PAN Europe reaction to the assessment report on the sustainable use of pesticides Directive

**THE ORIGINAL TIMETABLE OF THE SUD**

**14 DEC. 2012**
**TRAINING:**
MS establish certification systems and designate responsible for implementation (ART. 5.2)

**FROM 2013**
**GENERAL BAN ON AERIAL SPRAYING:**
Aircrafts to be equipped with best available technology to reduce drift (ART.9 (F))

**30 JUNE 2013**
**INTEGRATED PEST MANAGEMENT:**
MS to report to the European Commission on implementation of IPM (ART. 14.3)
PAN Europe reaction to the long-awaited evaluation report on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides


We also welcome that both the EU Council on agriculture (on 6 November 2017) and the European Parliament (on 13 November 2017) have both discussed the report and both confirmed their engagement towards ensuring serious implementation in the future.

We remind you that this report was due on 26 November 2014 (art. 4.3) and that it is now time to take serious action to recover the time lost.

Already in 2010 PAN Europe had prepared a report called ‘Best Practice National Action Plan’ to inspire MP regarding the implementation of SUD. In 2013 we prepared an Evaluation of the National Action Plans clearly showing that, while the majority of Member States (MS) are using the National Action Plans (NAPs) to gather information on pesticide uses in their country, most of their proposed actions were already foreseen by legislation already in force (e.g. “selling” measures already included in the water framework directive). Sadly, only a few innovative proposals have been made.

To our knowledge, the main achievement since the NAPs were prepared in 2011-12, are decisions in France, Luxembourg, Belgium and Netherlands to stop using pesticides in public areas. Our members in Italy and France have informed us about having strengthened rules on aerial spraying in Member States, and we are often made aware about progress in the field of checks on spraying equipment etc. However, we still find that major elements are missing.

We fully agree with the report’s main conclusion calling for MS to finally identify overall objectives, quantifiable pesticide use reduction targets, timetables and measures. We advise that special attention be given to monitoring environmental and health damages caused by pesticides, improving water quality, fostering and maintaining biodiversity, and supporting towns going pesticide-free while real Integrated Pest Management (IPM) is becoming mainstream in the European agricultural sector.

The report from the European Commission, inter alia, says: The national action plans are the basis of Member State controls of the Directive, but there is huge diversity in their completeness and coverage. And calls for ‘Member States need to improve the quality of their plans, primarily by establishing specific and measurable targets and indicators for a long-term strategy.’

The report also says: Integrated Pest Management is a cornerstone of the Directive, and it is therefore of particular concern that Member States have not yet set clear targets and ensured their implementation, including for the more widespread use of land management techniques such as crop rotation. We welcome that ‘the Commission will support the Member States in the development of methodologies to assess compliance with the eight IPM principles, taking into account the diversity of EU agriculture and the principle of subsidiarity’.
What is needed now is to catch up with the three year delay

It is time for the EU and MS to recover the time lost in the SUD implementation. They owe this not only to the SUD but also to the 1.3 million people who signed the European Citizens’ Initiative to ban glyphosate, reform the pesticides approval process and protect citizens and the environment from toxic pesticides.

It is becoming more and more evident that citizens want farmers to reduce dependency on pesticides, a fact recently compounded by the sheer velocity at which the ECI managed to fulfill the requirements for its successful completion (it is the fastest-growing ECI ever, having collected over 1.3 million signatures from across Europe in under six months).

The good news about the three years delay is that revision falls within the period where CAP reforms discussions are started.

**MEMBER STATES NEED TO SERIOUSLY REVISE THEIR NAPs**

PAN Europe calls on MS to publish their revised National Action Plans (NAPs), as foreseen in the SUD in 2017-early 2018, this time identifying overall objectives, quantitative targets, timetables and measures on pesticide dependency reductions, giving special attention to improving water quality and the uptake of alternative techniques in the agricultural sector.

**Article 4 of the SUD: When drawing up and revising NAPs, MS shall involve all relevant stakeholder groups.**

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**26 NOV. 2014:**
Commission shall submit report on NAP implementation to EP and Council (ART. 4.3)

**DEC. 2016-2017:**
Member States shall review National Action Plans at the least every five years (ART 4.2)

**26 NOV. 2018:**
Commission shall submit report on NAP implementation to EP and Council. It may be accompanied, if necessary, by appropriate legislative proposals (ART. 4.4)

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In addition to working the ground under vines mechanically rather than with chemicals, we have not used any weed-killer for over 25 years... over the past 10 years we have reduced our pesticide usage by 80%
PAN Europe calls the European Commission, MS and regional governments to support cities and towns in their efforts to ban the use of pesticides in both public and private areas including those used for agriculture. The European Commission and MS should encourage cities’ and towns’ moves towards going pesticide-free by creating a favorable political context, by using the SUD, in which towns and cities are able to take decisions to ban pesticides. PAN Europe calls on the European Commission to put in place enabling policy and regulatory frameworks for cities and towns to phase-out pesticide use in the areas under their control.

