

NAP Best Practice

Sustainable use of pesticides: Implementing a National Action Plan



Meeting the challenge,
protecting health,
environment & biodiversity



**Pesticide
Action
Network**
Europe

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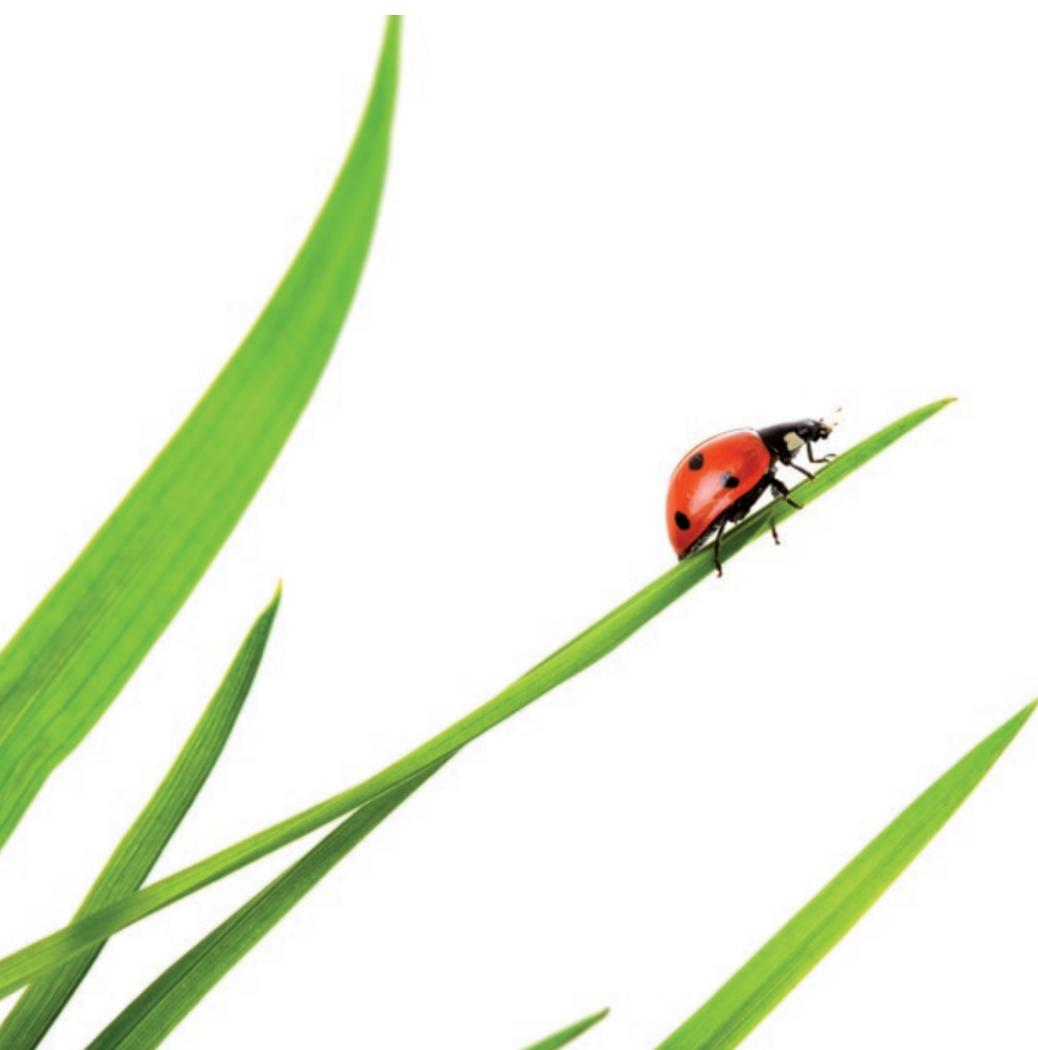


Table of contents

Why do pesticides matter?	3
Introduction	5
The purpose of this guide	5
The challenge for member states	5
1. Member states' obligation to produce National Action Plans by 2011	6
2. Preparing the NAP.....	7
2.1 Involving stakeholders	7
2.2 Accompanying NAP implementation with financial instruments	7
3. Setting quantitative targets: An essential objective of all NAPs	8
4. Integrated Pest Management (IPM) A key to a NAP which makes a difference	10
4.1 The practice based approach to IPM	10
4.2 The product based approach to IPM	11
4.3 IPM support systems which work	12
4.4 Protecting the environment and biodiversity as part of IPM	14
4.5 Start setting up your IPM framework now	16
5. How to target health in the NAP.....	17
5.1 Food contamination: Targeting MRLs in the NAP.....	17
5.2 Workers' exposure: Prohibiting use of pesticides in specific circumstances	18
6. Ban use of synthetic pesticides in specific areas, starting with public areas	18
7. Spraying.....	20
7.1 Prior and post-application of spraying hazard warnings	20
7.2 Aerial spraying: prohibit, or reduce to an absolute minimum	21
8. Inspection of equipment in use	22
9. Handling and storing pesticides	22
9.1 Diluting and recycling.....	22
9.2 Rules must apply to professionals and non-professionals	22
10. Monitoring the impact of pesticide use on human health and the environment.....	24
11. Measuring the NAP's success	24
12. Establishing a good IPM framework: Implemented as a hierarchy, prioritising preventive measures, and setting up the support system now	26
12.1 Governments to put information and tools for pest monitoring and decision-making and advisory services at the disposal of professional users	26
12.2 Get inspiration from existing IPM systems	27
12.3 Define crop-specific IPM methods and practices	27
12.4 IPM training linked to renewable spraying certificates	28
12.5 Oblige farmers who receive public funding to draft annual IPM plans	28
Conclusion	30
What other legal requirements applying to member states could be delivered by an effective NAP?.....	31
Contacts.....	32
References	34



Why do pesticides matter?

Pesticide exposure is not just relevant to farmers and agricultural workers who are in direct contact with these substances. Families can also be exposed directly through food, occupational use, gardening and household use, where homes are near sprayed fields, and through a parent's professional or amateur use. Children can also be exposed in school playgrounds, rolling on park lawns and on football pitches.

Pesticides don't respect boundaries and spread into water, and accumulate in plants and animals. So pesticide exposure doesn't just matter to those who work directly with chemicals. Pesticide exposure concerns us all.

The Collegium Ramazzini, an international academy of over 180 experts in environmental sciences and occupational health, has recently highlighted the growing body of scientific evidence demonstrating links between exposure to hazardous pesticides and potentially serious adverse impacts on human health. Several approved pesticides are considered carcinogenic and may contribute to the development of life-threatening diseases such as breast cancer, colon cancer, leukaemia and lymphomas. There is also scientific evidence associating children's and pregnant women's exposure to pesticides with cancers in childhood and later in life (EP ENVI study). Further scientific evidence is also emerging on the disastrous effects of combined pesticides on human health. In a new study commissioned for the European Commission, Professor Andreas Kortenkamp, the leading researcher, states that it has been demonstrated that the effects of mixtures of chemical substances are considerably more pronounced than the effect of individual components.

To protect vulnerable groups like unborn babies, and children who are particularly vulnerable to potential adverse health impacts, and that protective mechanisms such as metabolic pathways are immature, a responsible pesticides policy would apply the precautionary principle.



An ideal NAP will challenge modern agriculture's dependency on chemicals. It will involve all stakeholders in a process of identifying where reductions of pesticide use can be achieved without affecting farmer profitability, it will use targets and timetables so that progress in pesticide use reduction can be tracked and accelerated, and it will aim at chemical-free pest management and long-term sustainability of food production.

Gretta Goldenman, a founder of PAN International



Introduction

Pesticide Action Network (PAN) was founded in 1982 and is a network of over 600 non-governmental organisations, institutions and individuals in over 60 countries worldwide working to minimise the negative effects and replace the use of harmful pesticides with ecologically sound alternatives. Its projects and campaigns are coordinated by five autonomous Regional Centres.

PAN Europe is the regional centre in Europe. It was founded in 1987 and brings together 32 consumer, public health, and environmental organisations and other non-governmental groups in 19 countries.

PAN Europe is the focal point of NGO advocacy and public participation in EU pesticide policy. Our activities include: lobbying at Brussels level, disseminating information on pesticide problems, regulations and alternatives, holding workshops and conferences and facilitating dialogue for change between government, private sector and civil society stakeholders.

PAN Europe has traditionally focused on getting harmful pesticides banned. This is still essential as governments' pesticide evaluation lags many years behind product development and Europe's pesticide approval process has yet to tackle new concerns like endocrine disruption and increased sensitivity among children and foetuses. We have also seen that the latest generation of pesticides sold by chemicals companies are not appreciably safer for the environment or our health. So replacing old pesticides with new won't do much to reduce risks. PAN Europe therefore stresses that better agricultural practice and management are the best way to ensure sustainability and high food quality.



An ideal NAP is one taking all means into account to reduce pesticide dependency/use."

Professor Peter Esbjerg, Zoology Section, LIFE Copenhagen University (President of IOBC/WPRS 1997-2005)



The only way forward is dependency/use reductions, covering a set of targets and timetables, and based on a change in the current agricultural system, into a system based on sustainable, holistic integrated crop management also encouraging more organic farming.

Catherine Wattiez who was behind the PURE Campaign which led to the sustainable use directive



The purpose of this guide

PAN Europe has written this guide to assist and support EU member states in producing their National Action Plans (NAP) as required under the Sustainable Use Directive. Several countries have come up with promising initiatives for reducing pesticide dependency, though none has yet delivered a complete NAP. All EU member states must be proactive in making change happen.

The contact details at the end of this guide allow you to get in touch with those who can give you further information on practices which are already being applied in some countries.

More details, and updated information, can also be found on PAN Europe's website

PAN Europe does not necessarily endorse every detail of the examples given in this guide. In many cases we feel even more should be done. But we need to start somewhere and refine the process as we advance.

The challenge for member states

To develop a successful NAP, each member state must set up an overall strategy as a combination of instruments, regulating, communicating, stimulating and inspiring. Success will depend on cooperation between regional and national governments and farmers, research institutes, civil society and NGOs, including environment and health groups, plus enough funding to ensure proper implementation.



