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19-06-2013

Ministry for Rural Affairs

National Action Plan for the sustainable use of plant protection products for the period 2013–2017

Contents

1 Introduction

1.1 Directive on the sustainable use of pesticides

The requirement for Member States to prepare and establish action plans is a central component of the Directive on the sustainable use of pesticides (2009/128/EC)[1], referred to in the following as the Sustainable Use Directive or simply the Directive. Under the terms of Article 4 of the Directive, each country must adopt a National Action Plan to set up their quantitative objectives, targets, measures and timetables to reduce the risks and impacts of pesticide use on human health and the environment. The Directive also aims to encourage the development and introduction of integrated pest management and of alternative approaches or techniques in order to reduce dependency on the use of pesticides. In the National Action Plans, the Member States must describe how they will implement the measures in Articles 5 to 15 of the Directive in order to achieve the objectives of the plans. The National Action Plans must be reviewed at least every five years and, as specified in Article 2 of the Directive on public participation in respect of the drawing up of certain plans and programmes (2005/35/EC)[2], the public must be able to participate in the preparation and modification of the National Action Plans.

1.1.1 Restrictions and general definitions

The Directive may in future apply to all pesticides, but currently it only relates to plant protection products. Therefore, the National Action Plan only covers plant protection products. However, the term 'pesticide' is used to cover biocides and is also used where national legislation and the *acquis* use the term 'pesticide'.

The following terms are used in the report and have the meaning specified below:

Pesticide – a collective term for plant protection products and biocides. A product which is intended to prevent or counteract damage caused by animals, plants or microorganisms.

Biopesticide – a biotechnical organism (in other words, a living organism) which has been produced specially to prevent or counteract damage caused by animals, plants or microorganisms.

Plant protection product – used in agriculture, forestry and horticulture to protect plants against harmful organisms. Plant protection products are defined under the terms of Regulation (EC) No 1107/2009[3] concerning the placing of plant protection products on the market.

Biocidal product – a chemical or biological pesticide which is not a plant protection product. Examples include wood preservation products, rat poison and boat bottom paints.

[1] Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides.
[2] Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC.
[3] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC.

Biocidal products are defined under the terms of the Directive concerning the placing of biocidal products on the market (98/8/EC)[4].

Buffer zone – a zone of an adequate size to protect non-target aquatic organisms, which is the equivalent of the soil- and wind-related safe distance laid down when applying plant protection products.

Priority substances – priority substances under the terms of the Water Framework Directive (2000/60/EC)[5] which should be monitored in surface water. The list currently consists of 33 substances, while a further 15 substances have been nominated, including the plant protection product bentazone.

Guide values – a guide value is the highest concentration of a substance in water which is not expected to have negative effects on organisms in the water ecosystem.

Protected area – an area along the edge of a water course which is left overgrown, untreated and unfertilised and which can entitle the farmer or grower to financial compensation under the environmental compensation scheme in the Swedish Rural Development Programme for 2007–2013.

Safeguard zone – a zone next to surface water and groundwater which is used for the abstraction of drinking water and where pesticides cannot be used or stored.

Particularly dangerous substances – substances which are carcinogenic, mutagenic or reprotoxic. Substances with these properties are sometimes referred to as CMR substances.

Water catchment protection area – an area established by a municipality or county council to protect a body of water which is important for the supply of drinking water.

1.1.2 Public authorities responsible for implementing the National Action Plan

Several public authorities are responsible for transposing the Directive into Swedish legislation and for ensuring that its objectives are achieved.

The role of the Swedish Board of Agriculture, as the administrative authority for agriculture, is to actively promote a competitive food production industry, based on care for the environment and high standards of animal welfare, which brings benefits for consumers. The board also has special responsibility within the agricultural sector for environmental objectives and must take measures to keep the environmental impact of agriculture to a minimum. The board is responsible for providing supervisory guidance concerning the use of plant protection products in agricultural and horticultural production. It must provide training on using plant protection products and support for the voluntary function testing system. The board is also working to ensure that integrated pest management is more widely used.

[4] Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market.
[5] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

Except where another agency is responsible for a particular area, the Swedish Chemicals Agency is the administrative authority for issues relating to risks to health and the environment caused by chemical products, biotechnical organisms and goods which, because of their content or their treatment, have properties that require them to be regulated in the same way as chemical products or biotechnical organisms. The agency also has responsibility for the 'Non-toxic environment' objective established by the Swedish Parliament and evaluates applications for the approval of plant protection products.

The Swedish Environmental Protection Agency is the administrative authority for the environment and for activities relating to the climate and the air, the soil, biodiversity, contaminated areas, the ecocycle and waste, environmental monitoring and research. The agency plays a central role in environmental activities, which involves promoting, supporting and coordinating the implementation of environmental policies. The agency is responsible for regulations relating to the handling and application of plant protection products.

The Swedish Agency for Marine and Water Management was established in 2011 and is responsible for marine and water planning, supervision and regulation. The agency took over responsibility for the majority of seawater and freshwater issues from the Swedish Environmental Protection Agency. The agency is responsible for protecting the waters in and around Sweden.

In addition to these public authorities, there are several others which have responsibility for activities relating to the use and handling of plant protection products. These include the Swedish Work Environment Authority, the National Food Agency, the National Board of Health and Welfare and the Geological Survey of Sweden.

1.2 Consultation on the pesticide ordinance

The Swedish Government has circulated a proposal on a new pesticide ordinance for consultation. The proposal includes provisions which are relevant to the action plan and, therefore, the action plan will report on these provisions. When the consultation process is finished, the Swedish Government will make a decision about a new pesticide ordinance, after having considered the views expressed by the consultation bodies. Therefore, the final wording of the ordinance may differ from that of the proposal. As a result, the action plan may need to be updated.

2 The National Action Plan (Article 4)

Under the terms of Article 4 of the Directive, the National Action Plan must establish the objectives, targets, measures and timetables to reduce the risks and impacts of pesticide use. The plan must encourage the development and introduction of integrated pest management and of alternative approaches or techniques in order to reduce dependency on the use of pesticides. It must also include indicators to monitor the use of plant protection products containing particularly dangerous active substances, especially if alternatives are available. The Member States must describe in their National Action Plans how they will implement measures relating to Articles 5 to 15 in order to achieve the objectives of the Directive. The National Action Plan must take into account plans under other EU legislation on the use of plant protection products, such as planned measures under the Water Framework Directive. The plan must be reviewed at least every five years. The provisions on public participation laid down in Article 2 of Directive 2003/35/EC apply to the preparation and the modification of the National Action Plans.

2.1 The objectives for the period 2013–2017

The majority of the objectives of the National Action Plan are taken from the previous programme for the period 2010–2013, see Annex 1.

The objectives of the plan are to:

- reduce the risks to the environment and to health
- bring the levels of plant protection products in surface water and groundwater down almost to zero in line with the Swedish Parliament's 'Non-toxic environment' environmental quality objective by 2020
- ensure that residues of plant protection products in domestically grown vegetables are low and do not present a risk to consumers
- ensure that professional users of plant protection products are exposed to a low level of risk by taking safety measures and establishing appropriate working processes
- develop and use sustainable cultivation systems to a greater extent, including alternative approaches or techniques, in order to reduce dependency on chemical plant protection products

Section 3 describes in more detail the objectives, the measures needed to achieve them and the way in which they will be monitored.

The overall objective of the National Action Plan is to bring about a decline in the risk trend. The plan's aim is to improve sustainable plant protection even further by developing and implementing integrated pest management measures and different cultivation systems, including organic production.

The measures in the plan will focus on achieving the objectives and on targeted activities based on the specified risks involved in using plant protection products and opportunities for reducing these risks. The focus is on narrowing down the risks to health and the environment, so that measures are taken in areas where the problems are greatest. The work currently being carried out on the basis of the Water Framework Directive, for example,

provides important data for identifying bodies of water where residues of plant protection products are present.

In order to make further progress towards reducing the risks of using plant protection products and to counteract the ongoing fall in the number of plant protection products available, measures are needed to promote alternatives to chemical plant protection products.

In previous programmes, the involvement of businesses in the activities made a major contribution to the results. Therefore, it is essential for companies, research institutions and other stakeholders to participate in the ongoing work in this area. Businesses both took part in and acted as the driving force behind projects such as 'Safe plant protection', which was effective in communicating the results of research and information about legislation and the safe use and handling of plant protection products to farmers and other users.

The long-term aim is for the plant protection products of the future to be cost-effective, environmentally friendly and socially sustainable. Among other things, this involves a level of risk which is compatible with the environmental quality objectives. At the same time, in order for the agricultural industry to remain competitive, it will be necessary for plant protection products to be used in accordance with the current market regulations for the foreseeable future.

2.2 Integrated pest management and alternative approaches or techniques

The Directive's requirement for all professional users to apply integrated pest management measures and to make use of alternative approaches or techniques corresponds well with the activities taking place as part of previous action programmes for the sustainable use of plant protection products in Sweden. The use of integrated pest management involves preventive measures, such as well-planned crop rotation and appropriate cultivation techniques, choosing tolerant or resistant varieties, protecting and encouraging beneficial organisms etc. Plant protection measures must be designed to meet the specific requirements in each case. In order to ensure that this is the case, the Swedish Board of Agriculture is carrying out activities which include establishing forecasting and warning systems for serious harmful organisms, putting in place control strategies, monitoring and communicating the results of research and trials, running courses and providing information and training material. Advisory organisations that make their knowledge available to professional users are informed about the results of these activities.

Chemical controls must only be used when necessary and in such a way as to minimise the risks to health and the environment. Biological plant protection products and alternative approaches or techniques should be used whenever possible. The Swedish Government is promoting and supporting organic production by providing financial compensation as part of the Swedish Rural Development Programme for the period 2007–2013.

A combination of measures, such as regulations, information, advice, training and the development of knowledge, will result in all users implementing integrated pest management, with the consequence being a reduction in the risks to people and the environment.

2.3 Monitoring and evaluation

The Swedish Board of Agriculture is the authority responsible for coordinating and managing the work on the action plan and for organising the monitoring and evaluation of the plan. An annual coordination process will take place among all the authorities involved, with the aim of shedding light on the activities and highlighting any problems relating to the objectives. The results are to be reported to the Swedish Government. Every two years, companies and other stakeholders should be invited to take part in a more detailed dialogue about the work on the action plan and given the opportunity to express their views. The plan must be monitored and evaluated at least every five years.

2.4 Public participation

2.4.1 Survey on plant protection products

From mid-April until mid-May 2012, the public had the opportunity to respond to a survey about plant protection products on the Swedish Board of Agriculture's website in connection with the preparation of the proposal for the action plan.

The survey included information about the task of drawing up a National Action Plan, general information about plant protection products and the reason why the board wanted to find out the public's views. Information about the opportunity to take part in the survey was publicised in a number of different ways.

A total of 720 responses were received. Roughly equal numbers of men and women replied and the respondents were distributed across different age groups. The majority had their own garden, were concerned about the risk of being exposed to plant protection products when they handled fruit and vegetables and believed that they could influence the extent to which they were exposed to plant protection products.

The 579 responses that related to how public authorities should influence the use of plant protection products were broken down as follows:

- Trials and development, establishing new methods 134
- Regulations and bans 261
- Organic production 118
- Training and information 116
- Product availability and approval, risk-benefit assessments 68
- The general public and private gardens 43
- Other 79

The views expressed will be taken into consideration during the authorities' work on the action plan.

2.4.2 The hearing and the consultation on the proposal for the National Action Plan

In June 2012, the authorities involved held a hearing on behalf of the Swedish Government to prepare a proposal for the action plan and to plan the work needed to produce it. Interest groups and industry associations, other institutions, such as the Swedish University of Agricultural Sciences (SLU), and advisory organisations for professional users and for the general public, among others, were invited to the hearing. The Swedish Board of Agriculture also circulated the proposal for the National Action Plan for consultation. The views concerning the structure and the general content of the proposal were included in the final version of the proposal. The opinions concerning details of the implementation and the legislation will be considered by the authorities involved during the course of their future work.

3 Objectives, actions and monitoring

This section describes the objectives of the action plan, the actions needed to achieve them and the necessary monitoring activities which are based on indicators or other monitoring measures.

3.1 Overall objective for risks

3.1.1 Objective

- The risks to the environment and to human health must be reduced.

3.1.2 Monitoring

The existing national risk index for health and the environment and the toxicity index will be used to monitor the overall objective. See Section 14 Indicators for more information. These indices give an overall perspective of the trends in environmental and health risks. However, they have limitations, because they do not fully take into consideration all the factors which influence the complete risk picture. Another limitation is that the indices are affected by factors which are not related to actions taken as part of the action plan, for example, the areas used to cultivate certain crops and the size of these areas. Some of the actions taken to reduce risks are not covered by the indices. Therefore, additional measures are needed. These will include monitoring the progress of the actions taken in important areas, such as:

- The proportion of agricultural land under organic cultivation.
- The number of companies with protected areas and the total size of the protected areas.
- The proportion of conifer saplings protected using non-chemical methods.
- The proportion of biologically treated and heat treated seed, in other words, the proportion of non-chemically treated seed.
- The use of growth regulators in crops other than rye.
- The use of plant protection products to stop pre-harvest sprouting or to control weeds in cereal crops less than one month before harvest.

