Reducing and improving the use of plant protection products: Less is better

PROGRESS REPORT

Initial changes 2008-2009 in the NODU, the Ecophyto 2018 progress indicator

Slightly more sparing use of plant protection products

Following on from the Grenelle consultation process on environmental issues, the Ecophyto 2018 plan embodies the commitment given by all stakeholders – the plan’s co-authors – to cut the nationwide use of pesticides by 50% in the space of ten years, if possible. The most notable goal of Ecophyto 2018 is to reduce the dependency of farms on plant protection products, while at the same time maintaining agricultural production at a high level in both quality and quantity terms.

The indicator chosen as the yardstick of reference at national level is the number of dosage units (NODU) applied. This index, which expresses the quantity of each active substance sold in terms of a specific dosage unit, allows the intensity of the use of plant protection products to be assessed. Calculation of the NODU is based on nationwide data for sales of plant protection products.

The NODU is supplemented by another indicator: the “QSA” representing the quantity of active substances sold in France. Both indicators are calculated for each calendar year but changes in their level will be interpreted on the basis of a three-year sliding average in order to smooth out year-to-year variations.

Nationwide monitoring of changes in the use of plant protection products also needs to be backed by assistance in making changes to techniques on the ground. For this reason, regionalised monitoring by crop type will be implemented, based notably on the “IFT” or treatment frequency indicator.

In order to interpret correctly changes in the NODU, the national indicator for progress on the plan, other indicators will also be deployed, essentially of agronomic and socioeconomic character. Indicators for the risks and impact of plant protection products for the environment and health are also currently in the process of implementation.
What is the NODU?

The NODU is a “multi-crop” indicator calculated annually using sales data provided by distributors in their official returns as required by the diffuse pollution tax.

The NODU applies a weighting based on a NODU-specific dosage unit to the quantities sold of each active substance. This makes it possible to measure changes in the degree of use of plant protection products independently of any replacement of active substances by others effective at lower dosages.

At this stage, the NODU is calculated only for products spread on the land for agricultural purposes (i.e. seed treatments and attractants are excluded).

In line with the undertaking given, the government ministry with responsibility for agriculture has set in train the work needed to fine-tune the NODU for products sold for use in non-agricultural areas and for seed treatment. From 2011, changes in the NODU for all segments since 2008 will be evaluated and presented in a progress report.

The NODU is applied to two broad categories:
– according to function (herbicides, fungicides, insecticides, acaricides and other products),
– and according to the risk these product groups present for the environment or human health: a version of the indicator for products comprising substances offering low levels of risk is currently in the process of definition.

Plant Protection Product Uses Ultimately for NODU Monitoring (figure 1)
2008/2009 sales of plant protection products for agricultural uses other than strictly for seed treatment and attractants

The graph provided below (see figure 2) shows the comparative changes in the levels of the QSA and NODU for the period 2008-2009. Only agricultural uses (other than seed treatment and attractants) have been included.

Although the NODU seems to enter a slight decline (falling from 67 million in 2008 to 65 million in 2009 for metropolitan France), this trend remains to be confirmed in following years in the light of the calculation of the three-year sliding average and consolidation of the NODU.

The fall in the QSA and the differential changes in the QSA and the NODU can largely be explained by a decline in the use of products comprising very bulky active substances such as sulphur. This is important because mass as such does not affect the level of the NODU.

Of the four main product groups, only herbicides saw a marginal increase (figure 3). It is noteworthy that the use of herbicides is not directly determined by actual pressure from parasites.

In addition, while plant production has risen, this is not true of the use of plant protection products (figure 2).

It is apparent that in 2009, the destruction of weeds continues to be the main use category for plant protection products, followed by fungicides, with insecticides in third place.
The context: parasites and economics

1. Maintenance of low to middling parasitic pressure

For the purposes of evaluating progress on Ecophyto 2018, parasitic pressure is assessed by monitoring the levels of dedicated indicators based on crop-pest couplings for each farming sector: e.g. Soft wheat/Cereal eyespot, Carrots/Sclerotinia.