An ideal NAP is one established in cooperation with all interested parties with the objective to achieve radical changes in pest management in order to get away from today's prevailing pesticide dependence in food production, which will require extensive support in research and development of non-chemical plant protection methods and practices.

Peter Bergkvist, KEMI





If biodiversity is to be restored there must be a Europe-wide shift towards farming systems that does not depend on synthetic pesticide input but that secures harvest throughout improved crop management, crop rotation and crop diversity. An ideal NAP should take the Framework Directive's aim of reducing the impacts of pesticides on human health and the environment very serious and ensure the reduction of pesticide dependency by ensuring that priority is given to non-chemical pest prevention and control methods.

Susan Haffmans, PAN Germany



1. Member states' obligation to produce National Action Plans by 2011



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 4 that:

"Member states shall adopt National Action Plans to set up their quantitative objectives, targets, measures and timetables to reduce risks and impacts of pesticide use on human health and the environment and to encourage the development and introduction of integrated pest management and of alternative approaches and techniques in order to reduce dependency on the use of pesticides. These targets may cover different areas of concern, for example worker protection, protection of the environment, residues, use of specific techniques or use in specific crops."

As the first step to reduce pesticide dependency, the most important measures beyond setting quantitative use reductions, are:

- 1) **Implementing IPM**, for all EU farmers to apply from 2014, so "professional users of pesticides switch to practices and products with the lowest risk to human health and the environment among those available for the same pest problem." (Article 14.1). The importance is to give priority to preventative elements .
- 2) **Giving priority to non-chemical alternatives** "Member states shall take all necessary measures to promote low pesticide-input pest management, giving wherever possible priority to non-chemical methods."(Article 14)
- 3) Ensure that pesticide use is **minimised or prohibited in specific areas** (Article 12).
- 4) Establishing **appropriately-sized buffer zones** to protect non-target aquatic organisms and safeguard zones for surface and groundwater used for the abstraction of drinking water, where pesticides must not be used or stored (Article 11).



2. Preparing the NAP



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 4 that:

"When drawing up and revising their National Action Plans, member states shall take account of the health, social, economic and environmental impacts of the measures envisaged, of special national, regional and local conditions and all relevant stakeholder groups."

All NAPs should be developed as part of an overall strategy, comprising a range of instruments which bring positive results through regulation, communication, stimulation, and inspiration. The key to success is a transparent, participatory, practical and task-oriented NAP. The NAP must have a vision, which identifies local problems, is based on prevention, respects the precautionary principle (promoting substitutions and alternatives), encourages trailblazers and offers solid solutions.

The NAP also needs adequate financial backing if it is to be successfully implemented. Finally, the NAP review process is essential to continuously improving the system.

2.1 Involving stakeholders

The first step in setting up an effective NAP is establishing a real stakeholder forum involving all relevant players, especially environmental and health NGOs, to help develop, decide on, deliver and monitor progress and recommending enhancements of the NAP. Only by involving civil society organisations in this process can the final plan obtain public support.

2.2 Accompanying NAP implementation with financial instruments

This law comes when member states and regions are facing several environmental, health biodiversity and climate change challenges. Since the pesticides NAP overlaps with existing measures and programmes, here is an excellent opportunity to make NAP part of the overall environmental and health national plan fulfilling various real challenges while ensuring compliance with EU law.

It takes courage to develop a sustainable agricultural model committed to long-term agro-ecological methods, instead of simply continuing with agrochemical input for short-term solutions, but it is also a great advantage to member states which take this chance.

Consumers seem willing to pay for a reduction in pesticide use for both environmental quality and consumer health (Ali Chalak et al 2008), so why not apply a pesticide tax to help ensure successful implementation? Scandinavian countries already have a pesticide levy. Norway runs a seven-step levy which is directly proportional to the health and environmental damage which active substances cause. Denmark will soon introduce levies, which are directly proportional to a product's threat (it has already returned most of this money to farmers who now pay lower property taxes for their farms).



NAPs have proved a very effective tool to reduce both pesticides use and dependency in Denmark. The plans have been the cornerstones of the policy for more than two decades and we know it works. Based on the inclusion of all stakeholders in designing a balanced but ambitious policy we have achieved significant reductions and brought farming and environmental protection forward.

Dan Jorgensen, Member of the European Parliament, Vice-Chairman, Committee on the Environment, Public Health and Consumer Policy



Success stories

The United Kingdom has six action plan implementation groups and the pesticide forum. All are all multi-stakeholder fora.

Each action group is divided into topics, which allows stakeholders to join action groups in which they have specific interest or expertise.

Germany has a 'National Action Plan on Sustainable Use of Plant Protection Products Forum' (formerly the Reduction Programme Chemical Plant Protection Forum, established in 2002). The Forum comprises a committee of representatives from consumer protection, environmental protection and nature conservation, agriculture, horticulture and forestry, product approval and registration, the food processing industry, food and pesticide retailers, plant protection research and plant protection representatives from the German federal states. The Forum reviews progress with the Action Plan and recommends enhancements



Encarsia formosa
A classic biocontrol agent for greenhouse crops



3. Setting quantitative target: An essential objective of all NAPs

The quantity of pesticides used does not necessarily reflect the risk they represent. The risk depends on factors like type of product, toxicity, persistence, climate and soil conditions, water solubility, type of cultivation and application practices, and resulting exposure. New active substances can be applied far less copiously without necessarily bringing a corresponding cut in risk to health and the environment. High-dose pesticides will not necessarily produce an increased risk.

EU countries are definitely using more pesticides (in the Netherlands and Denmark it rose 15% in 2008). To avoid any increased risk to health and the environment, EU countries must set clear targets, financial backing and timetables for cutting dependency and use. This means cutting dependency on all synthetic pesticides, including new low-dose ones which are not necessarily any better for the environment and health but whose residues are hard to trace in the environment owing to the high cost of analysis.

Exempted from the obligation of reduction should be biological control agents, in line with Article 14 of the Framework Directive 2009/128/EC member states shall: "give wherever possible priority to non-chemical methods."



NAP may be a key, strategic document for continuous improvement of pesticide use towards less negative impacts on environment, ecosystems and human health, bringing an effective monitoring of residues in food, water and environment, a complex information system and independent advisory, as well as the guide for successful implementation of non-chemical alternative approaches for plant protection in practice.

Daniel Lesinsky, CEPTA and PAN Europe board member



A ideal NAP is one setting out clear and realistic country-specific targets, workable, with financial secured tools, effective implementation and revision, with a win-win result of dramatic pesticides dependency and risk reduction for farmers, bystanders, consumers and EU environment.

Valentina Lukova, Friends of the Earth Bulgaria and PAN Europe board member



An ideal NAP is one setting clear reduction targets and timetable for implementation, offering farmers a strong information system on existing IPM and non chemical systems and strongly supporting research to develop low input systems, including research on resistant varieties.

François Veillerette, President, MDRGF and PAN Europe board member



BEST PRACTICE!

France and Denmark: Setting overall quantitative use-reduction targets

In 2008, France set a 50% reduction, where possible, by 2018 in the 'Ecophyto 2018'. It also banned the 53 most problematic substances, 30 of which would be banned by the end of 2008

Denmark launched its first pesticide-use reduction programme in 1986. In 2000 the second pesticide action plan began. It aimed to reduce pesticide use to attain a treatment frequency index (TFI) of 1.7. This target indirectly remains in a new pesticide action plan which is part of a wider action plan. For 2010-15 the indicator TFI is slightly changed and now also includes organic cultivated land. The new target is a modified treatment index of 1.4 by 2013



GOOD PRACTICE!

Denmark: Setting quantitative targets in sensitive areas

The Danish NAP 2010-15 (included in the Green Growth Plan) proposes:

- Expanding organic crop cover to 15% of the Danish SAV in 2020 (from c 6% in 2008); corresponding to an increase of 230,000 hectares to a total of c 400,000 ha
- Establishing mandatory 10-metre non-sprayed, non-fertilised and unfarmed (footnote) buffer zones on all water courses by 2012, corresponding to 50,000 ha
- Establishing mandatory 25-metre spraying-free buffer zones around public drinking water sources corresponding to 800 ha

Setting quantitative targets for especially sensitive areas can only succeed if accompanied by a strict national strategy targeting conventional farmers, encouraging them to practise integrated pest management.



BAD PRACTICE TO AVOID!

Netherlands: Risk reduction targets with no dependency/use reduction

Risk approaches which lack dependency/use-reduction objectives have so far produced cosmetic results, as in the Netherlands where use remained constant for many years but the risk was predicted to fall by 80%. This unrealistic figure was obtained by just calculating the theoretical emissions reduction to water courses based on national regulation. Owing to uncertainty over what should be included in the risk assessment as common denominator we believe a fair-risk approach is impossible, or yet to be identified.

4. Integrated pest management (IPM): A key in the NAP which makes a difference

Integrated pest management technologies fall into two types: the 'practice based', which depends on changes in farming practices, and therefore have 'public good' characteristics, and the 'product based' which require farmer to purchase some new product in order to acquire the technology. Each needs subtly different policies to encourage farmer to adopt them. (Overcoming market and technical obstacles to alternative pest management in arable systems. Rural Economy & Land Use Programme Policy Note 10. Oct 2009)

4.1 The practice based approach to IPM

Diseases and pest pressure spread faster in monocultures than in other agricultural systems. Crop-specific pests and diseases have time to adapt and strengthen and can spread easily year after year.

One such hard-to-control pest is the **western corn root-worm**. It overwinters in the soil and the larvae feed on corn roots in early summer and severely damage the crop. But intensive maize growth does not invest in any preventive measures. Pesticide-treated seeds and combating pests with pesticides leads to massive bee death. In 2008 some 11,500 bee colonies were poisoned, killing the bees, after maize that was treated with Clothianidin. A preventive approach

includes integrating maize into a crop rotation with other crops to prevent soil erosion and leaching and conserving healthy soil structure. Farmers can row catch crops to prevent leaching, and integrate legumes (nitrogen-fixing plants) in crop rotation to reduce the need for fertiliser input. That is a plus for the environment and the climate and is the only sustainable option.

