sonck@ilvo.vlaanderen.be

First aid for heat stress in cows

The recent hot summers have made cattle farmers highly aware of the consequences of heat stress on their animals. The First Aid for Heat Stress in Cows project provided crucial support to Flemish cattle farmers in their choice of appropriate measures to prevent or remedy heat stress.
In this project, Inagro together with ILVO, Hooibeekhoeve and Boerenbond focused on the following themes: Optimal silage and feed management, grazing strategies, fans, misting and roof cooling. Field trials investigated the optimal placement of fans in a barn and also the potential of some feed additives to prevent scalding. An overview of the different techniques to combat heat stress and its consequences was made, including operating and possible investment costs.

contact: leen.vandaele@ilvo.vlaanderen.be

Europees Landbouwfonds voor Plattelandsontwikkeling: Europa investeert in zijn platteland

Opinions of free-range pig farmers on animal welfare

The goal of the European PPILOW project is to maximize the welfare of pigs and poultry in free-range or organic systems. A survey was conducted of 13 Belgian and Dutch free-range pig farmers to find out what they think about animal welfare and how they assess it on their farms. The participating pig farmers attach great importance to animal welfare and its various aspects and rate their own welfare performance positively. Sufficient availability of water and feed and expressing positive behavior were seen as priorities. On-farm water availability, feed availability and sufficient space were scored highest. The survey does show that the theoretical importance of the various animal welfare aspects is rated higher by pig farmers than the actual application on their own farms.
This may indicate that pig farmers either see room for improvement or that it is not always equally feasible to apply theoretical improvements in practice. Another realization of the project is the mobile application PIGLOW, which allows pig farmers in organic and free-range systems to monitor the welfare of their animals themselves.

contact: evelien.graat@ilvo.vlaanderen.be

Fresh beets in the milking robot feeding trough

One of our recent success stories is a working installation that can provide fodder beet or other feedstuffs as bait in the milking robot, as an alternative to concentrates. To realize this, dairy farmer Johan Vanhecke, engineers from Meyland, consultants Liba and Profarm and ILVO researchers worked together in the EIP operational group LOKROB. The advantage of presenting beets is to avoid that end-of-lactation cows put on too much fat, the number of robot visits increases, and a reduction in (concentrate) feed costs as well as the share of pick-up cows. The fodder beet is supplied automatically and is cut as fresh as possible. Dosing is done via a link to the milking robot's software. The beets are provided either as one fixed amount per robot visit or as a set amount per day, spread over the expected number of robot visits. Blockages in the system are detected by a built-in sensor which alerts the farmer of a possible problem. The system is also equipped with a camera to monitor intake and feed residue left behind.

contact: matthieu.frijlink@ilvo.vlaanderen.be

Strong interest in projects on alternative protein sources to imported soybeans

The "Soy-Free Pigs and Chickens" demonstration project examined the possibilities and consequences of a soy-free pig and poultry feed. Three feeding trials were conducted on piglets, fattening pigs and broilers. These showed that the growth performance in piglets and broilers fed a soy-free feed was similar to that of a conventional practical feed, but broilers fed a soy-free feed performed worse. The soy-free feed was more expensive, the slaughter yield in the pigs was lower, and the broilers achieved lower final weights. Livestock producers will therefore need additional compensation to offset these additional costs. The climate advantage of soy-free feed is considerable, however, which is not unimportant in a sustainable livestock industry with an increasing focus on its ecological footprint, among other things. Within the demo project, interviews also probed for possible drivers for implementing a feed mix on the farm, as well as the factors that facilitate or hinder this conversion. Given the great interest in this project, full efforts were made to disseminate the results through various popularized articles and presentations.

contact: marta.lourenco@ilvo.vlaanderen.be

Laboratory analyses of animal feed and animal-based (finished) products

The BELAC-accredited lab ANIMALAB performs chemical analyses on feed and animal (end) products such as bones, feces and urine but also eggs, meat and milk. This year more than 19,000 analyses were performed on these various matrices. These analyses are performed both at the request of ILVO researchers in the context of research projects or general operations, as well as at the request of external parties (40%) to determine the feed value of animal feeds for example. So do not hesitate to contact us if you have questions about feed evaluation or the quality/ composition of animal (finished) products!

More info:
https://ilvo.vlaanderen.be/en/animal-related-analyses-animalab

contact: dorien.vanwesemael@ilvo.vlaanderen.be

Marine Living Lab

via co-creation

towards sustainable blue innovation

The Marine Living Lab stands ...

...for sustainable blue innovation for and together with all actors active on and around the sea, particularly fisheries and aquaculture, including processing, retail and food quality, and (bio-)technology companies interested in the exploitation of known and unknown aquatic molecules (blue biotech), sand extraction, dredgers, wind energy, coastal protection and other actors linked to impact reduction, marine spatial planning and nature conservation. Concrete questions from these sectors are picked up and, together with suitable partners, developed into a customized solution or project. For this purpose, the living lab has expertise, a broad network and specialized labs, new aquaculture facilities and a net hall called 'Loods 33'.

More info: www.ilvomarienlivinglab.be/en/

contact: marienlivinglab@ilvo.vlaanderen.be

Shed 33 as workshop and meeting center for fishermen and scientists

Through LOODS 33, ILVO supports the sector together and in a hands-on/from practice way to optimize their fishing gear. The aim is to allow scientists and fishermen as well as fishermen among themselves to meet, consult, brainstorm and work on innovative gear designs, in addition to routine work in the context of scientific fisheries projects. This working and meeting place is located at Eduard Anseelekaai 33 in Ostend amidst the warehouses of Belgian shipping companies. An 'open door policy' is used to keep the threshold for fishermen as low as possible. Research and co-creation focuses on various aspects of the fishing process, such as the development of new fishing gear, improving the species- and length-selective properties of existing gear, alternative fishing techniques, reducing fuel consumption and reducing the environmental impact of fishing activities.

contact: els.vanderperren@ilvo.vlaanderen.be

LED There Be Light

'LED there be light' was an ambitious, collective project involving close cooperation with Belgian fishermen. The effect of light on catch composition was tested for several fishing techniques. Different light sources were designed and/or optimized to improve usability and robustness, especially for application in the plate and flyshoot fishery for squid. In the passive pot fishery for North Sea crab, we learned that white light could increase catches and that blue light was more likely to have a negative effect.
In the beam trawl - the technique most commonly used by Belgian vessels - light was tested in separation panels, on the beam and in a panel in the belly of the net (BRP). With the LED BRP, we succeeded in freeing up to 40 percent undersized plaice, without losing size plaice and sole. The project also allowed us to work with Marelec on a whole new system to sort out bycatch underwater. Funding is currently being sought to continue this collaboration.

contact: mattias.vanopstal@ilvo.vlaanderen.be

ILVO Loods 33

Europees Fonds voor Maritieme Zaken en Visserij

Consulting services to start-up and established Aquaculture companies

ILVO often receives questions about aquaculture from the Flemish Aqua Infoloket. But with the start of the ILVO Marine Living Lab, more people are finding their way directly to ILVO, even when it's not about marine aquaculture. In some cases it is an exploratory talk. These introductory talks sometimes lead to more concrete ideas for the start-up of a culture or a project. If necessary, ILVO then looks for the necessary partners with complementary knowledge.
For example, we received a request from the Netherlands to help solve some of the stumbling blocks the grower had with growing turbot. The problems were tackled in phases and an appropriate solution was sought each time. A poster was also made with an overview of the complete development of the turbot, what morphological changes are happening and how to anticipate them. The grower was pleased with these solutions.
But sometimes the questions or requests are very simple. For example, at the end of last year we received a question from the company Fishway as to whether it would be possible to obtain fresh fish (preferably live). From this, cells would be extracted to do cell culture, which would eventually make it possible to grow fish fillets in a petri dish.

contact: daan.delbaere@ilvo.vlaanderen.be

VISIM – Improving Data Collection through image analysis and AI

The VISIM II project aims to improve data collection for fish stock estimates, primarily to address the lack of data for less common fish species. This is made possible by using advanced machine vision and deep learning techniques to collect and process both species and length data. A central aspect of the project is the development of an autonomous system capable of processing this data in real time. Currently, the plug-and-play camera system can collect images autonomously and can already recognize 19 different commercial fish species. This system not only offers scientific benefits, but can also be very valuable to the fisherman and ship owner. By providing real-time insights into catch composition, fishermen can optimize their operational decisions while fishing. Although the integration of this system within the Vistools framework is not currently complete, it is on the agenda as a future development. This integration could provide valuable metadata for valorizing catch data and enable further optimization of fishing practices.

contact: sander.delacauw@ilvo.vlaanderen.be

Sustainability Assessments of fishing and Aquaculture products for Retailers and suppliers

At the request of retailers and suppliers, ILVO gives advice on the sustainability of fishery and aquaculture products. Sustainability assessments are also made for specific products. For example, for wild catches, a sheet is prepared that determines the ecological sustainability of the fish species, based on the biological characteristic of the species, the ecological effects of the fishing activity and the management of the species in the assessed area. As in previous years, there was intensive cooperation between ILVO and some larger retailers such as Colruyt and Delhaize in 2023.
Every year ILVO advises the VLAM in choosing the "Fish of the Year." In 2023 this was megrims. The megrims stocks are healthy, the quotas are respected and the share of more sustainable fishing techniques is increasing, thus there appears to be no danger of overfishing of megrims by Belgian fishermen. From a scientific point of view, ILVO therefore supported the choice of megrims as "Fish of the Year 2023.

contact: heleen.lenoir@ilvo.vlaanderen.be

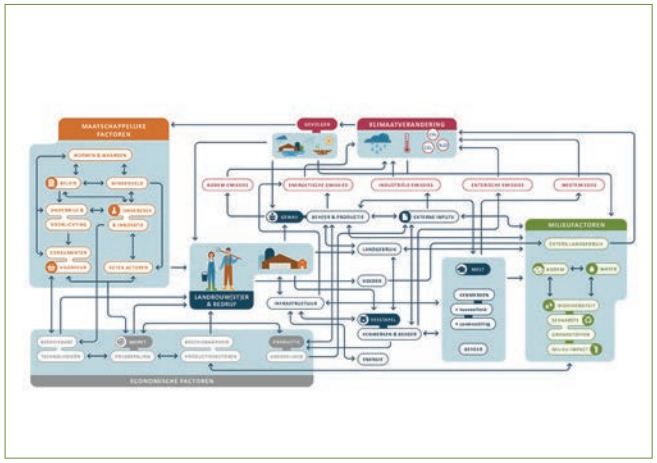
Center of Expertise for Agriculture & Climate

The center of expertise for Agriculture & Climate...
...ILVO-ELK, was created in late 2016 to take on a supporting and advisory role with respect to agricultural policy and the broader agricultural sector. ILVO-ELK brings together the diverse climate knowledge at ILVO, identifies gaps and initiates new research where necessary. It closely follows international evolutions in the field of agricultural and climate research and can therefore place the Flemish situation in a European and global perspective.

You can read more about ELK's research themes in the Climate Smart Food theme. Here we give two concrete examples of how ELK stimulates multi-disciplinary work, encouraging researchers to look beyond their own research topic. We join in working groups to think about agriculture as a system, with all its facets and linked parameters. We also organize visits to other research groups, in order to take a look at a lesser-known research topic.

More info: https://elk.ilvo.vlaanderen.be/en/

contact: elk@ilvo.vlaanderen.be



Systems thinking exercises: what influences what in the field of climate mitigation and adaptation?

