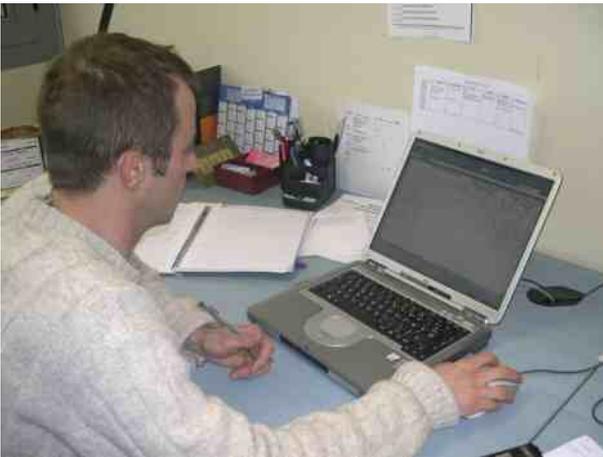


A series of tools to adjust inputs

Decision-making tools are already available to help adjust inputs as closely as possible to crop needs, but they remain underused. Experience often takes precedence. But in the era of new communication technology, those tools provide timely information. Here is an overview of the tools available for arable crops



Two thirds of farmers own a computer and half have Internet connection (INSEE data).

Over the past few years, agricultural research has produced operational, and even indispensable, decision-making tools to adjust inputs depending on plant needs. There are currently around twenty listed.

Arable crops are lending themselves to new technology applications. Internet, satellites, SMS... are put to good use to provide precise and timely information.

Diagnosing, anticipating, and deciding: those are some of the functions of those tools which combine productivity and environmental protection.

The reasoning behind the protection of potatoes against late blight for example is made easier by Mileos®, designed by ARVALIS in partnership with SPV (Plant protection services).

Assistance with nitrogen

Fertiliser inputs were the first to benefit from decision-making tools. Many services are dedicated to fertiliser material inputs, and in particular nitrogen.

N Rate management

1

Farmstar: nitrogen needs as seen from the sky

Nitrogen management in wheat, oilseed rape and barley can be based on satellite images via Farmstar. This tool measures the amount of green cover, or chlorophyll activity, and gives advice at field level at key cropping stages. For example, for wheat, subscribing farmers receive a provisional total nitrogen rate, a population assessment and yield potential at the end of winter, the risk of lodging appearing, nitrogen recommendation at the end of the stem elongation period to readjust the total nitrogen rate if necessary, and updated yield potential. An eyespot and fusarium risk assessment is also available as an optional extra.

In 2007, 345,000 ha, i.e. nearly 35,000 wheat, oilseed rape and barley fields, were under Farmstar subscription in France, with nearly 9000 subscribing farmers.

The farmer, who subscribes through his cooperative, receives his recommendation sheets either by email or by post. He can also download them from an Internet portal.

This tool helps farmers base their decisions on precise and easily available criteria (no measurements to be taken in the field). For wheat nitrogen management at the stem elongation stage, for nitrogen in oilseed rape and for lodging risk assessment, Farmstar files are compatible with the variable rate application tools found on spreaders (optional service). Surveys indicate that farmers who subscribe to Farmstar saved up to an average of 10 units of fertiliser per hectare of wheat and 20 units for oilseed rape. However, this average value is highly variable and very much depends on the level of variability within fields (in some cases farmers were able to save over 50 nitrogen units per hectare in their fields).

Anne Blondlot

Plani-LIS® gives advice on what P, K, Mg and CaO rates to apply and Azo-LIS® calculates the total Nitrogen rate that should be applied. Both tools make calculations easier and more accurate than manual calculations. They make it possible to save data in order to retrieve the history and speed up calculations.

There are many management tools for late nitrogen applications in France: Jubil, Ramsès, N-Tester, GPN, N-Sensor and Farmstar. The latter is based on satellite and aerial images, to provide different nitrogen advice for wheat, barley and oilseed rape fields (insert 1). Cetiom (Technical Centre for Oilseed Crops) has also developed tools for this market: the "nitrogen slide calculator" helps to manage oilseed rape applications and Hélotest is specific to the needs of sunflower crops.