3.1.3 Actions

The following actions are expected to contribute to achieving the objective:

- The actions specified in the Directive, in particular in Articles 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15.
- Training, information and advice to restrict the use of growth regulators in cereals and to prevent the need for products to stop pre-harvest sprouting.
- Training, information and advice about integrated pest management, in other words, the tailored use of plant protection products and the application of alternative approaches or techniques, safe handling routines etc.
- Better information about products and their use with the aim of improving the application and handling of plant protection products (see Section 13 Integrated pest management).

An increased proportion of agricultural land under organic cultivation as a result of measures such as information, advice and environmental compensation as part of the Swedish Rural Development Programme for the period 2007–2013.

3.2 Residues in surface water, groundwater and drinking water

3.2.1 Objective

- Levels of plant protection products in surface water and groundwater must be brought down almost to zero in line with the Swedish Parliament's 'Non-toxic environment' environmental quality objective by 2020.

The overall objective consists of the following goals:

	Goal	**Comment**
Surface water	The level of individual plant protection products must not give rise to any harmful effects in the aquatic environment. This means that the level in surface water must not permanently exceed a guide value for the active substance.	The guide value is the highest concentration of each active substance which is not expected to cause any harmful effects to organisms in the aquatic environment.
Groundwater	The level of an individual plant protection product, including the relevant metabolites,	

	degradation and reaction products, must be lower than 0.1 µg/l and the total level of all the plant protection products in a sample must be lower than 0.5 µg/l.	
Raw water for drinking water (both surface water and groundwater)	1. It must not be possible to detect levels from the current and future use of plant protection products. 2. The proportion of existing raw water with levels from the previous use of plant protection products must be reduced.	The fact that it must not be possible to detect the levels means in practice that the detection limit must apply to every individual substance, but it must be 0.025 µg/l at the lowest. In order to achieve the first goal, the actions must primarily be focused on preventing residues of plant protection products from contaminating raw water. The choice of raw water supply and treatment options will be decisive in achieving the second goal. It will only be possible to distinguish between previous and current use if a meaningful distinction can be made at a substance level. As the current findings in groundwater supplies are dominated by substances which form part of previously banned products, this may be a practicable approach. This applies mainly to atrazine and metabolites of atrazine and dichlobenil.
Drinking water	The level of an individual plant protection product, including the relevant metabolites, degradation and reaction products, must be lower than 0.1 µg/l and the total level of all the plant protection products in a sample, including the relevant metabolites, degradation and reaction products, must be lower than 0.5 µg/l.	The limit for drinking water plants covered by food legislation is specified in the National Food Agency's regulations (SLVFS 2001:30) on drinking water. The guide value for drinking water plants not covered by food legislation (individual water supplies) is specified in the National Board of Health and Welfare's general advice (SOSFS 2003:17) on precautionary measures for drinking water, amended by SOSFS 2005:20.

3.2.2 Monitoring

- Monitoring changes in the levels of plant protection products which exceed the guide value or limit in surface water, groundwater and drinking water on the basis of samples and analyses as part of the system of environmental monitoring.
- Municipalities' programmes for monitoring drinking water supplies for plant protection products in accordance with the relevant legislation.
- The number of companies with protected areas and the total size of the protected areas.
- The proportion of agricultural land under organic cultivation.
- Monitoring statistics on the sales of products containing the active substances bentazone, pendimethalin and various pyrethroids.

3.2.3 Actions

The following actions are expected to contribute to achieving the objective:

- The actions specified in the Directive, in particular in Articles 5, 6, 8, 9, 11, 12, 13, 14 and 15.
- An increase in the size of protected areas as a result of measures such as information, advice and environmental compensation as part of the Swedish Rural Development Programme for the period 2007–2013.
- Training, information and advice about integrated pest management, in other words, the tailored use of plant protection products and the application of alternative approaches or techniques, safe handling routines etc.
- Better information about products and their use with the aim of improving the application and handling of plant protection products (see Section 13 Integrated pest management).
- An increased proportion of agricultural land under organic cultivation as a result of measures such as information, advice and environmental compensation as part of the Swedish Rural Development Programme for the period 2007–2013.

3.3 Residues in domestically grown vegetables

3.3.1 Objective

- Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.

3.3.2 Monitoring

- On the basis of samples and analyses of residues, monitoring changes in:
    - The total intake of residues of plant protection products from domestically grown vegetables or vegetables which are important from an intake perspective (including cereals).

    - The use of growth regulators in cereals.
- The proportion of agricultural land under organic cultivation.

3.3.3 Actions

The following actions are expected to contribute to achieving the objective:

- The actions specified in the Directive, in particular in Articles 5, 6, 8, 14 and 15.
- Training, information and advice to restrict the use of growth regulators in cereals and to prevent the need for products to stop pre-harvest sprouting.
- Training, information and advice about integrated pest management, in other words, the tailored use of plant protection products and the application of alternative approaches or techniques, safe handling routines etc.
- Better information about products and their use with the aim of improving the application and handling of plant protection products (see Section 13 Integrated pest management).
- An increased proportion of agricultural land under organic cultivation as a result of measures such as information, advice and environmental compensation as part of the Swedish Rural Development Programme for the period 2007–2013.

3.4 Risks for users of plant protection products

3.4.1 Objective

The level of risk which professional users of plant protection products are exposed to must be low as a result of taking safety measures and establishing appropriate working processes.

The overall objective consists of the following goals:

- All professional users of plant protection products must use the required safety equipment.
- At least 95 % of all sprayers must be equipped with rinsing water tanks.
- Everyone who fills a sprayer must have routines to minimise the risks to health and the environment when handling plant protection products.
- At least 70 % of sprayers must be fitted with preparation filling mechanisms and tank rinsing equipment.
- All professional users of plant protection products must store them in an appropriate way.

3.4.2 Monitoring

- Monitoring the goals on the basis of statistics and other investigations.
- Monitoring the use by professional users of plant protection products of safety equipment such as gloves, protective eyewear and protective clothing, with regard to the choice of material, cleaning, storage and replacement.

3.4.3 Actions

The following actions are expected to contribute to achieving the objective:

- The actions specified in the Directive, in particular in Articles 5, 6, 8, 13, 14 and 15.
- Training, information and advice about the safe handling and storage of plant protection products, the use of technical aids, the disposal of hazardous waste and the use of safety equipment.
- Better information about products and their use with the aim of improving the application and handling of plant protection products (see Section 13 Integrated pest management).

3.5 Developing sustainable cultivation systems

3.5.1 Objective

- Sustainable cultivation systems which include the use of alternative approaches or techniques must be developed and used to a greater extent in order to reduce dependency on chemical plant protection products.

3.5.2 Monitoring

- Reports from supervisory projects on the application of rules on integrated pest management.
- The proportion of agricultural land under organic cultivation.
- The proportion of conifer saplings protected using non-chemical methods.
- The proportion of biologically treated and heat treated seed, in other words, the proportion of non-chemically treated seed.
- The use of growth regulators in cereal crops other than rye.

3.5.3 Actions

The following actions are expected to contribute to achieving the objective:

- The actions specified in the Directive, in particular in Articles 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15.
- Training, information and advice with the aim of restricting the use of growth regulators in cereals.
- Training, information and advice about integrated pest management, in other words, the tailored use of plant protection products and the application of alternative approaches or techniques.
- Better information about products and their use with the aim of improving the application and handling of plant protection products (see Section 13 Integrated pest management).

- An increased proportion of agricultural land under organic cultivation as a result of measures such as information, advice and environmental compensation as part of the Swedish Rural Development Programme for the period 2007–2013.

4 Training (Article 5)

4.1 The requirements of the Directive

Article 5 contains requirements for training all professional users, distributors and advisors. They must have access to appropriate training which must consist of both initial and additional training courses.

The training must be designed to ensure that participants acquire sufficient knowledge regarding the subjects listed in Annex I of the Directive, taking account of their different roles and responsibilities. There must be a certification system where the certificate provides evidence that sufficient knowledge has been acquired. The system must include requirements and procedures for granting, renewing and withdrawing training certificates.

4.2 National legislation

Professional users of plant protection products must have a licence to use particularly dangerous plant protection products. One requirement for being granted a licence is that the user must have successfully completed a training course. Other products for professional use can be used after the user has successfully completed a training course. The training courses are also open to advisors and distributors.

The Swedish Board of Agriculture is the authority responsible for training courses relating to plant protection products in agriculture, forestry and horticulture. However, the Swedish Board of Agriculture has appointed the county administrative boards as the bodies responsible for implementing the majority of the training courses. Nevertheless, the Swedish Board of Agriculture has responsibility for training on treatment with plant protection products and treating individual saplings in forestry plantations. The authority responsible can commission other players to contribute to the courses. Users' permission can be withdrawn under certain circumstances.

Users who have undergone a training course have permission to use plant protection products for five years. This permission must be renewed by taking an additional training course.

4.3 Actions

4.3.1 Training for distributors

The distributors who currently do not have a training certificate must be given access to training by 26 November 2013 at the latest.

Under the terms of the Government's proposal for an ordinance, which has been circulated for consultation, the Swedish Chemicals Agency is the authority responsible for training distributors of plant protection products

4.3.2 Training syllabuses

Under the terms of the Government's proposal for an ordinance, which has been circulated for consultation, the training syllabuses must include the subjects listed in Annex I of the Directive. The courses must provide sufficient knowledge on these subjects.

4.3.3 Training for distributors

The distributors who currently do not have a training certificate must be given access to training by 26 November 2013 at the latest.

Under the terms of the Government's proposal for an ordinance, which has been circulated for consultation, the Swedish Chemicals Agency is the authority responsible for training distributors of plant protection products

4.4 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objectives	**Impact on the objectives**
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	++
Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.	++
The level of risk for users of plant protection products must be reduced.	++
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	++

5 Requirements for sales (Article 6)

5.1 The requirements of the Directive

Under the terms of Article 6, every Member State must ensure that distributors have sufficient staff in their employment holding a certificate. This requirement comes into effect on 26 November 2015. These people must be available at the time of sale to provide adequate information to customers with regard to pesticide use, health and environmental risks and safety instructions to manage those risks. Micro distributors selling only products for non-professional use may be granted a derogation if they meet certain requirements. The provisions relating to micro distributors and the requirements that they must meet will be decided by each Member State.

The Member States must take the necessary measures to restrict sales of pesticides authorised for professional use to persons holding a certificate. This requirement comes into effect on 26 November 2015.

The Member States must require distributors selling pesticides to non-professional users to provide general information regarding the risks for human health and the environment. The Member States may require pesticide producers to provide this information.

5.2 National legislation

Under the terms of Swedish legislation, there is requirement that anyone who provides plant protection products to a person who is not using the plant protection products professionally must inform the user that the use of the products can involve the risk of harm to or problems with human health and the environment. They must also inform the user about the dangers of handling the products and how they must be stored, applied or handled in other ways, about how the remainder of the product must be disposed of after use and about possible alternatives which involve a smaller risk.

In Sweden, the majority of distributors carry out voluntary checks on people who buy plant protection products for professional use. Distributors can request excerpts from the Swedish register of authorised professional users and check their customers against the register.

Private individuals require a licence to buy particularly dangerous chemical substances[6]. This also applies to particularly dangerous plant protection products. The licence is granted by the county administrative board following an investigation into whether the applicant needs the products for artistic, technical, scientific or similar purposes. The licence can be refused if less dangerous products are available which can be used instead.

[6] Particularly dangerous substances are products which are classified as carcinogenic, mutagenic or reprotoxic (CMR), highly toxic, toxic or highly caustic.

5.3 Actions

5.3.1 Amendments to legislation

The proposal for an ordinance which has been circulated for consultation by the Government states that a plant protection product can only be provided to another person if the company providing the product has an employee with a valid training certificate. The person with the certificate must be available at the time of sale. Training certificates are issued by the county administrative boards to people who have successfully completed a test of their knowledge.

The proposal for the ordinance also states that plant protection products which fall into class 1 or class 2 can only be provided to people who have a licence to use the product or to a distributor.

5.4 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objectives	**Impact on the objectives**
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	++
Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.	++
The level of risk for users of plant protection products must be reduced.	++
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	++

6 Information and awareness-raising actions (Article 7)

6.1 The requirements of the Directive

Under the terms of Article 7(1), the Member States must take measures to inform the general public and to promote and facilitate information and awareness-raising programmes and the availability to the general public of accurate and balanced information relating to pesticides, in particular regarding the risks and the potential acute and chronic effects for human health, non-target organisms and the environment arising from their use, and relating to the use of non-chemical alternatives.

Under the terms of Article 7(2), the Member States must put in place a system for gathering information on acute pesticide poisoning incidents, as well as chronic poisoning developments where available, among groups that may be exposed regularly to pesticides, such as operators, agricultural workers or people living close to pesticide application areas.