To capture the complex relationship between mitigation, adaptation and overall sustainability, a systems thinking exercise was initiated within ELK. Several experts from different research themes put their heads together and worked out these systems, using their own expertise and that of colleagues. This systems thinking exercise allowed us to test whether climate measures are really climate smart; climate measures that achieve only one objective but get in the way of another are out of the question. In addition, global processes do not stop at national borders; indirect influences and impacts also often come into play. These "problem shifts" must be taken into account when proposing climate measures. Finally, measures are always framed within a local socioeconomic and policy context. Their success depends on the legal framework, socioeconomic feasibility, values and norms in society, etc. Systems thinking allows the ELK to take into account the context and consequences of certain management choices or measures and also to be mindful of problem shifts.

The main subsystems that matter in agricultural and climate issues are:

- the farmer(s) and the farm
- climate change and its consequences
- social factors
- economic factors
- environmental factors

In this exercise, we put the farmer's choices and how they relate to the different emission sources (emissions from fertilizer, enteric processes, energy, soil and industry) at the center of the exercise. For example, we see that within the climate mitigation theme, the choice of the FARM will have a major impact on (i) ENTERIC EMISSIONS as well as an impact on (ii) FERTILIZED EMISSIONS through the MANURE from these animals. Both are closely related to the CHARACTERISTICS and MANAGEMENT of livestock. In turn, herd management and manure management are related to the choice of housing system and INFRASTRUCTURE; these require ENERGY e.g. for lighting, ventilation, emission control (air purification), mechanization. In turn, this leads to a certain amount of ENERGETIC emissions. If the manure is applied on the farm and incorporated into the SOIL, it benefits the CROP PRODUCTION as a fertilizer. There may be enrichment of C in the soil. However, applying manure (organic and mineral) may also release more SOIL EMISSIONS including N2 O (due to increased mineral N content). Etc. etc...

These systems thinking exercises give a better picture of all aspects that matter in climate mitigation and climate adaptation. They help us as researchers think more broadly than the specific research topics we work on individually. In this way, we help agriculture as a whole move forward with all climate issues.

contact: jonas.vandicke@ilvo.vlaanderen.be

How climate change breeding affects work at ILVO – an eyewitness report of an active ELK info session

Participants in the ELK Discussion were in luck. On April 25, there was not only Mathias Cougnon's fascinating contribution on breeding. It was also a rare sunny spring day! Ideal for a bike ride along the trial fields and greenhouses, where ILVO breeds grasses, clovers, but also chicory, quinoa or narrow plantain.

Breeding requires patience, a lot of patience. It takes an average of ten years to finish a new variety. It started 90 years ago at ILVO with the breeding of forage grasses and clovers. In the early years, the focus was on increasing yield, persistence and disease resistance. In recent decades, traits such as feed value and drought tolerance have become more important. Breeding also requires knowledge, a lot of knowledge. And so Mathias explained the difference between tetraploid and diploid varieties. Did you know that the tetraploid version of narrow plantain – oh irony - has wide leaves? Wisdom never to be forgotten: Yield trials are essential in any breeding research.

'Drought and heat can cause crops to fail. That's why at ILVO we concentrate on breeding drought-tolerant varieties. These are resilient plants that recover quickly after a period of drought. How quickly can a grass species recover after it has turned red because of intense drought?' Mathias Cougnon - plant breeder and grassland researcher.

And so ILVO is researching drought-resistant (mixed) crops with grasses such as reed fescue, white and red clover or grassland herbs such as narrow plantain. These can all serve as animal feed. In the early years, ILVO was mainly known for breeding English and Italian ryegrass. For human consumption, we at ILVO have been betting on dividing quinoa and chickpea for 2 years. To select varieties with better drought tolerance, we have high-tech infrastructure such as rain-out shelters and tools such as drones.

''Thanks to yield measurements via drones, we gain space and potentially 4 times less land area is needed for yield trials.' Mathias Cougnon - plant breeder and grassland researcher.

The focus of ILVO researchers is also on mitigation effects: How can we reduce emissions of greenhouse gases such as methane? Because: Sustainable grassland exploitation promotes soil carbon storage, limits (nitrogen) fertilization and increases digestibility (giving rise to less enteric methane). Along the way, we deviated from the calibrated path and rode between the experimental fields like accomplished cyclocross bikers. Reed fescue and ryegrass lay neatly mowed side by side. We felt the stiff reed fescue and the deliciously tender ryegrass and nodded approvingly when Mathias told us that cows choose the latter, if they have a choice. A little further on, Ann-Sophie was full of admiration for the "clean clover" in our experimental fields. The skylark saw high in the sky that it was good.

contact: mathias.cougnon@ilvo.vlaanderen.be

Living Lab agroecology and organic farming as partners for co-creation and knowledge exchange

Mission...
...Since 2020, the Living Lab Agroecology and Organic Agriculture connects organizations and individuals who want to commit to the further development of agroecology and organic agriculture in Flanders. LLAEBIO is a network with a wide range of experts from different disciplines, who together can shape a question or idea. Together we study the challenges for agroecology and organic agriculture in Flanders and, if necessary, work out a research project.

More info: www.llaebio.be

contact: llaebio@ilvo.vlaanderen.be

Created by Solikin from the Noun Project

LLAEBIO looks ahead Setting 2023 priorities together

The 2023 schedule was set together with 25 interested parties. The participants selected priorities and an overarching theme for knowledge-sharing and research activities on agroecology and organic farming.
It became a neck-and-neck race between two themes, but in the end we decided to make "cooperation throughout the chain in function of a fair price" the annual theme for 2023. The activities around this theme are being developed by the LLAEBIO core team within ILVO, together with BioForum, CCBT and Voedsel Anders.

contact: llaebio@ilvo.vlaanderen.be

System exercise From short-chain challenges to opportunities for collaboration

Together with 40 experts and interested parties, we took a closer look at cooperation in short chains. We started from social trends and analyzed their impact on short chain operation. Guiding questions were "What opportunities are there for cooperation in the short chain, and what challenges does it bring? What innovations can further support cooperation?"
We drew inspiration from research by Philippe Baret (UCL) on criteria for fair pricing and by Maarten Crivits (ILVO) on patterns of thinking that influence cooperation and on the crucial role that local governments and knowledge institutions play in establishing local partnerships.

contact: llaebio@ilvo.vlaanderen.be

Networking for research
Mogelijkheden tot onderzoeksprojecten verkennen

On June 1, we organized our first research networking event. In total, 55 participants signed present for an explanation of potential research programs for agroecology and organic agriculture. Several speakers explained the opportunities for project funding through the Horizon Europe research program, the European Partnerships for Innovation, the Flemish food strategy and the VLAIO research programs. This was followed by an exchange of project ideas around various themes, such as soil, chain cooperation, setting up new chains and animal production. These workshops were the first step in further development of some project proposals on dürum wheat, pit pumpkins and soil health.

contact: llaebio@ilvo.vlaanderen.be

Company visits

Some 20 participants visited three initiatives centered on collaboration throughout the chain during two field trips. The initiatives visited were The Barn, the Ceinture Aliment-Terre Liègeoise (CATL) and Cultivaé. All of these initiatives aim to use partnerships to make sustainable, healthy and locally produced food more accessible to consumers. At the same time, much attention is also being paid to farmer autonomy by creating communication channels and agreement frameworks through which farmers can have a say in price and volumes.
The first initiative was initiated by two motivated entrepreneurs who want to generate as much positive, social impact as possible. They do this by granting one farmer per convenience store various benefits such as a premium price, investment support and a say in the planning. The CATL demonstrates how provinces, cities and towns can encourage farmers to join together in cooperatives with maximum participation in pricing. In addition, the CATL is committed to supplying the industrial kitchens in public schools, hospitals and nursing homes with local and sustainable food.
The Cultivaé cooperative provides farmers with small-scale infrastructure for processing and selling grain. In addition, they promote the adoption of sustainable agricultural practices by guiding and compensating them through a set of specifications. They do this in close collaboration with Soil Capital and Regenacterre.

contact: llaebio@ilvo.vlaanderen.be

LIVING LAB
AGRO-ECOLOGIE & BIOLOGISCHE LANDBOUW

Concluding publications

In 2024, we will complete the theme "cooperation throughout the chain as a function of a fair price" with two publications: A brochure for the sector and a policy paper for the government.

contact: llaebio@ilvo.vlaanderen.be

Living Lab Agrifood Technology

as a partner for co-creation and knowledge exchange

At the Living Lab Agrifood Technology...

...you can get support in developing technological innovations for various agri-food processes. We help your company develop from idea to design or prototype that offers a solution to a concrete challenge in practice. Within the developments the focus is on integration of the most state-of-the-art technologies in sensor technology, data processing and robotics around a number of current themes such as precision treatments via agricultural robots and drones.

The goal is to conduct practice-oriented research with a focus on improving efficiency and sustainability. By working together with various stakeholders (co-creation), we strive for solutions that are not only scientifically based, but also practically applicable and economically viable. In doing so, we rely on our multidisciplinary expertise, up-to-date infrastructure and extensive network. To strive for practice-relevant solutions in the most efficient way possible, we use an agile development process, in which successive cycles of design, realization and field testing succeed each other in successive cycles.

More info: https://www.agrifoodtechnology.be/
or info@agrifoodtechnology.be.
Follow us on social media, on X or LinkedIn.

contact: simon.cool@ilvo.vlaanderen.be

Launch of AgrifoodTEF project (open test and experimentation facility)

Our food supply faces major challenges. The world's population is growing while agricultural land is becoming scarcer. At the same time, we need to reduce the impact of agriculture on the environment. Innovation is crucial to address these challenges. Artificial intelligence (AI) and robotics offer enormous potential benefits for agriculture. AI can help optimize crop production, control pests and diseases, and use water and fertilizers more efficiently. Robotics can automate tasks, thereby increasing labor efficiency while also reducing climate impact.
This is why Flanders and Europe are investing in the future of agriculture with the establishment of AgrifoodTEF, the Flemish Test and Experiment Facility for robotics and AI at ILVO. This unique facility, offers a realistic agricultural environment where companies can test and validate their innovative ideas with AI and robotics, and thus get them to the market faster.

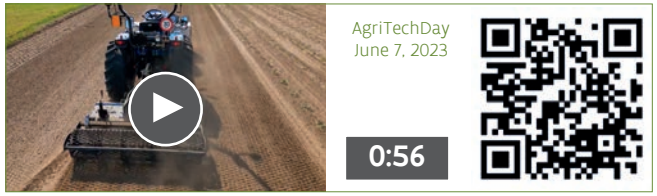
More info: www.agrifoodtefvlaanderen.be

contact: marijke.hunninck@ilvo.vlaanderen.be

AgriTechDag

On June 7, 2023 our annual AgriTECH day took place at ILVO, this year we combined this demonstration event for new technologies with the launch of the Flemish Test and Experiment Facility, AgrifoodTEF. During the event, a series of prototypes developed within the Living Lab over the past year were demonstrated in action to our Minister of Agriculture, the press and a wide audience of industry stakeholders. For example, we presented the Djust-E, the very first automatic, electric tractor in Flanders developed together with Verschueren BVBA and Linak. In addition, a planting machine from Lauwers equipped with RTK-GPS and a prototype precision hoe developed together with Vanhoucke Engineering were also shown in operation.

contact: info@agrifoodtechnology.be



Farm Equipment Days

On Saturday September 24 and Sunday September 25 the "machinery days", one of the largest open-air fairs in the Benelux for agricultural mechanization and agricultural technology, took place in Oudenaarde. Two developments from the living lab were demonstrated to the general public: The electric autonomous tractor Djust-E was equipped with a modified precision sprayer from Beyne, to perform a site-specific treatment of potato storage in a grass field based on a task map from drone images. An intelligent Energy Storage System (ESS) was also demonstrated, to charge, store and transport electric robots and tractors off-grid via batteries and solar panels in a climate-neutral way.

contact: simon.cool@ilvo.vlaanderen.be

Robotics island at Agribex

On December 6 to 10, the specialized agricultural fair Agribex took place at Brussels Expo. Together with Fedagrim, FIRA and a number of partners, a robotics island was organized, specifically applied to innovative mechatronic solutions for arable and outdoor vegetable farming. A series of new robotics solutions and technological developments were presented. In addition, a series of panel discussions delved deeper into a number of topics related to the introduction of robotics for agricultural applications: Challenges and opportunities, impact on profitability and sustainability, safety and good agricultural practices.