Water and irrigation, which comes under the new 2007 regulation on water, is another input covered by decision-making tools. At a time when collective water management has become a necessity, irrigation comes under close scrutiny. Irrinov®, for cereals, maize, peas and potatoes, and IrriBet for sugar beet, help to irrigate crops only when they actually need it.



Most of those tools are based on a duly completed field record.

Good practices are crucial

Agricultural production is subject to many regulations which are regularly updated. Regulations regarding plant protection products are tightening and environmental (water, air, soil) risk limitation, or even elimination, is a heavily monitored area.

Tools are available to help farmers diagnose their own practices so that they can make sure they comply with regulations. The "Environment" range focuses on the different potential sources of pollution. Aquaplaine® focuses on control of non-point pollution at field level. Aquasite® (*insert 2*) diagnoses plant protection product handling on the farm. Aqualéa® lists key points to limit the risk of nitrate leaching from the soil.

Those diagnoses are combined with proposed improvements to help users comply with regulations, but also to develop good agricultural practices which respect the environment. Recommendations on "chemical mixtures" can be seen as an extension of those tools and are available free of charge on the Cetiom (Technical Centre for Oilseed Crops) and ARVALIS – Institut du végétal websites : www.arvalisinstitutduvegetal.fr.. Regularly updated, they help to check the compliance of the chemical mixtures used on cereals, maize, oil seeds, pulses and potatoes.

Along the same lines, two Internet applications are available free of charge from the ARVALIS – Institut du végétal website to improve spraying practices. The first one, "Proper sprayer rinsing", details the rinsing procedure that should be implemented depending on the characteristics of the sprayer. The second one, "Help with choosing nozzles", gives guidelines on choosing appropriate nozzles depending on spraying parameters (forward speed, flow rate...).

Besides helping farmers make decisions regarding treatment, some tools also provide them with all the information they need to comply with the regulations currently in force in France.

Controlling pollution

2

Aquasite® diagnoses the farm.

Compliance with regulations, optimised input management and implementation of good PPP handling practices at farm level, all come under the objectives of an Aquasite® diagnosis. It is not a case of checking up on farmers, but of helping them to establish good practices. The diagnosis finishes with proposed improvements and changes agreed with the farmer. It is then up to him to implement them or not.

This diagnosis relates to transport, storage, preparation of spray solutions, filling and rinsing of sprayer, as well as waste management.

In 2007, 100 Aquasite® diagnoses carried out in the Yser catchment area (north of Lille), as part of the European TOPPS project (LIFE Programme), highlighted what had been achieved and what needed to be improved. Here are some examples of the progress made:

- 90% of farmers in the catchment area have a dedicated chemical store.
- 85% check their sprayer at least every five years - 93% recycle empty packaging through specialised operators.

Other actions are potential sources of improvement for the near future:

- installing a device which helps to avoid water source contamination during filling operations,
- if necessary, collecting product overflow from the surface of the filling area (impermeable area, manifold),
- installing a rinsing tank with a capacity of at least 10% of the main tank, as a minimum means of ensuring that the sprayer is rinsed in accordance with the latest decree, dated July 2006.

Julie Maillet-Mezery

Compatibility of tools with each other

Besides being more accurate, new communication and information technologies are less demanding than older methods. With tools like Mileos® and Farmstar for example, measurements in the field are no longer required. Conversely, most electronic tools are based on similar types of field record.

The number of such tools is increasing, and it is time to find a common language, so that the farmer only needs to fill in one field record which is then compatible with all the tools. We speak of the

interoperability of those tools. There is a standard: AgroEDI Europe. Studies are currently underway and should soon help farmers go from one tool to another without wasting any time.

Increasingly fast, increasingly precise.... for timely information.



Combined with a GPS, some of those tools, like Farmstar, are replacing "precision farming".

Nicolas BOUSQUET
n.bousquet@perspectives-agricoles.com

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