**Pesticide Free Towns**

PAN Europe welcomes the fact that the European Commission finally recognizes its role as guardian of the EU laws and that actions of non-compliance are now foreseen.

The report states: *The Commission has written to those Member States where there are noted omissions in either the plans or their implementation, to remind them of their obligations and the importance of the implementation of this Directive. Building on the series of six fact-finding visits to Member States in 2017, the Commission will continue evaluating the NAPs and to monitor implementation of the Directive by Member States through its audits, other actions and follow-up activities to ensure that the objectives of the Directive are being achieved. If necessary, the Commission will give consideration to infringement action.*

Danish use of pesticide in public area, as an illustration on what it means when quantitative targets, timetables and measures are missing.

Since the 90s, Denmark has had a policy aiming at zero use of pesticides in specific public areas, for example pesticide use in cemeteries were banned, while there is a voluntary agreement with Danish towns and the Union of Golfers to phase out pesticides.

However, it is still up to each individual town to decide whether or not to follow the deal, and while the Danish authorities don’t monitor pesticide use in public areas since 2010, and don’t publish findings, the Danish administration has no tool to ensure compliance and no right to ask questions to towns, as the timetable is missing.

**The European Commission needs to ensure implementation while shifting focus**

PAN Europe calls on the European Commission, MS and regional governments to support cities and towns in their efforts to ban the use of pesticides in both public and private areas including those used for agriculture. The European Commission and MS should encourage cities’ and towns’ moves towards going pesticide-free by creating a favorable political context, by using the SUD, in which towns and cities are able to take decisions to ban pesticides. PAN Europe calls on the European Commission to put in place enabling policy and regulatory frameworks for cities and towns to phase-out pesticide use in the areas under their control.

**PAN Europe calls on the European Commission to recover the three years’ delay by:**

1. Making sure MS revise their NAPs this time identifying clear quantitative targets, time tables and measures for delivering in 2017-early 2018
2. The European Commission should deliver the 2018 SUD evaluation as planned, and the SUD reflection should be fully integrated into the post 2020 CAP
3. Integrate the SUD into other EU policies starting with the CAP including measures to ensure serious uptake of IPM and make sure that transition towards low impact farming become a corner stone of the post 2020 CAP, with reduction of pesticide dependency becoming one of the indicators of success

Also, PAN Europe encourages the European Commission to go beyond mere compliance with the SUD (check of equipment, training and certificates, etc. towards focusing on how to obtain better environmental results for soil, water, biodiversity, etc.), sufficient monitoring and surveillance, and promoting the central European experience in making towns pesticide free, while ensuring uptake of real IPM in EU’s agricultural sector.

**A new income type for the farming community: Regis Quore, Fredon Alsace, farmers association;**

We were approached by the Alsace Region and the Rhine Meuse water agency in the early 2000s to work with local councils to help them reduce the quantity of pesticides being used
Check of equipment is not an end in itself, but part of living in a society

The main achievement so far in the implementation of the SUD seems to be that now all farmers need to be trained, and their equipment needs to be checked regularly. However, as EU policy-making is moving toward the idea of result-based approaches, it is questionable to what extent monitoring whether pesticide spraying equipment has been checked, should be considered an achievement and/or trigger public funding. It is difficult to understand this from a citizen’s point of view, as doing so seems the absolute minimum.

Each car owner in Belgium with a car over four years old, needs to do an annual technical check to be paid by the car owner, to be able to keep on driving in Belgium.

Finally, in the debate on harmonized risk indicators PAN Europe proposes to move focus towards ensuring collecting of pesticide use statistics data as foreseen in EU Regulation No. (EC) 1185/2009 on pesticide use statistics. This would imply giving less attention to complicated indicators like Harmonised Environmental Indicator for Pesticide Risk (HAIR) and instead more attention to simple indicators like the Foot Print indicator and the IRENA agro-environmental indicators, while giving more attention to EU wide monitoring tools like the Land Use/Land Cover Area Frame Survey (LUCAS).