More info panel talks: Robotisering | Agribex

contact: simon.cool@ilvo.vlaanderen.be

ILVO and Kanaal Z create ten-part TV series on artificial intelligence and robotics in agrifood

For the occasion of the launch of AgrifoodTEF, ILVO, in collaboration with Kanaal Z and Trends.be, portrayed the operation and services of the AgrifoodTEF. Under the name Z-Agrifood, 10 television episodes of 4 to 5 minutes each on AI and robotics were broadcast.

More info: https://ilvo.vlaanderen.be/nl/nieuws/z-agrifood

contact: greet.riebbels@ilvo.vlaanderen.be

Living Lab
Food Pilot

For companies big and small

The Food Pilot in Melle is ready to help you with development of new products, upscaling of processes, and more. We provide guidance to companies big and small, with trust and confidentiality are at the heart of our approach. More than 90 food processing machines, accredited labs and consultants are at your disposal. Food Pilot is an initiative of ILVO and Flanders' FOOD.

Need advice?

Food Pilot also stands for technological advice, free and without obligation. About 200 companies use it every year. Would you like advice before purchasing a new processing machine? Or advice on ingredients and recipe development, process optimization, or info for the label? Or are you looking for help in getting to the bottom of a quality problem? We bring the appropriate expert to the table.

In 2023, 260 technology consultations were provided. These are intake interviews where the question is analyzed, advice is provided with possible supported by analyses, and an examination of how to approach the issue at hand.

More info: www.foodpilot.be

contact: foodpilot@ilvo.vlaanderen.be

Who uses the Food Pilot?

In 2023, 260 technology consultations were provided. These are intake calls where the question is analyzed, advice is provided, possibly supported by analysis, and a look at how to solve the issue.
In addition, 707 pilot tests were conducted for 98 clients. Of the 98 principals of pilot tests in 2023, the following were 35 new contacts. 66 clients were industrial companies, of which 43 were Belgian and 23 foreign, and 50% were SMEs. In addition, there were pilot tests for 7 agricultural companies, 2 of which were Belgian and 5 Dutch. Nine were knowledge institutions or companies. Finally, 19 assignments were in the framework of (international) projects.
The largest share of pilot tests were in alternative protein sources (26%), valorization of residual flows (11%), vegetable processing (10%), ingredient development and applications (10%), dairy analogues (9%), dairy processing (9%) and meat analogues (4%).

contact: karen.verstraete@ilvo.vlaanderen.be

Food Pilot also provides guidance using nutritional analyses

In 2023, about 20,000 food analyses were performed for 190 private companies (food companies, farmers, labs, certification & inspection bodies, consumer organizations, kit producers, pharmaceutical industry, etc.) in the context of product improvement or problem solving. In addition, about 100 different items (ring tests, standards, reference series, control samples,) for quality assurance were created by ILVO for 65 different customers (milk control laboratories, companies, kit producers, scientific institutions, ….)and more. In total, more than 300 companies are thus reached each year.

contact: karen.verstraete@ilvo.vlaanderen.be

Small-scale innovative processing equipment

The pilot-scale equipment at the Food Pilot is well equipped with very versatile equipment to simulate most food operations, including extraction of (new) proteins. In some cases those protein extractions do not yield such large amounts of protein. In other cases, new alternative protein sources in the exploratory phase of primary production also have only very small amounts available on which to perform further testing and analysis. To meet the demands of SMEs to test innovative technologies even with their small amounts of protein-rich raw materials, the ERDF project Innolab specifically invested in small-scale equipment for cutting, grinding, separating, dissolving, homogenizing, drying, heating and shaping protein-rich raw materials. By combining with the other pilot equipment in the Food Pilot, complete processing processes can now be simulated from various protein-rich raw materials into new end products in the subsectors of fruits and vegetables, meat, bakery, dairy, prepared meals, and so on. This project was funded by ERDF and the province of East Flanders and is a collaboration between ILVO and Flanders' FOOD. Analysis of the products is also important. Therefore, the ERDF project Fast-analab invested in analysis equipment that allows mobile analysis to achieve quality and sustainable food. With this analysis equipment we want to support innovations at companies that result in more diverse and sustainable protein rich products. This objective is part of the Flemish Protein Strategy and contributes to the Smart Specialization Strategy of Flanders.

contact: nathalie.bernaert@ilvo.vlaanderen.be

provincie Oost-Vlaanderen

EFRO EUROPEES FONDS VOOR REGIONALE ONTWIKKELING

Europese Unie

Parkinson's patients can enjoy extra culinary delights thanks to custom cookbook 'Feed Your Brain'

Parkinson's patients often struggle with chewing and swallowing problems and even loss of taste and smell but they can enjoy extra culinary delights thanks to the adapted cookbook "Feed your brain" by fellow patient Yves Meersman. Geertrui Vlaemynck talked more about it during a studio interview on AVS.

contact: geertrui.vlaemynck@ilvo.vlaanderen.be

Management 2023

2023 has been another year of growth for ILVO: more projects, more people, more collaborations, more publications, more press coverage, more networking moments with policy people, companies, nonprofit organizations... It therefore makes sense that more energy has also been put into monitoring of processes and of good internal cohesion. 'We continue to retain the character of a well-run family business, with remarkably short lines and flexibility, while simultaneously strengthening and streamlining the processes where necessary to proactively manage risks and to address increasingly complex societal challenges.'

Research coordination and EU group

Record number of research projects

Never before have there been more ongoing research projects: as many as 407 projects! This also explains the higher staff numbers. ILVO has had to recruit aggressively in order to carry out the many and especially larger research projects in which ILVO is involved.
No fewer than 105 new projects were started in 2023. That are almost as many as the record 109 new projects that were started in 2021, after a Covid year with a lot of homework and inspiration.

More research projects, of course, also means more valuable research results, which find their way into the scientific world through publications in scientific journals. In 2023, 147 peer reviewed papers were published from ILVO (co-)authors.

contact: bjorn.posse@ilvo.vlaanderen.be

Top participant in European programs

At the conclusion of the European Horizon 2020 research program, which ran from 2014 to mid-2023, it appears that ILVO was the tenth most important participant from Flanders, and thus 'top participant'. (EWI publication 'Analysis Framework Programs. 2023,' Dec 23). The partners in this Flemish top 10 in Horizon 2020 together accounted for 69.6% of the total EU contribution from Horizon 2020 to Flanders.

For ILVO it concerns 68 projects, accounting for € 22.1M. In the new framework program Horizon Europe (HE), which runs from 2021 to 2027, ILVO is currently ranked 8th in the Flemish list of participants, which totals 946 Flemish knowledge institutions and companies. Since the start, there are already 57 research projects in which ILVO is involved.

ILVO is again submitting a nice success rate in 2023 of 50%. 'We owe that to the commitment and quality of our researchers,' says Cathy Plasman, head of ILVO's EU group. The same trend continues in other programs such as Digital Europe, Interreg (European Regional Development Fund - ERDF) and EFMZVA (European Fund for Maritime Affairs, Fisheries and Aquaculture)

contact: cathy.plasman@ilvo.vlaanderen.be

Marie Sklodowska-Curie postdoc fellowship-program

For the first time ILVO has been able to attract a top scientist with international experience through the Marie Sklodowska-Curie postdoc fellowship program. The research topic was "keystone bacteria" that influence the formation of biofilms. Marc Heyndrickx, ILVO scientific director of food safety: 'In addition to research, this fellowship included training aspects for the foreign postdoctoral researcher, which optimized his career opportunities. The strong collaboration that emerged between research groups from KU Leuven and the University of Copenhagen were a significant added value.'

contact: marc.heyndrickx@ilvo.vlaanderen.be

Three additional Memorandums of Understanding (MOU)

ILVO remains committed to strategic partnerships, based on the realization that complex issues in the research domain require a multidisciplinary and systemic approach, and that a broader view then often helps. In July, TRANSfarm (KU Leuven) and ILVO committed to close collaboration. TRANSfarm is the pilot center for KU Leuven's circular bioeconomy in Lovenjoel, which includes a food lab, a state-of-the-art poultry and piglet research platform, an aquatic unit and some 70 hectares of research fields. 'Scaling up innovations and lab expertise is a shared ambition. A rapid flow of research results to the market and society is indispensable. ILVO has a lot of experience in that area, from which we want to learn,' said Wouter Merckx, director TRANSfarm KU Leuven.
The MOU with Ireland's Teagasc officialized an already long and successful collaboration. Teagasc (Agriculture and Food Development Authority) is the (larger) counterpart of ILVO in Ireland in terms of agricultural and nutritional research. In addition research as well as education and information tasks in their sector. The mutual intention is to intensify knowledge exchange and intensify collaborations.
The Paris ACTA, a network of 19 French agricultural technical Institutes, and ILVO also signed a Memorandum of Understanding. The aim is to streamline the relationship and exchanges with ILVO and individual researchers, engineers and consultants within each institution/network to further encourage shared activities (such as Horizon Europe projects) with a common interest and with mutual benefit. Precision agriculture is a key focus in this MOU.

contact: bjorn.posse@ilvo.vlaanderen.be

Visits

Through direct dialogue with stakeholders, ILVO likes to keep a finger on the pulse of policy, sector and corporate midfield. Some of the working visits:

- Kathleen Helsen, Antwerp delegate for agriculture, and Prov. Department of Agriculture, March 6
- Young colleagues from Agency Agriculture & Marine Fisheries, March 8
- Carina Van Cauter, governor of the province of East Flanders, March 22
- Green Circle main board, March 29
- SICA group (Ambassadors of Belize (co-ordinator), Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua and Panama), March 30
- Minister of the North Sea, Vincent van Quickenborne, May 15
- Agricultural delegation from Benin, in Belgium through their town twinning with Merelbeke, June 6
- Riet Gillis, East Flanders deputy for Environment, Nature and Climate, June 7
- Minister of Agriculture, Economy and Innovation, Jo Brouns, June 26
- Valerie Trouet, Belgian Climate Center, Aug. 31 -Teagasc, Oct. 17
- Maryna Nehrey, Prof. of Agricultural Economics Univ. Kiev, temporarily working at ETH Zurich, November 9
- Dutch-Limburg Agricultural and Horticultural Union (LLTB), November 23
- Vzw Exchange, December 11

contact: communicatie@ilvo.vlaanderen.be

Scientific Integrity

Results of scientific research must be produced correctly: openly, transparently and with integrity. In the past year, ILVO also organized an open dialogue on this internally with all staff members, among others through dilemma training sessions, with supplementary guidelines and by creating a system for capturing internal requests for advice and handling them thoroughly. Because the boundaries between scientific integrity, ethics and more general behavior of integrity are not always productive nor clear, ILVO decided in 2023 to create a unified "Integrity Commission" with renewed procedures and under an external chairmanship.

