



DURUM WHEAT, AN OPPORTUNITY TO DIVERSIFY OUR MAJOR CROPS?

CHANGES IN THE CLIMATE (FEWER COLD WINTERS, SPRING AND SUMMER DROUGHTS) PROVIDE AN OPPORTUNITY FOR WALLOON FARMERS TO DIVERSIFY THEIR PRODUCTION BY TURNING TO NEW CROPS.

Durum wheat (*Triticum turgidum* L. subsp. *Durum*) is a case in point. This small grain cereal is mainly grown in the hot, dry regions around the Mediterranean, and is used for the production of semolina, pasta, bulgur and biscuits. 90% of European durum wheat is produced in Italy, France, Spain and Greece, amounting to 7,750,000 tonnes in 2019, but it is also grown in more northern regions such as Canada and Russia. Durum wheat can be both a winter and a spring crop.

Since 2018, the CRA-W has been developing exploratory trials to determine whether there is a place for durum wheat in the Wallonia crop rotation.

In practical terms, the CRA-W has tested more than 24 varieties in 5 trials. Approximately fifty farmer's fields are also being monitored.

Although there are a few differences, the cultivation method is very similar as soft wheat, which typically has a high protein content.

During the two growing seasons, the maximum yields obtained reached 10 tonnes/hectare or more. Strong differences between varieties have also been observed, with the varieties from France providing the best yields. Because some sections of the trials were fungicide free, results concerning the resistance to fungal diseases are also available for the different varieties. Unsurprisingly, the performance of the «spring» trials proves poorer than the winter seedlings. Damage caused by the cold remains a crucial criterion in the development of cultivation in Belgium, and the few observations made show that the varietal diversity encountered may provide an answer to this problem. The varieties originating in Eastern Europe were found to be highly tolerant of the cold spell of February 2021.

The technological criteria used to assess the quality of the grains and their suitability for processing into pasta were also analysed, with satisfactory results.

This crop therefore seems promising. Due to the existing varietal diversity, consideration



can be given to the integration of this crop into our rotations, whilst also providing interesting material for a selection adapted to Belgium.

These encouraging results provide a basis for new trials whose purpose will be to 1) extend varietal screening, 2) cover all pedoclimatic conditions and production systems (e.g.: organic farming) and 3) improve crop management by setting up specific phytotechnical trials in connection with the quality criteria sought for their exploitation as food for human consumption.



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USE OF FORAGE RESOURCES AND AUTONOMY, TWO COMPLEMENTARY APPROACHES TO IMPROVING THE SUSTAINABILITY OF DAIRY FARMS.

THE ANALYSIS OF 99 WALLOON DAIRY FARMS SHOWS THAT THE EFFICIENT USE OF FORAGE RESOURCES IMPROVES THE ECONOMIC RESULTS OF THE FARM, WHILE HIGH AUTONOMY HAS A GREATER EFFECT ON ITS ENVIRONMENTAL IMPACT.

In order to study the potential impact of the efficiency of using forage resources (ERF) on the sustainability of farms, the anonymous accounting data of 99 dairy farms monitored by Elevéo (AWE group) and the Directorate of Agricultural Economic Analysis (DAEA) were assembled. The forage resources include both self-produced and purchased fodder. The sustainability of these farms was considered in relation to the economic profitability and the environmental impact of dairy speculation. The ERF and the technical, economic, and environmental indicators were calculated for each farm, according to the available data. The ERF is calculated by dividing the milk production made possible by the forage by the estimated amount of forage distributed to dairy cows.

A better ERF typically involves a higher milk production (per cow or per hectare). Although the economic results of the farms with the best ERF prove more favourable than those of other farms (gross margin and gross operating profit (EBITDA) per cow, per

hectare and per kg of milk, economic viability, dependence on aid), their environmental impact (UAA load per hectare, energy consumption, greenhouse gas emissions) is on the other hand more damaging. They also have, on average, a lower level of autonomy.

Should we therefore favour autonomy or ERF? At a given level of ERF, increasing the level of autonomy improves economic profitability and reduces the environmental impact of the farm. This also results in a lower proportion of concentrates in the feed. At a given level of autonomy, increasing the ERF improves the feeding efficiency of the herd as well as the economic results of the farm (gross margin, EBITDA, economic efficiency) but has little effect on its environmental impact.

Depending on the specificities of the farm, it may not necessarily be possible to improve both the ERF level and the autonomy at the same time. It will all depend on the targets of farmers and the resources available to achieve them.



Good use of fodder for good economic results

For further information  <https://www.cra.wallonie.be/en/effort-2>

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WHO DOES AGRICULTURAL AND ENVIRONMENTAL DATA BELONG TO?