The blight fungus *Phytophthora* is still the major threat to potatoes. The focus on yield encourages farmers to neglect resistant varieties, the obvious alternative to massive pesticide use. Other measures include wide crop distances and using protective substances. Curative fungicide use can be reduced by deploying decision-supporting systems. Resistance to soil nematodes is also useful. Nematodes, which cause root knot, should be virtually absent. Wide crop rotation is the best way to avoid nematode accumulation. Some green plants can also reduce nematode numbers. Farmers must understand and use the Rhizoctonia index. (Rhizoctonia is a soil-bound fungus which produces stem and stolon canker). Another prevention technique is to limit or ban soil fumigation. Dutch laws have cut soil fumigation to one treatment every 4-5 years, a step in the right direction, which needs to be accompanied by introducing of wider crop rotation.

The practice based approach to IPM needs to be encouraged further in the post 2013 Common Agricultural Policy.

Eretmocerus
widely used in biocontrol on tomato and pepper

4.2 The product based approach to IPM



The NAPs that member states have to adopt should provide a mix of measures that will lead to the reduction of pesticide use, and more explicitly the reduction to an acceptable level of the risks attached to plant protection. The NAPs should set clear sectorial objectives associated with a timetable of foreseen achievements. The most important measures should be the replacement of risky chemical pesticides and the promotion of alternative non-chemical and biological systems. In order to reach a level of low and socially acceptable risks, a special attention should be given to the training and the education of all people concerned with plant protection and providing to those who have engaged in that direction recognition and justified incentives.

Bernard J Blum, Head of International Affairs, International Biocontrol Manufacturers' Association (IBMA)



This includes many different species of parasitic and predatory insects and mites to be applied in several open field and protected crops, e.g. releasing parasitic trichogramma wasps to control corn borer in maize.

What needs to be done to encourage the product based approach to IPM:

A longer-term objective must be to establish a EU-wide regulation for alternatives, though promotion of non-chemical alternatives should start by:

Mating disruption by pheromones. In Europe, this is already authorised and used to control moths in vineyards, orchards and rice fields. A range of 25 microbial species are EU-approved for use in plant protection (Annex I of directive 91/414/EEC). More pheromones and microbial biopesticides should be promoted by registration in line with a **fast-tracking system for biocontrol products**, similar to the system in the USA and Canada.

Support quicker, easier and cheaper registration by adapting regulatory procedures and requirements for selling biocontrol products, helping biological plant protection product companies with the authorisation procedure. The need for qualified biocontrol specialists might grow if biocontrol agents played a greater role.

Promote acceptance and use of biocontrol products and beneficial invertebrates already authorised in various EU countries. Promotion can be carried out by member states, advisory services, etc, by raising awareness of non-



Prevention is when you know something and then you can prevent it. Precaution is when you do not know it but think that there is a big problem. Banning smoking in 1960 would have been precautionary and preventative. Banning smoking in 2003 is purely preventative.

(David Gee, 2003)



Success stories



The Swedish model:

Chlorpyrifos – never approved as a PPP; Linuron – banned in 1995; Mancozeb – 75 % use reduction owing to restrictions and other phase-out activities

Chemical soil disinfection in potatoes was banned 20 years ago in Sweden, and replaced by the following preventive measures: crop rotation, use of resistant crop varieties and monitoring areas infected by plant nematodes

According to the Swedish environmental quality objective 'A Non-Toxic Environment', newly manufactured finished chemical products are as far as possible free from PBTs and CMRs as from 2007. The same will apply to existing products from 2010 including endocrine disrupting or highly allergenic substances.

In 2007 Belgium launched project 'bio-pesticide', hiring a bioengineer to improve biopesticide availability in Belgium. The project targets natural pesticides and products used in organic farming. The global context is the registration procedures. Support has been given to registration dossiers of bio-pesticides and the companies which deal in them. A database with bio-pesticides registered in Belgium is available on the Belgian website: (www.fytoweb.be/biopesticidesweb/07agricultbio.htm) In two years nearly 20 new bio-pesticides have been registered in Belgium in the context of this project.

For more information, see:

Jérémy Denis, jeremy.denis@health.fgov.be

Macrolophus caliginosus
a commonly used predator of whiteflies in tomato

chemical alternatives and methods, by giving them more attention in various fora (including direct advice, websites, advisory leaflets, campaigns).

Rural development programmes of the CAP should be developed to highlight more steps in IPM approach towards alternative techniques, giving more room for both preventive agronomic practices based and product based. Rural development programmes in Belgium, France and Luxembourg already give special attention to alternative products.

It is also important **to support documentation and experience-sharing** in practical and profitable use of these methods, to disseminate information from farmers who have learnt to use different methods.

Finally, there is need to be **increased research** into the pest/pathogen-plant relationship, interaction between pathogenic and antagonistic microorganisms, induction of plant defence mechanisms which increases understanding of the biology and pests' means of communication and behaviour. The more we can interfere with the latter, the more successfully we can avoid using poison.

4.3 IPM support systems which work

An illustration of the pioneering approach to non-chemical pest management is using invertebrate biocontrol agents to control pests in glasshouses. In Denmark this began in the early 1970s with the introduction of the predatory mite *Phytoseiulus persimilis* to attack spider mites, *Tetranychus urticae* in cucumbers, and *E formosa* against the whitefly *Trialeurodes vaporariorum* in tomatoes. Both pests had become highly pesticide-resistant. Many growers began using these two beneficials. In 2000, biocontrol had become routine in glasshouse vegetables (Eilenberg 2000). The same applies in the Netherlands, which now uses biological control in some 50,000 hectares of greenhouses.

PAN Europe sees the imminent move to mandatory application of IPM for EU farmers from 2014 as a major opportunity for the post-2013 Common Agricultural Policy.

We picture implementation of integrated pest management across the EU as a 'ladder'. Prohibited, mandatory and voluntary measures for each crop are defined (if possible including not just pesticides but also fertiliser management). Each step allows farmers to become more sustainable, and increasingly independent of chemical pesticides.

The new IPM system should work alongside a good, accessible and independent advisory and training system, strict checks, and detailed monitoring, and farmers should develop an annual IPM plan as a condition for receiving CAP funding post-2013.

For an evaluation of current IPM support scheme under rural development see: http://www.birdlife.org/eu/pdfs/Could_do_better_report_05_09.pdf
For more details contact: Ariel Brunner, Head of European Policy, Birdlife International: ariel.brunner@birdlife.org.

PAN Europe advises avoiding a single-component approach and stresses the importance of ensuring a more holistic strategy. Instead, member states must aim to apply integrated crop management as a 'ladder'.

BEST PRACTICE!

Switzerland: Financial support for IPM in all agricultural policy fields

Switzerland encourages a preventive approach. The policy supports farmers who provide a range of environmental and animal-friendly measures in both first and second pillars. The scheme is flexible, based on points earned by adopting different practices, and allows phased learning which supports continuous improvement, climbing the IPM ladder.

BAD PRACTICE TO AVOID!

Financial support for single rural development funding measures

Several member states co-finance IPM through rural development funding as a single component approach. For instance, the German state of Rhineland-Palatinate pays farmers €300/hectare for crop rotation, Belgium pays €50/ha for mechanical weeding, and the German state of Thuringia offers an annual subsidy of €5/ha for establishing flowering strips for biodiversity purposes.

GOOD PRACTICE!

Italy and Austria: Financial support for IPM in rural development

Only a small element of the CAP, the second pillar's agro-environmental scheme, allows EU countries to take special action to promote environment-friendly practice, including IPM¹. But little attention is paid to serious implementation of IPM. Unfortunately, some EU countries have used this tool to compensate farmers for proper use rather than genuine pesticide dependency reduction, and little has been done to develop a more pro-active and holistic approach, starting with requiring agronomic practices beyond mandatory levels.

"The ideal NAP develops agricultural practices that allow the maintenance and restoration of biodiversity whose state is a major indicator of environmental policies. In particular, it seeks to respect all insects, particularly pollinators. It bans systemic and preventative pesticide treatments and focuses on alternative control methods, including the redevelopment of a network of natural farmland."

Janine Kievits, Chargé de mission CARI, Beekeeping Research and Information Centre

Success stories

Among the more serious holistic approaches (containing an entire package of measures, in a 'prevention-first' approach) are:

The Italian region of Emilia-Romagna (co-financed by CMO for fruit and vegetables), offers €100 (arable) €300 (vegetable), €50 (fruit) per hectare to farmers who use selected pesticides combined with an integrated production system (crop rotation, fertilisation plant, soil protection measures).

Austria promotes integrated production, co-financed by the rural development programme, of various crops which impose crop rotations (annual crops), restrictions on fertiliser and pesticide use, training and record-keeping.

Premiums vary from €50/ha (potatoes and turnips), €50/ha (strawberries), €300/ha (fruit and hops), up to €400/ha (vines). (This is co-financed by RDR funding)



The new NAP must take the aims of the Framework Directive very seriously, which are the reduction of pesticide use, risk and - which is very important - dependency. This implies the promotion of non-chemical pest management strategies like organic agriculture and the intensification of non-chemical plant protection research. The NAP must ensure binding and improved IPM standards that ensure priority for preventive pest control, cut back on pesticide-intensive monocultures, and guarantee a minimum of crops in crop rotation. Beyond, the protection of biodiversity is to be guaranteed by setting clear quantitative biodiversity targets and indicators in the NAP.

Susanne Smolka, PAN Germany



Emilia Romagna



4.4 Protecting the environment and biodiversity as part of IPM



An ideal NAP ensures appropriate measures to protect the aquatic environment, especially water resources for drinking water supply in order to comply with the objectives of the Water Framework Directive.

Claudia Castell-Exner of EUREAU Commission I Working Group on Chemical Water Quality



A 2001 EUREAU survey of the sources of drinking water showed that several EU countries had quite high levels of pesticide residues. As little as 100 grammes of some pesticides can contaminate up to a billion litres of water, and pesticide removal is expensive. The estimated annual cost of eliminating pesticides from water sources was some £100m in the UK. This is not sustainable in the long term as pesticide removal is energy and resource-intensive. In the worst-affected countries, Belgium, Denmark, France, Germany, the Netherlands and the UK, 5-10% of water resources regularly contain pesticides of over 0.1 µg/l. Pesticides are also found in European rainwater, where 44 pesticide active ingredients have been detected since 1990. But it is not just the quantity (high residue levels) that is a problem but also that fewer water bodies are pesticide-free. In Germany some 28% of all analysed groundwater reveals pesticide contamination. Some 38% of German water suppliers found pesticides or pesticide metabolites in ground and surface water in their catchment areas.