contact: bjorn.posse@ilvo.vlaanderen.be

Working and human capital

Efficiency

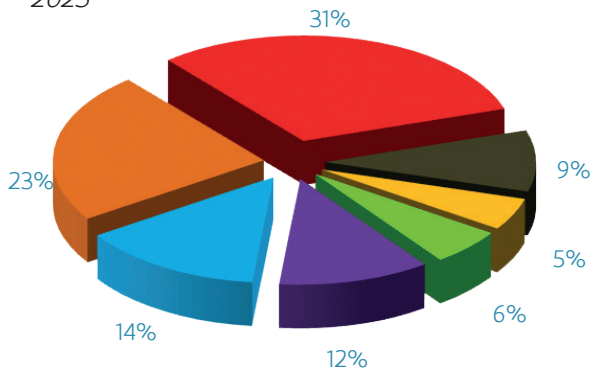
Administratively, ILVO consists of two entities that reinforce each other in a remarkable way: the IVA 'ILVO-VO' (the Internal Independent Agency of the Flemish government – without corporate personality) and 'ILVO-EV' (ILVO's Own Capital fund). These legally-separated entities each have a budget, a staff and governing bodies. Whereas ILVO-VO largely operates through the basic endowment, ILVO-EV acquires resources in a flexible manner through competitive research at home and abroad, paid analyses for companies and paid services.
In 2023, additional time was invested in further automation of the financial processes among other things by the commissioning of in-house developed applications. As a result the financial management of the research projects is now even more efficient. In the first years of ILVO, the ratio of VO to EV was approximately equal. This year, the balance EV/VO is at about 2/3 - 1/3. In 2023, the base endowment to ILVO accounts for 31% of ILVO's total operating funds.

contact: katrien.debruyn@ilvo.vlaanderen.be

Basic grant Policy Area L&V	31%
Structural financing: 31%	

Grant L&V	9%
Flemish Government	5%
VLAIO	6%
Federal Government	12%
EU	14%
Private sector and Business Unit	23%
Project-based financing: 69% (assignments and competitive research)	

Distribution of operational resources ILVO 2023



Now more than 750 staff members

In 2023, the rising trend in the number of staff at ILVO continued. The increase is mainly in ILVO's (private) Own Capital, while the number of staff of the Flemish government at ILVO continues to decline. Finding the right people to carry out all research projects is crucial and, in the currently tight labor market, quite a challenge. ILVO continues to make efforts to profile itself as an attractive employer and to improve the onboarding of new colleagues.

contact: personeel@ilvo.vlaanderen.be

Number of employees in 2023

	Employees			Fulltime Equivalents		
	FG	OC	total	FG	OC	total
dec 2017	249	342	591	221.7	324.1	545.8
dec 2018	239	370	609	211.8	346.6	558.4
dec 2019	231	415	646	207.1	388.0	595.1
dec 2020	223	454	677	201.3	427.5	629.8
dec 2021	212	487	699	194.0	460.0	654.0
dec 2022	214	524	738	195.5	494.1	689.6
dec 2023	209	547	756	192.1	514	706.1

Attention for doctoral students

A special group of colleagues at ILVO are the doctoral students. They experience specific challenges during their employment that were mapped out during a workshop series in 2023. Together with the universities, we are now looking at how these challenges can be addressed.

contact: personeel@ilvo.vlaanderen.be

Establishment of the Farmers' Council

Fewer and fewer ILVO staff have a family tie or active relationship with Flemish agriculture, while they still have to produce knowledge in a realistic way to make the sector more sustainable. This observation has led ILVO to establish a new internal advisory council. The farmers' council unites ILVO colleagues who have close and/or active ties to a farm.
The goal is to advise the Executive Board and make the practical experiences of the members and their network to ILVO researchers. Chair and ILVO colleague Lorenzo Plant: 'The voice of the agricultural sector within ILVO is now louder. There are 12 active members within the different ILVO units.'
One of the first initiatives of the brand new Farmers' Council were the tours during Agribex in December 2023. The Farmers' Council members took colleagues on a tour of the agricultural fair and gave explanations at the stands of machinery manufacturers, service providers or inspections. Following the New Year's reception 2024 an educational and entertaining Farmers' Council Quiz was organized.

contact: lorenzo.plant@ilvo.vlaanderen.be

ILVO Values Days

The five ILVO values are 'positive,' 'professional,' 'proactive' 'working together' and 'being an example'. They are framed within a context of an open discussion culture and trust. ILVO wants to be a values-driven organization and in that context five values days were organized in October 2023 at the ILVO site in Ostend, this time focusing on the value 'working together'. The focus was on integrity in the workplace and leadership.

contact: personeel@ilvo.vlaanderen.be

Infrastructure

Property improvements

ILVO chooses to develop both its infrastructure and land develop sustainably, with minimal climate impact. The strategic real estate plan that was launched in 2022 is pervasive.

In 2023, the infrastructure cell continued to work on that real estate plan. Some major construction files scheduled to start in 2024 have been thoroughly prepared. In terms of realizations in the field this year, we mention several renovation and energy-saving works. Among other things several roofs were insulated, many electrical projects were carried out, external joinery was replaced and an outdated heating system was replaced by an energy energy-efficient one.

contact: evy.devlieghere@ilvo.vlaanderen.be

Renewable energy

ILVO installed three new solar panel installations on three different sites. The new installations came on the warehouse at the Venlo greenhouses, the machine shop, and the drying shed. They have an installed capacity of 68, 51 and 75 kWp, so together they will generate about 194 MWh of electricity. That corresponds to the consumption of about 55 families on an annual basis. Added to the already existing installations, ILVO is knocking off a total installed capacity of 585 kWp.
ILVO monitors and logs the efficiency of solar energy production daily, initially to quickly detect anomalies (such as e.g. pollution). 'The plan is also to use the heat pumps that are coming up for the greenhouse complex and elsewhere to be maximally drive with energy from the solar panel systems.'

contact: gerlinde.devogeleer@ilvo.vlaanderen.be

Visioning around our Research Landscape

A landscape vision was initiated in 2023 as a step in a journey toward a strategic property plan. Biodiversity on the so-called Onderzoekskouter will get a boost thanks to an approved Nature Management Plan 'ILVO-Onderzoekskouter Gondebeek Valley'. At the end of 2023 the ground was broken for the first adjustments to the site, with the construction of a wooded bank and a pond. ILVO calls the totality of its land (over 220 ha) and research facilities the 'Onderzoekskouter', a real, dynamic test and experimentation space on the border of Merelbeke and Melle. This is where independent scientific research happens that provides innovative insights about sustainable agriculture and food production.
ILVO urgently needs to form a vision around the real estate and landscape. Many of ILVO's buildings in Melle and Merelbeke are outdated and are scattered in the rural environment. To strengthen this agricultural landscape and ensure the quality of agricultural research, ILVO has started the implementation of the strategic real estate plan and to create an urban-landscape vision.
Six guiding principles guide that process.

- Economical use of available space.
- Reclaim and demolish old buildings
- Energy-efficient, climate-neutral central campus
- Encourage collaboration and knowledge sharing
- Combine rural environment and technological knowledge
- Open and accessible to the neighborhood

contact: onderzoekskouter@ilvo.vlaanderen.be

A nature management plan for an agricultural institute?

ILVO, like many farmers, has part of its Research Landscape in an SPA, a nature Special Protection Area. The involves wet grasslands in the Gondebeek Valley in Merelbeke, located between two forest cores. As a government agency, ILVO is obliged to draw up a nature management plan or to have one drawn up for these lands. We chose draw up the plan ourselves and we finished it in 2023. The plan describes the management for the next 24 years of a total of 5.5 ha. In addition to the realization of a patch of forest, an amphibian pool and an extensive woodland edge, it shifts the pasture there from intensive to extensive grass management.
The process required for a non-naturalist to design a management plan and to design and consult with all agencies will be documented and published.

contact: hilde.weemaes@ilvo.vlaanderen.be

ILVO plants forest and investigates agriculture–nature balance

On December 15, 2023 ILVO started planting almost 4000 trees and shrubs on a total of 4.8 ha of grassland plots located in an SPA. Like all Flemish government institutions, ILVO is obliged, for lands in 'Special Protection Zone' for nature, to draw up a nature management plan. With the deliberate planting on the Research Landscape in Merelbeke ILVO is resolving a missing ecological link between two nearby nature reserves and contributes to the afforestation ambitions of the Flemish government. In the zones where will not be planted, research will be conducted into extensive grassland management. Yield changes and changes in nutritional value of grass cuts will be monitored, evaluated and communicated to industry and policy.

contact: thijs.vandennest@ilvo.vlaanderen.be

Living artwork on ILVO's Research Landscape

ILVO successfully applied for a recent project call from the Flemish government "Art in Assignment." Through an Incentive instrument aims to promote quality art in the (semi-) public space, not only in the city but also in open space. ILVO's proposal stood out, both because of the location (open, rural space) and the theme (agriculture and research).
In June 2023, as the first (fully subsidized) artwork of ILVO, EQUILARBRE was inaugurated, designed by the artist duo Driessens and Verstappen. It is a living work of art and at the same time a scientific experiment, consisting of 3 young utility trees planted at the edge of a cylindrical pot. How does a tree grow that is not firmly anchored in full soil? What happens when a tree experiences its own weight as a force that threatens to throw it off balance?
The walnut, poplar and chestnut tree will be continually challenged over the continuously challenged for the next 10 to 20 years. They will during the growth process, they will constantly have to look for new equilibria. 'This is art that challenges and dialogues with the environment.

contact: elke.vanempten@ilvo.vlaanderen.be
onderzoekskouter@ilvo.vlaanderen.be
katrien.laenen@vlaanderen.be
Department of Culture, Youth, and Media of the Flemish government

Communication

ILVO in the press

2023 appears to have been a year in which more journalists more frequently wanted to report on agricultural, fisheries and food research. We counted around 300 press clippings. Possibly that figure is an underestimate, because the monitoring is done manually and in-house.
ILVO itself organized 10 press conferences, each in response to interesting and highly visual news from the house. house. The (interim) results of KLIMREK, Coastbusters, NuhCaS, Soy in 1000 Gardens, the launch of the HYDRAS and Equilarbre received high praise.
ILVO sent out nearly 50 press releases. These include news about doctorates (co)carried out at ILVO, about news (project results) explored at ILVO seminars and about new projects (kickoffs) with a large expected societal impact.
Even more striking is that over 100 spontaneous questions from journalists arrived at the communications department, which in almost all cases lead to an interview with an ILVO expert and thus ILVO quotes in the newspapers, audiovisual media and trade press.
It should be noted that, if desired, researchers can receive coaching to give these interviews (at the appropriate intelligibility level).

contact: communicatie@ilvo.vlaanderen.be

Enterprising Flanders sees ILVO series on KanaalZ

ILVO made 10 reports of 5 minutes each about precision agriculture. They were broadcast in the theme concept Z-Agrifood, on KanaalZ. This resulted in a reach of at least 250,000 viewers per episode and a total of 1.18 million views. The reason for this collaboration with Channel Z was the launch of the TEF Agrifood, a European-Flemish Test and Experiment Facility that aims to encourage the AI and digital ecosystem in our region to participate more intensively in digitalization and robotization in the agrifood sector.

Live seminars and demos

Nearly 100 events were (co-)organized by ILVO. The makes the specialized stakeholders and buyers of the knowledge and innovative insights from ILVO had ample opportunity to enter into direct contact with the researchers about their professional activities or challenges. The formulas were diverse: seminars, lectures, workshops, webinars, milk cafes, dialogue days, conferences, forums, demos and networking days, but also info walks, tours and field visits.
Standouts included the AgriTech day with robotics and AI demonstrations, the field day on the agroecological trial platform in Hansbeke and the legume study day in a tent amidst the almost harvest-ready chickpeas, soybeans, and beans in mixed and mono cultivation.
ILVO is also making a name for itself internationally by organizing several project webinars and the coordination of Annual Science Days of the European Joint Programme for SOIL, this time in Riga.