6.2 National application

Swedish public authorities such as the Swedish Board of Agriculture, the Swedish Chemicals Agency, the Swedish Environmental Protection Agency and the Swedish University of Agricultural Sciences have extensive information about plant protection products on their websites. The information includes processes for approving plant protection products, the risks to health and the environment of using plant protection products, applying plant protection products in a responsible way and alternatives to chemical plant protection products.

The poisons information centres, which form part of the Medical Products Agency, collect information about the risks, symptoms and treatment of acute poisoning caused by medicines, chemical substances, plants, fungi and animals. They also have information about almost 100 000 chemical products, including plant protection products. In cases of poisoning, the Swedish health service contacts the poisons information centres to obtain information about appropriate treatment. The poisons information centres maintain statistics about these poisoning cases.

6.3 Actions

6.3.1 Information from the respective authorities

The authorities involved must continually update information via the relevant channels with the aim of meeting the general public's need for access to accurate and balanced information, including information about the use of non-chemical alternatives.

6.4 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objectives	**Impact on the objectives**
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	--
Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.	--
The level of risk for users of plant protection products must be reduced.	+
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	+

7 Inspection of equipment in use (Article 8)

7.1 The requirements of the Directive

Article 8 states that all Member States must ensure that pesticide application equipment in professional use is subject to inspections at regular intervals.

The Member States must ensure that pesticide application equipment has been inspected at least once by 26 November 2016 to enable the equipment to be used. Under the terms of the Directive, there are possibilities for derogations. The inspections must verify that pesticide application equipment satisfies the relevant requirements listed in Annex II of the Directive, in order to achieve a high level of protection for human health and the environment. Equipment that complies with harmonised standards developed in accordance with the Directive will be presumed to comply with the requirements in Annex II of the Directive.

7.2 National application

There is currently a voluntary system for function testing which complies with the standards for boom sprayers and blowers (SS-EN 13790 parts 1 and 2). As part of the checks currently carried out, simple faults can be repaired. Similarly, there is also the opportunity to provide information and advice to equipment operators. This includes information about calibrating the sprayer. The function tester can also hand out information material. In order to ensure that the information is provided in an effective way, it is recommended that the owner or operator of the equipment is present during the test.

7.3 National legislation

Equipment for applying plant protection products must be fit for purpose, well-maintained and correctly calibrated.

7.4 Actions

7.4.1 Derogations from the requirement for the function test

The current system for voluntary function testing of boom sprayers and blowers will be changed to a mandatory system for function testing of all types of application equipment. Derogations can only be granted if there is a justification for making use of the options for derogations in the Directive.

The Government's proposal for an ordinance states that equipment for applying plant protection products can only be used in a professional context if the user of the equipment can demonstrate that the equipment is approved by the Swedish Board of Agriculture or has been checked in another EU Member State and can be used under the terms of that Member State's legislation. During the most recent check, the equipment must have complied with the Swedish Board of Agriculture's regulations concerning the requirements for equipment used for applying plant protection products.

The regulations will state, among other things, that equipment for applying plant protection products must be fit for purpose, well-maintained and correctly calibrated.

Equipment which has been granted a derogation from the function test or which has a different interval between function tests is also covered by the requirement for calibration and technical checks.

7.4.1.1 Handheld equipment and knapsack sprayers

The Directive offers the possibility of exempting handheld pesticide application equipment or knapsack sprayers from inspection, after an assessment has been carried out of the risk to human health and the environment, including an assessment of the extent to which the equipment will be used. In this case, the Member States must ensure that operators have been informed of the need to change the accessories regularly and of the specific risks relating to the equipment. In addition, operators must have been trained in the proper use of the pesticide application equipment in accordance with Article 5.

The Swedish Government is considering making use of the opportunity to exempt handheld pesticide application equipment and knapsack sprayers from the need for inspection, because it believes that the way in which the equipment is used is more important than its technical status with regard to the risks to human health and the environment. Furthermore, it considers that the cost of the test would be greater than the cost of buying new application equipment. Therefore, handheld equipment and knapsack sprayers should possibly be exempted from inspections. In these cases, information and training can be given to users of knapsack sprayers and other portable equipment with the aim of communicating knowledge about how the equipment must be used in order to avoid problems for human health and the environment.

7.4.1.2 Equipment with a very low level of use

It is possible to apply different timetables and inspection intervals for certain types of equipment with a very low level of use. Examples include equipment used in greenhouses and equipment for killing fungi on tree stumps. The Swedish Government is considering making use of the opportunity to set different timetables and inspection intervals for equipment with a very low level of use. A derogation of this kind would require an assessment to be carried out of the risk to human health and the environment. This would include an assessment of the level of use of the equipment.

7.4.2 Technical inspections

As a starting point, technical inspections should include the elements of a function test which can be carried out without using function testing equipment, for example, investigating whether the spraying platform is level and whether the hoses are undamaged and correctly fitted etc. Users must carry out technical inspections or function tests before each cultivation season.

7.4.3 Standardising the function test and equipment for applying and handling plant protection products

By continuing to take part in international efforts to develop standards for function tests and pesticide application equipment, Sweden can help to reduce the problems caused to human health and the environment. The authority responsible is the Swedish Board of Agriculture.

7.5 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objectives	Impact on the objectives
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	++
Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.	++
The level of risk for users of plant protection products must be reduced.	++
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	++

8 Aerial spraying (Article 9)

8.1 The requirements of the Directive

Under the terms of Article 9, the Member States must appoint the competent public authorities to establish the special conditions under which aerial spraying can take place, to review the applications required and to publicise information about the crops and the areas, the circumstances and the special spraying requirements for aerial spraying.

8.2 National legislation and application

In Sweden there is a general ban on spraying pesticides from aircraft. However, there is the option of granting an exemption in individual cases if there are special reasons for doing so. The cases of aerial spraying in Sweden in recent years have been restrictive and have been limited to biological products (*Bacillus thuringiensis*). Exemptions have been granted for spraying plant protection products (Bordered White butterfly in Hökensås in 1997 and Black Arches in Skåne in 1998) and biocidal products (mosquitoes in the lower Dal River area during the 2000s).

8.3 Actions

8.3.1 Amendments to legislation

The process used in practice to decide on exemptions from the ban on aerial spraying of pesticides is considered to be compatible with Article 9 of the Directive. However, it would still be appropriate to clarify in the legislation the requirements for an exemption from the ban. The proposal for an ordinance circulated for consultation by the Swedish Government contains a provision which states that an exemption can be granted if there are special reasons for doing so and providing that the requirements of Article 9 of the Directive are met.

8.4 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objectives	**Impact on the objectives**
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	++

Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.	+
The level of risk for users of plant protection products must be reduced.	++
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	+

9 Information to the public (Article 10)

9.1 The requirements of the Directive

Under the terms of Article 10, the Member States can include provisions in their National Action Plans for informing people who may be exposed to spray drift. This is also described in Article 31(4)(b) of Regulation (EC) No 1107/2009 which states, with regard to the content of a product approval, that countries can introduce requirements covering: 'the obligation before the product is used to inform any neighbours who could be exposed to the spray drift and who have requested to be informed'.

9.2 National legislation

Swedish legislation contains provisions which aim to protect people from exposure to spray drift. The provisions state that operators spraying pesticides in Sweden in areas that the public has access to must inform the public before the spraying takes place of the time and the area affected. The obligation to provide information does not apply when spraying pastureland or uncultivated arable land.

9.3 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objectives	**Impact on the objectives**
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	+
Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.	--
The level of risk for users of plant protection products must be reduced.	--
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	+

10 Specific measures to protect the aquatic environment and drinking water (Article 11)

10.1 The requirements of the Directive

Under the terms of Article 11 of the Directive, measures must be taken to protect the aquatic environment and drinking water supplies from the impact of pesticides. These measures must support and be compatible with relevant provisions of the Water Framework Directive and Regulation (EC) No 1107/2009. Article 11 states that the measures must be as follows. Preference must be given to pesticides that are not classified as dangerous for the aquatic environment and to the most efficient application techniques. The measures must include creating appropriately-sized buffer zones for the protection of non-target aquatic organisms and safeguard zones for water used for the abstraction of drinking water, where pesticides must not be used or stored. Applications on or along roads, railway lines, very permeable surfaces or other infrastructure close to surface water or groundwater or on impervious surfaces with a high risk of run-off into surface water or sewage systems must be avoided or restricted.

10.2 National legislation and application

There is a general obligation in Sweden to choose less dangerous chemicals if alternative products are available (the so-called product choice principle). The Centre for Chemical Pesticides (CKB) at the Swedish University of Agricultural Sciences (see Section 15) provides support for the application of the product choice principle by producing and communicating information about the environmental effects of chemical plant protection products.

Professional users are also obliged to use the best possible techniques. Help with choosing the best technique is available in the training course on the use of plant protection products, in the form of information on spraying techniques and opportunities for reducing spray drift.

Under Swedish law, people who handle pesticides must determine and observe the safe distance needed to protect water supplies, lakes and water courses and surrounding land, taking into consideration the circumstances. The safe distance is the distance to surrounding areas that must be maintained when spraying, cleaning equipment or handling pesticides in other ways in order to protect these areas from unintentional spraying, such as spray drift or soil transport. When determining the safe distance, special consideration must be given to the ambient temperature and wind conditions, the extent of the area to be sprayed in the direction of the wind, the type of soil and ground structure and the gradient of the ground to the surrounding area on the site where spraying is intended to take place, the properties of the pesticide and the sensitivity of the surrounding area to the product. The

public authorities have produced guidelines and advice to help users to determine the necessary distance. In the case of a soil-related safe distance, this involves observing the following minimum distances unless it is obvious because of other precautionary measures that have been taken or because of ground conditions that a smaller distance is sufficient: 1 metre to ditches and drainage wells, 6 metres to lakes and other water courses and 12 metres to drinking water wells. The pesticide liquid must be prepared and the spraying equipment must be filled and cleaned 30 metres away from the landscape features described above.

Swedish legislation includes a ban on using plant protection products without a licence in water catchment protection areas. The ban also appears in water protection regulations which apply to water catchment protection areas. The ordinance on water quality management[7] includes specific requirements relating to bodies of water which are or can be used as drinking water supplies. Water catchment protection areas with the accompanying regulations can be established by county administrative boards or municipalities to protect water supplies. Dividing the water catchment protection area into different zones (generally 2–3) allows the regulations for the water catchment protection area to be adapted to the needs of each zone. This can involve a ban on spraying or handling pesticides or the need for a licence or a notification inside the zone. A licence can be linked to certain conditions. The regulations can cover both professional and private use.

Before pesticides are used on railway embankments, the municipal executive board must be notified. The possibilities for using plant protection products are heavily restricted on many highly permeable or impervious surfaces, because of the obligation to observe the safe distance required to protect the surrounding area.

10.3 Actions

10.3.1 Amendments to legislation

In the proposal for an ordinance circulated for consultation by the Swedish Government, there is a requirement for a licence to apply plant protection products on highly permeable surfaces and other infrastructure close to surface water or groundwater and on impervious surfaces with a high risk of run-off into surface water or sewage systems. Licences are granted by the municipal executive board. The municipal executive board must be notified of plans to apply plant protection products along roads and railways. The proposal also includes a provision which requires people considering using plant protection products as part of their business to give preference to products which are not dangerous to the aquatic environment.

The proposal for an ordinance circulated for consultation by the Swedish Government gives municipalities the right to access the records which farmers keep under the terms of Article 67(1) of Regulation (EC) No 1107/2009. The general public can access the records by contacting the municipality. Drinking water providers are currently obliged to monitor the water for plant protection products which can be assumed to occur in a water supply. The proposal for an ordinance enables drinking water providers to obtain information about which plant protection products are being used in the vicinity of the water supply. This will

[7] Ordinance (SFS 2004:660) on water quality management.

allow them to target more effectively their measures to monitor water quality, which will result in better and more relevant analyses.

10.3.2 Advice on protecting groundwater

Levels of pesticides (including levels above the limit for drinking water) have been discovered in private and municipal groundwater supplies. This indicates that the handling and application of plant protection products must be continuously improved so that the risks of using and handling these products are reduced. The 'Focus on Nutrients' advisory project will continue to pay particular attention to protecting groundwater.

10.3.3 Guide values for plant protection products in surface water

The guide values for levels of plant protection products in surface water are intended as effect-based thresholds. They are based on current knowledge of the maximum level of a substance in water at which no negative effects on the ecosystem can be expected. Guide values are primarily laid down to help with interpreting data from environmental monitoring programmes and to monitor the 'Non-toxic environment' environmental quality objective. The purpose of the guide values is to make it easier to carry out general assessments of the status of the environment and to evaluate the results of environmental monitoring programmes. Therefore, they should not be regarded as limits or as environmental quality standards. In other words, they are not legally binding figures which lead to criminal liability or the need to take action if they are exceeded.

The results of the Swedish Environmental Protection Agency's environmental monitoring programmes show that active substances from plant protection products often occur at measurable levels in Swedish surface water. Surface water includes lakes, rivers, streams, brooks, reservoirs and coastal waters. The fact that a substance can be detected in water using sensitive analysis methods does not necessarily mean that it will cause harm to aquatic organisms. In order to evaluate the risk of exposure, the levels that are measured must be considered in relation to the toxicological effect of the substance on different aquatic organisms.