Pesticides harm a wide range of non-targeted life including birds, fish, and beneficial insects. For example, in-field biodiversity has been reduced by the use of herbicides for weed control. A 1997 report cited pesticide use as a major factor in the decline of many bird species over the past 30 years. While mass killing of fish or birds sometimes occurs, the less visible, indirect effects of pesticide use also have a profound impact on wildlife levels. Insecticide and herbicide use can reduce food sources and shelter for many species, leading to reduced breeding success and further pressure on species already threatened by habitat loss.

Several investigations in Germany show that areas close to organic farms are characterised by greater biodiversity than those near conventional farms. The variability of organisms can be up to six times higher in land under organic farming compared with land under conventional agriculture. Species listed on the IUCN Red List of Threatened Species could be found in 79% of the agricultural areas sampled where organic farming had been applied for at least 25 years, whereas Red List species could be found on only 29% of

land in conventional agriculture, beetles were 94% more abundant in organic fields than in conventional ones. The number of beetle species was 16% higher.

Danish studies also stress the negative effects of pesticides on biodiversity. According to the Bichel Report, the effects of pesticide use on above-ground arthropods are significant, and a larger insect population could be expected if pesticide use were phased out. According to a Danish 2002 report, half and quarter dosages of herbicides and insecticides improve the 'natural elements' of the fields with an increased number of weed species, an increased proportion of flowering species and increased abundance of insects. Using half the dose only creates negligible, if any, agricultural problems.

Seriously targeting the environment in the NAP, using adequate buffer zones and drift-reducing equipment would not only help reduce surface and ground water contamination, but could also help fight biodiversity loss. The Millennium Ecosystem Assessment (60% of all ecosystems damaged) and the Living Planet index (40% loss of biodiversity in 40 years), underline the need to act on biodiversity loss. Pesticide dependency/use reduction can play an important part in this.



DIRECTIVE 2009/128/EC of 21 October 2009 calls in article 11.2(c) for:

"The establishment of appropriately-sized buffer zones for the protection of non-target aquatic organisms and safeguard zones for surface and groundwater used for the abstraction of drinking water, where pesticides must not be used or stored."



NAP must explicitly aim at minimising pesticide impacts on biodiversity, especially through concrete measures promoting sound agro-ecological approaches such as crop rotation and the presence of sufficient amount of unsprayed wildlife habitats at farm level.

Ariel Brunner, Head of European Policy, Birdlife International



"An ideal NAP should make soils alive and healthy again, full of biodiversity that can act as a natural control over pathogens."

Pieter de Pous, Senior Policy Officer, European Environmental Bureau



BEST PRACTICE!

Denmark: Establishing sufficiently large non-farmed buffer zones, with compensation

The 2010-5 Danish Green Growth Plan, will oblige farmers to establish ten metres of non-cropped buffer zones around all lakes over 100 m², and water courses. These zones can only produce pluri-annual energy crops and grass, but no pesticides and fertiliser may be applied. Farmers will be compensated for lost output through rural development funding.

Countries with strong independent advisory systems and good control systems which are unwilling to compensate farmers for financial loss, might consider:

Sweden: Buffer zones calculated as a proportion of temperature, wind speed and spraying distance

Farmers in Sweden must protect water bodies by consulting a leaflet indicating various scenarios calculating the size of the buffer zones in various temperatures, wind speed and height and boom (also indicating lower-dose options).

Netherlands: Buffer zone calculation linked to crop grown

In 2000 Dutch farmers were obliged to cut pesticide releases into surface water by 90%. A national regulation ensures this. The reduction can be achieved by using a small buffer zone and adjustments to spraying equipment, or a wider buffer zone and fewer adjustments to equipment.

How was this 90% reduction achieved for each crop? Bulb growers with expensive land overwhelmingly chose a small buffer zone of 0.5 metres with special requirements for spraying equipment. Growers on arable fields mainly chose a 1-2 metre buffer zone. Farmers with trees used hedges or non-crop trees at the edge of ditches to prevent spray drift. All farmers must respect a maximum wind speed while spraying (<3 m/second) and use special nozzles and edge-nozzles.

Following an initial improvement in water quality in 2000, in 2008 many exceeding of water quality standards were still observed. This means the 90% reduction target is insufficient, and is in places poorly enforced, and that 99% ought to be the next target.

Slovenia: Buffer zones defined by water protection regulation

The buffer zone for first class surface water courses is 15 metres, and for second class surface water courses 5 metres. The use of pesticides and fertilisers is not allowed in first, second or third class underground water protection zones where a special regime has been established. If the risk assessment deems it necessary, a wider buffer zone as defined in the Regulation is envisaged for specific plant protection products.

Hungary and Bulgaria: Aerial spraying and water protection

In Bulgaria a 50-200 metre buffer zone along water courses has been established, and the size depends on the type of fertiliser used. Why not expand this to include pesticides?

Hungary has buffer zones of 200m for pesticides categorized R50 (very toxic to the aquatic environment), R50/53 (toxic to the aquatic environment) if there is no risk assessment which allows smaller buffer zones (the minimum is 5m). The option to seek exemptions seems disproportionate given that in just one second a helicopter can travel 11-22 metres.

Soil, biodiversity and pesticides

The level of biodiversity of soil-dwelling organisms (microorganisms, nematodes, worms, mites and other invertebrates) is many times greater than the above ground level. For example, more than 109 microorganisms are present per gram of soil, but still only 5 to 10 % of soil microflora species are known.

Although soil organisms are not visible to the naked eye, they are essential for maintenance of soil stability and fertility. They play a key role in transformation and decomposition of organic matter into nutrients available for plants, animals and humans. Soil invertebrates act as ecosystem engineers

and biological regulators that help to maintain soil structure and promote pest control.

Many researches have proven that pesticides have negative impacts on non-target soil species and disrupt soil microbial activities. Moreover, repeated application and combination of several pesticides can lead to a reduction of soil biodiversity. On the other hand, low pesticide input and organic farming systems enhances biological activity and biodiversity, mainly in favour of beneficial organisms. For instance, results of a review study (Bengtsson et al., 2005) showed increase up to 50 % of species abundance and 30 % of species richness in soils under organic farming methods.



A Europe-wide study in eight western and eastern European countries found important negative effects of agricultural intensification on wild plant, carabid and bird species diversity and on the potential for biological pest control. Of the 13 components of intensification measured, the use of insecticides and fungicides had consistent negative effects on biodiversity. The study concludes that despite decades of European policy to ban harmful pesticides, the negative effects of pesticides on wild plant and animal species persist. At the same time the opportunities for biological pest control are reduced. If biodiversity is to be restored in Europe and opportunities are to be created for crop production using biodiversity-based ecosystem services like biological pest control, there must be a Europe-wide shift towards farming with minimal use of pesticides over large areas (Geiger, F et al 'Persistent negative effects of pesticides on biodiversity and biological control potential on European farmland. *Basis and Applied Ecology*' (2010), doi: 10.1016/j.baae.2009.12.001).

4.5 Start setting up your IPM framework now



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 14(2) that:

“Member states shall establish or support the establishment of necessary conditions for the implementation of integrated pest management. In particular, they shall ensure that professional users have at their disposal information and tools for pest monitoring and decision making, as well as advisory services on integrated pest management.”

And in Article 14(3) that:

“By 30 June 2013, member states shall report to the European Commission on the implementation of paragraphs 1 and 2 and, in particular, whether the necessary conditions for implementation of integrated pest management are in place.”

PAN Europe encourages EU countries to begin setting up a curative framework now, to ensure that an independent IPM curative framework (covering inter alia IPM advisory and training systems) is in place by 2013, allowing farmers to make maximum use of agro-ecological knowledge and resources, from the first day of application.

5. How to target health in the NAP

A survey by the European Commission's DG Environment, shows that 63% of citizens are concerned about residues in their food, and 42% believe pesticides will harm their health (Eurobarometer, DG SANCO, 2006).



An ideal NAP would adopt the goal of 'better health and a safer environment'. By starting to drastically reduce pesticide exposure now, our children would grow up with reduced risks of breast, testicle and prostate cancer and of neuro-degenerative conditions, such as Parkinson's Disease. This ideal NAP would include setting up pesticide-free zones such as schools and playgrounds.

Génon K Jensen, Executive Director of Health & Environment Alliance



The NAPs offer the unique opportunity to minimise or end exposure to hazardous pesticides, by phasing out products containing dangerous pesticides, establishing pesticide-free areas, and making laws on pesticide residues in food (maximum residue limits) stricter.

Several supermarkets in the EU already ask farmers to provide healthy products. For instance, the British retailers Co-op, Marks & Spencer and Sainsbury's have banned some problematic pesticides from their supply chains and restricted others, and aim to phase them out in the medium term (PAN UK, 2009). The last two also have medium and long-term targets for eliminating residues in food. The

Dutch supermarket Super de Boer will sell residue-free vegetables and fruit from 2010. The German supermarket REWE is selling products containing just 30% of the MRLs set by Regulation (EC) 396/2005.

5.1 Food contamination: Targeting MRLs in the NAP

According to NGOs' analysis, even existing MRLs cannot fully protect the health of vulnerable groups, including unborn babies and children (see <http://www.pan-europe.info/Media/PR/080828.html>). So PAN Europe recommends that EU countries build on the new EU residue law to put health at the top of the NAP agenda

PAN Europe expects EU countries to develop robust systems to verify application of the MRL regulation. We ask governments to carry out adequate checks on residues (the right products and enough tests in terms of number of samples, frequency of monitoring, and number of types of pesticides analysed) in food. It is also important for member states to analyse and promptly report health limits (ADI and ARfD) for all tested food calculated for children (below 15 kg), and special attention paid to minimising multiple residues in even low MRLs, as current scientific knowledge cannot predict the combined health effects of pesticides. (eg <http://www.ncbi.nlm.nih.gov/pubmed/18585444>).