Exhibitions and trade shows

ILVO continues to see added value in a strong presence at the well-known agricultural fairs Agriflanders, the Machinery Days and Agribex. At Agriflanders (January 2023) ILVO unveiled the services of five of its thematic Living Labs, the operation of its Expertise Center for Agriculture and Climate, and the bioeconomy platform B2BE.

The livestock farmers were given details of the KLIMREK approach, with the climate scan of the individual farm and the tailored potential climate measures with economic cost-benefit and the footprint calculation per unit of cultivated or grown agricultural product. There were also seminars on soy, non-cage systems for laying hens, and data sharing. The Machinery Days in Oudenaarde (September 2023) were the theme of soil compaction, the self-propelled tractor and a spray robot, and many crops bred by ILVO. ILVO organized non-stop 10-minute talks on useful research results. A success.

During Agribex (December 2023) ILVO communicated about its nitrogen emission research, on-farm biosecurity, data sharing with DjustConnect and robotics (on a thematic island).

Social media and website

ILVO saw its reach increase (between 6% and 55% increase) through expanded channels. Instagram is the newest (and youngest) channel for ILVO. We post an average of between 60 and 160 social media posts, almost exclusively informational. It is a strategic choice NOT to express opinions or stimulate dialogue on these channels. On a yearly basis, ILVO messages reached 900,000 views, about 60,000 views per month. The website visits at www.ilvo.vlaanderen.be be also recorded growth to a total of 180,000 visits in 2023.

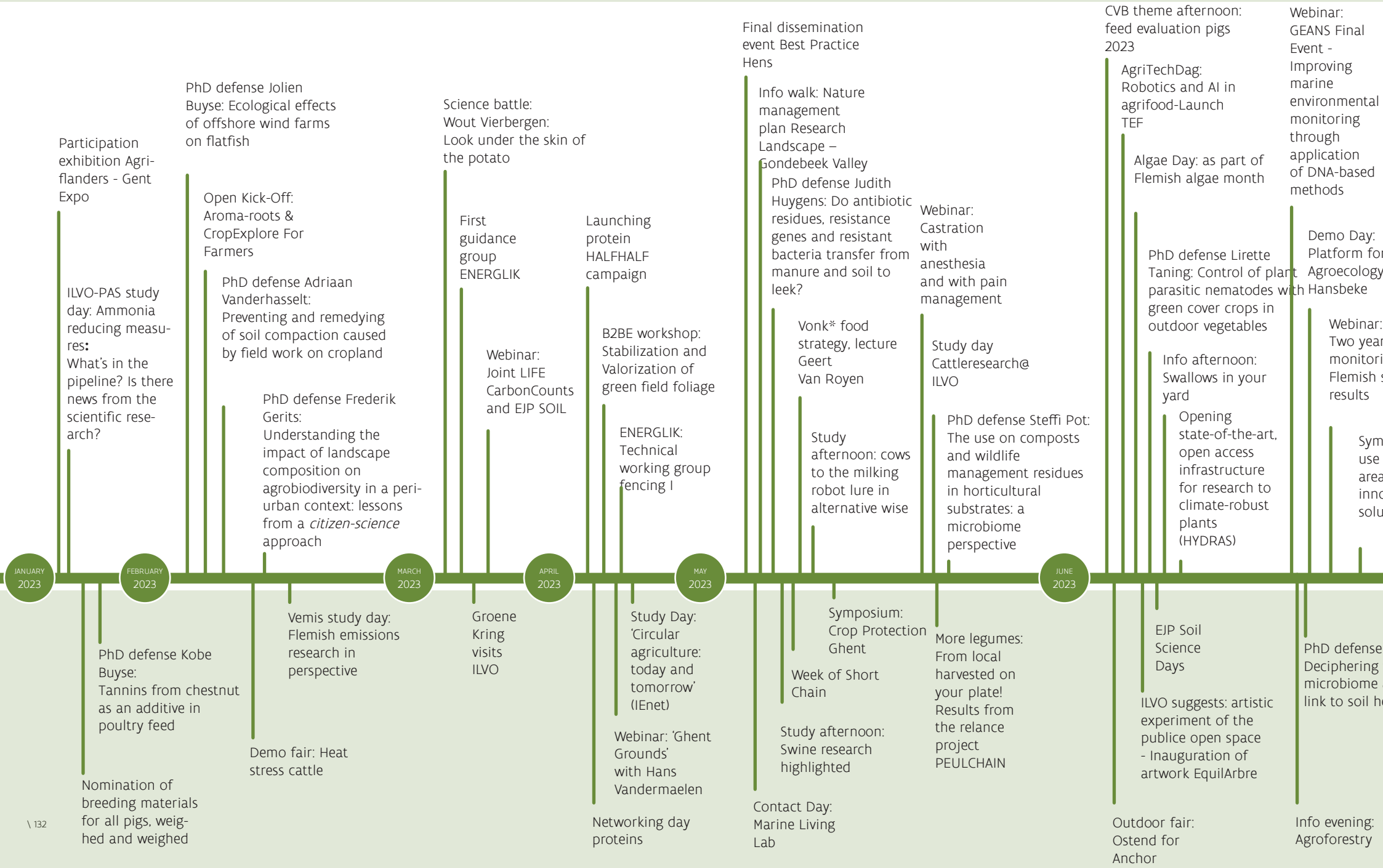
Reach social media

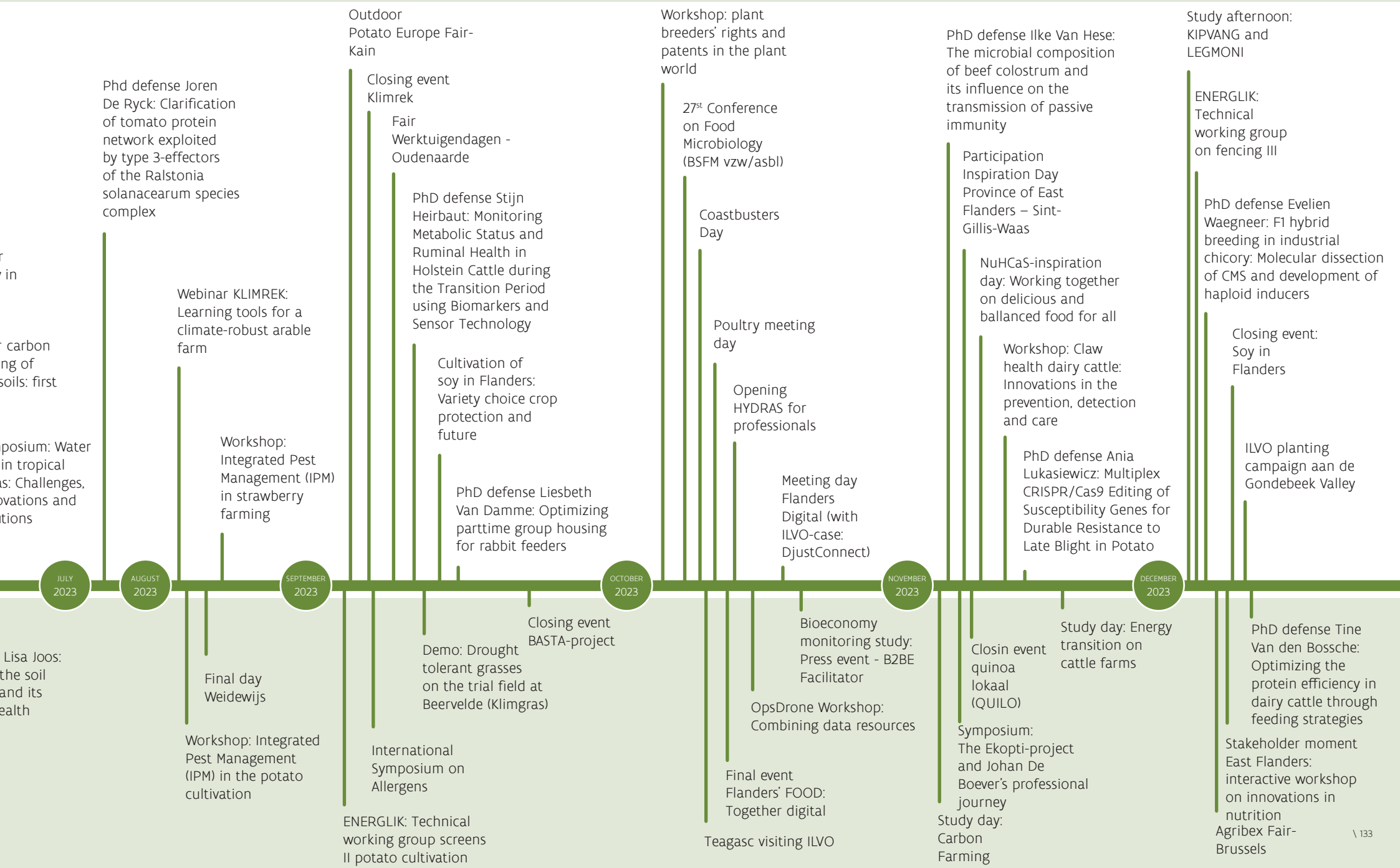
	Followers
LinkedIn	13300 (+23%)
X	3300 (+6%)
Facebook	2800 (+13%)
Instagram	550 (+55%)

Internal communication

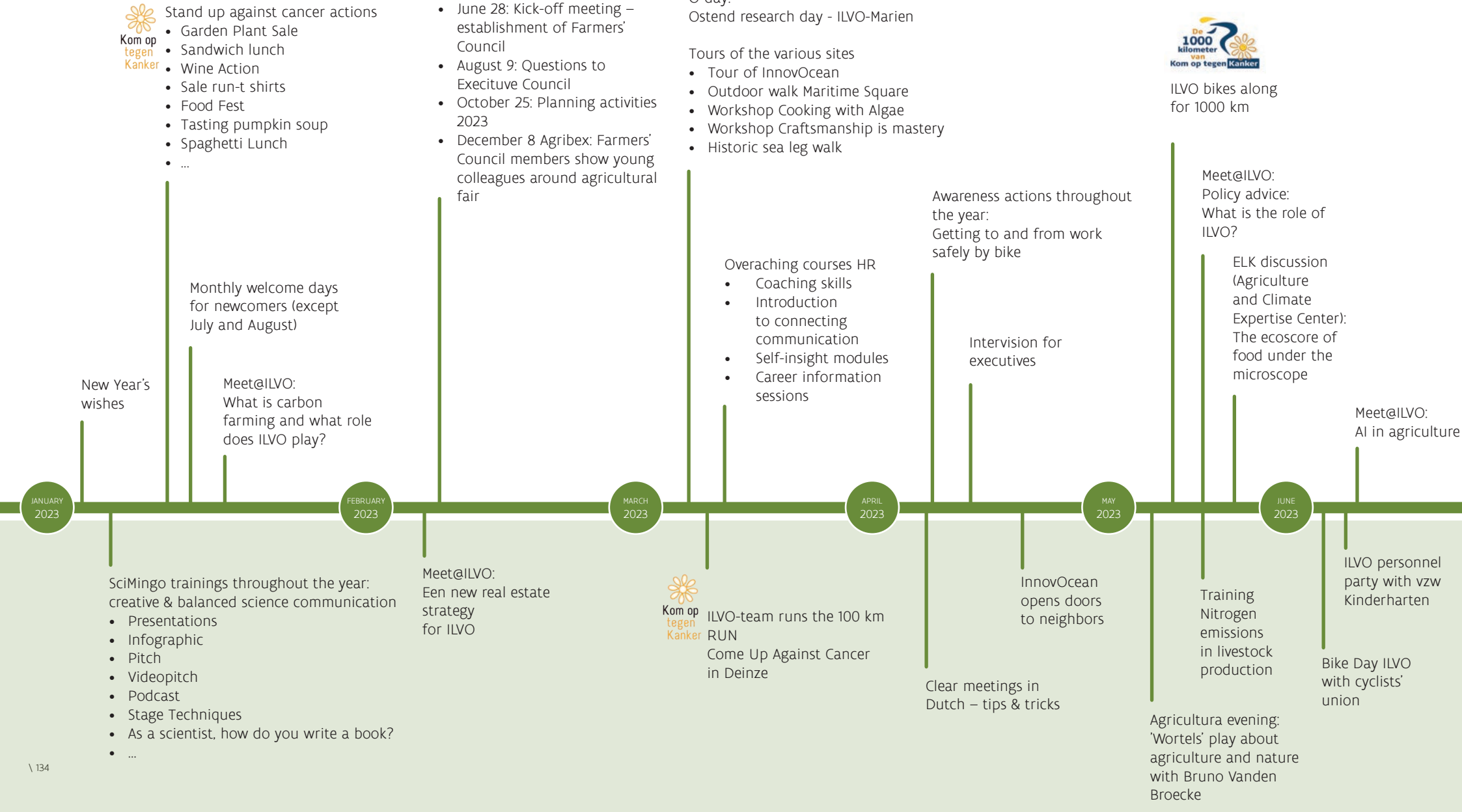
Keeping ILVO employees connected is a concern of management. The communication tools used for that purpose are deployed are diverse: there is the weekly digital internal newsletter ComILVO, which was given a fresher look and feel. There were again two ILVO-wide Research Days, at which colleagues from all departments and levels talked about their work, and where, during breakout sessions, people engaged in dialogue, debate or exploration about topics in the field. Also, the system of meet@ ILVOs, spontaneous, informative and debate-oriented, internal webinars, works as a unifying force. Furthermore, there is the ILVO Youth Council and ILVO Farmers' Council and there are in-person lunchtime activities organized in the "Greenhouse" an unused greenhouse, as well as the AgriCulture evenings.