10.4 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objective	**Impact on the objectives**
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	++
Residues of plant protection products in domestically grown vegetables must be low and	--

must not present a risk to consumers.	
The level of risk for users of plant protection products must be reduced.	--
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	+

11 Reduction of pesticide use or risks in specific areas (Article 12)

11.1 The requirements of the Directive

Article 12 of the Directive states that Member States must, having due regard for the necessary hygiene and public health requirements and biodiversity or the results of relevant risk assessments, ensure that the use of pesticides is minimised or prohibited in certain specific areas. It also states that the specific areas in question are:

> a) areas used by the general public or by vulnerable groups as defined in Article 3 of Regulation (EC) No 1107/2009, such as public parks and gardens, sports and recreation grounds, school grounds and children's playgrounds and in the close vicinity of healthcare facilities
> b) protected areas as defined in Directive 2000/60/EC or other areas identified for the purposes of establishing the necessary conservation measures in accordance with the provisions of Directives 79/409/EEC[8] and 92/43/EEC[9]
> c) recently treated areas used by or accessible to agricultural workers

These provisions enable the Member States to restrict or minimise the use of plant protection products in specific areas without the need to justify this using risk assessments.

11.2 National legislation

A licence from the municipality is needed before pesticides can be applied to the grounds of pre-schools and schools or to public playgrounds. Pesticides are used very little in these areas. The municipality must be notified before pesticides are used on sports grounds and on areas larger than 1 000 square metres in size.

In Sweden, Natura 2000 sites are protected under the terms of the Swedish Environmental Code and are all classified as being of national interest. Anyone who wants to carry out activities or take measures which could have a significant impact on the environment in a Natura 2000 area (Chapter 7, Section 28a of the Swedish Environmental Code) requires a licence. The use of plant protection products can constitute an activity of this kind. This also applies to actions taken outside a Natura 2000 site which could affect the site. Sweden has listed around 4000 Natura 2000 sites with a total area of around 6 million hectares or around 15 % of the total area of Sweden. Very little cultivated agricultural land is found in Natura 2000 areas.

Employers are obliged to inform their employees about the risks involved in their work. They must also ensure that the employees have sufficient training and sufficient knowledge

[8] Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds.
[9] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, also referred to as the Habitat Directive.

to avoid the risks in the work environment. Employees must follow the specified safety instructions. Employers must ensure that only employees who have been given sufficient instructions have access to areas where there is an obvious risk to health. Employers must take all the necessary measures to prevent employees from being exposed to ill-health.

11.3 Actions

11.3.1 Amendments to legislation

The proposal for an ordinance circulated for consultation by the Swedish Government includes the requirement for a licence to use plant protection products in open areas around apartment blocks, in the grounds of pre-schools and schools, in public playgrounds, in parks and gardens which the public has access to and in sports and leisure facilities. The municipality must be notified before plant protection products can be used in planning and construction work and in places consisting of a continuous area of more than 1 000 square metres where the public can move freely.

Notifications and applications for licences must be submitted to the municipality. Applications for licences must be assessed on the basis of the so-called product choice principle, which means that, if several products are available, the product which is least dangerous to human health and the environment must be chosen.

11.4 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objectives	**Impact on the objectives**
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	+
Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.	--
The level of risk for users of plant protection products must be reduced.	--
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	+

12 Handling and storage of pesticides and treatment of their packaging and remnants (Article 13)

12.1 The requirements of the Directive

Under the terms of Article 13, the Member States must take the necessary measures to ensure that the following operations by professional users and, where applicable, by distributors do not endanger human health or the environment:

a) Storage, handling, dilution and mixing of pesticides before application.
b) Handling of packaging and remnants of pesticides.
c) Disposal of 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 EU legislation on waste.

In addition, the Member States must 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 the sizes of containers or packaging.

The Member States must also ensure that storage areas for pesticides for professional use are constructed in such a way as to prevent unwanted releases. Particular attention must be paid to the location, size and construction materials.

12.2 National legislation and application

There is a general obligation in Sweden for people who are carrying out or intending to carry out an activity or taking an action to implement the safety measures, observe the restrictions and take the precautionary measures needed to prevent the activity or the action from causing harm to or problems for human health or the environment. For the same reason, professional users must make use of the best possible techniques. These precautionary measures apply, among other things, to handling, diluting and mixing pesticides, storage of pesticides, the design and construction of storage areas and cleaning the equipment used after application. In addition, people in possession of waste, such as packaging and the remnants of pesticides, must ensure that it is handled in an acceptable way with regard to human health and the environment.

Specific regulations apply to handling hazardous waste. Waste is regarded as being hazardous when it is explosive, flammable, caustic, infectious or toxic to humans or the environment. The remnants of chemicals that have been used and that have properties of this kind are classed as hazardous waste. This also applies to plant protection products. How hazardous a plant protection product and, therefore, its remnants and its packaging

are, depends entirely on the substances that it contains. The classification of waste plays a decisive role in determining how a number of environmental provisions are applied. Among other things, it forms the basis for the safe disposal of waste under the terms of the waste ordinance (SFS 2011:927).

The training of professional users includes, among other things, working routines for counteracting risks to health and the environment while filling, applying and cleaning spraying equipment and while handling remnants of products and empty packaging and transporting hazardous waste. The training also provides information about how storage premises must be designed and constructed.

The Swedish Work Environment Authority has produced readily available information about the safety equipment which must be used when applying pesticides.

The 'Safe plant protection' information and training campaign began in 1997 and aims to improve the handling and application of plant protection products in Swedish agriculture in order to reduce the risks to health and the environment. Information and training activities take place throughout Sweden and the campaign has aroused a great deal of interest. The assessment is that the campaign has had a positive impact on the environment and that it is contributing to reducing the environmental and health risks involved in agriculture. The goal of the campaign is to make contact with the majority of farmers who use plant protection products and to provide tips, ideas and knowledge about the safe and thoughtful handling and application of plant protection products. The campaign also aims to provide information about new legal requirements in this area. It is run by the Federation of Swedish Farmers (LRF) in collaboration with the Swedish Board of Agriculture, the Swedish Environmental Protection Agency, the Swedish Chemicals Agency, Lantmännen (one of the largest groups in food, energy and agriculture in Scandinavia) and Svenskt Växtskydd (the Swedish plant protection industry association). The fact that several different organisations are highlighting the issues relating to the safe handling and application of plant protection products means that farmers are receiving information from a number of different sources about how important these issues are.

When plant protection products are approved, the Swedish Chemicals Agency assigns them to different classes. Products which must be used by professionals fall into class 1 and class 2. Products which can be sold to the general public (class 3) must be ready-mixed and must not have any dangerous properties.

The focus of the previous Swedish action plans was on handling plant protection products and a number of projects were implemented with the aim of changing users' behaviour. This was followed up by means of user surveys which showed a positive trend, with more users currently using the required safety equipment and not filling their spraying equipment in the farmyard (the most recent survey was carried out in 2010) than in 2006.

12.3 Actions

12.3.1 Amendments to legislation

The proposal for an ordinance circulated for consultation by the Swedish Government states that plant protection products which are not being used must be stored and handled in a way which does not cause any harm to human health or the environment.

12.3.2 An improved work environment

The Swedish Work Environment Authority will continue to distribute information about risks in the work environment from the use of plant protection products and about how these risks can be reduced, for example by means of good practices for handling and applying plant protection products. The importance of using technical aids, such as preparation filling mechanisms, tank rinsing equipment and rinsing tanks etc., and safety equipment, such as gloves, protective eyewear and protective clothing, with regard to the choice of material, cleaning, storage and replacement, will be highlighted, for example, by means of advice, courses and informational material.

12.4 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objectives	**Impact on the objectives**
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	++
Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.	--
The level of risk for users of plant protection products must be reduced.	++
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	--

13 Integrated pest management (Article 14)

13.1 The requirements of the Directive

Integrated pest management plays a key role in achieving the objective of reducing the risks of using plant protection products.

In the Directive, integrated pest management is defined as:

‘Careful consideration of all available plant protection methods and subsequent integration of appropriate measures that discourage the development of populations of harmful organisms and keep the use of plant protection products and other forms of intervention to levels that are economically and ecologically justified and reduce or minimise risks to human health and the environment. Integrated pest management emphasises the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.’

The requirements relating to integrated pest management appear in Article 14 and Annex III of the Directive.

The requirements which the Member States have to fulfil are given in Article 14 and include, in brief, the following points:

- Sweden must establish or support the establishment of the necessary conditions for the implementation of integrated pest management. Professional users must have at their disposal information and tools for pest monitoring and decision-making, as well as advisory services on integrated pest management.
- Sweden must ensure that the general principles of integrated pest management are implemented by all professional users by 1 January 2014.
- The Member States must encourage professional users to implement crop or sector-specific guidelines for integrated pest management on a voluntary basis.

The general principles of integrated pest management are described in Annex III of the Directive and include:

- Taking preventive measures or providing support for them.
- Decisions on plant protection measures must be taken after monitoring in the field and, if possible, must be based on reliable threshold values.
- The use of pest management measures must be tailored to the situation in question. Firstly, non-chemical methods should be chosen. When chemical plant protection products are used, their use must be restricted, the most targeted product must be selected and the risk of resistance must be taken into consideration.

- The success of the plant protection measures taken must be monitored on the basis of the records kept.

13.2 National legislation and application

Sweden has been applying the principles of integrated pest management for some years, with a focus on the need for preventive measures, using forecasting, warning and decision support systems, tailored use of plant protection products, employing alternative approaches or techniques and evaluating the measures that have been taken. Projects which develop knowledge about the reduced risks of using plant protection products and which support the introduction of integrated pest management have been underway in Sweden for a long time. Special initiatives have been taken to develop a knowledge base covering integrated pest management and alternative approaches or techniques. Actions which currently contribute to the low usage of plant protection products, involving both organic production and integrated pest management, include information, training and advisory activities and financial control measures, such as environmental compensation for organic production. The industry has introduced a variety of certification systems which have integrated pest management as one of their components. See also Section 15 for more information on the measures taken.

In Sweden, access to plant protection products for small-scale use, where the extent of the use or the area is small, is highly restricted in some cases. A project run by the Federation of Swedish Farmers produces information which makes it possible to apply for approval for the small-scale use of plant protection products.

Sector-specific guidelines have been drawn up for golf courses and green spaces by the Scandinavian Turfgrass Environment Research Foundation (STERF) and are available on its website. A digital knowledge library containing information about various issues relating to golf courses and green spaces has been developed.

Regulation (EC) No 1107/2009 states that all users are required to apply the principles of integrated pest management. In addition, there is a general obligation in Sweden to choose less dangerous chemicals if alternative products are available (the so-called product choice principle). The Centre for Chemical Pesticides (CKB) at the Swedish University of Agricultural Sciences (see Section 15) provides support for the application of the product choice principle by producing and communicating information about the environmental effects of chemical plant protection products.

13.3 Actions

A combination of actions will be taken, including legislation, information, training, advice, the use of forecasting, warning and decision support systems, and financial control measures, for example initiatives as part of the Rural Development Programme to promote organic production, in order to ensure that all farmers and growers in Sweden apply the principles of integrated pest management or move to organic production by 2014 at the latest.

13.3.1 Amendments to legislation

The proposal for an ordinance circulated for consultation by the Swedish Government states that anyone considering the use of plant protection products as part of their business must, as far as possible, choose the method or the product which is least harmful to human health and the environment, if more than one plant protection product or method is suitable for the same plant protection problem.

More detailed regulations about the application of integrated pest management will be issued by the Swedish Board of Agriculture.

13.3.2 Rules for integrated pest management

The Swedish Board of Agriculture must set up a supervisory project aimed at the agriculture industry and the application of the principles of integrated pest management in order to make it easier to review the application of the principles and, if necessary, to improve the possibilities for implementing the requirements of the Directive.

13.3.3 Information, training and advice

The Swedish Board of Agriculture must implement measures to increase users' expertise in integrated pest management by means of information, training and advice on the subject. These measures will give professional users easy access to information and knowledge about integrated pest management.

One prerequisite for implementing integrated pest management is to provide the necessary knowledge to the industry. There is a significant need for knowledge, for example about diagnosing different types of harmful organisms and understanding their biology, which is essential in order to be able to tailor the control measures. A knowledge boost is required and, therefore, information and advice will be offered in different ways. Information and advice about the use of plant protection products is provided in the form of skills development measures with an environmental focus as part of the Rural Development Programme. This is described in more detail in Section 15. The Swedish Board of Agriculture is also responsible for providing training and advice on pest management strategies and preventive measures.

The plant protection centres play a coordinating role in the area of advice and fulfil an important function with regard to the distribution of knowledge. Their activities, which include managing forecasting and warning systems (see below), producing control strategies and disseminating knowledge to advisors in different forms, are central to the application of integrated pest management. This is described in more detail in Section 15.