The slogan of the PAN Europe campaign in 2002 suggested a text for the Directive on Pesticide Use Reductions in Europe (PURE): ‘Rather than wasting more years to agree on standard risk indicators, it is time to take action to protect environment, health and biodiversity’

Special measures needed

42% of the EU’s freshwater ecosystems suffer from chronic toxicity because of failures of pesticide risk assessment/risk management systems to protect our aquatic ecosystems and their contribution to the environmental degradation we experience today. Studies show that the agricultural sector is a major cause of water pollution. Pesticides banned decades ago, such as atrazine, a reprotoxic and endocrine disrupting herbicide, keep reappearing: recently also the herbicide desphenyl-chloridazon used in the production of sugar beets, beets and onions, which was banned in 1996 in Denmark but is appearing in wells.

In 2013, PAN Europe concluded, in its report Evaluation on the National Action Plans that improvement of water quality is one of the areas not being sufficiently targeted in the NAPs. From the European Commission report it seems that not much has changed since then. The Commission report states: NAPs are also inconsistent as regards establishing quantitative objectives, targets, measurements and timetables for the various action areas. In some areas, for example the testing of pesticide application equipment, the plans are excellent with almost all of them setting specific targets to achieve full compliance. On the other hand, most Member States did not establish targets and timetables for measures to protect the aquatic environment from pesticides. In addition, in around 80% of cases, action plans do not specify how the achievement of targets or objectives will be measured. The absence of clear measurable targets makes it difficult to assess the progress with implementation and to identify areas where further actions are needed.

PAN Europe welcomes that the topics of agriculture and sustainable water management in the EU were at the core of the informal council of Agriculture Ministers meeting in Malta on the 23rd of May 2017 (SWD(2017)153 final), also included a reference to pesticide use and implementation of the SUD. However, we believe that the way forward should be a much more rigorous approach, in the way that pesticide authorisation is carried out that derogations need to be seriously limited. Furthermore, since the current CAP is unable to encourage reductions in pesticide dependency, it needs to be reformed using the SUD as a basis to do so.

Watch the film to find out about alternatives from the IPM triangle that Marc Cocquyt uses

“...we ended up being invited to a couple of meetings at the Gorsem Agricultural Research Centre that was around 1988... That was when my opinion changed completely. Over the past 30 years our company has managed to voluntarily reduce pesticide use by 90%”
A number of towns across Europe (e.g., Aarhus) have taken interesting approaches to ensure the protection of drinking water, but are being seriously challenged by farmers’ unions and the pesticide manufacturing industry. In this regard, PAN Europe takes note of the European Commission guidance document on monitoring (C(2017) 6766 final) and surveying the impacts of pesticide use on human health and the environment.

We call specific attention to the following issues in the next NAP preparation period:

- **Victims of pesticides**: many people who are victims of pesticides who dared to challenge the system and break out of their anonymity are now appearing on the French or European map of victims of pesticides. A French association has been established to assist victims of pesticides.

- **Soil**: Soil samplings done within Land Use/Land Cover Area Frame Survey (LUCAS), and a collaboration between European Commission’s Joint Research Centre and two Dutch laboratories, made it possible to monitor glyphosate in topsoil, finding that 45% of Europe’s topsoil contains glyphosate residues. It is crucial that pesticides (at least starting with glyphosate and neonicotinoids) are included as monitoring parameter within LUCAS.

- **Biodiversity**: More than three decades of scientific measurement in German natural reserves shows a 75% loss in insect populations, according to new findings revealing that intensive agriculture surrounding the nature reserves has played a crucial role in this (Hallman et al. 2017). Similarly, German birds monitoring shows a drop of 15% of birds (especially insectivorous species) over 12 years in Germany (NABU 2017). Unfortunately, the lack of data on pesticide use in neighboring fields does not allow for the establishment of a clear link with the biodiversity loss in reserves. It is a good moment to kick off an EU study on this matter.

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**Pesticide use statistics**

Article 67.1 of EU Regulation (EC) No 1107/2009 on placing of the market of plant production products specifies:

*Producers, suppliers, distributors, importers, and exporters of plant protection products shall keep records of the plant protection products they produce, import, export, store or place on the market for at least 5 years.*

*Professional users of plant protection products shall, for at least 3 years, keep records of the plant protection products they use, containing the name of the plant protection product, the time and the dose of application, the area and the crop where the plant protection product was used.*

Article 2.1 of EU Regulation (EC) No 1185/2009 concerning statistics on pesticides doses, specifies that MS have to transmit:

- Annually provide statistical data on pesticides placed on the market each year (pesticide sales statistics) starting in 2011;
- Every five years, provide statistics on pesticides used in agriculture (pesticide use statistics) starting in 2015 and covering the period 2011-2014.

