

## SECTION 2

### *Elaboration on Possible Arguments and Objectives of an Additional EU Policy on Plant Protection Products*

**(Report prepared by Oppenheimer Wolff & Donnelly)**

This Report analyzes the experiences of six Member States with regard to PPP risk reduction and PPP use reduction programs. It assesses the likely impact of Directive 91/414 on PPP use patterns and the risks stemming from those patterns, after the Directive has been fully implemented. Finally, it identifies a number of options for an additional EU policy, and discusses their appropriateness for achieving different risk-reduction objectives.

#### **2.1 INTRODUCTION**

The European Community's Fifth Environmental Action Programme sets as one of its targets the significant reduction of pesticide use per unit of land under production and conversion of farmers to methods of integrated pest-control, at least in all areas of importance for nature conservation. It lists three actions for meeting this target: (1) registration of sales and use of PPPs; (2) control on sale and use of PPPs; and (3) promotion of "Integrated Control" (in particular training activities) and promotion of bio-agriculture.

Four of the EU's Member States -- Denmark, France, The Netherlands, and Sweden -- have already set in place programs designed to achieve overall reductions in the volume of plant protection products used in agricultural activities within their borders. Advocates of PPP use reduction programs point to these countries as examples of the feasibility of reducing use of plant protection products without unduly lowering agricultural productivity.

In other Member States, such as Germany and Italy, reductions in PPP use are occurring without government intervention. Opponents of PPP use reduction programs point to this as evidence that EU-level action may not be necessary.

Plant protection product use reduction as an objective is therefore somewhat controversial. Although the Member States have approved the Fifth Environmental Action Programme and its call for a significant reduction in PPP use at least in all areas of importance for nature conservation, no clear consensus exists as to whether this should be the direction for future EU risk reduction efforts in this area.

#### **2.2 OBJECTIVES OF THE SUB-REPORT**

This Report envisages a more strategic study on possible directions of an additional EU policy on plant protection products. The problem posed for this study is the following:

***Given the differing concerns and objectives of the Member States with regard to PPP risk reduction policies, what are the most relevant options for an additional E.C. policy on plant protection products?***

## 2.3 BACKGROUNDS OF NATIONAL STRATEGIES

The national strategies and policies of the six Member States investigated for this study are very diverse, in terms of both content and ripeness for investigation. Existing national initiatives for all six countries are summarized in Table 1 below:

**Table 1: PPP Risk Reduction - National Initiatives**

National Initiatives	DK	SW	NL	D	F	I
Requirement to spray only if observed need	X	X		X	X	
Re-registration program <sup>1</sup>	X	X	X			
Regular review of registrations		X		X		
Obligatory education/certification of sprayers	X	X	X	X	X	
Mandatory farm-level record keeping of PPP use	X					
Approval of types of spray equipment	X		X	X		
Phase-out of harmful active substances	X	X	X	X		X
Permits for PPP use			X	X		X
Applied agriculture research program	X	X	X	X	X	X
Extension programs promoting need-based models		X	X	X	X	
Groundwater monitoring program	X		+/-	X	X	
Controls over PPP use in drinking water protection zones		X	X	X	X	
Strict limits on aerial spraying	X	X				
Tax on PPPs	X	X				
National reduction program	X	X	X			
Active research on integrated and biological farming	X	X	X	X		X
Economic support to convert to organic farming	X	X	X	X		X
Economic support for spray free zones	X			X		
Standards for max. allowable concentrations of PPPs in environment general			X			

<sup>1</sup> Note that since 1968, Germany has required all PPPs to be assessed against strict criteria at 10-year intervals.

Which concerns or motives<sup>2</sup> drive a country's choice of strategy and policies goes to the heart identifying feasible options for an additional EU policy. Where the underlying concerns or motives are similar in nature, it may be easier for the Member States to reach agreement on the need for an additional policy, and the content of that policy.