The training which is mandatory for all professional users of plant protection products plays an important part in increasing their skills. One of the days of the basic training course for professional users must be devoted to integrated pest management. This day must also be offered as a separate course for those users who have already undergone the basic training. Training must be available to people who carry out control measures themselves, to those who hire other people to carry out control measures and to those who are involved in the decision on control measures in some other way. Information initiatives are needed to encourage these last two categories of people to take part in training.

13.3.4 Forecasting and warning system

The work on the forecasting and warning system and the subsequent tailoring of the pest management measures to meet the requirements is very important. Methods and ways of working need to be reviewed on an ongoing basis to ensure that they are up-to-date and being used as effectively as possible. This applies to the forecasting and warning system, the information systems and the control strategies. The forecasting and warning system monitors around 1 000 fields throughout Sweden every week during the cultivation season for different harmful organisms. The results of the most recent inventories are compiled and appropriate control strategies are prepared. These are reported on an ongoing basis to local advisors by telephone, in status reports and in plant protection newsletters for farmers, with the aim of giving both advisors and users of plant protection products appropriate and rapid information which is tailored to the current situation during the cultivation season. The data that are collected can also be accessed in a database. The crops, the geographical locations and the parameters that are monitored are continuously evaluated and modified. The public authority responsible is the Swedish Board of Agriculture.

As part of its forecasting and warning activities, the Swedish Board of Agriculture will develop existing risk values, forecast models and control thresholds further and produce new ones. These thresholds apply in particular to insects. A project is underway to develop additional control thresholds. Risk values, forecasting models and decision support systems are primarily used for fungal diseases. There is a major requirement to produce new models and develop existing ones. Validating foreign systems for use in Swedish circumstances is also an important task.

13.3.5 Crop-specific guidelines

The Swedish Board of Agriculture must produce crop-specific guidelines to give professional growers and farmers guidance on how integrated pest management can best be applied. Guidelines for the most common crops are drawn up to provide information on how to manage the problems and on the actions which are most important for each crop. The guidelines must be updated regularly in order to include the latest knowledge, for example about available forecasting and control methods. The guidelines will be available on the Swedish Board of Agriculture's website and information about them will also be provided during training courses for professional users and advisors.

13.3.6 Knowledge base

In order to achieve the objective of using integrated pest management, a knowledge base is needed which will take the form of research activities, trials and development work. Both applied research (including testing) and research and development of a more fundamental nature are required. A number of areas have been identified where additional knowledge must be developed and disseminated, such as control thresholds, preventive measures, cultivation systems which combine different forms of control of plant protection problems using both chemical and non-chemical methods, more detailed biological knowledge of different plant protection problems and the development of systems which provide decision support before a plant protection measure is taken. More fundamental knowledge is needed in areas such as new cultivation systems and changes in existing systems, the actual cost to

the environment of plant protection measures and the effects of plant protection products on individual organisms and ecosystems, among others. Calculations covering several years which demonstrate the profitability of new crop rotations or cultivation systems are required in order to ensure that they gain acceptance among farmers.

The areas which have been identified as targets for further measures correspond with many other countries' descriptions of problems. A continuous supply of new knowledge is needed in order to make successful progress with integrated pest management.

The Swedish Government has commissioned the Swedish Research Council Formas (which specialises in research into the environment, agricultural sciences and spatial planning) to produce a knowledge overview and to carry out a survey of ongoing research and development in the field of plant protection and, on this basis, to identify the need for research and development to promote agricultural, forestry and horticultural production that is sustainable and competitive in the long term. Both new and existing harmful organisms will be covered by the project, which will give an overall picture of the research and development requirements for integrated pest management. The council will submit its report to the Swedish Government by 30 June 2014 at the latest.

An overview of the knowledge required in the golf sector has been carried out by STERF. This showed that there is a need for more knowledge in a number of areas, including varieties with more resistance to disease, weed control with a minimal use of chemical plant protection products, the ideal methods of fertilising and watering and the financial consequences of introducing integrated pest management.

13.3.7 Adapting databases to circumstances in Sweden

The Swedish Government should evaluate whether the databases available in other countries, which contain the results of trials and existing knowledge, can be adapted to Swedish circumstances. Various databases are available in other Scandinavian countries which provide the opportunity to use trial results and existing knowledge as the basis for possible control measures under Swedish circumstances. For example, during 2012 Sweden tested a Danish database of trials which is also used by Norway. The Swedish University of Agricultural Sciences was responsible for this project. There are plans to make use of the database in Sweden by 2014 at the latest.

13.3.8 Product and user information

Another area where action is needed is improving the wording of product and user information on the labels of plant protection products and the availability of the information. The information on the packaging of plant protection products plays a key role in their correct use. It is important that the information is easy to find and understand, both for farmers and for advisors. The conditions of use for plant protection products also form part of so-called cross-compliance in the common agricultural policy. When professional users are asked detailed questions about waiting periods, areas of use and other applications, many of them have difficulty in interpreting the information. This was made particularly clear in an interview survey of professional users of plant protection products

carried out by Statistics Sweden in 2010. The proportion of farmers who felt that the information was difficult to interpret had increased since the previous survey in 2006.

In order to make the information clearer and the labels easier to read, the wording must be reviewed. A label template could be produced, for example. It would also be possible to specify which MoA[10] group the plant protection product belongs to, in order to make it easier to apply resistance strategies.

A database where information is stored is also needed. On the website of the Swedish Chemicals Agency, there is a database which contains information about registration and conditions of use for products. Work is currently underway to develop the database to include information about preparations in the same place in an easily accessible form.

A working group consisting of representatives from the Swedish Board of Agriculture, the Swedish Chemicals Agency and the industry, among other areas, is reviewing the labelling of plant protection products and information channels for the registration and conditions of use of the products.

13.3.9 Approval of microbiological plant protection products

The availability of biological plant protection products is an important means of reducing dependency on chemical plant protection products and applying integrated pest management. The wording of the current Swedish provisions concerning the requirements for approval for nematodes, insects and arachnids can impede access to these products. In order to simplify the process of making these organisms available on the market, the Swedish Government has commissioned the Swedish Environmental Protection Agency to carry out a review of the current provisions on importing, selling and using insects, nematodes and arachnids for control purposes or for other technical purposes by 9 September 2013 at the latest. The aim is to produce a comprehensive set of rules for these groups of organisms which will help to protect biodiversity in Sweden and, at the same time, by simplifying the rules, will make it easier to introduce the organisms onto the market and to use them as an alternative to chemical plant protection products.

13.4 Impact on the achievement of the objectives

Implementing the article is expected to make the following contribution to achieving the objectives of the action plan.

Objectives	Impact on the objectives
The risks to the environment and to human health must be reduced.	++
Levels of plant protection products in surface water and groundwater must be brought down almost to zero in the long term (within a generation).	+

[10] Mode of Action, in other words, the way in which the active substance works.

Residues of plant protection products in domestically grown vegetables must be low and must not present a risk to consumers.	+
The level of risk for users of plant protection products must be reduced.	+
Sustainable cultivation systems must be developed and all farmers and growers must use integrated pest management or organic cultivation methods.	++

14 Indicators (Article 15)

14.1 The requirements of the Directive

It is necessary to track the progress made in reducing the risks and negative effects of the use of plant protection products on human health and the environment. Under the terms of Article 15, harmonised risk indicators, as referred to in Annex IV, must be established by using statistical data collected in accordance with EU legislation concerning statistics on plant protection products. However, there are currently no harmonised indicators available, so the Member States may continue to use existing national indicators or other appropriate indicators.

The Member States must identify trends in the use of certain active substances. Similarly, they must identify priority items, such as active substances, crops, regions or practices, that require particular attention in order to achieve the objectives of the Directive to reduce the 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 or techniques in order to reduce dependency on the use of pesticides. The Member States must also identify good practices for the same purpose.

The Member States must communicate the results of the evaluations to the Commission and to other Member States and must make this information available to the public. The Commission must calculate risk indicators at an EU level in order to estimate trends in risks from pesticide use.

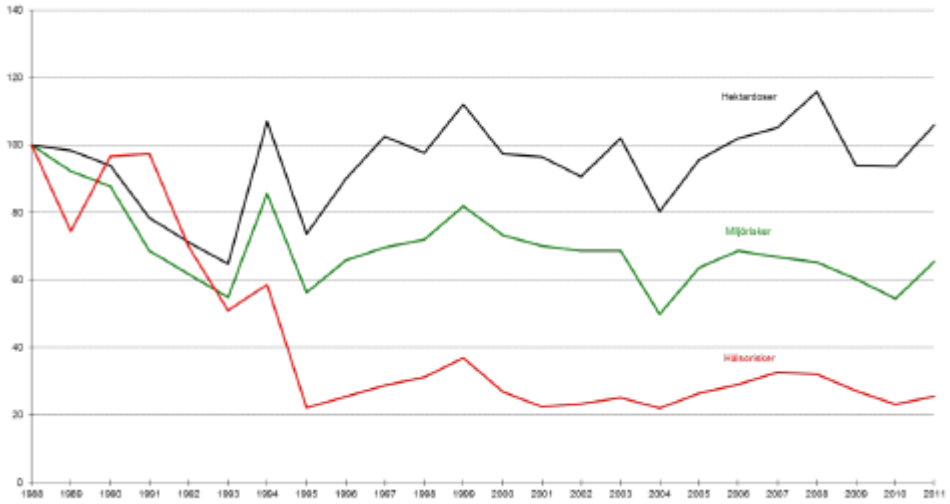
14.2 National risk indicators and other monitoring methods

In order to attempt to produce a clear description of the changes in risks over time, two national indicators are used: the national risk index for health and the environment and the toxicity index. These indexes are indicators in the Swedish environmental objective system which enable the 'Non-toxic environment' environmental quality objective to be monitored. The indexes are calculated annually by the Swedish Chemicals Agency.

14.2.1 The risk index for health and the environment

Since 1997, the Swedish Government has used the national risk index for health and the environment to track the effects of national action plans for plant protection products. The indicators are based on a simple points system. Points for the intrinsic properties of each active substance and for a number of exposure factors of a representative plant protection product are added together. The total number of points is multiplied by the number of applications per year of each substance, which is calculated on the basis of the quantity of the substance sold each year and its recommended dose per hectare. The aim is to highlight trends in potential risks over time, not to quantify the risks. These risk trends are then

compared with the total number of hectare doses each year. The three data series are indexed with 1988 as the base year (the index for 1988 is 100) in order to highlight the relative changes over time[11].



Risk index for plant protection products 1988–2011
Hectare doses
Environmental risks
Health risks
Diagram 1. *Risk index for plant protection products 1988–2011, broken down into the health and environmental risk index and hectare doses.*
Source: The Swedish Environmental Protection Agency, Environmental Objectives Portal

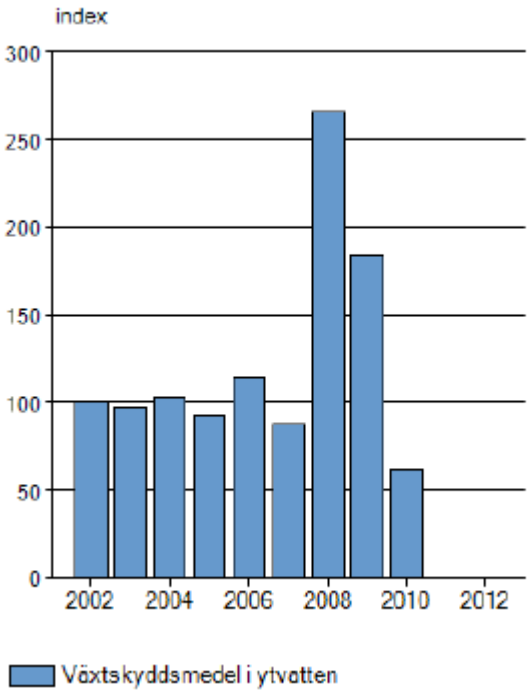
The fluctuations which can be seen in 1994/1995, 1999/2000 and 2003/2004 are examples of occasions where sales do not reflect the actual use in the same year and, therefore, do not represent the risks either.

From a longer term perspective, the health and environmental risks, expressed as an indicator, have reduced significantly. Compared with the base year 1988, the reductions are 74 % and 34 % respectively.

14.2.2 The toxicity index

The toxicity index or PTI (Pesticide Toxicity Index) is a simple means of calculating the development over time of levels of substances in aquatic environments in relation to the guide value. The index shows how the risks of harm to aquatic organisms have changed over time. It is a compilation of the levels of plant protection products measured in water courses in four small agricultural areas in relation to the guide values for these substances. A guide value is the highest level of the substance in surface water which can be expected to have no negative effects.

[11] http://www.kemi.se/Documents/Publikationer/Trycksaker/PM/PM6_04.pdf42



Index
Plant protection products in surface water

Diagram 2*. The toxicity index for measured levels of plant protection product residues in surface water. The index shows the trend for the combined levels of plant protection product residues in relation to the guide values for the substances (the index for 2002 is 100).*
Source: The Swedish Environmental Protection Agency, Environmental Objectives Portal

The indicator shows how the potential risk of harm to aquatic organisms has changed over time. No reduction in the risk has been observed. Over the period of time that the measurements have been made, the trend has been for a slight increase, but in overall terms it has remained relatively unchanged. This may be due to the fact that the use of plant protection products has changed little over recent years. High or low levels of certain substances can cause deviations in trends in individual years. In addition, the analysis methods have improved over time and, therefore, the detection limits have fallen for the majority of substances, which has led to the guide values being reduced in certain cases. However, this has not been taken into consideration in Diagram 2.