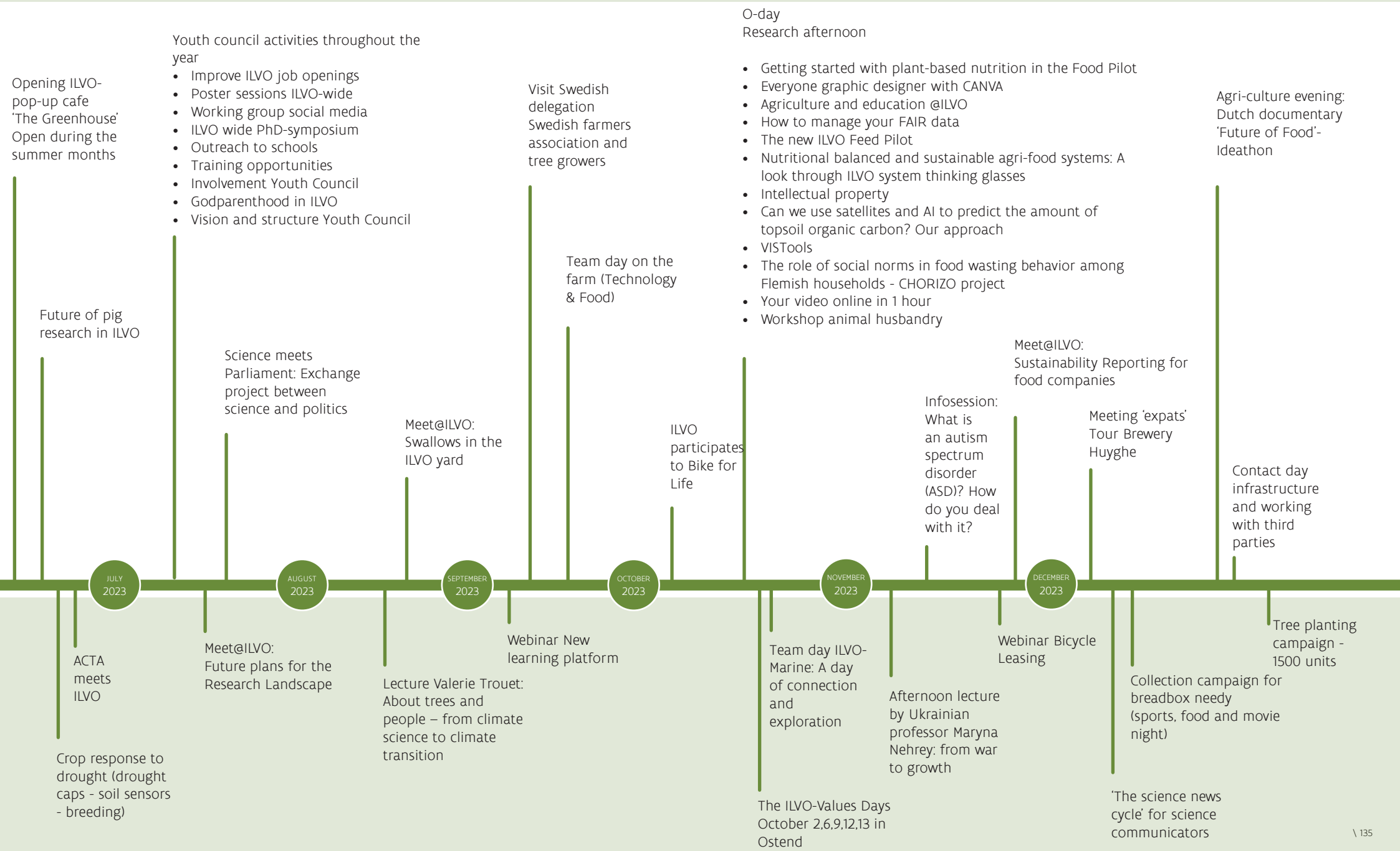
External events




Lisa Joos: the soil and its ealth
carbon ng of soils: first
posium: Water in tropical s: Challenges, ovations and tions
JULY 2023
Phd defense Joren De Ryck: Clarification of tomato protein network exploited by type 3-effectors of the Ralstonia solanacearum species complex
AUGUST 2023
Webinar KLIMREK: Learning tools for a climate-robust arable farm
Final day Weidewijs
Workshop: Integrated Pest Management (IPM) in the potato cultivation
Workshop: Integrated Pest Management (IPM) in strawberry farming
SEPTEMBER 2023
Outdoor Potato Europe Fair-Kain
Closing event Klimrek
Fair Werktuigendagen - Oudenaarde
PhD defense Stijn Heirbaut: Monitoring Metabolic Status and Ruminal Health in Holstein Cattle during the Transition Period using Biomarkers and Sensor Technology
Cultivation of soy in Flanders: Variety choice crop protection and future
PhD defense Liesbeth Van Damme: Optimizing parttime group housing for rabbit feeders
Demo: Drought tolerant grasses on the trial field at Beervelde (Klimgras)
Closing event BASTA-project
International Symposium on Allergens
ENERGLIK: Technical working group screens II potato cultivation
OCTOBER 2023
Workshop: plant breeders' rights and patents in the plant world
27st Conference on Food Microbiology (BSFM vzw/asbl)
Coastbusters Day
Poultry meeting day
Opening HYDRAS for professionals
Meeting day Flanders Digital (with ILVO-case: DjustConnect)
Bioeconomy monitoring study: Press event - B2BE Facilitator
OpsDrone Workshop: Combining data resources
Final event Flanders' FOOD: Together digital
Teagasc visiting ILVO
NOVEMBER 2023
PhD defense Ilke Van Hese: The microbial composition of beef colostrum and its influence on the transmission of passive immunity
Participation Inspiration Day Province of East Flanders – Sint-Gillis-Waas
NuHCaS-inspiration day: Working together on delicious and ballanced food for all
Workshop: Claw health dairy cattle: Innovations in the prevention, detection and care
PhD defense Ania Lukasiewicz: Multiplex CRISPR/Cas9 Editing of Susceptibility Genes for Durable Resistance to Late Blight in Potato
Closin event quinoa lokaal (QUILO)
Study day: Energy transition on cattle farms
Symposium: The Ekopti-project and Johan De Boever's professional journey
Study day: Carbon Farming
DECEMBER 2023
Study afternoon: KIPVANG and LEGMONI
ENERGLIK: Technical working group on fencing III
PhD defense Evelien Waegneer: F1 hybrid breeding in industrial chicory: Molecular dissection of CMS and development of haploid inducers
Closing event: Soy in Flanders
ILVO planting campaign aan de Gondebeek Valley
PhD defense Tine Van den Bossche: Optimizing the protein efficiency in dairy cattle through feeding strategies
Stakeholder moment East Flanders: interactive workshop on innovations in nutrition
Agribex Fair-Brussels

Internal events




Opening ILVO-pop-up cafe 'The Greenhouse' Open during the summer months
Future of pig research in ILVO
JULY 2023
ACTA meets ILVO
Crop response to drought (drought caps - soil sensors - breeding)
Youth council activities throughout the year
• Improve ILVO job openings
• Poster sessions ILVO-wide
• Working group social media
• ILVO wide PhD-symposium
• Outreach to schools
• Training opportunities
• Involvement Youth Council
• Godparenthood in ILVO
• Vision and structure Youth Council
Science meets Parliament: Exchange project between science and politics
AUGUST 2023
Meet@ILVO: Future plans for the Research Landscape
Meet@ILVO: Swallows in the ILVO yard
SEPTEMBER 2023
Lecture Valerie Trouet: About trees and people – from climate science to climate transition
Visit Swedish delegation Swedish farmers association and tree growers
Webinar New learning platform
Team day on the farm (Technology & Food)
OCTOBER 2023
ILVO participates to Bike for Life
O-day
Research afternoon
• Getting started with plant-based nutrition in the Food Pilot
• Everyone graphic designer with CANVA
• Agriculture and education @ILVO
• How to manage your FAIR data
• The new ILVO Feed Pilot
• Nutritional balanced and sustainable agri-food systems: A look through ILVO system thinking glasses
• Intellectual property
• Can we use satellites and AI to predict the amount of topsoil organic carbon? Our approach
• VISTools
• The role of social norms in food wasting behavior among Flemish households - CHORIZO project
• Your video online in 1 hour
• Workshop animal husbandry
NOVEMBER 2023
Team day ILVO-Marine: A day of connection and exploration
The ILVO-Values Days October 2,6,9,12,13 in Ostend
Infosession: What is an autism spectrum disorder (ASD)? How do you deal with it?
Afternoon lecture by Ukrainian professor Maryna Nehrey: from war to growth
Meet@ILVO: Sustainability Reporting for food companies
Webinar Bicycle Leasing
DECEMBER 2023
Meeting 'expats' Tour Brewery Huyghe
'The science news cycle' for science communicators
Collection campaign for breadbox needy (sports, food and movie night)
Agri-culture evening: Dutch documentary 'Future of Food'-Ideathon
Contact day infrastructure and working with third parties
Tree planting campaign - 1500 units

ILVO in the press

A2A2-melk biedt ... voor verteringsproblemen

Er zijn mensen voor wie koemelk niet altijd goed te verteren valt. Een samenwerkingsverband tussen Boerenbond, In... Landbouw-, Visserij-...

Selectief behandelen heeft g... op uiergezondheid of afvoe...

DIER 18

Bij milde en matige klinische mastitis

Om de effecten van het selectief behandelen van milde en matige klinische mastitis te detecteren, legde een team van internationale onderzoekers 13 wetenschappelijke publicaties naast elkaar. Uiteindelijk konden ze geen nadelige effecten vaststellen.