**Box 1: Top Ten Concerns (all 6 Member States)**

1. Contamination of water resources used for human consumption
2. Possible adverse effects on the ecology, e.g., non-target species
3. Risks to consumers of food with residues
4. Effects of exposure to residues in water, soil and air
5. (tie) Contamination of surface water or marine environments  
(tie) Risks to users of agricultural chemicals
7. Misuse of PPPs due to lack of knowledge of users
8. Specific concern about adverse effects on an ecosystem element (D - agriculturally beneficial arthropods, SW -herbicide use in forests)
9. Dependency of agriculture on chemicals for pest control (NL)
10. Frequent and large-scale use of PPPs (NL)

Other patterns become clear when the concerns of countries with PPP use reduction strategies are analyzed separate from the three Member States in the study which do not pursue PPP use reduction.

**Box 2: Top Concerns of 3 Member States with PPP Use Reduction Strategies**

1. Contamination of water resources used for human consumption
2. Possible adverse effects on the ecology, e.g., non-target species
3. Contamination of surface water or marine environments
4. (tie) Effects of exposure to residues in water, soil and air  
(tie) Risks to consumers of food with residues  
(tie) Frequent and large-scale use of PPPs (NL)

**Box 3: Top Concerns of 3 Member States without PPP Use Reduction Strategies**

1. (tie) Contamination of water resources used for human consumption
1. (tie) Risks to consumers of food with residues
1. (tie) Risks to users of agricultural chemicals
4. (tie) Possible adverse effects on the ecology, e.g., non-target species  
(tie) Effects of exposure to residues in water, soil and air

<sup>2</sup> This study uses the term "concern" to denote a worry or anxiety about a matter. A concern is, in effect, a perceived problem. An individual concern may not, by itself, be sufficient to bring about a response. However, a cluster of concerns may tip the balance and become motivation.

The term "motive" is used in this Report to mean an impelling force, i.e., the circumstance, desire or fear that has induced an action. A motive can be a positive response to a concern. It can consist of a desire to go forward by seeking a solution to a concern, or by seizing a particular opportunity. The concerns and motives underlying Member States Strategies were obtained by questionnaire and contact with key officials in competent authorities.

Box 4 below provides the top five motives for all six countries when evaluated together. Once again, differences emerge when the countries with use reduction strategies are analyzed separately from those without such strategies.

**Box 4: Top Motives (all 6 Member States)**

1. General public demand for PPP use reduction
2. Increase agricultural productivity by, *inter alia*, development of IPM
3. Export market requirements, *e.g.*: maximum residue levels for foodstuffs
4. (tie) Strengthen admissions policies by reducing dependency on PPPs (NL)  
(tie) Incorporate more integrated approach towards pest control

**Box 5: Top Motives of 3 Member States with PPP Use Reduction Programs**

1. General public demand for PPP use reduction
2. Strengthen admissions policies by reducing dependency on PPPs (NL)
3. International commitment to reduce chemical emissions (DK, NL)
4. Prolongation of product efficacy by retarding development of resistance (NL)
5. Make admissions policy more flexible by ensuring responsible pest control practices (NL)

**Box 6: Top Motives of Member States without PPP Use Reduction Programs**

1. Increase agricultural productivity by, *inter alia*, development of IPM
2. Export market requirements, *e.g.*, maximum residue levels for foodstuffs
3. (tie) General public demand for PPP use reduction (I)  
(tie) Opportunity to incorporate more integrated approach towards pest control (D)

Most officials interviewed felt that the original motives and concerns underlying their country's additional strategy were still relevant today. Nonetheless, most countries' additional policies have developed considerably over the years, and new concerns have emerged. For example, there is growing concern about dependency of agriculture on chemical pest control.

## 2.4 OBJECTIVES WITH RESPECT TO AN ADDITIONAL POLICY

The term "objective" is used in this analysis to refer to the endpoint which a strategy or policy aims to achieve, *i.e.*, the purpose or intention of a country's additional policies with respect to PPPs.