14.2.3 Other monitoring activities

In addition to the national health and environmental risk index and the toxicity index, other specific monitoring activities are used to track the achievement of the objectives in the action plan. These activities are described in more detail in Chapter 3 in relation to the monitoring of the individual objectives. Monitoring the actions that have been taken provides an important incentive for users of plant protection products to continue taking the actions.

14.2.4 Statistics

Statistics concerning the amount of products sold and used and the way in which they were used represent important information for monitoring developments in the area with regard to the risks related to the use and handling of plant protection products. An EU Regulation concerning statistics on pesticides came into effect in 2009[12]. The Swedish Chemicals Agency is the authority responsible for statistics on the quantities of plant protection products sold and used.

14.3 Actions

14.3.1 Identifying trends in the use of certain active substances

The Swedish Government will identify trends in the use of the following active substances:

- Pendimethalin. This substance meets the requirements for the milestone target of phasing out certain particularly dangerous substances under the terms of the 'Non-toxic environment' environmental quality objective, because of its bioaccumulative and persistent properties. The details of the 'Non-toxic environment' objective include ensuring that the use of these substances comes to an end as far as possible within a generation.
- Bentazone. Among the active substances used in plant protection products that are currently approved, bentazone is detected most frequently at levels above 0.1µg/l in samples of Swedish groundwater. See the report[13] by the Skåne county administrative board.
- Pyrethroids. Alpha-cypermethrin and beta-cyfluthrin, which form part of this group, were the substances which exceeded by the largest amount the guide values in surface water (up to 50 times) in the environmental monitoring programme for 2010.

The public authority responsible for producing annual statistics on the quantities of these active substances sold is the Swedish Chemicals Agency. The Swedish Board of Agriculture is required to report on trends in use over time.

14.3.2 Priorities which require special attention

Before Directive 2009/128/EC came into force, the use of chemical plant protection products was low or non-existent in the following areas:

- post-harvest treatment of fruit and ware potatoes
- soil disinfection, with the exception of ornamental plants and use in nurseries

This played an important role in reducing the risks and the impact of the use of plant protection products on human health and the environment. This is a priority area which

[12] Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides.
[13] http://www.lansstyrelsen.se/skane/SiteCollectionDocuments/Sv/publikationer/2012/Grundvattenkvalitet_i_Skane_2012.pdf

demonstrates how alternative approaches or techniques have been used successfully to reduce the risks and impact of the use of pesticides.

14.3.2.1 Use of plant protection products for soil disinfection

Plant protection products are not currently used to kill harmful organisms in the soil, except in the case of ornamental plants and nurseries. Instead, farmers and growers take preventive measures, such as beneficial crop rotation, tolerant or resistant varieties and sowing and planting in fresh soil. The objective of stopping all use of plant protection products for disinfecting the soil, except for the purpose of forcing ornamental plants and for use in nurseries, was achieved before Directive 2009/128/EC came into force. The objective is that the use of chemical plant protection products for soil disinfection must not start again in Sweden. However, it must still be possible to continue using these products for ornamental plants and in nurseries, because this usage is very limited. Under the terms of the Government's proposal for an ordinance, chemical plant protection products can only be used for treating soil to kill harmful nematodes in crops intended for the production of food or feedstuffs, if the Swedish Board of Agriculture has granted an exemption for their use.

14.3.2.2 Post-harvest treatment of fruit and ware potatoes

Chemical plant protection products are not currently used to combat fungal attacks after harvesting. Instead, growers and farmers use climate control to prevent attacks of harmful organisms after harvesting when fruit and ware potatoes are stored. The objective that fruit and ware potatoes should not be treated with chemical fungicides after harvesting was achieved before Directive 2009/128/EC came into force. The objective is that the use of chemical plant protection products for this purpose must not start again in Sweden. The Government's proposal for an ordinance states that chemical plant protection products in the form of fungicides should only be used for treating fruit and ware potatoes after harvest, if the Swedish Board of Agriculture has granted an exemption for their use.

14.3.2.3 Other priorities which require special attention

Plant protection products were used in Sweden to combat the growth of aquatic plants in lakes and ditches in the 1980s, but have since been replaced with mechanical methods, such as dredging and reed clearance. The objective that plant protection products should not be used in water was achieved before Directive 2009/128/EC came into force. The objective is that the use of chemical plant protection products in water must not start again. The Government's proposal for an ordinance states that chemical plant protection products can only be used in lakes and water courses if the Swedish Environmental Protection Agency has granted an exemption for their use.

14.3.3 Good practices which are an example of how to achieve the goals of the Directive

Before Directive 2009/128/EC came into force, the use of chemical plant protection products was low or non-existent in the following areas:

- growth regulation in cereals other than rye

- stopping pre-harvest sprouting and controlling weeds less than one month before harvest in cereal crops intended for the production of food or feedstuffs

This played an important role in reducing the risks and the impact involved and the Swedish Government has identified these as good practices which are an example of how to achieve the Directive's goal of reducing the risks and impact of using pesticides.

14.3.3.1 Growth regulation in cereals other than rye

The use of growth regulators in Sweden is limited. Problems caused by lodged cereal crops and ear and stalk breakage are primarily handled by means of preventive measures, such as the choice of variety, sowing time, seed density, fertiliser and careful treatment against harmful fungal diseases. This has resulted in low levels of growth regulators being used in cereals other than rye in Sweden. The objective is to maintain the low levels of use of products to reduce stalk height in cereals other than rye. In order to achieve this objective, the Swedish Board of Agriculture must continue to ensure that preventive measures and alternatives to chemical plant protection products for growth regulation are used first and foremost, such as the choice of variety, sowing time, seed density, fertiliser and careful treatment against harmful fungal diseases.

14.3.3.2 Stopping pre-harvest sprouting and controlling weeds before harvest in cereal crops

Cereals can be treated less than 30 days before harvesting for two reasons: to combat couch grass more effectively than is possible after harvesting and to stop pre-harvest sprouting of grains because this will make harvesting easier. Plant protection products may be used to stop pre-harvest sprouting if large amounts of rain fall just before harvesting, which can lead to large quantities of lodged cereals, weeds growing through the crop and the risk of ears sprouting. This type of situation makes harvesting very difficult and can have a negative impact on the quality of the harvest.

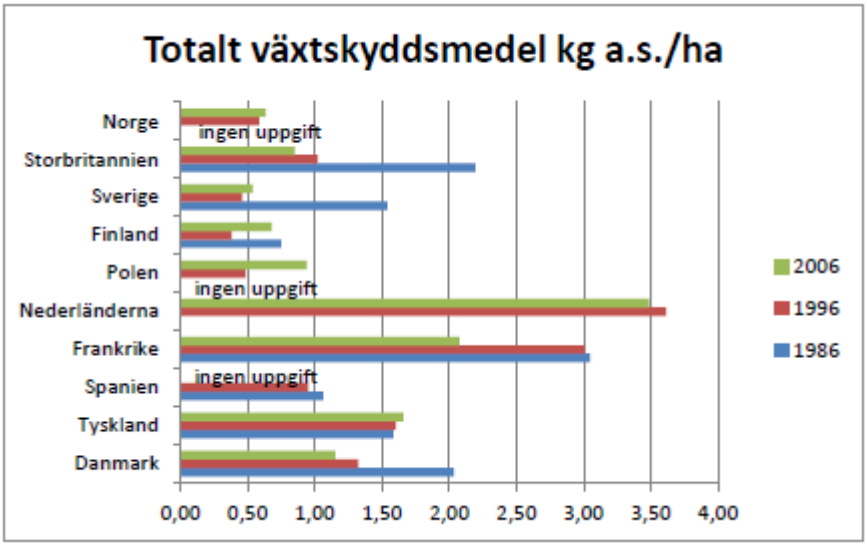
There are currently no plant protection products approved for stopping pre-harvest sprouting and for weed control before harvesting in Sweden. If an exemption is granted for stopping pre-harvest sprouting in cereals under difficult harvesting conditions, then the crop must only be used for purposes other than food production, for example, feedstuffs. The objective is to maintain the low levels of use of products to stop pre-harvest sprouting in cereals for feedstuffs and to ensure that products are not used to stop pre-harvest sprouting in cereals destined for human consumption. In order to achieve this objective, the Swedish Board of Agriculture must continue to ensure that preventive measures and alternatives to chemical plant protection products are used first and foremost, such as mechanical controls, chemical-mechanical controls, crop rotation, choice of variety, seed density, fertiliser and different treatment times.

15 Current use of plant protection products, activities to promote and monitor reduced risks to health and the environment

15.1 Use of plant protection products in Sweden and other countries

The consumption of plant protection products in Sweden during the 2009–2010 growing season was 0.39 kilograms of active substances per hectare of arable land. If the fact that only a certain proportion of Swedish arable land is sprayed is taken into consideration, the average use is 0.75 kg/ha.

There are significant differences in the levels of use in different countries. The diagram below shows sales in 1986, 1996 and 2006 in various EU countries and Norway. In some countries, 3 kilograms of active substances were applied per hectare. The diagram indicates that the quantity sold per hectare of agricultural land in Sweden is at a relatively low level and that it fell significantly between 1986 and 1996, but that it has been difficult to reduce the amounts even further since then. The statistics were compiled in different ways for different countries.



Total plant protection products in kilos of active substance per hectare

No data
Norway
Great Britain
Sweden

Finland
Poland
The Netherlands
France
Spain
Germany
Denmark

Diagram 2. *Sales of plant protection products measured in kilograms of active substance per hectare of agricultural land in ten European countries in 1986, 1996 and 2006. Source: Eurostat's database of sales of pesticides and utilised agricultural area.*

15.2 Changes in usage in Sweden

During 2010, almost half the farms in Sweden with more than 5.0 hectares of arable land used some form of chemical plant protection product, including glyphosate, which is a total weedkiller (Statistics Sweden 2010). The results of an equivalent study carried out by Statistics Sweden in 2006 on behalf of the Swedish Board of Agriculture were similar. Of the total area of arable land in the country, 81 % belongs to farms which use plant protection products. However, there are significant differences between farms of different sizes. Large farms generally use plant protection products to a greater extent than smaller farms. Of the farms with more than 200 hectares of land, 90 % used plant protection products, while the figure for farms with less than 20 hectares was only 8 %.

In total, 47 % of the entire area of crops in 2010 was treated with plant protection products. The percentage of the land where plant protection products were used varied significantly between different regions, depending on the intensity and type of farming methods. Less than 10 % of land in Norrland was treated, which is due to the large area of pastureland that is given either very little treatment or none at all. In addition, the climate in northern Sweden is less favourable to fungal diseases and insects than it is further south. In southern Sweden, a larger percentage of the land is treated. In Skåne, where many crops that require treatment are grown, such as sugar beet, potatoes and oilseed crops, almost 60 % of the total amount of plant protection products was used in 2010.

The total use of herbicides, fungicides and insecticides in agriculture in 2010 was 853 tonnes, compared with 817 tonnes in 2006. The quantity of active substances per hectare of land treated has remained largely unchanged at 0.75 kilos. The use of total weedkillers (glyphosate) which kill all plants, for example when treating stubble after harvest or to open up fallow land, land where catch crops have been grown or pastureland to allow a new crop to be sown, was around 400 tonnes in 2010.

A survey of farmers' behaviour was carried out in order to allow measures to be targeted more effectively. The study showed that the percentage of farmers who fill agricultural spraying equipment in the farmyard, where there is a major risk of leakage into surrounding land and water courses, has fallen from 16 % in 2006 to 5 % in 2010. A total of 26 % of users filled sprayers in so-called biobeds or other biologically active land. This was most common on farms with larger yards. Only 1 % of farms admitted that sprayer operators did not use any safety equipment at all (Statistics Sweden MI 31 SM 1101).

15.3 Residues in food

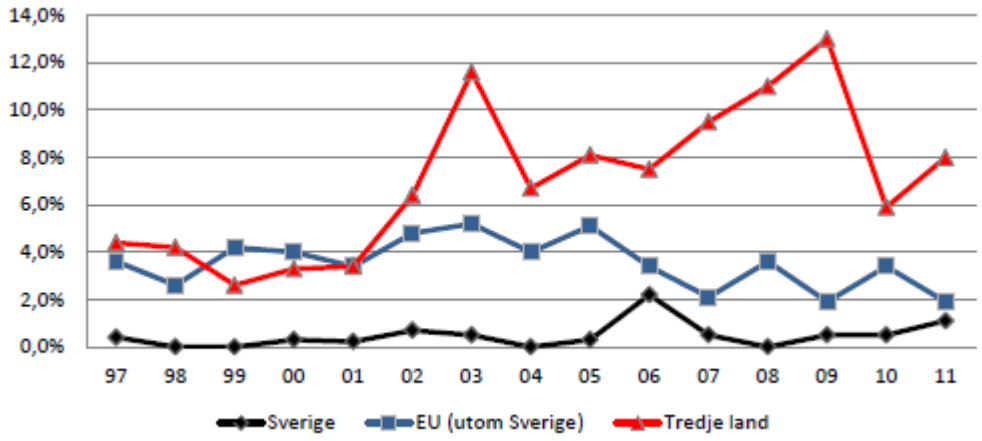
Residues of plant protection products are found primarily in imported fruit, vegetables and cereals. The National Food Agency's 1 645 routine checks of foods of vegetable and animal origin show that 4.8 % of the samples exceeded the limits for residues of plant protection products in 2011.