CULTIVATION, BREEDING, ENVIRONMENT: 6 WALLOON STAKEHOLDERS HAVE JOINED FORCES TO DEFINE A FRAMEWORK FOR DATA PROTECTION AND ENHANCEMENT.

The amount of data generated on farms, including data for environmental monitoring, is growing exponentially.

These data are being used for launching online platforms and modelling Decision Support Tools (DST).

In the context of «big data», the development of intellectual property rights in response to digital practices, and rapidly evolving regulations relating to the access to and transfer of data (RGPD, PSI, Open data, etc.), the OpEnAgro 4.1 project aims to:

- define good practices necessary for the development of platforms and DST,
- upload high-performance Walloon tools that comply with data ownership,
- provide legal training for those involved in the research and development of Smart Farming.

OpEnAgro 4.1 brings together those involved in the agricultural and environmental sectors in an unprecedented way (CRA-W, ISSeP, elevéo (awé Groupe),

WalDigiFarm and REQUASUD), along with experts in legal matters and new technologies: CRIDS, UNamur.

The case studies considered so far have provided answers to a series of questions, for example:

- Do the data generated on a farm (the production of a cow, an aerial photo or the geolocation of a tractor, data from the weather station, etc.) constitute personal data?
- How can research results based on personal data be scientifically enhanced?

With the implementation of recommendations emerging from this project, we can reassure farmers and research partners that their data is used according to the European, Belgian and Walloon regulations currently in force, and also according to the conditions of use required by farmers, breeders or other «data creators».

The formalisation of user agreements and data management plans, which are established systematically for collaborative



research projects, is the first good practice proposed. It helps to develop better trust and transparency in the sharing of data that may be related to strategically or commercially important challenges.

For further information  www.cra.wallonie.be/en/openagro41



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THE TRAIN THAT FORECASTS RAIN

HISTORICALLY, FARMERS HAVE WORKED WITH WEATHER IN MIND. IN ORDER TO HELP THEM, CRA-W IS LAUNCHING TWO NEW ONLINE PLATFORMS IN SUPPORT OF THE AGRICULTURAL COMMUNITY: WWW.AGROMET.BE AND WWW.BCGMS.BE.



As I was walking around my village on a beautiful summer evening to cool off after a scorching hot day, I stopped to chat for a moment with my old neighbour, Francine, who has been a farmer for over 70 years. We talked about rain, fair weather, sweltering heat and weather that's not like it used to be. During the conversation, she said: "When I was little, my father always used to say,



'Francine, if you hear the train, it's going to rain". I was touched by this memory filled with nostalgia, a testimony to the pragmatic but keen-eyed knowledge of meteorology that farmers have always had.

I could have explained to Francine that the CRA-W has just launched two new online platforms, www.agromet.be and www.bcgms.be, which means you can follow in real time weather conditions on your smartphone for the whole of Wallonia, or even use your pc to monitor key weather events during crops growing season as well as the crops growth through satellite images. These platforms feed into decision support tools (DST) to help decide when to apply late blight treatment, spread fertiliser on your fields or even monitor potential evapotranspiration to manage your field irrigation. But I decided not to say anything, so I took my leave and wished her good evening.

After a few steps, I couldn't help but smile when I heard a little blond boy on his pedal tractor shouting "Granny, I hope daddy hurries up and brings in the hay. I heard the train goes by" ...

For further information

www.agromet.be: reference meteorological platform

www.bcgms.be: platform that provides agrometeorological indicators across the agricultural regions

Funding: CRA-W Moerman fund (agromet) and the Belgian science policy BELSPO (bcgms)



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DECIDE 2.0., A TOOL FOR THE ASSESSMENT OF GREENHOUSE GASES, ENERGY AND AMMONIA ON FARMS

BASED ON THE LIFE CYCLE ANALYSIS (LCA) APPROACH, THE DECIDE DECISION SUPPORT TOOL, SPECIFIC TO WALLONIA, OFFERS AN ASSESSMENT OF ENERGY, GREENHOUSE GASES (GHG) AND AMMONIA ON FARMS.



DECIDE 2.0 is free of charge and can be accessed via the website: (www.decide.cra.wallonie.be). This tool is supported by Walloon research and developed in partnership with the Walloon Air and Climate Agency (AWAC) and management bodies such as the Directorate of Agricultural Economic Analysis (DAEA) and Elevéo. It provides the means of estimating the impact of the agricultural sector according to a harmonised, internationally recognised methodology.

DECIDE users can directly encode data relating to their farms or automatically import a large part of their accounting data via their management organisation, thus saving a considerable amount of time.

Using an easily interpretable visual image available online or in pdf format, farmers

can perform a rapid audit of their farm and compare it with other farms of the same type, enabling them to identify potential strategies for reducing GHG emissions, ammonia and energy consumption.