The most significant decline in the types of usage of plant protection products has been registered for fungicides, and this can be put down to an objective reduction in fungal pressure on major field crops and general improvement in their health after two years of limited pressure from plant disease.

In the case of vines, in 2009 protection was made easier by favourable weather conditions despite high levels of parasitic pressure.

Unlike parasitic pressure, weeds are not monitored under any national surveillance programme: this is because it is a factor essentially determined by highly localised plot conditions: grain stock, crop emergence conditions, weeding strategies, and so on.

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<thead>
<tr>
<th>Cereals, oilseeds, protein crops, forage crops</th>
<th>Fungal Diseases</th>
<th>Pests</th>
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<tbody>
<tr>
<td>change 2008-2009</td>
<td>stable</td>
<td>stable or declining</td>
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<tr>
<td>2009 level</td>
<td>middling</td>
<td>low, to middling for potatoes (high in 2008)</td>
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<tr>
<th>Industrial crops and potatoes</th>
<th>Funkal Diseases</th>
<th>Pests</th>
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<tr>
<td>change 2008-2009</td>
<td>declining</td>
<td>stable or declining</td>
</tr>
<tr>
<td>2009 level</td>
<td>low, to middling for potatoes (high in 2008)</td>
<td>low (low to high in 2008)</td>
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<tr>
<th>Vegetable and fruit crops</th>
<th>Funkal Diseases</th>
<th>Pests</th>
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<tr>
<td>change 2008-2009</td>
<td>stable for crop-pest couplings monitored</td>
<td>stable except for aphids and codling moths: sharp increase</td>
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<tr>
<td>2009 level</td>
<td>variable: low to high according to disease</td>
<td>increase</td>
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<tr>
<th>Vines</th>
<th>Funkal Diseases</th>
<th>Pests</th>
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<tr>
<td>change 2008-2009</td>
<td>stable</td>
<td></td>
</tr>
<tr>
<td>2009 level</td>
<td>middling to high</td>
<td>middling (low in 2008)</td>
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Parasitic pressure

Potential pressure from bioaggressors is tracked under the Ecophyto plan using disease and pest bulletins. These are based on the observations of the epidemiological surveillance network, laboratory testing and feedback from the various concerned actors. The data are interpreted and merged through a process of collegial expert analysis within the ministerial plant protection network and shared with all stakeholders.

This pressure reflects the effects of weather over the year in a given agricultural context (which is itself largely determined by varietal sensitivity given the main cultivars sown and the date of sowing) in any given year. It is important to stress that on French national territory major differences in parasitic pressure can be observed according to the various farming methods used, and especially crop rotation, irrigation and fertiliser use, in addition to the various soil and climate combinations.
2. An economic situation under pressure

Small grain cereals saw record yields in 2009. Wine and fruit returned to normal production levels after a negative year in 2008. Production of vegetables is virtually stable but marketing conditions are generally difficult with declining prices.

After marking time in 2007, the prices for plant protection products rose in 2008 and 2009 (see figure 5).

This increase affected all plant protection products: from 2008 to 2009, prices for fungicides rose by 5%, and herbicides and insecticides by 3%. This meant that major field crops suffered a hike in the cost of farm inputs in a context typified by falling selling prices.

After a sharp rise in 2006 and 2007, declining revenue levels continued to affect the plant production sector for the second year running. This cut in revenue has been estimated at 47% for the major field crops. It is estimated at 53% for fruit orchards and at 34% for horticulture. Winemaking revenue levels could fall by 2%, but with sharply differing situations according to category: improvement for standard winemaking, but a worsening for designated origin winemaking.

This situation may also explain the decline in the use of plant protection products in some parts of the farming industry.
The sanitary/environmental profile of molecules marketed for agricultural uses, other than seed treatment and attractants

Changes in the NODU can be monitored in accordance with the sanitary and environmental profile of the active substances proposed for agricultural uses other than seed treatment and attractants.