We urge member states to publish test results on their official websites immediately after testing, with the date of sampling, supermarket and producer's name. The UK has taken this approach for over ten years which has helped encourage retailers to avoid exceeding MRLs. The Hungarian Ministry of Agriculture has taken a similar approach, by publishing annual monitoring results with data on samples which exceed MRLs. Data on all commodities are also published with the number of multiple residues, rate of contaminated



Success stories

The new German NAP, which aims to reduce the use of chemical plant protection products to the necessary minimum includes an element on consumer protection, 'Monitoring pesticide residues in food'.

The idea is to include a condition targeting MRL exceedances below 1% in domestic and imported food for all food types from conventional and integrated production (in the next five years). German NGOs support this target and its reintroduction in a revised German NAP, but propose to decrease the exceedance level to 0,3% in 10 years.

A good example of keeping the public informed is the Natuur en Milieu and Friends of the Earth-Netherlands 'Know What You Eat' initiative. (www.weetwatjeet.nl).

The two organisations began analysing pesticide residues in food in 2002. Thanks to action in the courts, these organisations obtained Dutch national analyses including the name of the retailer tested in each case. They could therefore tell the public:

- Which supermarkets provide the best fruit and vegetables (or the most polluted ones)
- Which fruit and vegetables are least polluted and can be safely eaten, and which are highly polluted and should never be eaten, especially by children or pregnant women

samples. The result should, where necessary, be followed by a policy change proposal. Publishing the results can help reassure consumers that governments are complying with the Regulation.

Supermarkets have also begun reacting to the many publications and the campaign's media focus. They are steadily reducing levels of chemicals in their products and some (eg Super de Boer) claim they will sell only residue-free products from 2010 on.

A less public approach has been taken in Denmark, where positive test results by the Danish umbrella organisation for fruit and vegetables are immediately publicised. It is obliged to tell farmers about high residue levels and offer professional advice on reducing hazardous pesticide use.

5.2 Workers' exposure: Prohibiting use of pesticides in specific circumstances



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 2.3 that:

"The provisions of this Directive shall not prevent Member states from applying the precautionary principle in restricting or prohibiting the use of pesticides in specific circumstances or areas."

Few independent studies on poisoning of workers were carried out at European level in the late 1990s. The European Federation of Agricultural workers (now EFFAT) ran a survey on pesticide poisoning among its two million members. Some 1,230 questionnaires from individuals and organisations were analysed. At least one in five people believed they had been made ill, poisoned, or adversely affected by pesticides. Problems of use represent 73% of incidents, particularly: handling concentrates (6%), application (39%), and preparation and mixing (28%). But the proportion of incidents following pesticide treatment is noticeable: washing after use (12%), operations involving contaminated equipment (7%), or containers after use (2%), working in previously treated areas (6%), making a total of 27%. In 46% of cases, poisoning involved medical intervention, either consultation or hospital visit.

What is more, a recent European Parliament Environment Committee (ENVI) study highlights the fact that farmers and their families are especially prone to illnesses caused by pesticides. Workers are potentially exposed to higher levels than the general population, and many scientific studies show harm to health related to occupational exposure. For example, several studies have found that the risk of

childhood cancer is higher among children of agricultural workers and children living on farms. So having strict exclusion criteria for some hazardous pesticides will result in additional protection for farmers and their families.

PAN Europe encourages member states to start protecting workers by banning specific pesticides from greenhouses, and curbing access after spraying, in line with Article 2.3 of the directive 2009/128. .

6. Ban use of synthetic pesticides in specific areas, starting with public areas



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 12 that:

"Member states shall, having due regard for the necessary hygiene and public health requirements and biodiversity, or the result of relevant risk assessments, ensure that the use of pesticides is minimised or prohibited in certain areas(...)The specific areas in question are areas used by the general public or vulnerable groups, such as public parks and gardens, sports and recreation grounds, school grounds and children's playgrounds; protected areas as defined in the Water Framework Directive, recently treated areas used by or accessible to agricultural workers."

A recent report by the Health and Environment Alliance and PAN UK revealed that in the UK, children may be exposed to at least four potentially cancer-causing pesticides, and seven other pesticides found may have a serious health impact (www.pesticidescancer.eu). It is time to ban synthetic pesticide use in specific areas, starting with areas used by the public or vulnerable groups, including parks and gardens, sports and recreation grounds, school grounds, children's playgrounds and around healthcare facilities, as highlighted in Article 12.a of the Directive. This is especially important to protect children, who are more vulnerable to exposure. Currently, children can play on a football pitch which has been sprayed with pesticides just minutes earlier. These may be the same pesticides which workers must apply from a distance and wear protective clothing to. It is time to change this practice!



BEST PRACTICE!

Denmark: Protecting workers in greenhouses

Biological control as a means of combating pests is already widespread in Danish greenhouses, with 98% or 110 ha of cucumbers and tomatoes. The number of commercialised predators has risen from two in 1978 to 120 in 2008. To protect workers in Denmark, some of the most hazardous endocrine-disrupting substances in greenhouses have been banned.

Belgium: Ban pesticide use in public areas

The Belgian region of Flanders passed laws in 2001 giving public authorities a choice between not using any chemical plant protection products after 2004, or drafting a reduction plan and phasing out pesticide use by 2015 in all public areas (www.zonderisgezonder.be). The cities of Grobbendonk, Hasselt, and Ghent have banned the pesticide use in streets, parks, and cemeteries, but still need to ban it on football pitches.



GOOD PRACTICE!

In 1998, Denmark agreed voluntarily to phase out pesticide use in all public areas by 2003. (http://www.mst.dk/Bekaempelse-smidler/Pesticider/Regulering/Aftale_offentlige_arealer.htm) Since 1998 pesticide use in public areas has been reduced by 80%. In 2005, a voluntary agreement was signed with golf clubs. The goal was a 75% (kg active substance) reduction in pesticide use by the end of 2008. But by 2008 average pesticide use had only fallen by 39%. In 2009, the deal with golf clubs was renegotiated.

In 2000-9, Denmark imposed a general ban on use of glyphosat, mainly Roundup herbicide, on hard surfaces in public places. Unfortunately, owing to the introduction of the new pesticides regulation, this condition is now likely to be revised.

Not only the EU is working on phasing out pesticides. The Canadian province of Ontario has just banned all pesticide use on lawns and in parks. Switzerland has banned the use of herbicides on roofs, balconies, storage areas, roads, squares, and grass strips along streets and railways (excluding motorways and railway tracks), and it is planned to ban the use of pesticides classified T and T+ in public parks from mid-2010.





7. Spraying

7.1 Prior and post-application of spraying hazard warnings



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 10 that:

“Member states may include in their National Action Plans provisions on informing persons who could be exposed to the spray drift.”

PAN Europe encourages all EU countries to set up systems to ensure that everyone who wishes to be is warned in advance of spraying. Farmers in Britain must tell bee-keepers directly, and in Bulgaria the authorities must tell bee-keepers as soon as they have been told about aerial spraying by farmers. Why not expand this arrangement to all bystanders?

A cheap and effective prior notification system has run successfully for years in New Zealand. Farmers send spray application information up to an hour before spraying to a central data collection team. Interested members of the public can ask to receive information on their local area by phone or text message. Introducing such a system is feasible, and would cost farmers little.

A more ambitious way to reduce exposure to passers-by was in the past run in Malmö in Sweden, where pavements sprayed with pesticides are sealed off for several hours. In Switzerland, aerial spraying of forestry also leads to sealing off.

A solid policy on advance warnings will not only help protect workers, other farmers and citizens' rights, but it will also help make citizens feel safer.

7.2 Aerial spraying: Prohibit, or reduce to an absolute minimum



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 9.1 that:

“Member states shall ensure that aerial spraying is prohibited. With Article 9.2 specifying specific cases for derogation.”

PAN Europe opposes aerial spraying because it exposes bystanders and workers in neighbouring fields, and other rural inhabitants. Aerial spraying also causes increased drift. We therefore encourage member states to limit aerial spraying to an absolute minimum, if possible banning it. We encourage member states never to exempt aerial spraying near natural parks, reserves and Natura 2000 areas, or close to residential areas.

While ground-spraying can limit the coverage to near the field border, helicopter use makes it much harder to confine spraying. There also seems to be a lack of scientific backing to the rules on aerial spraying. While the maximum wind speed under which spraying is allowed is 3 m/second in Poland, it is 2 m/second in Bulgaria.

PAN Europe encourages EU countries not to apply the implicit consent procedure even though this is allowed in Directive 2009/128/EC. Given the many dangers of aerial spraying, permission to use must only be granted with prior official consent with, in each case, a cost analysis beforehand to ensure potential economic cost benefits do not exceed potential environmental and health costs.

With aerial spraying, Article 10 of Directive 2009/128/EC must apply, which means having a well-organised advance warning system in place for neighbours and bystanders, plus regular monitoring of exposure from aerial spraying.



BEST PRACTICE!

Ban aerial spraying

Total bans currently exist in several countries, including Slovenia.



GOOD PRACTICE!

Sweden: Limit aerial spraying as far as possible

In Sweden, aerial spraying is generally banned, but exemptions may be granted (only twice in 30 years for *Bacillus thuringiensis* for tree protection purposes (PPP use) and few for mosquito control). No exemption has ever been given to spray forests to combat brushwood.

Switzerland: Advance approval, serious application, guiding, and monitoring

In Switzerland farmers need permission before spraying. Aerial spraying companies may seek permission once a year. Applicants must specify the zones to be sprayed. In some zones (including residential areas, wetlands, forests and water bodies) approval is only given when applicants can prove that the long-term sustainability and the ecological balance are not seriously disturbed by aerial spraying. Pilots are guided by accredited experts, who measure exposure on the ground and publish the results by the end of the spraying year. Groups of farmers must alert local inhabitants of the times and zones to be sprayed, and the area must be closed during spraying.

8. Inspection of equipment in use



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 8.1 that:

“Member states shall ensure that pesticide application equipment in professional use shall be subject to inspections at regular intervals. The interval between inspections shall not exceed five years until 2020 and shall not exceed three years thereafter.”