The latter should be based on collection on data from farmers as foreseen in article 67 of the EU Regulation No (EC) 1107/2009. However, to date this information is not being collected.


*Pesticide statistics are too aggregated to effectively inform environmental risk assessment. A robust analysis of the impacts of pesticide application on ecosystems would require data on which specific active substances in pesticides are applied to which crops, as well as information on the types of ecosystems in which those crops are sited.*

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The farm land borders were first planted as part of a Water Board experiment to see if the three metre wide border of flowers or grass would result in less fertiliser and pesticides being found in the water... in the past 10 years, I haven’t had to use anti-lice spray on my potatoes, sugar beets or grain... the word spread... we now have 550km of flower borders.
The Regulation provides that for the statistics on agricultural use of pesticides, each Member State has to decide on a selection of crops to be covered during the five-year reference period that is representative of the crops cultivated in that Member State and of the substances used. The selection of crops has to include those most relevant for the national pesticide action plans. However, as national action plans do not always contain any reference to the most relevant crops, the choice of crops has been quite diverse. This has led to a situation where there is a risk that it will not be possible to fully compare data on pesticide use on crops between countries.

The report among others proposes following statistical improvements:

The Commission considers it equally important to adapt further the legislation on pesticides use statistics to ensure a more consistent approach and coverage across the Member States. This could include specified common reference periods and clear coverage requirements for the crops to be surveyed. The coverage rules could be based on the crop production statistics (a certain percentage of arable and permanent crops could be covered) and on analyses of the potential risks to the environment and human health, based on the sales of active substances. These rules would be set up in close collaboration between the relevant Commission’s services and agencies and with national experts. ...

The Commission strongly recommends that pesticide statistics should be also merged with the other agricultural statistics domains.

The European Commission’s fact-finding overview said that only in 3 out of 6 MS (Denmark, Germany and the Netherlands), where visits took place, demonstrated substantial progress towards the achievement of risk reduction targets.

It is a real pity that this message is not reaching the other MS as information on pesticide use is not being collected from all parts of EU.

Table Grapes Stefano Borracci

“.. my main products are cherries and table grapes..we produce both seeded and seedless varieties...”

our company set itself a target of transforming to 100% organic production over the course of the next few years -

PAN Europe calls on the importance of proceeding to implement this regulation to ensure that pesticide use statistics are made available to policy makers and the general public. For example, in the last couple of years the heated debate around the ban on neonicotinoid pesticides and the renewal of authorisation for glyphosate took place without official statistics being available about the use of these substances which coincidentally are amongst the most widely and heavily-used.
On uptake of IPM and its integration into the CAP

Art. 4.1 of the SUD clearly states that MS should use the NAPs ‘to encourage the development and introduction of IPM and of alternative approaches or techniques in order to reduce dependency on the use of pesticides’.

Art. 14.4 also states that ‘Member States shall describe in their National Action Plans how they ensure that the general principles of integrated pest management as set out in Annex III are implemented by all professional users by 1 January 2014’.

In its 2013 report, Evaluation on the National Action Plans, PAN Europe concluded that MS have not taken the necessary measures to ensure compliance with the SUD.

The recent report from the European Commission confirmed that little has changed, saying: Integrated Pest Management is a cornerstone of the Directive, and it is therefore of particular concern that Member States have not yet set clear targets and ensured their implementation, including for the more widespread use of land management techniques such as crop rotation.

Member States need to develop clearly defined criteria so that they can assess systematically whether the eight principles of IPM are implemented, and take appropriate enforcement measures if this is not the case. Such tools could confirm that the intended outcome of IPM as specified in the Directive, a reduction of the dependency on pesticide use, is being achieved.

It is positive to notice that the European Commission in the report states: ‘the Commission will support the Member States in the development of methodologies to assess compliance with the eight IPM principles, taking into account the diversity of EU agriculture and the principle of subsidiarity’.

### PAN Europe calls for the main focus of the post-2020 CAP: Encourage farmers to transition towards low-impact farming

Spa mineral water: we established a partnership in 1967 with the public authorities... we introduced a range of rather innovative production measures... also some very specific such as banning pesticides – way back in the 1960s – banning fertilisers... This has all been done with a view to protecting our resources.
As explained in PAN Europe’s position paper from July 2017, the current CAP is not capable of reducing pesticide dependency at the farm level.