Op een melkveebedrijf wordt bij het behandelen van klinische mastitis heel wat antibiotica gebruikt. Het selectief behandelen van milde en matige klinische mastitis, na diagnose van de ziekteverwekker, kan dit gebruik echter gevoelig verminderen.

Voordelen selectief behandelen

infecties niet te behandelen met antibiotica en om zo het gebruik van antibiotica te verminderen. Op deze manier kan het antibioticaverbruik op een melkveebedrijf gevoelig verlaagd worden. Verschillende onderzoeken toonden reeds aan dat op bedrijven met veel gramnegatieve uterinfecties de reductie door selectief behandelen kan oplopen tot meer dan 50%! Een overkoepelend onderzoek bundelde uiteindelijk alle resultaten van de verschillende studies om een algemene conclusie te trekken over de effecten van selectief behandelen.

Klaar voor de praktijk?

De laatste 10 jaar zijn er verschillende sneltesten voor kiemdetectie op de markt gekomen...

Interesse voor ammoniakreducerende technieken

VEEHOUDERIJ ILVO presenteerde de resultaten van onderzoek naar een aantal beloftevolle technieken die boeren kunnen helpen hun ammoniakemissies te reduceren. Doel is om boeren een menu van maatregelen aan te kunnen bieden, waaruit elke boer de techniek kan kiezen die het beste bij zijn bedrijf past.

Technieken en maatregelen

Het ILVO-onderzoek omvat vooral managementtechnieken. Deze bieden potentiële grote voordelen voor landbouwers, omdat ze minder grote investeringen vergen. Iets waar Boerenbond al sinds 2015 via ILVO mee in investeert. Voorbeelden zijn het verlagen van het eiwitgehalte in het rantsoen, de inzet van ureaseremmers, het aanzuren van de mest en het gebruik van zeolieten.

Gouden standaard

Verder werd tijdens de studiedag toelichting gegeven bij technieken voor het monitoren van emissies...

daarbij op zoek naar een gouden meetstandaard die discussies uitsluit en ook het effect van wijzigingen in de stal (aantal dieren, voedersamenstelling, al dan niet uitrijden van mest) ... onweerlegbaar kan aantonen. Het meten van de uitstoot van natuurlijk geventileerde stallen is moeilijk, omdat in- en uitgangen van lucht heel groot zijn en ook kunnen variëren onder invloed van bijvoorbeeld de windrichting. De huidige onderzoeksmethode is complex en duur, maar het streven is om te komen tot een goedkopere – maar even correcte –meettechniek. ■

www.boerenbond.be/ILVO-ammoniak

AGROFORESTRY, LIGHTVERSIE VAN VOEDSELBOSSEN

In het Oost-Vlaamse Merelbeke scharrelen kippen in een vrije uitloopzone gevuld met hazelaars. Sommige kippen zijn uitgerust met een zender. Scifi-hennen. 'Zo volgen we hoe ver ze zich wagen en hoe lang ze ergens rondhangen', zegt Bert Reubens, onderzoeker *agroforestry* bij het Instituut voor Landbouw-, Visserij- en Voedingsonderzoek (ILVO). Kippen in vrije uitloop be... schikken ... Maar, zo ... dat kale ... Ze hebb... roofvo... Met ha... kipper... door ... De ha... last v... ven ... sten... ook ... Dit ... me... vo... lar... no...

Veel boeren vrezen dat een boom plaats inneemt en tijd vergt. Maar, zo argumenteert Reubens, zonder bomen blijft het potentieel van land vaak net onderbenut. 'Klassieke teelten gebruiken de grond slechts een deel van het jaar en in één dimensie, de vlakte. Terwijl er drie dimensies te benutten vallen – ook de hoogte en de tijd. Als je enkel naar het individuele product kijkt, dan kan je zeggen: die bomen staan in de weg. Maar in ... het een ander plaatje. Uit ...

notelaars, een jaar later volgden l... kleinfruit – van logan- en jostabess... druiven, rozenbottel en de cassis w... veel ingeweken Oost-Europeanen ve... kerd zijn. Langs elzen slingeren kiwib... zich omhoog. Bij mooi weer fietsen G... tenaren langs de Brugse Vaart naar hi... hun mandjes te vullen met zomerframb... zen, kruisbessen en aalbessen.

'Ik koos voor de combinatie tussen bom... en kleinfruit om ruimte, zonlicht en bode... zoveel mogelijk te optimaliseren', verklaar...

project aWISH

Dierenwelzijn automatisch monitoren van stal tot slachthuis

ILVO coördineert project aWISH om zo'n systeem in Europa op poten te zetten

In zes slachthuizen verspreid over Europa zetten onderzoekers en bedrijven nieuwe technologieën op om een set dier gebaseerde, wetenschappelijk gevalideerde welzijnsindicatoren gedurende vier jaar automatisch te monitoren. Ze doen daarvoor een beroep op artificiële intelligentie, camerasystemen, en beeld- en geluidsanalyse, en ze ontsluiten en integreren ook ... data(bases). De ...

integreren van bestaande data uit de stal. Zo wordt in Europa door veehouders al veel informatie verzameld over diergezondheid, antibioticagebruik, voederopname en stalklimaat. Dr. Jarissa ...

Auteurs: Niels Demaltre en Kris De Boere (Proefbedrijf Pluimveehouderij), An Cools (Inagro), Koen De Reu, Marc Heyndrickx en Ulric Van Rossum (ILVO)

Figuur 3: Standaard radiaal en VF-band, met respectievelijk 2 en 1 bar bandenspanning.

leidde het ook tot een significante vermindering van brandstofverbruik. Het verlagen van de bandenspanning bij het toepassen van drijfmest vooraf gaand aan de inzaai van maïs op een zandleem bodem liet een brandstofbesparing van 9 tot 22% toe naargelang de vullingsgraad van het drijfmestvat. Nieuwere technologieën, zoals drukwisselsystemen en meer flexibelere bandentypes, kunnen hier van nut zijn. Drukwisselsystemen laten toe om de bandenspanning relatief snel te wijzigen tussen veld- en wegverkeer en de nieuwere banden-types, zoals VF-banden (= very high flexion), kunnen werken bij nog lagere bandenspanningen. Rupsbanden werken verder op dit principe van het vergroten van het contactoppervlak, maar deze techniek werd niet verder onder-

zocht binnen het kader van dit project.

Het is daarbij van groot belang dat deze nieuwe technologieën niet louter gebruikt worden om het veld te betreden onder nattere omstandigheden of om de **wiellast** verder te laten toenemen. De preventieve impact van het grotere contactoppervlak is immers vooral e... fectief in de toplaag. Dieper in de o... dergrond neemt de invloed van wiella... en bodemvochtgehalte stelselmatig to... ten koste van contactoppervlak. Ho... zwaarder de machines en hoe natter d... bodem, hoe dieper in de grond struc... tuurschade zal optreden. Eenmaal dez... diepere ondergrond verdicht geraakt ... het zeer lastig om het te verhelpen e... kunnen de gevolgen nog decennia voe... baar blijven.

Contact

Tommy D'Hose,
ILVO,
tommy.dhose@ilvo.vlaanderen.be

Drinkwater

BiofilmPrevent: praktijkgericht onderzoek naar de aanpak van biofilms in drinkwatersystemen van varkens en pluimvee

Drinkwaterkwaliteit is binnen de veehouderij een belangrijke parameter in functie van preventieve gezondheidszorg. Met het oog op het terugdringen van het antibioticagebruik wordt ... aandacht aan ...

digen in het water en zich kunnen vasthechten en biofilms kunnen vormen aan de oppervlakken van de leidingen. Bijkomend zijn ook deze jonge dieren vaak het meest gevoelig voor kiemen die mogelijks afkomstig kunnen zijn uit het drinkwater. Het is de bedoeling om via een betere kennis van de microbiologische biofilmsamenstelling op varkens- en pluimveebedrijven te komen tot betere advisering omtrent drinkwaterbehandeling en reiniging van drinkwaterleidingen. Hierbij zal naast de microbiologie ook rekening gehouden worden met de chemische samenstelling van het water. Door v... beteren van de drinkwaterkwaliteit beteren van de dieren te... gezondheidsstatus van de dieren te... beteren wat resulteert in een op... technische prestatie van de dieren ... daling van het antibioticagebruik.

Deelnemen?

Wij zijn op zoek naar 30 vleesdrijven om een wate...

'De boer is trots. Maar ook hij heeft emoties'

LANDBOUW Steeds meer boeren zoeken psychologische hulp. Een onzekere toekomst bezorgt hen slapeloze nachten. De aanslepende stikstofonderhandelingen op Vlaams niveau maken het nog erger.

'Ik heb het gevoel dat ik voortdurend in een hoek word gedreven. Maar een boer zal zich geen huidig personeel kunnen veroorloven ...

Inspiratie
FOCUSING

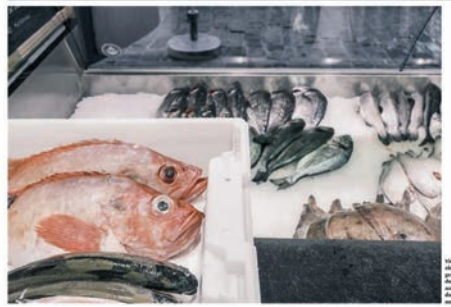
Best Practice Hens

Ondersteuning bij overgang naar kooivrije huisvestingssystemen voor leghennen

Het project 'Best Practice Hens' heeft als doel de eiproductie in niet-kooi systemen te ondersteunen en het dierenwelzijn te verbeteren. Dat doen onderzoekers door kennis te verzamelen rond het houden van poeljen en leghennen in kooivrije huisvestingssystemen (scharrel, uitloop, biologisch). Verder verzamelen ze ook tips om de transitie naar een kooivrije huisvesting beter te ondersteunen.

50-plus en op zoek naar werk? Bereid je alvast voor op veel 'nees'

DISCRIMINATIE Begeerd vóór hun vijftigste, uitgespuwd erna. Oudere werkzoekenden worden het hardst gediscrimineerd bij aanwervingen. 'Goede cv's van 50-plussers belanden vaak meteen op de stapel met nees.'



Veel vis gevangen (maar daarom wordt hij nog niet goedkoper)

DING In 2022 werd 13.217 ton vis verkocht in Belgische havens, tegenover 11.901 ton in 2021. Ondanks dat grotere aanbod, steeg ook de prijs aanzienlijk: per kilo kwam er in 2022 gemiddeld 17,7 procent bij. Wordt vis op ons bord stilaan onbetaalbaar?

Minder beandstof

De grotere vraag uit Nederland komt niet alleen door het sluiten van de Noordzeehaven Vlaardingen, maar ook door de aanlandplicht. Deze verplicht vissers om alle gevangen vis aan land te brengen, ook de ongewenste soorten en ondermaatse exemplaren. Vroeger gooiden ze die meestal overboord, nu moeten ze ze aanlanden. Dat kost tijd en ruimte aan boord, waardoor vissers minder lang op zee kunnen blijven. Ook de steeds hogere brandstofprijzen zorgen voor minder bedrijvigheid.

'Duurzaam of niet, de vraag van de klant naar inktvis steeg niet mee met het aanbod'

Walter Vanmoerkerke
Vlaamse Nederlandse Bruzel

Belgische cabaniers in Spanje en Griekenland

Door het verminderde aanbod aan de kades is ook de prijs van cabaniers in Spanje en Griekenland gestegen. Dat is een van de redenen waarom de vissers die dieren en niet meer in onze wateren voorkomen, hoofdzakelijk te zoeken met de kotter. Ook de prijs van de vis is gestegen. Dat is een van de redenen waarom de vissers die dieren en niet meer in onze wateren voorkomen, hoofdzakelijk te zoeken met de kotter.