The National Food Agency continuously takes samples of foods to identify the presence of residues of plant protection products.

During 2011, a total of 1 168 samples (both Swedish and imported) of fresh and frozen fruits and vegetables were analysed. Of these, 62 % contained measurable residues of plant protection products. In 2010, the percentage was slightly higher at 68 %. The study distinguishes between plant protection products and biocides, but it was mainly plant protection products that were found.

Of the samples containing levels above the limits, very few were domestic products. The residues were detected in 62 % of the samples, of which 56 (4 %) exceeded the limits. Measurable residues were found in 101 (38 %) of the 263 Swedish samples. The limits were exceeded in three samples of kale, dill and fennel. The residues which exceeded the relevant limits were generally of insecticides and fungicides.

Over the last 15 years, it has been more common for imported fruit and vegetables to exceed the limits than for domestic produce (generally less than 1 % of the samples). It is most often products from third countries which exceed the limits. See diagram 3. Domestically grown cereals did not exceed the limits in any cases in 2011. However, samples with residue levels below the limits were found.



Sweden
EU (excluding Sweden)
Third countries

***Diagram 3**. Levels exceeding the limits in fruit and vegetables 1997 – 2011.*
Source: The National Food Agency

15.4 Measures to reduce health risks for users

The Swedish Work Environment Authority is the public authority responsible for ensuring that work environment legislation is complied with. The authority takes measures to reduce the exposure risks for users of plant protection products. Special information and training initiatives have been introduced to ensure that more sprayer operators use appropriate safety equipment and good practices when handling plant protection products. The Swedish Work Environment Authority has carried out a project in collaboration with the Swedish Board of Agriculture and the Federation of Swedish Farmers to improve the work environment by making greater use of technical aids and to increase the use of safety equipment.

A basic concept has been drawn up which describes the personal safety equipment that is appropriate when handling plant protection products. The basic safety methods are explained in information material, which also includes details of personal safety equipment suitable for different types of plant protection product handling, for example when using a boom sprayer, in greenhouses, for knapsack and handheld sprayers and blowers. The aim is to provide information about the safety equipment that is sufficient is most cases and to make the information easy for users to understand. The information material was very well received both by users and by suppliers of personal safety equipment, technical equipment and plant protection products. Instructors who provide training for professional users and function testers of agricultural sprayers have also been provided with the material so that they can pass on knowledge within the area as part of their work.

15.5 Existing advisory, information, training and environmental monitoring activities

15.5.1 Advice, information and training

Advice and information on using and handling plant protection products takes the form of skills development activities within the Rural Development Programme. The measures consist of regional activities at the Swedish Board of Agriculture's plant protection centres. Activities also take place as part of county skills development programmes which the county administrative boards are responsible for. The measures within the Rural Development Programme take the form of individual advice, courses, field walks, demonstration crops and printed information, with the aim of helping to achieve the environmental quality objectives. 'Safe plant protection' is an information and training campaign that is part of the Rural Development Programme and involves cooperation between businesses and Swedish public authorities in order to improve the handling of plant protection products. The target groups of the campaign are farmers and advisors, among others. The environmental advice and information has had a major impact and is an important part of the ongoing measures to reduce the risks of using plant protection products.

All professional users of plant protection products must undergo mandatory training which covers issues relating to the use of plant protection products, together with techniques, the work environment and other relevant areas.

15.5.1.1 County administrative boards' advisory services

The county administrative boards are responsible for the environmental advisory measures (skills development) that take place within each county as part of the Rural Development Programme. The activities at county level include individual advice, sometimes in the context of the 'Focus on Nutrients' advisory project, courses, field walks and demonstration crops. Among other things, the measures aim to tailor and reduce the use of plant protection products, improve the handling of the products from a health and environmental perspective, emphasise the importance of different techniques for the treatment results and highlight opportunities for reducing spray drift.

Advice targeted at organic production also forms part of the county administrative boards' services. The aim is to support the growth of organic production. The advisory service provides in-depth knowledge about the need for preventive measures, such as crop rotation, choice of varieties, mechanical weed control, the importance of good drainage and liming etc.

Most of the activities aimed directly at farmers are managed by the county administrative boards. They purchase services where external expertise is required from other bodies, such as Hushållningssällskapen (Swedish Rural Economy and Agricultural Societies).

Each county administrative board decides which measures are most important in each county and these are described in the strategy for the Rural Development Programme drawn up by each county. Counties with more arable crops and a greater use of plant protection products generally provide more activities in this area and adapt them to the county's specific needs.

15.5.1.2 Plant protection centres

The plant protection centres form part of the Swedish Board of Agriculture's regional activities and are based in five locations in southern and central Sweden. They play a coordinating role in the provision of advice. Their goal is to ensure that the cultivation of crops is environmentally friendly and, at the same time, competitive at an international level. Important aspects of the plant protection centres' work include managing forecasting and warning activities, producing control strategies and advisory material, taking part in courses and conferences, providing information about preventive measures and identifying the need for trial and development measures, as well as participating in the measures. Their work also involves plant protection and weed issues in agriculture and horticulture, together with application systems and handling techniques.

The goal is that chemical control measures must be tailored to the specific requirements of each situation. In other words, control measures can be taken if the damage is considered to be greater than the cost of the control measures. This allows the measures to be tailored to the requirements in each case and enables spraying for safety's sake (sometimes called 'insurance spraying') to be avoided. Forecasting and warning activities play a key role in enabling control measures to be tailored. In practice, this involves carrying out an inventory of around 1 000 fields with different agricultural crops every week using predefined processes. The results of the weekly inventories are compiled and analysed on an ongoing basis. The subsequent information is then provided to advisors and retailers. Every week a telephone conference is held for advisors and retailers at which the results are presented and relevant control strategies are decided on. The recommendations are passed on to

farmers by means of a plant protection newsletter which is available on the Internet or sent out by e-mail or text message. Forecasting and warning activities in this form have been taking place since 1987. As a result, a large volume of data is available in a database. The information in the database can be used to compare the levels of harmful organisms in different years and also to follow long-term trends relating to the climate etc.

The work on control strategies involves annual updates to the recommendations on suitable preparations, treatment times, doses etc. The information is available in printed form and on the Internet.

In addition to chemical control activities, the plant protection centres also work in different ways with preventive measures. This includes providing information about suitable crop rotations, choices of variety and other cultivation methods, which can lead to a reduction in the need for chemical controls, and initiating and supporting a variety of research and development projects.

The plant protection centres' work makes an important contribution to the advice on chemical control methods and is highly effective. Because the work covers several fundamental areas of the concept of integrated pest management, it is crucial to the implementation of the concept.

15.5.1.3 Regional activities relating to organic production

The Swedish Board of Agriculture provides support for advice on organic production with the aim of increasing the amount of land under organic cultivation. Its activities include running courses for advisors, producing information material and supporting regional advisory services in the area. The Swedish Board of Agriculture's regional advisory centres for organic production are in Alnarp, Skara and Uppsala. The regional offices coordinate and help with the provision of advice in each region. The advisors at the regional offices are also experts in different areas and can provide advice throughout the country as part of their role.

15.5.1.4 'Safe plant protection'

'Safe plant protection'[14] is an information and training campaign which aims to improve the handling of plant protection products in Swedish agriculture. The goal of the campaign is to make contact with the majority of farmers who use plant protection products and to provide tips, ideas and knowledge about the safe and thoughtful handling and application of plant protection products. The campaign also aims to provide information about new legal requirements in this area.

The 'Safe plant protection' campaign covers the entire country. The assessment is that the campaign has had a positive impact on the environment and that it is contributing to reducing the environmental and health risks involved in agriculture. It is run by the Federation of Swedish Farmers in collaboration with the Swedish Board of Agriculture, the Swedish Environmental Protection Agency, Lantmännen (one of the largest groups in food, energy and agriculture in Scandinavia), the Swedish Chemicals Agency and Svenskt Växtskydd (the Swedish plant protection industry association). The wide range of

[14] For a period the campaign was called 'Focus on plant protection'.

organisations involved in the campaign ensures that there is a joint focus on the safe handling of plant protection products.

15.5.2 Trials and development activities

Trials and development projects which focus on reducing the risks involved in the use of plant protection products are funded primarily by the Swedish Farmers' Foundation for Agricultural Research (SLF). Between 2009 and 2011, the majority of the projects concerned integrated pest management and alternative control methods. The projects covered a range of different areas, including tailoring chemical control methods to specific harmful organisms, studies of how leakage of plant protection products into water courses can be avoided and the development of biological control methods etc.

The Swedish Board of Agriculture also provides financing for trials and development projects which focus on reducing the risks involved in plant protection products, applying integrated pest management, methods and techniques that are alternatives to chemical plant protection products and organic production.

Therefore, there are many projects in progress which aim to reduce the risks of plant protection products and to apply integrated pest management. The results of these projects will be important starting points for training, advice and information intended for users in order to develop the use of integrated pest management on an ongoing basis, to apply alternative approaches or techniques and to reduce the risks of using plant protection products for people and for the environment. A knowledge base is still urgently needed in this area.

15.5.3 Centre for Chemical Pesticides

The Centre for Chemical Pesticides (CKB) was established at the Swedish University of Agricultural Sciences (SLU) in 2006 and acts as a national competence centre which supports a variety of public authorities and organisations. The CKB coordinates the establishment of knowledge and the long-term development of skills and is also responsible for areas such as chemical analysis expertise, methods for environmental monitoring and training and information relating to chemical plant protection products. The aim of its activities is to develop knowledge which allows impacts on the environment to be described and predicted in a reliable way and actions to be taken to keep the effect of chemical plant protection products on the environment within acceptable boundaries.

15.5.4 Centre for Biological Control

The Centre for Biological Control (CBC) is a new centre which was launched at the SLU in 2012. Its work focuses on controlling pests and diseases with living organisms and it aims to contribute to the sustainable use of biological natural resources. Biological control methods have a great deal of potential for limiting the effects of harmful organisms in agriculture, horticulture, forestry, livestock farming and aquaculture. For example, there are applications along the entire plant production chain from sowing to the final product. The CBC carries out its own research, but is also collaborating with other researchers in the field of sustainable control methods. Close cooperation with stakeholders, such as growers, industry, public authorities and other organisations is also an important part of its work.

15.5.5 Centre for Organic Food and Farming

The Centre for Organic Food and Farming (EPOK) is a meeting place for researchers, advisors, farmers, decision-makers, representatives of industry and public authorities and students. It is also a knowledge hub for organic production and consumption. The EPOK is based at the SLU and its tasks include:

- Providing practical, sound knowledge from a number of different perspectives which will lead to the sustainable development of organic farming.
- Helping to ensure that research into organic farming promotes the development of agriculture as a whole.
- Encouraging a dialogue between researchers and society about organic farming and ensuring that research results are made available quickly.
- Contributing to increased international collaboration on research into organic farming.
- Coordinating and initiating training about organic agriculture on a contract basis in order to meet demand.

15.5.6 Promoting organic production

The aim of organic production is to use natural resources, such as energy, land and water, in a way which is sustainable in the long term. Other goals are high levels of biodiversity and concern for animal welfare. The characteristic features of organic production include:

- the management of harmful organisms and weeds
- the way in which nutrients are supplied to crops
- a particular focus on animal welfare

In organic farming, preventive measures are the main method of combating harmful organisms and weeds, for example varied crop rotation, tillage methods and resistant varieties. Chemical plant protection products are not used in organic production.

Organic farming is constantly growing in Sweden. In some regions, the Rural Development Programme objective of having 20 % of the agricultural land under organic production has already been achieved. In 2011, the total certified area of agricultural land which had either converted to organic production or was in the process of conversion amounted to 481 000 hectares or approximately 15.7 % of the entire area of agricultural land.

The Swedish Government is taking a number of measures to promote organic production, including environmental compensation, skills development and the provision of advisory services, information and training as part of the Swedish Rural Development Programme for the period 2007–2013.

The Swedish Board of Agriculture provides support for advice on organic production (see above).

Comprehensive measures have been put in place to promote the development of knowledge about organic production. These take the form of research, trials and development activities. They are financed by the Swedish Research Council Formas (which specialises

in research into the environment, agricultural sciences and spatial planning) and the Swedish Board of Agriculture.

Measures to stimulate the market for organic produce have also been taken.