Interestingly, though concerns varied greatly, policy makers have responded by choosing remarkably similar objectives.

**Box 7: Top Objectives for Additional PPP Strategies (all 6 Member States)**

1. Reduction of risk to consumers' health through protection of water resources used for human consumption
2. Reduction in emissions to the environment
3. Reduction of load to surface waters and/or the marine environment
4. Reduction of risk to consumers' health from residues on food
5. (tie) Promotion of alternative methods of pest control, *e.g.*, via support of research, subsidies for low-input agriculture  
(tie) Improvement of technological base for, *inter alia*, application of PPPs
7. Reduction of dependency on PPPs in agriculture (NL)
8. (tie) Reduction of risk to chemical workers or users of PPPs  
(tie) Achieve a balanced approach towards reduction of risks associated with PPP use (D)

**Box 8: Top Objectives for Member States with PPP Use Reduction Strategies**

1. Reduction of risk to consumers' health through protection of water resources used for human consumption
2. Reduction in emissions to the environment
3. Reduction of load to surface waters and/or the marine environment
4. Reduction of risk to consumers' health from residues on food
5. Reduction of dependency on PPPs in agriculture

**Box 9: Top Objectives for Member States without PPP Use Reduction Strategies**

1. Reduction of risk to consumers' health through protection of water resources used for human consumption
2. (tie) Reduction in emissions to the environment  
(tie) Reduction of load to surface waters and/or the marine environment  
(tie) Promotion of alternative methods of pest control, *e.g.*, via support of research, subsidies for low-input agriculture  
(tie) Improvement of technological base for, *inter alia*, application of PPPs
6. (tie) Reduction of risk to consumers' health from residues on food  
(tie) Reduction of risk to chemical workers or users of PPPs  
(tie) Achieve a balanced approach towards reduction of risks associated with PPP use (D)

#### 2.4.1 Use-Reduction Versus Risk-Reduction

The objective "reduce use of PPPs" was not one of the options provided in the questionnaire. Although interviewees could have volunteered it, they did not. In all three countries with PPP use reduction strategies, PPP use reduction was regarded as only one of the means to achieve the objective of risk reduction, although considered useful in particular because (1) risk reduction is difficult to quantify; (2) use reduction can be quantified in ways that can be communicated to the public, including the farming community; and (3) "it gets the ball rolling".

Other Member States (e.g.: Germany) oppose a PPP use reduction strategy on several grounds: (1) the current framework conditions already minimize PPP use at necessary amounts; (2) further use reduction would result in both high economic costs and negative impacts for the environment; (3) PPP use reduction is not considered an efficient way to reduce risk; (4) improvements in application conditions and strengthening research and extension of IPP would be more effective risk reduction measures than reducing quantity used.

It should be noted that there are limits to PPP use reduction. For example, Sweden considers that further use reductions beyond its current goal of 75% will be increasingly difficult to achieve without incurring excessive costs for farmers, given the competition experienced upon accession by Sweden to the EU.

## 2.5 PARAMETERS FOR MEASURING PROGRESS IN MEETING OBJECTIVES

A parameter is defined as a measurable or quantifiable characteristic or feature, and the choice of parameters for measuring progress may be fundamental to the success of any additional strategy. There is no consensus among the six countries surveyed concerning the relevance, usefulness and/or feasibility of an agreed range of parameters.

### **Box 10: Primary Parameters Used to Measure Progress in Countries with Additional Programs**

Denmark -	Reduction in total amount of active ingredients sold nationally (but not differentiating AIs from toxicity), <i>combined with</i> reduced frequency of treatments as indicator of ‘environmental load’ <sup>3</sup>
Germany -	Reduction in number of products registered; monitoring of negative impacts (applicators, consumers, environment)
Netherlands -	Reduction in total amount of active ingredients sold nationally
Sweden -	Reduction in total amount of active ingredients sold nationally, <i>combined with</i> phase-outs of specific products and area of land treated <sup>4</sup>

### 2.5.1 Total Amount of Active Ingredient Sold

The parameter of total amount of active ingredient sold is viewed (notably in France and Germany<sup>5</sup>) as inappropriate, on the grounds that (i) it is derived from the principle of restriction of industrial emissions and does not reflect the fact that plant protection products are applied to

<sup>3</sup> One difficulty identifiable with a parameter based on frequency of application is that a farmer’s decision to apply a PPP in separate treatments may be based on actual need and would therefore be in line with IPP principles.