Policy instruments which can help change farmers’ behaviour relating to pesticides use includes among others: mandatory law requirements, direct aid (e.g. CAP subsidies and state aid) and indirect aid (e.g. VAT exemptions), subsidies and taxation.

To date there are few mandatory instruments within the CAP encouraging farmers to reduce pesticides use. Simple and effective practices like crop rotation was introduced into the Good Agronomic and Environmental conditions in the 1999 reform, but lost significant attention but was discontinued in the 2013 CAP reform. Instead, crop diversification was introduced as a Greening measure, but this only applies to bigger farms, and does not actually oblige crop rotation, we doubt its effectiveness. Therefore, we consider that the main achievement so far in the CAP first pillar on pesticide dependency reductions, is the so-called Ecological Focus Areas measure (at least part of the year) should become pesticide free from 2018.

On the other hand there are still many instruments that artificially encourage farmers to buy pesticides. MS like Poland, Portugal, Slovenia, Spain and Cyprus still offer artificially low levels of VAT for farmers buying chemical pesticides and fertilisers!

Since 2015, MS are obliged to inform farmers wishing to have information about alternatives to pesticides via the official Farm Advisory System (FAS), financed under the CAP second pillar. All MS need to have FAS in place as a mandatory aspect of the CAP.

MS wishing to reduce dependency on pesticide use can use both bottom up and top down measures. They can either introduce a significant pesticide tax (e.g. Denmark but also outside the EU, Norway) or offer Rural Development funding to farmers to encourage them to introduce crop-specific IPM, and as a result reduce pesticide use. Also, MS can encourage uptake of alternative techniques through information and training session offered by farm advisors, establishment of demonstration farms, farmer-to-farmer exchanges of best practice, etc.

### Pesticide taxation

The Danish pesticide tax was introduced in July 2013. It is composed of a ‘base tax’ which is determined by the amount of active ingredient in the pesticide and the three load factors based on the toxicological, environmental fate and ecotoxicological properties of the product. The highest tax of 7 709 Danish Krone (DKK)/kg, equivalent to 1 040 EUR/kg, relates to insecticides containing the active ingredient cypermethrin. Among the lowest tax are those applied to herbicides containing glyphosate, which have a relatively low pesticide load and hence tax, with taxes up to DKK 51 DKK/l, equivalent to 6.90 EUR/litre.

PAN Europe asked the European Commission to obtain an overview of how the 118 Rural Development Programmes encourage reduction of pesticide use (measures offered, number of hectares, number of farmers and related amounts).

Also, we have asked to know how the FAS across Europe encourage uptake of alternatives. We are still waiting for a reply!

Instead, the fact-finding missions that Health and Food Safety Directorate General have been undertaking in 2016, summarised in an overview report, gives some very interesting information about uptake of alternative techniques in MS, including:

- MS already have monitoring systems in place for forecasting, warning and early diagnosis of pest and disease control. MS have established economic thresholds for significant pests to help farmers with decision-making, while many MS have IPM demonstration farmers and that a wide range of IPM guidelines already. Some MS keeps on developing new tools, for instance IT system to map weeds in Denmark (point 95) which over time will be able to reduce the farmers dependency on herbicides.

- Some of the MS visited have been reflecting on what to do next (point 7): France has identified that the main challenge in achieving their use reduction target is ensuring the widespread adoption of innovative techniques, such as mechanical weeding.

- There is still a lot of scepticism within the farmer advisers and grower associations regarding uptake of alternatives to chemical pesticides (point 95): ‘During all six missions, both CAs and grower organizations acknowledged that there are insufficient alternative control methods and techniques available to growers of field crops, compounded by a low level of implementation of some IPM techniques in these crops.’

- The importance of independent, publicly-funded research and advisory services was emphasised by grower organisations in the course of all six missions (point 91).

### A reminder in this entire debate on pesticide use and economics:

Jacquet et al. 2011: pesticide use can be reduced by 30% without consequences for yields and margins; and

Lechenet et al. 2017: pesticide use can be reduced by 42% in 59% of the (946) farms studied without consequences on yield.
Also the SUD evaluation report states that: In all six Member States visited, the authorities stated that in their view, some IPM techniques could be adopted on a more widespread basis, such as crop rotation, proper selection of seed and planting material and use of adequate cultivation techniques. A survey in Denmark corroborated this view by showing that while awareness of IPM techniques had increased among farmers, the actual level of implementation of these techniques had only increased marginally. An analysis carried out by the Netherlands showed that IPM principles are implemented by farmers generally, but none of the IPM general principles is used to their full potential.