15.5.7 Monitoring plant protection products in surface water, groundwater, rainwater and sediment

As part of the agricultural component of the national environmental monitoring programme, studies have been carried out since 2002 into the environmental impact of using plant protection products. The studies were implemented by the Centre for Chemical Pesticides (CKB) on behalf of the Swedish Environmental Protection Agency. The results of the environmental monitoring activities form the basis for assessing whether the environmental quality objectives are being met. Similarly, the results are also relevant for monitoring the actions that have been taken to reduce the risks of using plant protection products. The activities are constantly being developed and, during the Swedish Environmental Protection Agency's review of the programme, which will probably take place in 2014, the Directive's requirements for monitoring should be taken into consideration.

Currently the programme involves studies of plant protection products in surface water, groundwater, rainwater and sediment. More than 120 different chemicals were analysed in 2010. The focus was on those which are widely used, are prone to leakage, have low guide values and are priority substances under the terms of the Water Framework Directive. In addition to the analyses, data about crop cultivation (including information about the use of plant protection products), water discharge and precipitation were also collected. The samples were taken from four small catchment areas (so-called typical areas) and from two rivers.

The levels of plant protection products in water courses varied during the year, with the highest levels often occurring during the early summer when harmful organisms are subject to the most intensive control measures. Plant protection products are primarily transported during the winter because of the higher level of water discharge during this period. Around a quarter of the substances detected in precipitation in 2010 are now banned in Sweden (and some of them are also banned in the EU), which indicates that these substances are being transported a long distance across national boundaries.

15.5.8 Monitoring plant protection products in drinking water

Drinking water suppliers, which are generally municipalities or municipally-owned companies, are responsible for supplying drinking water to consumers that meets the quality requirements of the National Food Agency's regulations on drinking water (SLVFS 2001:30). The pesticides which may occur in a water supply (surface water and groundwater) must be analysed. Water supplies which are used for the abstraction of drinking water and which are categorised with regard to the risk of the impact of ongoing activities must be subject to operational monitoring under the terms of the Water Framework Directive. The results of the monitoring process can be used to track the risks of using plant protection products and to take actions to reduce their impact.

15.5.9 Random sampling of residues in vegetables

In order to ensure that the use of plant protection products does not give rise to levels of residues in vegetables which are higher than the existing limits, random samples are taken in Sweden. The scope of the current activities may need to be reviewed and the number of random samples to identify the presence of plant protection product residues in vegetables may need to be increased. The National Food Agency is the body which carries out the random sampling.

15.5.10 Monitoring the banned use of plant protection products by means of random sampling of residues in vegetables

The National Food Agency monitors the use of plant protection products by means of random sampling of residues in vegetables. These checks allow cases of the banned use of plant protection products to be identified and help to ensure that approved plant protection products are only used for the crops specified in the approval document and that products which have been withdrawn or banned are not used.

Annex 1

16 Previous action programmes

When the action programme was first introduced in Sweden in the mid-1980s, the main emphasis was on reducing the use of chemical plant protection products. The activities taking place today still focus on reducing levels of use and, most importantly, on reducing the risks. This can involve a range of measures, such as modified doses, improved handling practices, protection for operators and ensuring that application equipment functions effectively.

The previous action programme was the fifth in succession since the mid-1980s and covered the period 2008 –2013. The starting points for the objectives of the action programme include helping to achieve the national environmental quality objectives, taking action where the risks are greatest, promoting the involvement of business and consumers and minimising conflicts between the different environmental quality objectives.

The work carried out as part of the action programme and the activities to reduce the risks of using plant protection products are described in the report ‘Hållbar användning av växtskyddsmedel – Förslag till handlingsprogram’ (The sustainable use of plant protection products – Proposal for an action programme) (report 2008:14 from the Swedish Board of Agriculture). The report also explains the standpoints which form the basis for the work.

The action programme consisted of legislation and financial control measures. Other important features included advice, information and training courses, together with research, trials and development activities. International cooperation was also considered to be significant.

17 Environmental policy objectives

The overall objective of Swedish environmental policy is to pass on to the next generation a society in which the major environmental problems have been resolved, without causing increased environmental and health problems outside Sweden's borders. This objective, which is known as the generation goal, is a directional goal for environmental policy and acts as a guideline for environmental activities at all levels of society.

The overall objective is accompanied by 16 national environmental quality objectives which are formulated on the basis of the environmental impact that the natural world can withstand and which describe the state of the environment that the work is intended to bring about. Milestone targets identify the steps on the road to achieving the environmental quality objectives and the generation goal. They are intended to explain the changes needed in society in order to fulfil the environmental quality objectives and the generation goal.

Public authorities, such as the Swedish Board of Agriculture, the Swedish Environmental Protection Agency, the Swedish Agency for Marine and Water Management, the Swedish Chemicals Agency, the Swedish Forest Agency and the Geological Survey of Sweden, which are responsible for legislation relating to the use of plant protection products are also responsible for the environmental objectives:

- A varied agricultural landscape
- A rich diversity of plant and animal life
- A non-toxic environment
- Good-quality groundwater
- A balanced marine environment, flourishing coastal areas and archipelagos
- Zero eutrophication
- Flourishing lakes and streams
- Sustainable forests

These objectives must also be taken into consideration as part of the work on plant protection products. In addition, there are goals relating to the responsibilities of the individual authorities. For example, in 2012 the Swedish Board of Agriculture proposed a number of objectives for certified organic production[15]. The link to organic production is a positive one for objectives relating to the effects of using plant protection products. In addition, the Swedish Agency for Marine and Water Management has established an action programme under the terms of the Water Framework Directive. Parts of the action programme reinforce the activities that are taking place to ensure the sustainable use of plant protection products.

[15] 'Behov av nya mål och åtgärder för ekologisk produktion i landsbygdsprogrammet' (The need for new objectives and actions for organic production in the Rural Development Programme), the Swedish Board of Agriculture's reference number 26-10960/2011.

18 Non-toxic environment

The occurrence of man-made or extracted substances in the environment must not represent a threat to human health or biological diversity. Concentrations of non-naturally occurring substances will be close to zero and their impacts on human health and on ecosystems will be negligible. Concentrations of naturally occurring substances will be close to background levels.

The aims of the objective are to ensure that:

- total exposure to chemical substances via all sources of exposure is not harmful to people or biodiversity
- as far as possible, particularly dangerous substances are no longer used
- there is very little spread of unintentionally produced substances with hazardous properties, and information is available concerning the formation, sources, emissions and spread of the most significant of these substances and their degradation products
- contaminated sites are remediated to such an extent that they do not represent a threat to human health or the environment
- knowledge about the environmental and health properties of chemical substances is available and sufficient for the purposes of risk assessment
- information is available about substances hazardous to the environment and health that are present in materials, chemical products and articles

In April 2012, the Swedish Government adopted 13 milestone targets which replaced the previous subsidiary objectives. The Government has identified three milestone targets for dangerous substances:

- **Particularly dangerous substances.** The milestone target means that decisions taken within the European Union and internationally on such substances are to include measures which mean that:
    - by 2015, endocrine disruptors and highly allergenic substances are considered particularly dangerous substances in relevant regulations
    - by 2018, particularly dangerous substances are subject to examination or phase-out decisions under current regulations in all areas of use
    - by 2018, particularly dangerous substances in production processes are only used under strictly regulated circumstances
    - by 2018, the term ‘particularly dangerous substances’ in relevant regulations also includes substances with serious properties other than those included in the current specific criteria and which give rise to an equivalent level of concern

- **Knowledge on the health and environmental properties of substances.** The milestone target means that decisions taken within the European Union and internationally will require that information on the properties of chemicals that are hazardous to the environment and human health is to be available and sufficient for the purposes of risk assessment for all areas of use.

- **Information about dangerous substances in articles.** The milestone target means that regulations or agreements within the European Union or internationally are to be applied in such a way that information about substances hazardous to health and the environment that are present in articles is available to all parties concerned by 2020. The regulations are to be introduced gradually for different product groups and children's health is to be given particular focus in the information. Information about substances hazardous to health and the environment that are present in materials and articles is to be made available throughout the entire product life cycle through harmonised systems that cover prioritised product groups.

The milestone targets identify the need for changes within the EU and internationally. They mean that Sweden must make every effort to bring about changes in the EU's regulations and in international agreements. The important legislative acts within the EU are REACH[16], the Plant Protection Products Regulation[17] and product-specific directives, such as the RoHS Directive[18], the Directive on Biocidal Products[19] and the Toy Safety Directive[20]. There are also frameworks on a global level, including the protocol to the Convention on Long-range Transboundary Air Pollution (CLRTAP[21]) on heavy metals, the Strategic Approach to International Chemicals Management (SAICM[22]) and the Stockholm Convention on Persistent Organic Pollutants.

[16] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
[17] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market.
[18] Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
[19] Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market.
[20] Directive 2009/48/EC of the European Parliament and of the Council of 18 June 2009 on the safety of toys.
[21] http://www.unece.org/env/lrtap/
[22] http://www.saicm.org

19 Objectives for the development of rural areas

The overall objective of rural policy is development which is sustainable in financial, environmental and social terms. Increased growth and increased competitiveness are important aspects of this development. Agriculture is often highlighted as being a significant component of rural enterprise.

Therefore, it is essential to obtain an overall picture of the effects on the environment of changes in the availability of plant protection products, and not only the direct effects. It is important that the effects on other objectives are described and taken into consideration. Otherwise, there is the obvious risk of indirect effects occurring, such as:

- New control strategies which lead to the increased use of plant protection products, for example as a result of products being removed from the market and replaced by less effective products.
- The negative impact on the agricultural landscape and on biodiversity of changes in cultivation or cultivation coming to an end.
- The export of environmental problems if produce grown in Sweden is replaced by imports.

It is important to ensure that each action has an overall positive effect. Actions which counteract or compensate for the negative effects of plant protection products may be needed, in the same way as measures to develop alternative ways of managing the relevant plant protection problems.

20 Factors which can influence the use of plant protection products

Almost 70 % of the previously approved substances have been withdrawn from the European market as a result of the EU work programme to review active substances during the period 1995–2008. Similar activities took place at a national level in Sweden, before the country joined the EU in 1995. Therefore, Sweden is not affected to the same extent as countries in southern and central Europe by changes in the availability of plant protection products on the European market.

The developments highlight the problems of relying in the long term on chemical plant protection products to provide protection for plants to the same extent as they did in the past. The circumstances which suggest that fewer plant protection products should be available include:

- More stringent EU testing requirements. Regulation (EC) No 1107/2009 concerning the placing of plant protection products on the market introduces stricter requirements than those which previously applied to the approval of individual active substances.

- The increasingly widespread and accelerating development of resistance is restricting the use of certain active substances and reducing the time that they are available on the market.

- Svenskt Växtskydd, the Swedish plant protection industry association, has stated that despite ongoing development work, the number of new products has fallen in recent years. Increasing registration requirements, application charges and development costs are contributory factors to this changing situation. Another cause is the fact that it is becoming increasingly difficult to find substances with new modes of action.

- The future availability of plant protection products will also be determined to a certain extent by the companies which market plant protection products. They will choose the countries and the regions in which they will apply for approval. An assessment of the potential profits to be made on the Swedish market will be one of the main reasons for deciding to launch a product in Sweden.

In order to counteract these changes, products must be developed more quickly to replace other products that are being withdrawn from the market and to allow for sustainable resistance strategies which require access to more active substances. The points listed above indicate that the trend is moving in the opposite direction. One way of resolving this problem in the long term is to develop alternatives to chemical control methods and new combinations of chemical controls and other measures. Comprehensive action is needed to establish alternatives and this involves both new knowledge and the identification of appropriate methods. The work must focus on maintaining or increasing the safety and reliability of Swedish plant production by offering several effective alternatives for resolving different plant protection problems. This applies in particular in the areas where there is uncertainty about the availability of chemical plant protection products in future. In

this context, it is also important to continue the successful results of previous work. This involves, for example, promoting the plant protection methods which restrict or replace the need for chemical plant protection products.

A number of factors can influence the potential rise in the use of plant protection products. The most important of these is increased demand for vegetables, which can lead to higher prices for produce. Changes in the biology or occurrence of harmful organisms could result in greater usage of chemical plant protection products. If the availability of these products is reduced, there could be an increased risk of resistance which in turn could lead to greater use of less effective preparations in order to compensate for their lack of effectiveness.

There are many areas where measures can be taken to counteract these developments. These include ongoing research and development activities and advisory services, which are important tools for tailoring the use of chemical controls and preventing the increased use of plant protection products. Integrated pest management plays a key role in this context. Preventive measures, such as the choice of resistant varieties, suitable tillage methods and balanced crop rotations, are important means of keeping levels of usage low. The main areas where the use of plant protection products needs to be reduced include crops which require intensive control methods, such as potatoes and apples. The introduction of forecasting models for potatoes can be expected to result in a reduction in the use of fungicides, although in certain years the levels of usage may still rise. Blight-resistant potato varieties have also produced promising results. The development of new techniques, such as the combination of mechanical and chemical weed controls, also has a great deal of potential and, most importantly, can be expected to lead to a reduction in herbicide use in certain drilled crops, including maize, peas and field beans. Another example of measures which could counteract these changes is environmental compensation for organic production as part of the Rural Development Programme.