<sup>4</sup> Any parameter based on set-aside areas should however be used with caution, since other areas could be more intensely cultivated. For example, in Italy most set-aside areas are in fact the less productive areas, e.g. hillsides, that had never experienced high rates of PPPs in any event.

<sup>5</sup> Although in Germany the amount of active ingredient sold is considered both before and subsequent to authorisation (the latter for purposes of considering re-authorisation).

solve a problem; (ii) it neglects the need for a practicable alternative; (iii) it does not account for the different biological activities of active substances and therefore does not correlate with the actual danger potential; (iv) no use of PPPs is not always the best alternative, *e.g.*, soil erosion following mechanical weed control. Despite its flaws, the parameter of total amount of active ingredients sold is nevertheless monitored even in countries without PPP use reduction strategies, including Germany and France.

### 2.5.2 Environmental Indicators

Environmental indicators used by Member States include surface and groundwater contamination; effects on water organisms or birds. By way of example, the 'environmental yardstick' developed by the Dutch Center for Agriculture and Environment (CLM) is used on a voluntary basis by 5-10 % of Dutch farmers.

One of the problems with environmental indicators is that the perception of what constitutes a negative side-effect from PPP use can vary widely among government, industry and the agricultural sector, on the one hand, and among environmental groups on the other hand. Some scientists have argued that the indicator should be actual occurrence of damage. But even the scientific community is divided on what should be considered "actual damage".

### 2.5.3 "Pesticide Load Index" or "Risk Index"

In Denmark, considerable discussion has taken place concerning the development of some type of "pesticide load index" or "risk index" which could express the joint effect from PPPs, based on each PPP's toxicity to plants and animals, combined with treatment frequency and quantity used for each PPP, and intended to provide a quantitative measure of the risk or load each PPP comprises for plants and/or animals. These modeling systems are extremely complex, however.

A "risk index" would indicate the total weighted effect of the hazardous characteristics of a PPP, *e.g.*, toxicity, mobility and biodegradability, together with the degree of exposure in the environment, and would summarize the risk to the environment associated with the use of a PPP. It may, however, be impossible to create a risk index that can summarize all risks to the environment from PPPs in a meaningful way, since most risks cannot be compared. An index for a specific PPP would not be able to indicate there was a great risk for a single group of plants or animals, or a lower risk for several groups.

A "joint load index" would aim to provide an indicator of the total environmental load posed by the use of several PPPs. This would, however, encounter similar difficulties as with the proposed "risk index". A "joint load index" would need to summarize the environmental effects of chemicals used for completely different purposes, *e.g.*, insecticides, herbicides, and growth regulators. Since these groups of chemicals have completely different effects on the environment, a joint load index would appear to have no scientific basis.

### 2.5.4 "Environmental impact quotient" (EIQ)

The environmental impact quotient ("EIQ") although sometimes criticized, is a proposed system of comparing PPPs on the basis of their known toxicological properties, characteristics, and behavior in the environment, determined for each PPP on the basis of farm worker, consumer and environmental exposure components. The averaged relative toxicities are added together to arrive at a single numerical value for each PPP, multiplied by (a) its use rate and (b) its

frequency of application, to arrive at a final EIQ value for each PPP in a specific cropping system, reportedly enabling different PPPs to be compared, with those having low values being safer than those having high values. Some concerns have been expressed, however, that such a method would be far too complicated to operate in practice.