1 This classification is drawn up annually on the basis of an official order listing the substances of priority importance and the substances defined under Article R. 213-48-13 of the French code of environmental law concerning the diffuse pollution tax.

The categories are as follows: carcinogenic, mutagenic or reprotoxic substances (CMR 1 or 2, CMR 3), highly toxic or toxic substances (t+ or t) and ecotoxic substances (N).

1. Substances toxic to human health: observation of a significant partial reduction

Substances classified CMR 1 or 2 saw a reduction of 82% between 2008 and 2009 (see figure 6). This decline can be put down to the withdrawal from sale of preparations containing active substances of concern (see box below) and non-inclusion on the EU list, e.g. the fungicides Carbendazim and Dinocap in the present instance.

This trend is not obvious where other categories of toxic substance are concerned. Use of those classified as “t” or “t+” have not declined in any major way.

The toxicity classification changed between 2008 and 2009 with 22 additional substances being deemed toxic. For this reason, despite the fact that 11 substances classified t or t+ were affected by the withdrawal of certain preparations, the effect of the withdrawals was in fact masked by the change in the list of classified substances.

The withdrawal of preparations containing 30 active substances of concern in 2008

In January 2008, the minister responsible for agriculture announced the withdrawal of the marketing authorisations for preparations containing the 30 substances deemed to be of most concern. This decision was taken in accordance with the commitments made under the Grenelle consultation process on environmental issues and following discussions with agricultural organisations, technical institutes, manufacturers and plant protection experts.

The 30 substances were ingredients in over 1,500 preparations sold for plant protection purposes.

The products concerned were withdrawn from sale at the earliest possible date, taking into account the availability of alternative solutions.
2. Stabilisation of the use of products toxic for the environment

The proportion of the NODU comprising substances classified as ecotoxic rose by 42% in 2009 (see figure 7). This can be put down essentially to the classification in the "N" category of substances not previously included: 121 substances were classed as ecotoxic in 2008 and this number rose to 192 in 2009.

Applying the 2008 classification to sales of plant protection products in 2009, the increase was 2.6%.

The indicator for progress on the Ecophyto plan, the NODU, does not reveal any differential movement between 2008 and 2009 strictly specific to agricultural uses other than those strictly for seed treatment and attractants. The reduction in tonnages of plant protection products sold in 2009, due to cyclical reasons, has however gone hand in hand with an improvement in the toxicological profile of the products sold, reflecting the decision taken by the ministry responsible for agriculture to withdraw certain preparations from the market.

There has been no particular change in the ecotoxicological profile if the change in substance classification in 2009 is left out of account.

However, it is difficult to interpret any change that occurs between just two years. The years 2008 and 2009, covering the period of initial launch of Ecophyto 2018, will enable a baseline to be approximated for the evaluation of later trends in the changing level of the NODU in order to judge how far ECOPHYTO 2018 has been able to achieve its targets.
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INFORMATION SOURCES
With the exception of the figures for changes in the NODU and QSA indicators (MAAP calculations using BNV-D data) and parasitic pressure (MAAP expert assessments), all data have been taken from official Agricultural Statistics.

TO FIND OUT MORE
About the Ecophyto 2018 plan: www.agriculture.gouv.fr/ecophyto-2018

GLOSSARY
BNV-D: The national distributor sales database, used to calculate the NODU and QSA.
CMR: Carcinogenic, Mutagenic, Reprotoxic: one of the French classifications of the toxicity of active substances.
MAAP: Ministry of Food, Agriculture and Fisheries.
NODU: Number of dosage units, the indicator used to monitor progress on the Ecophyto 2018 plan.
QSA: Quantity of active substances sold in France.
T/T+: Toxic/Highly toxic: one of the French classifications of the toxicity of active substances.