OCMW's zetten landbouwgrond in de uitverkoop

De Oost-Vlaamse OCMW's verkopen sinds 2020 een vijfde van hun publieke gronden, het grootste deel landbouwgrond. Omdat lokale besturen de belastingen niet willen verhogen, kijken ze naar hun historisch patrimonium.

PIETER LAMBRECHT

Joris Relaes Gooi publieke landbouwgrond niet te grabbel

De auteur

Joris Relaes is administrateur-generaal van het Instituut voor Landbouw-, Visserij- en Voedingsonderzoek (ILVO).

De kwestie

Pladijs profiteert van windmolenparken in de Noordzee

'De relatie tussen verstedelijking en voedselproductie is in veel opzichten onhoudbaar'

01.03.2023

Begin februari stelde stedenbouwkundige Hans Vandermaelen (UGent-ILVO) zijn doctoraatsonderzoek over de rol die steden kunnen spelen in het verduurzamen van landbouw voor. Wij spraken hem over publieke gronden, hongerige steden en individuele boeren die met collectieve verantwoordelijkheden opgezadeld worden. 'Niet de voedselproductie moet aangepast worden aan de huidige stad, maar omgekeerd.'

'Als we een ander soort voedselproductie willen, dan hebben we ook een ander soort stedenbouw nodig', stelt Hans Vandermaelen als we hem spreken naar aanleiding van zijn doctoraat *De verstedelijking van de agro-ecologische reproductie van bodemvruchtbaarheid* (2023). Hierin buigt de geograaf en

Keuring spuittoestellen Evolutie van het spuitmachinepark in Vlaanderen

Dit jaar werd in België reeds de tiende driejaarlijkse keuringscyclus voor spuittoestellen opgestart (2023-24-25). Tijd om de

de gebruikte regelsystemen zien. Hierbij zien we een duidelijke stijging van het aantal toestellen met spuitcomputer (DPAe) tot nadele van toestellen met manuele regeling (DPM) of CD) of mechanische volumeregeling (DPAm). Verder blijft het aandeel gedragen toestellen vrij hoog. Het groot maar toch zitten zowel de getrokken als de zelfrijdende machines overdelijk in de lift.

Kikkererwten kunnen ook bij ons geteeld worden

Onderzoek ondersteunt introductie van lokale kikkererwt en gele erwt

Het onderzoek zet steeds meer in op droge eiwitgewassen voor humane voeding. Kikkererwt en gele erwt zijn populair, maar voor de effectieve introductie in Vlaanderen is meer onderzoek nodig. Beide gewassen bewijzen zich met hun opbrengstpotentieel en eiwitgehalte, al zijn de opbrengsten nog wisselvallig. Vogelschade, onkruidgroei, afrijping, legering en het wisselende weer dagen de teelten uit.

Zodra de kikkererwtplanten een goudgele kleur hebben, kan er worden geoogst.

Een werkradio boven de melkrobot speelde de kalvergeluiden af in de stal. Foto: ILVO

Alternatieve lokmiddelen

Kunnen kalvergeluiden koeien naar de melkrobot lokken?

Kunnen koeien ook zonder krachtvoeder, op een alternatieve manier naar de melkrobot gelokt worden? Het project Lokrob onderzocht, naast voederbieten, ook kalvervocalisaties als lokmiddel in de melkrobot.

Routeplanner Melkvee

Beslissingstool helpt de melkveehouder

Coolpigs-project

Helpt een lagere hokbezetting

Voederproef toont aan:

Voer met 100 procent bijproducten uitstekend alternatief

Vlees van varkens die evenwichtig voer met enkel bijproducten krijgen, is even smakelijk als van varkens die graan- en sojarijk voeder vreten. Ook voederconversie en vleespercentage zijn vergelijkbaar. Twee typen Piétrain eindberen reageren hetzelfde: deze voeders zijn dus breed inzetbaar. Wel liggen voederopname, groei en karkasrendement iets lager.

Wat zegt de duurzaamheidsscore echt?

ILVO-afdelingshoofd neemt adviestaak op in Wereldgezondheidsorganisatie

Lieve Herman stelt haar expertise over microbiologie en voedselveiligheid ter beschikking van een tijdelijke 'One Health' adviesgroep van de WHO.

Project JongLeven: groeitraject begint voor de biestfase

Methaan in Vlaanderen: de vloek van de melkkoe

De werkgroepleden kregen uiteenzettingen over klimaat, beschikbaarheid van water, bodem en energiebesparing. Op het geschikte moment werd er geschakeld tussen de vergaderzaal en een terreinbezoek.

Een interessante en leerrijke namiddag bij het ILVO

Perspectief voor lokaal plantaardig eiwit

Het Varkensloket beantwoordt jouw vragen!

Ruim 300 eindberen vergeleken in de testwerking tool

Koeien naar de melkrobot lokken met voederbieten

Waarom kweken we geen tong?

Insectenmeel als alternatief voor leghennen?

Expert doorprikt 8 feiten en fabels over honing: is het gezonder dan kristalsuiker? En kan het hooikoorts genezen?

Vraag en antwoord

Het Rundveeloket beantwoordt jouw vragen!

Thema: eiwithoudende gewassen

Bouwen aan rendabele sojateelt in Vlaanderen

De grote invoer van soja, zowel voor humane consumptie als voor veevoeder, nodigt uit tot het lokaal proberen telen van dit subtropisch en vlinderbloemig gewas. Op praktijkschaal is de teelt vooralsnog niet evident, zo ervaren de pioniers. In 2021 was de opkomst op heel wat percelen te slecht. In 2022 was dat een minder groot probleem maar ...

In de picture

Nieuw Strategisch Plan Bio legt biopuzzel 2023-2027

Virtuele vissen maken om echte vissen te herkennen

Veenvervanging in stroomversnelling

Factchecker
'Onze landbouw is de meest duurzame wereldwijd'
ILVO lanceert Test- en Experimenteer Faciliteit 'AgrifoodTEF' om toepassingen van AI, robotica en data in agrifood te versnellen
AI loodst boeren door veranderend klimaat
Hoe mosselen onze kust verstevigen
Klimaatbewust(e) boeren
KLIMREK
Welkom op het Klimrek-slotmoment
Hou rekening met je persoonlijkheid, bedrijfstype en omgeving
Overweeg je een wijziging van de voedersamenstelling op je varkens- of pluimveebedrijf?
Varkens en kippen sojavrij voederen?
Gunstiger voor het klimaat, maar met een hoger prijskaartje
MARIEN BIOLOOG JOLIEN GESELECTEERD VOOR 'PHD CUP 2023'
"Meningen zijn geen feiten"
"Ik onderzoek onder meer welke impact windmolens hebben op platvissen"
Gaan Vlaamse boeren massaal soja kweken na "veelbelovende" proef op Vlaamse akker?
Proefproject sojakweek in Vlaanderen lijkt 'veelbelovend'
Soja uit Vlaamse grond weer stapje dichterbij
TEL HET ONTELBARE
HANDIGE TOOL VOOR VISBESTANDEN - GEOFISH
"MARIENE WETENSCHAP IS EEN KOSTBARE ONDERNEMING EN WE ZULLEN NOOIT ALLES WETEN, MAAR SAMENWERKING TUSSEN WETENSCHAPPERS EN DE INDUSTRIE IS VAN CRUCIAAL BELANG OM HET FEITENMATERIAAL TE VERBETEREN EN GOEDE BEHEERBESLISSINGEN TE NEMEN."
ILVO heeft interesse in vezelrijke gewassen
Vlaanderen zet ondergrondse elektroden in tegen droogte
Virtuele vissen maken om echte vissen te herkennen
Wortelgestel gedetailleerder dan ooit in kaart
De populatie zwaluwen nam ook in Vlaanderen de laatste decennia zeer sterk af.
MELKVEEBEDRIJVEN IN BELGIË SCOREN ZEER GOED OP DUURZAAMHEID
De klimaatvriendelijkste koeien zitten bij boer Niels (35)
JOLIEN (30) IS MET HAAR ONDERZOEK GESELECTEERD VOOR VLAAMSE PHD CUP 2023
«Windmolenparken vormen echt paradijs voor pladijs»
Brongerichte vermindering van ammoniakemissie centraal in nieuw ILVO-project
DUURZAAMHEID MONITOREN
"MOMENTEEL LAAT ONGEVEER TWEE DERDE VAN DE BELGISCHE VAARTUIGEN ZICH ACTIEF BEGELEIDEN ONDER VALDUVIS."
Is het rendabel om te starten met het kweken van insecten?
Insectenkweek als alternatief
Is het rendabel om te starten met het kweken van insecten op je bedrijf?
Haalbaarheidstools ontwikkeld voor meelwormen en zwarte soldatenvlieg


Vijf vragen voor de jury
Automatische opvolging en planning
Azalea forceren in meerlagensysteem
Verwelking in paprika lijkt niet alleen veroorzaakt door Fusarium
MEER KENNIS OVER SAMENSTELLING NODIG
Bestendige aminozuren voor melkvee
Bio-economie wint verder aan belang
Joris Relaes
ZORGACTOREN BUNDELEN KRACHTEN
"Voedselverspilling tegengaa
Groeiachterstand en verwelking na besmetting met drie isolaten
Minder achterblijvende nutriënten en toch gelijke opbrengst na bemestingsstop in laatste twee oog
4 vragen over het project Klimrek
KLIMREK
middeld melkveebedrijf verliest tot 1.500 eu maand bij hittegolf
Presteren snelgroeiende vaarzen beter?
Mossels moeten kust beschermen tegen stormen en stijgende zeespiegel: "Maakt ook zeewater properder"
Een gezonde bodem, een gezonde plant,... met een vleugje plastic?
Mosselriffen moeten beschermen tegen kusterosie
Bierbrouwers maken zich hopzorgen door klimaat
Klimaat
Methaan in Vlaanderen: de vloek van de melkkoe
"Vooral voedermaatregelen blijken veelbelovend om minder methaan uit te stoten."
ELS LEMEIRE

ILVO – Management

Burg. Van Gansberghelaan 92
9820 Merelbeke
T +32 9 272 25 00

ilvo@ilvo.vlaanderen.be
www.ilvo.vlaanderen.be

Technology & Food Science

Brusselsesteenweg 370
9090 Melle
T +32 9 272 30 00

Burg. Van Gansberghelaan 115, box 1
9820 Merelbeke
T +32 9 272 28 00

tv@ilvo.vlaanderen.be
www.ilvo.vlaanderen.be

Animal Sciences

Scheldeweg 68
9090 Melle
T +32 9 272 26 00

Jacobsenstraat 1
8400 Oostende
T +32 59 56 98 75

dier@ilvo.vlaanderen.be
www.ilvo.vlaanderen.be

Social Sciences

Burg. Van Gansberghelaan 115, bus 2
9820 Merelbeke
T +32 9 272 23 40

lm@ilvo.vlaanderen.be
www.ilvo.vlaanderen.be

Plant Sciences

Caritasstraat 39
9090 Melle
T +32 9 272 29 00

Burg. Van Gansberghelaan 96
9820 Merelbeke
T +32 9 272 24 00

Burg. Van Gansberghelaan 109
9820 Merelbeke
T +32 9 272 27 00

plant@ilvo.vlaanderen.be
www.ilvo.vlaanderen.be

ILVO
Instituut voor Landbouw-, Visserij- en Voedingsonderzoek
Burg. Van Gansberghelaan 92
9820 Merelbeke - België

T +32 9 272 25 00

ilvo@ilvo.vlaanderen.be
www.ilvo.vlaanderen.be