The SUD evaluation report also explains why the implementation of the SUD has failed so far: Member States have not converted the IPM principles into prescriptive and assessable criteria. They see IPM mainly as an education tool for farmers, and have no methods in place to assess compliance with IPM principles. While Member States take a range of measures to promote the use of IPM, this does not necessarily ensure that the relevant IPM techniques are actually implemented by users. Farmers are economic operators, and while IPM techniques are sustainable from a long-term perspective, IPM can mean a higher economic risk in the short-term. For example, it may be seen as preferable to grow maize or wheat in monoculture for economic reasons. However, this short-term approach to land management comes at considerable risk of longer term cost, for example due to increasing populations of pests or weeds in monoculture. Ultimately, monoculture can cause loss of biodiversity, soil erosion and even desertification. As an example of a short-term approach, Romania granted emergency authorisations for using neonicotinoids as seed treatment in an undefined area of maize, without investigating the potential of crop rotation as an alternative.

PAN Europe agrees completely with this statement, and propose following aspects to become core element in the post 2020 CAP:

A new CAP policy framework (in both the first and the second pillar) able to support farmers technically, financially and morally towards the holistic uptake of low-impact farming. This should be supported by a strong and independent FAS that encourages the continuous implementation of the IPM and IWM (Integrated Weed Management) tools.

- As agreed as part of the 2013 CAP reform, include aspects of SUD into the CAP, building on the IPM and IWM pyramids asking each farmer to develop a plan, selecting the combination of IPM/IWM tools from a menu of measures, and to obtain different levels of points, making him/her eligible for different levels of CAP support
- As explained in PAN Europe’s position paper on risk management: Convert part of the current first pillar payments in the development of certain forms of mutual funds to cover part of the production risks. This tool could encourage farmers to apply preventative agronomic measures to prevent the pest from establishing/spreading, and encourage an uptake of low impact farming

PAN Europe recognises that not all farmers or advisors have the necessary knowledge of alternative systems: many have lost their knowledge about what working with nature (rather than against it) means, while not all are aware of the alternative products on offer (widely used in some MS but not allowed in others), and finally of course there are situations where alternatives are still to be (re-)discovered. For this reason, it is important to engage also in the European Innovation Partnership (EIPs), financed under the Rural Development pillar of the CAP. It is also important to foster a bottom-up as well a top-down participatory approach, and to allow exchanges of knowledge and best practice between farmers, advisors and researchers on alternatives to pesticides.

Part of this change should be financed by establishment of a third pillar of the CAP for input taxations.

PAN Europe also demands a systematic collection of pesticide use statistics at farm level and forwarded to public administration. This could even be a key tool to control compliance as should as a result become one of the success indicators of the CAP post 2020.

An example of record-keeping and monitoring (point 85 of fact-finding overview).

In the Netherlands, farmers must record all IPM measures carried out, including pesticide use, in a plant protection register kept on farm. The register must be kept up to date and completed within two months after the end of the growing season. Records kept are required to include all IPM measures taken, including crop rotation, use of resistant varieties, biological, physical and non-chemical methods, selection of pesticides based on risks for the environment and humans, monitoring of harmful organisms, use of warning and forecasting systems and resistance management. The plant protection register is intended to help growers to evaluate their IPM approach and adapt it for the following growing season.
Integrating Weed Management

Many little hammers

- Eliminating rhizomes
- Uprooting and removal, harrowing
- Cutting weeds before they set seed
- Grazing by animals
- Mechanical weeding (including robotic)
  - Mowing/cutting
  - Ploughing
  - Mulching
  - Hoeing
  - Rolling
- Hot water
- Steaming
- Flaming
- Electricity
- Finger weeding

Knowledge building,

Preventive,

Agronomic practices

Physical weed control;

Biological control

Biological, cultural, and biological

Physical, mechanical, thermal and biological

Mapping, monitoring, and designing

Forecasting

Practices

In IWM

Crop rotation

Selection of competitive varieties

Interseeding cover crops

Use of stale seed beds

Dense planting of crop

Avoid bare soil

Under-sowing with secondary crop

Weed suppression by growth inhibitors in cover crops/residues (allelopathy)