PAN Europe urges EU countries to ensure regular checking of all equipment, including hand-held equipment, by independent inspectors. Regular checks will help reduce both drift and worker exposure.

The introduction of mandatory checks of pesticide equipment already in use goes hand-in-hand with Directive 2009/127/EC. Mandatory pesticide equipment checks, and the implementation of the annex II on health and safety and environmental requirements on the inspection of pesticides application equipment, should comply with the environmental protection requirements for pesticide application machinery, which were recently introduced in the Machinery Directive.

Mandatory checks of hand-held equipment is an efficient way to ensure even better protection of workers' safety and health in line with Council Directive 89/391/EEC.



9. Handling and storing pesticides

9.1 Diluting and recycling



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 13.1 that:

“Member states shall adopt the necessary measures to ensure that the following operations by professional users and where applicable by distributors do not endanger human health and the environment: (a) storage, handling, dilution and mixing of pesticides before application; (b) handling of packaging and remnants of pesticides; (c) disposal of the tank mixtures remaining after application; (d) cleaning of the equipment used after application; (e) recovery or disposal of pesticide remnants and their packaging in accordance with Community legislation on waste.”

PAN Europe encourages proper recycling of agricultural packaging. The German PAMIRA system ensures that agricultural pesticide packaging is checked, returned and recycled (<http://www.pamira.de/en/index.asp>). In Poland, empty toxic or very toxic packaging must be returned to where the product was bought (for return of the deposit). In Hungary pesticide producers have set up a non-profit company (see www.cseber.hu) to collect pesticide waste.

9.2 Rules must apply to professionals and non-professionals



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 13.2 that:

“Member states shall take all necessary measures regarding pesticides authorised for non-professional users to avoid dangerous handling operations. These measures may include use of pesticides of low toxicity, ready to use formulations and limits on size and containers or packaging.”

It is essential that non-professional pesticide users also dispose of pesticides responsibly, and that 'ready-to-use' products (eg household and garden pesticides) provide clear, detailed and understandable guidance. We recommend a system where non-professional users must also return packaging to where they bought pesticides and help recycle products. Some British county councils have for example launched free schemes and 'amnesties' for householders. It is desirable that information for non-professional users should come from an independent source and not from industry.

A solid policy on pesticide handling must take seriously the need for the pesticides industry rather than tax-payers, and in some countries farmers, to pay for container recycling and cleaning, in line with the 'polluter pays principle' among others highlighted in Article 191 of the treaty on how the EU functions.

It is essential for national governments to enforce handling requirements thoroughly. This happens in Denmark, where rule-breakers are fined, and serious offenders (who risk causing environmental damage or who benefit financially from flouting the law) can be imprisoned for up to two years.



BEST PRACTICE!

Germany: Compulsory checks on spraying equipment

In Germany the owners of field-sprayers and air-assisted sprayers for viticulture, fruit and hop-growing are obliged to have their equipment tested every two years by official inspection (agricultural machinery) workshops. New sprayers must be inspected six months after initial use. The Julius Kuhn institute (JKI) is authorised to determine the inspection procedure and technical requirements for sprayers and inspection facilities. Federal states are responsible for inspecting sprayer inspections. Federal states have built up a wide network of officially-recognised inspection workshops. There are over 1,000 inspection centres throughout the country which carry out inspections in over 2,000 locations. In 2008, 80,643 field sprayers and 22,160 air-assisted sprayers were checked. Of these about half were faulty and had to be repaired.

Official inspection centres generally have an agricultural machinery workshop at their disposal so obvious faults can be repaired immediately.

Other member states where checks are compulsory include the Netherlands, where all spraying equipment is examined every three years, and Slovakia and Slovenia, which have imposed mandatory checks every two years since 2005.

10. Monitoring the impact of pesticide use on human health and the environment



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 7.2 that:

“Member states shall put in place systems for gathering information on pesticide acute poisoning incidents, as well as chronic poisoning developments where available, among groups that may be exposed regularly to pesticides such as pesticide operators, agricultural workers or persons living close to pesticides application areas.”

EU countries must develop independent poisons centres, in close contact with health centres, responsible for collecting information on acute poisoning, and bio-monitoring.

Data collection makes a valuable contribution to better evaluating pesticide exposure. For the centres to operate efficiently, a national poisons information data base should be developed, with information on specific hazards, with doctors and hospitals required to tell centres about chemical, pesticide and biocide poisoning.

Regulation (EC) No 1185/2009 of 25 November 2009 on statistics on pesticides requires national governments to collect data on sales and use. The regulation will also make it mandatory for member states to publish information on annual national pesticide sales. Member states should also each year release information on national pesticide use. Some countries already do so, for instance Slovenia, where pesticide use data are published annually, with figures on active ingredients used per hectare. Britain's environment department runs usage surveys on ten agricultural cropping systems, with further surveys on grain and potato stores, aerial spraying and sheep dipping, plus a ten-year review of usage (FERA Pesticide Usage Surveys).

Member states must provide annual information on regional use presented in a non-aggregated way, containing information on the amounts and nature of PPP active ingredients by crop type, non-agricultural use and geographical area, without revealing the identify of the owner or property where pesticides are applied. This approach could help identify the causes of potential poisoning but will also allow poisons centres to identify each crop and similar climatic conditions and indicate the best performance achieved in

a given country, and thus measure the effectiveness of the IPM system.

Poisons centres, and scientists working with them, must study external costs of pesticides, such as loss of pollination and natural enemies, and the cost of water purification, from which the centres should develop league tables of the top-ten water-polluting and air-polluting pesticides. These centres should also study pesticide-use reduction opportunities, taking inspiration from the Danish work done in the Bichel Committee which gathers together various Danish scientists and other experts developing reduction scenarios.

Poisons centres should help coordinate any independent research projects aimed at investigating combination toxicity, etc.

11. Measuring the NAP's success

Ideally, a proper pesticide risk indicator would take account of all these elements. But this would involve complex and contentious calculations. There are not yet enough data to allow a 'scientifically sound' pesticide risk indicator to be calculated.

Quantitative dependency/use reduction remains the best way of coping with scant information on combination effects, low-dose-long-term effects, the lack of information on several toxicological properties, especially for unborn babies, and children, and a poor understanding of aggregated exposure. So it is best to tackle difficulties in evaluating the real risks associated with pesticide use and hence the difficulty in determining 'acceptable exposure' to pesticides.

Although no indicator gives a complete picture, PAN Europe believes that the most comprehensive way of measuring synthetic pesticide dependency reduction is the treatment frequency index (TFI). This approach is scientifically-informed, practical, and follows the precautionary principle when there is major scientific uncertainty, and is the best way of delivering real benefits for biodiversity, soil, water, health in the short-to-medium term.

The TFI is the best indicator to measure the intensity of synthetic pesticide use. While it has recently been criticised following development of the Danish model, we believe that the cause may be problems in applying the Danish model, rather than problems with the calculation, as the indicator over the years has actually shown increasing use, thereby showing that pesticides dependency is increasing.

The TFI does not reflect a substance's toxicity (it makes no distinction between 'highly toxic', 'less toxic' or 'not toxic at

all') so it should only be used for agrochemicals (and not, eg, for nettle-broth which is also used against pests and might have a much higher TFI, as it is sprayed more often). An approach in line with Article 14 of the Framework Directive 2009/128/EC, which says that member states shall "give wherever possible priority to non-chemical methods." Thus, biological control agents including micro-organisms, pheromones and plant resistance inducers must be exempted from the reduction obligation.

However, the TFI could be supported by more specific indicators, eg:

1) Biodiversity/eco-toxicity indicators:

Bees as indicators (internal and external analysis of bees and their behaviour and bee products (honey, propolis, beeswax, pollen) as environmental indicators according to the University of Bologna), or reduced numbers of authorised PPPs which contain active ingredients classified as toxic for bees

Birds as indicators (populations of grey partridge, yellow-hammer and corn bunting are affected by pesticide use, and raptors are particularly sensitive to secondary poisoning, often by pesticides and biocides) In German National Sustainability Strategy there is a species diversity indicator which is based on the development of 59 bird species and water organisms

2) Amount/residue indicators:

Percentage of food with pesticide residues; pesticides used under derogation; residues in water, number of water bodies contaminated by pesticides (indicators should be used according to Water Framework Directive objectives, eg phasing out high-priority substances, reducing the number of exceedances of the pesticide limit for drinking water (data available from officials and water suppliers)

3) Crop-specific agro-ecological indicators:

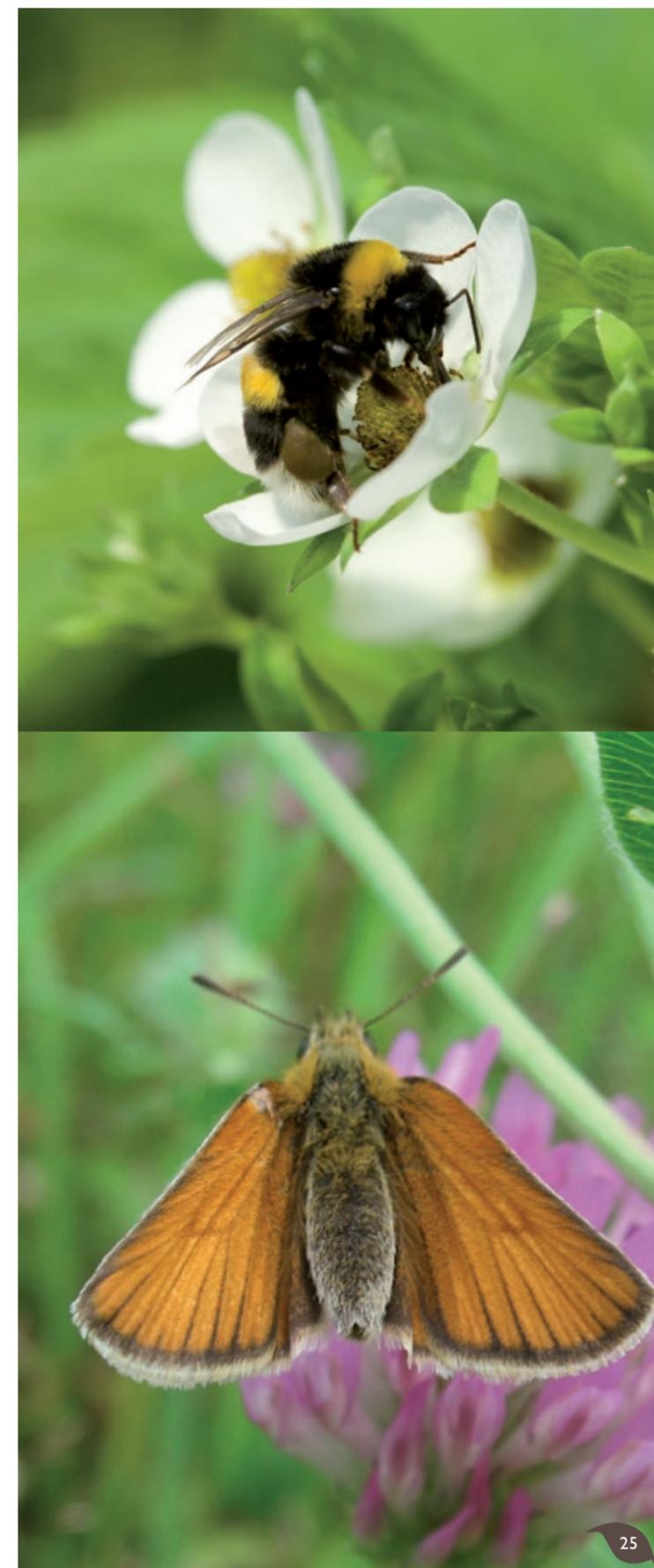
Amount and frequency of crop rotation; number of authorised biocontrol agents, bio-pesticides, natural enemies; use of resistant/tolerant crops varieties; how much organic farming, size of buffer zones

4) Knowledge indicators per crop:

Number of education/information events per year and farmer; existence and access to free advisory systems (on non-chemical control, preventive methods and best crop practice); how many advisers per 100 farmers; on-line advisory systems; early-warning systems on diseases and pests; rate of improper pesticide trade and use by official retailer and farmer inspection statistics of (eg number of pesticide applications in buffer zones: the German BVL has already begun annual reporting on the outcome of inspections)

5) Control & transparency indicators per crop:

Number of IPM controllers, whether results of checks are available to public



12. Establishing a good IPM framework: Implemented as a hierarchy, prioritising preventive measures, and setting up the support system now



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 14(2) that:

“Member states shall establish or support the establishment of necessary conditions for the implementation of integrated pest management. In particular, they shall ensure that professional users have at their disposal information and tools for pest monitoring and decision making, as well as advisory services on integrated pest management.”

And in Article 14(3) that:

“By 30 June 2013, member states shall report to the European Commission on the implementation of paragraphs 1 and 2 and, in particular, whether the necessary conditions for implementation of integrated pest management are in place.”

EU countries must begin setting up a curative framework now, to ensure that an independent IPM curative framework (covering inter alia IPM advisory and training systems) is in place by 2013, allowing farmers to make maximum use of agro-ecological knowledge and resources, from day one of application. Member states should start by considering the obligatory tools covering sector-specific guidelines, early warning systems, measuring thresholds, establishing independent IPM advisory services and continuous training courses.

Some CAP funding (RDR and Common Market Organisation for fruit and vegetables) is already available and should be activated. National governments may change their RDR twice a year. Why not use the next rural development programming deadline to launch new measures to help ensure a good start to implementation of the Framework Directive?

12.1 Governments to put information and tools for pest monitoring and decision-making and advisory services at the disposal of professional users



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in annex III, point 2 that:

“Harmful organisms must be monitored by adequate methods and tools where available. Such adequate tools should include observations in the field as well as scientifically sound warnings, forecasting and early diagnosis systems where feasible as well as the use of advice from professional qualified advisers.”

It is essential that each member state helps farmers develop this approach by:

- 1) Developing a centralised independent early warning system, indicating regional thresholds, where necessary divided into weather zones, with spraying recommendations
- 2) Expanding the existing national advisory system, which EU countries had to establish to obtain CAP cross-compliance funding, systematically also to include advice on IMP.

The purpose must be to obtain highly qualified independent advisory service, with many active advisers, all of whom must be able to help farmers along the IPM path, and thus develop an IPM plan and reduce pesticide use, informing them about prevention measures and the availability of non-chemical alternatives. To encourage a knowledge-based approach which will create synergies between farmers and advisers, we encourage EU countries to follow examples from Sweden and Bulgaria where advisory services are free to national farmers' union members.

A crucial issue in implementing IPM is training and updating advisers and farmers. It is essential that advisers are also trained in these new topics. Perhaps this should be done by organisations like the International Organisation for Biological Control (IOBC) which developed them in the first place?

12.2 Get inspiration from existing IPM systems

Some argue against introducing a robust IPM, claiming it is hard to use as a marketing tool (as it lies somewhere between organic and conventional farming). Others oppose IPM on the grounds that it is hard to control. PAN Europe understands these viewpoints but points to several effective programmes which are already successfully running as examples.

EU countries could finance some extra costs to farmers linked to implementing effective crop-specific guidelines through the rural development programme. Introducing a pesticide tax could help ensure the element of national funding, and might even help finance other elements.

12.3 Define crop-specific IPM methods and practices



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 14.5 that:

“Member states shall establish appropriate incentives to encourage professional users to implement crop and sector-specific guidelines for integrated pest management on a voluntary basis.”

EU countries should define prohibited, mandatory and voluntary standards for integrated crop management for every crop. Again, inspiration can be found in the IOBC, which invented the IP concept in the 1970s and now offers crop-specific guidelines on IP for pome fruits, stone fruits, arable crops, grapes, soft fruits (berries), olives, citrus and field-grown vegetables (see: http://www.iobc.ch/download_docs.html).

Other crop-specific guidelines worth mentioning cover Sigill/ Seal (Sweden), which has developed crop-specific guidelines for IPM on vegetables, fruit and strawberries (see: www.svensksigill.se/website/1.0.1.0/2/1/index.php).

Inspiration on potatoes, arable crops, and apples see also the homepage of PAN Europe.



Success stories

On early warning systems:

Sweden's Växtskyddscentralerna (www.sjv.se/vsc <<http://www.sjv.se/vsc>>) informs advisers by internet of potential pest problems and local pest attacks, and recommends whether or not to spray (Co-financed by RDP)

On IPM farm advisory system:

The only official Emilia-Romagna (Italy) advisory system is IPM- based (co-financed by CMO for fruit and vegetables).

On science based advisory system:

The Danish extension service is based on field tests by scientists. Dialogue between researchers, advisers and

farmers is ensured, allowing farmers to strike a balance between ecology and economy

Getting inspiration from existing IPM systems

IOBC endorses some organisations (see <http://www.iobc.ch/orglist.html> <<http://www.iobc.ch/orglist.html>>)

This endorsement allows organisations to sell market products more successfully

IOBC has a well-developed farm inspection protocol (SESAME) on IP control. See: <http://www.iobc.ch/toolbox.html#6>

Examples of crop specific IPM guidelines

IOBC has a complete set of sector-specific guidelines to offer inspiration: (http://www.iobc.ch/download_docs. <http://www.iobc.ch/download_docs>)

12.4 IPM training linked to renewable spraying certificates



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in article 5 that:

“Member states shall ensure that all professional users, distributors and advisors have access to appropriate training of both initial and additional training to acquire and update knowledge on among others ‘Notions on integrated pest management strategies and techniques, integrated crop management strategies and techniques, organic farming principles, biological pest control methods, information on the general principles and crop or sector-specific guidelines for integrated pest management.’” (Annex I on training in point 4)

A crucial aspect in implementing IPM is training, updating and coaching advisers and farmers. It is essential that advisers are trained in these new topics. The International Organisation for Biological Control (IOBC) which originally developed the IP concept and which has engaged researchers throughout the EU may be involved.

IPM must also be supported by backing experience-sharing between farmers and initiatives targeted at creating better networking within the food chain. A successful example is the Dutch telen met toekomst (<http://www.telenmettoekomst.nl/>), (farming with a future) an agricultural network approach established in 2004 which works towards sustainable crop production. The network focuses on knowledge development and dissemination in practice involving all stakeholders. Originally, the network covered 34 regional networks with 400 participating farmers and related stakeholders. Since then the network has adopted a more flexible approach, allowing tailor-made work involving farmers in testing new technology. With the stakeholders covering the pesticide industry, the distribution chain, farmers’ unions, water boards and drinking water companies, traders, retailers, independent advisors, and environmental NGOs. Over 200 companies and organisations collaborate in the network.

Finally, as part of the training, lessons learnt by successful private sector initiatives should be incorporated, eg. some supermarkets’ experiences in implementing prohibited and restricted lists and what IPM alternative methods they had to use.



DIRECTIVE 2009/128/EC of 21 October 2009 specifies in Article 5.2 that:

“By 14 December 2013, member states shall establish certification systems and designate the competent authorities responsible for their implementation. These certificates shall, as a minimum, provide evidence of sufficient knowledge of the subjects listed in Annex I acquired by professional users, distributors and advisers either by ongoing training or by other means.”

PAN Europe recommends making training a condition for obtaining spraying certificates – allowing farmers to manage checked equipment. The certificates should be of limited duration (eg two years) to ensure both initial and additional training as highlighted in Article 5.1, with IPM training required by all players in the chain (with no exemptions for micro-distributors).

12.5 Oblige farmers who receive public funding to draft annual IPM plans

PAN encourages EU countries to offer financial support to farmers who are willing to write an IPM/environmental plan, making a moral commitment for several years, as a tool to make farm projects more economical, environmental and, where possible, even socially sustainable. It should be quite easy for farmers to prepare since several private standards, and a number of EU countries, already demand similar input. Such an approach could especially if developed with support of an independent farm adviser, help farmers become clearer on long-term farm objectives.