DECIDE takes into account features specific to Wallonia concerning soil, climate, animal performance and food production. The tool can be improved through the measurement of GHG emissions or carbon storage by soils carried out on animals, herds or trial fields. By the end of 2021, owing to the results of the INDIGGES research project (CRA-W), it will also be able to take cultivation and breeding practices into account.

This tool can be used for field crops, dairy cattle, meat cattle and mixed farms. Through the MonoDECIDE research project (DGO3 and

CRA-W allowance), reports for monogastric breeding (pigs and poultry) will also be available before the end of 2021.

A consultation with the main users (management organisations and agricultural advisers) and the regional authorities is underway to define a timetable for adding new indicators. These concern, for example, nutrient balances (NPK), calculation of the water footprint, sheep livestock units, etc.

In collaboration with Natagriwal, biodiversity indicators are also being developed on the basis of data already collected by the tool (Agri-environmental and climate measures (MAEC), areas of ecological interest, presence of hedges, ponds, natural areas, maintenance of meadows, etc.).

An initial training cycle in use of the tool, advice to farmers and on-farm monitoring was organised for agricultural advisers in June 2021.

For further information

www.decide.cra.wallonie.be



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IDENTIFYING AND RESPONDING TO THE NEEDS OF THE ORGANIC FARMING SECTOR

AN INTERNAL TOOL HAS BEEN SET UP AS PART OF THE STRATEGIC PLAN FOR THE DEVELOPMENT OF ORGANIC AGRICULTURE (PSDAB) IN WALLONIA BY 2020: FREDO.

Among its various missions, two courses of action have been allocated to the Transversal Unit for Research in Organic Agriculture (CtRab):

- To identify the needs of producers and processors in the organic farming sector;
- To establish an inventory of scientific work and projects concerning organic farming and the monitoring of them.

As a result, two separate databases were created in 2015, to compile the "demand" and "supply". In view of their complementarity, it was soon found necessary to align the two in order to establish links between them. Just because an interested party identifies a need, it does not mean that it has not already been addressed or been the focus of experiments in Wallonia, Belgium or Europe.

Cross-checking between supply and demand enables the identification of both Gap of Knowledge (GOK) and Gap of Research (GOR) expressed by the sector.

While a GOK is an indication the failure to transfer results, research or trials already available and requires dissemination, demonstration or management, a GOR arises from the lack of

a known solution, implying the need for upstream research.

To facilitate access to little-known knowledge, a "knowledge base" dynamic has been initiated at CRA-W. This involves producing a summary on a specific topic, an informative summary for researchers that can be disseminated to those involved in management structure, who can then share it with their beneficiaries. These knowledge bases make it possible to bridge GOKs and to specify GORs, used to define questions concerned with research and to formulate research plans.

In order to provide a comparison between supply and demand, an internally developed tool makes it possible to:

1. consult and encode needs,
2. consult and encode research work;
3. determine the correlation between "supply" and "demand".

This platform, currently named FREDO, which stands for Fichier REcapitulatif des Demandes et des Offres [summary file of supply and demand] for research and development in the organic farming sector, is dynamically driven.



Prospects for development and external access to this tool are currently being considered, particularly with a view to taking part in the efforts of the PSDAB by 2030.

Have you identified a need or a question for research? The CtRab encourages you to share information so that it can be incorporated into the tool.

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TESTIMONIAL

FEEDBACK OF A PARTNER OF THE CRA-W

CHEMOMETRIC BRAIN AND CRA-W, AN ESSENTIAL ALLIANCE TO APPLY CHEMOMETRICS IN FOOD QUALITY CONTROL

When we, at Blendhub - the first global network for food production through multi-localised production hubs -, started working with NIR technology for quality control of raw materials and ingredients for the food industry, we knew we had to partner with the best to achieve our goals.

We were looking for more information about ingredients blends through easy and non-destructive analysis, and we chose CRA-W as a high-level research centre in spectroscopy to find the technique that would provide us with the best and most accurate information. Thus, in 2013 we started a joint research project that helped us develop Chemometric Brain, a proprietary NIR-based quality software, a pioneering tool in the food industry as it is the only one based in the cloud, which facilitates the control and analysis of samples from different devices and locations.



Chemometric Brain was originally created as proprietary software of Blendhub and in January 2020, it separated into a completely independent organization due to significant interest from many organizations in the sector to adopt the technology into their own companies.

CRA-W has been essential in the evolution of our software and the samples analysis. They have provided us with the necessary knowledge and advice to apply chemometrics and spectroscopic analysis to our products, mainly powder-based products, for which there were initially no spectral libraries.

Therefore, we consider CRA-W as an essential ally in our R&D strategy to continue optimizing our software and to provide an increasingly better and more complete service to our customers.

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More info 

www.chemometricbrain.io/en/videos/



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