3) does not require training and can be used by non-professionals

Annual IPM plans

Danish farmers who tend areas above 20 hectares are offered financial support (1,000/year) when they agree to develop green accounts – minimum engagement is once a year for five years – developed with a professional adviser, reviewing possible elements such as buffer zones. (Co-financed by RDR)



Success stories

On spraying certificates

In Sweden, spraying certificates are linked to training, and are renewed every five years. Two categories are involved, class 1 L (particular hazardous products) and class 2 L (hazardous products). A third category (class

Conclusion

Europe is at a crossroads, not only over pesticide use, but also in wanting to stop biodiversity halt and reduce climate change. The solution is there, let us stop soil and water contamination, starting by encouraging sustainable agricultural practices, in which we define prohibited, mandatory and voluntary standards for each crop, allowing farmers steadily to reach a more holistic approach in the agro-ecological end of integrated production.

Remember, serious pesticide reduction targets can encourage innovation. The Danish general ban on pesticide use in public areas allowed the Danish Road Institute to seek new types of footpaths with unbound surfaces. In 2002 a new concept for unbound surfaces was developed by Forest and Landscape Denmark, University of Copenhagen for the Palaces and Properties Agencies in Denmark, and is sold under the *Slotsgrus*® brand. Regarding jobs, research in the UK has shown that organic farms employ 135% more full-time equivalent jobs per farm than conventional ones, and predicts that there would be 19% more British farming jobs if 20% of the farms became organic (Morison et al, 2005). If an NAP persuades more farms to convert to organic and lower agrochemical input farming, it can help create much-needed jobs in the countryside.

NAPs which approach human health seriously could help deliver long-term cost savings on healthcare provision to

those adversely affected by exposure to pesticides. Pesticide dependency reductions could actually help **reduce external costs which are currently borne by citizens and the environment**. These 'external costs' are not reflected in the price of pesticides and it is their victims, the environment and citizens who end up paying for them. Studies in the UK and Germany conservatively estimated annual external costs at US\$257m and \$166m respectively (Pretty & Waibel, 2005).

Now it is time to take the opportunity to identify national, regional and local environmental and health problems, and develop a master plan with the NAP as an integral part of the overall environmental and health national plan, targeted at prevention, precaution and innovators, starting with introduction of a sustainable, holistic and dynamic integrated production system, and helping to halting biodiversity loss, improving water and soil quality and ensuring healthier food, and targeting climate change.

It is up to governments in Member States to give the final push and convince farmers and others in the production chain to change habits and start the transition to IPM. The gains are enormous, for citizens and for farmers, achieving modern agriculture, and the costs are negligible. The real obstacles are out-moded habits, lack of innovation and failing to recognise the need to change. Society needs to change. With the new framework Directive on sustainable use of pesticides you are in a position now to stimulate and enforce this change for the better.

What other legal requirements applying to member states could be delivered by an effective NAP?

An NAP targeting the precautionary principle, as identified in Article 191 of the Treaty for the functioning of the EU, would not be able to target all the above-mentioned elements. It could also help member states to show they are in line with the Commission Communication adopted in February 2000, modified in the White Paper on Food Safety (January 2000), it would be a way to ensure compliance with the Cartagena Protocol on Biosafety.

Other EU legislation which apply the precautionary principle includes the Drinking Water Directive (Council Directive 98/83/EC); and the Baby food Directive (Commission Directive 2006/125/EC).

An NAP targeting health issues would help EU countries ensure the legal requirements in Regulation (EC) 396/2005 on maximum residue levels in food. A NAP targeted at employee protection would help member states ensure that employers, employees and employees' representatives respect the legal requirements of Council Directive 89/391/EEC on health and safety at work.

An NAP targeting sustainable agricultural practices and protection of sensitive areas, inter alia though banning aerial spraying, could help EU countries achieve the EU's objectives of halting biodiversity loss by 2010, expected soon to be replaced with a 2020 objective, and the EU backbone of the nature conservation legislation (Birds Directive (Council Directive 79/409/EEC) and the Habitats Directive (Council Directive 92/43/EEC)). An NAP stipulating sufficiently wide non-farmed buffer zones, would be better able to comply with the EU Water Framework Directive (Directive 2000/60/EC), The Drinking Water Directive (Directive 98/83/EC), and the new Groundwater Directive (2006/118/EEC).

Member states which decide to enlarge the concept of IPM implementation to embrace fertilisers, developing the concept of integrated production, might become better able to comply with the Nitrate Directive (Directive 91/676/EEC on nitrates from agricultural sources), with a future soil directive and contribute to combating climate change through mitigation.

Finally, a NAP halting the use of synthetic pesticides in sensitive areas frequented by children and other vulnerable groups will help ensure a safer future for our children in line with the WHO Europe Action Plan on Children's Environmental Health (CEHAPE), in which EU countries have committed themselves to reducing the risk of exposure from hazardous chemicals. It also underlines the aim of the EU Strategy on Environment and Health (SCALE) to reduce diseases in Europe caused by environmental factors.



Contacts

For details on Swedish NAP ideas under development, contact:

KEMI (Swedish Chemicals Agency)
Peter Bergkvist
peter.bergkvist@kemi.se
<http://www.kemi.se>
Box 2
SE - 172 13 Sundbyberg
SWEDEN

The Danish NAP is available in English on PAN Europe's website. Or contact:

Danish Environmental Protection Agency
Anita Fjelsted
anfje@mst.dk
www.mst.dk
Strandgade 29
DK - 1401 København K
DENMARK

The German NAP is available in English on <http://www.bmelv.de/cae/servlet/contentblob/741738/publicationFile/40210/NationalActionPlan2008.pdf> Or contact:

Dr. Wolfgang Zornbach
wolfgang.zornbach@bmelv.bund.de
www.bmelv.de
Tel: +49(0)2 28 / 9 95 29 – 4317
Fax: +49(0)2 28 / 9 95 29 – 553595
Referat 517 (Pflanzenschutz),
Rochusstraße 1,
DE - 53123 Bonn
GERMANY

For inspiration of a non-EU (Swiss) NAP and agricultural support systems which work contact:

Federal Office for Agriculture FOAG
info@blw.admin.ch
Tel: +41 31 322 25 11
Fax: +41 31 322 26 34
Mattenhofstrasse 5
CH - 3003 Berne
SWITZERLAND

For inspiration on possibilities for reduced pesticide use contact:

Institute of Food and Resource
Jens Erik Ørum
je@foi.dk
Tel: +45 35 33 68 79
Mobil: +45 40 87 85 06
Economics, University of Copenhagen
Rolighedsvej 23
DK-1958 Frederiksberg C
DENMARK

Pesticide-free parks:

Local authorities interested in switching to non-chemical methods to combat weeds can seek advice on implementing non-chemical strategies by contacting:

Palle Kristoffersen
Senior researcher at the University of Copenhagen
Faculty of Life Science, Forest & Landscape
pkrist@life.ku.dk
Tel: +45 3533 1500
Fax: +45 3533 1508
Rolighedsvej 23
DK-1958 Frederiksberg C
DENMARK

For information on IPM:

The International Organisation for Biological and Integrated Control of Noxious Animals and Plants (IOBC) was established in 1955 to promote environmentally safe methods of pest and disease control in plant protection. Members include individual scientists, governmental, scientific and commercial organisations from 24 countries in Europe, the Mediterranean and Middle East.

The IOBC has appointed a Commission among others to define and up-date the conceptual framework of Integrated Production (IP) as an advanced sustainable agricultural production system; to develop, up-date and publish crop-specific technical IP guidelines. See: http://www.iobc.ch/download_docs.html

For further information on IOBC guidelines:

Carlo Malavolta
Regione Emilia-Romagna
cmalavota@regione.emilia-romagna.it

For ideas on a holistic approach to IPM:

Tiziano Galassi
Regione Emilia-Romagna, Servizio Fitosanitario
tgalassi@regione.emilia-romagna.it
While the holistic approach on IP is well developed in Emilia Romagna, the model seem to lack sufficient dynamism to ensure the system continues to improve.

For ideas on non-chemical alternatives:

The International Biocontrol Manufacturers' Association (IBMA) is the worldwide association of biocontrol industries producing microorganisms, macroorganisms, semiochemicals and natural pesticides for plant protection and public health.

David Cary, Executive Director
david.cary@ibma-global.org
www.ibma-global.org

For ideas on protecting employees:

GEOPA and EFA (today EFFAT) have developed guidelines on employee protection, inspiring operators on safe spraying methods, the environment, and safety. This information is already available in 11 EU languages, and can be downloaded from the EFFAT website:
<http://www.effat.eu/public/index.php?menu=74&lang=2>

Or contact:

Jesper Lund Larsen
United Federation of Danish Workers 3F
jll@3f.dk
www.3f.dk
Kampmannsgade 4
1790 Copenhagen V
DENMARK

For information on EFFAT, contact:

Arnd Spahn
Sectoral Secretary for the Agriculture sector
a.spahn@effat.org
EFFAT Secretariat
Rue du Fossé-aux-Loups, 38 box 3
B-1000 Brussels
BELGIUM

For information on health effects of pesticides and victims of pesticides:

Sick of Pesticides Campaign
Health and Environment Alliance
info@env-health.org
Tel: +32 2 234 3604 28
Boulevard Charlemagne
1000 Brussels
BELGIUM

For ideas on inspecting sprayers:

Julius Kühn-Institut (JKI)
Bundesforschungsinstitut für Kulturpflanzen
Institut für Anwendungstechnik im Pflanzenschutz
Dr.-Ing. Heinz Ganzelmeier
heinz.ganzelmeier@jki.bund.de
www.jki.bund.de
Tel: +49 (0)531 299-3650
Fax: +49 (0)531 299-3012
Messeweg 11/12
38104 Braunschweig
GERMANY

Further information on Dutch strategies and Farming with a Future:

Frank Wijnands
frank.wijnands@wur.nl
Tel: + 31 32029 1621
Fax: +31 32023 0479
Post: Postbox 430
8200 AK Lelystad
NETHERLANDS

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Pesticide Action Network Europe

Brussels representative

Rue de la pépinière, 1

B - 1000 Brussels

tel: + 32 2 503 08 37

fax + 32 2 402 30 42

www.pan-europe.info



**Pesticide
Action
Network**
Europe

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