#### 2.5.5 Other

A number of other parameters were mentioned as interesting possibilities by interviewees, including the percentage of PPP users trained in integrated pest control techniques; the number of sellers and users of PPPs having specialist qualifications; calls to its occupational safety board's "hot line" reporting PPP-related incidents; substitution of modern technology for old spraying equipment; monitoring of the number of PPP sprayers inspected; amount of investment in low-input versus higher-input agriculture; allocation of money for technical training of farmers; number of farmers advised to follow *agriculture raisonnée* and extent of agriculture area where IPM applied. Finally, Italian environmental organizations expressed a wish for a mandatory limit on total amount of PPP residues on food, similar to the overall limit for PPP residues stipulated in the EU Drinking Water Directive.

### 2.6 EVALUATION OF NATIONAL EXPERIENCES

One theme throughout interviews conducted with officials was the difficulty in measuring progress in risk reduction because of a lack of reliable parameters in this areas, and lack of agreement on principles of monitoring. Determining the effectiveness of specific policy elements and activities was also difficult because of the existence of other factors which could have affected the outcome.

As a general remark, achievement of set goals has had mixed success when measured against stated parameters. For example, although the parameter of a 50% reduction in PPP use and treatment frequency has been identified in Denmark, in practice reduction figures for treatment frequency have not taken place, reducing only by between 6-22%.

By way of contrast, in most of the Member States re-registration has resulted in refusals of applications and withdrawal of substances from the market. Stricter conditions are also frequently placed on older active substances. The elements to which success in reducing PPP use are attributed differ widely from Member State to Member State, however. The most important elements, are summarized in Table 2 below.



**Table 2: Factors contributing to the effectiveness and the lack of effectiveness of additional strategies**

<b>Factors contributing to the success of additional strategies</b>	<b>DK</b>	<b>NL</b>	<b>SW</b>	<b>F</b>	<b>D</b>	<b>I</b>
High level of environmental awareness generally	X	X	X		X	
Strong national consensus on need for the additional strategy on PPPs			X			
Good cooperation between agricultural and environment ministries	X	X	X			
Strong commitment and participation on the part of farmers			X			
Extensive agricultural research and extension network to reach local farmers		X	X			
Good information about ways to reduce dependency on PPPs			X			
Setting of quantifiable targets		X	X			
Mandatory activities, such as certification of users	X	X	X	?	X	
Strict registration criteria					X	
Consumer demand for quality food						X
<b>Factors contributing to lack of success</b>	<b>DK</b>	<b>NL</b>	<b>SW</b>	<b>F</b>	<b>D</b>	<b>I</b>
Lack of support among farming community	X	X		X	X	X
Difficulties in defining objectives and parameters for measuring progress			X		X	
Lack of resources for agricultural research and extension		X	X	X	X	X partial
Adverse economic results associated with restricted use of PPPs		X	X			
Conflicts with other environmental initiatives, <i>e.g.</i> , "green cover" program	X		X			
Lack of penetration of information to farming community		X		X	X	X
Lack of alternatives for certain "high risk" PPPs			X			
Lack of cooperation among ministries and interest groups in general				X	X	X
Lack of legal basis for additional programs		X				
Difficulties linking agricultural innovation with product phase-out needs		X				

## **2.7 THE IMPACT OF DIRECTIVE 91/414 ON RISKS FROM FUTURE PPP USE**

Directive 91/414 concerning the placing of plant protection products on the market<sup>6</sup> ("the Directive") is intended to harmonize the PPP registration systems now in existence in the various Member States. It establishes common rules which are to be applied in approving -- or rejecting -- active ingredients and plant protection products. These rules include health and environment-related criteria set forth in 'Uniform Principles'.

After the Directive has been fully implemented, active ingredients ("AI") and PPPs have to meet the criteria established within the framework of the Directive in order to be placed on the market within the European Union. Full implementation is expected to take 10 to 15 years -- the estimated amount of time required for the review of some 800 active substances currently on the EU market mandated by the Directive.

Some important stakeholders in the debate concerning possible additional EU measures concerning PPPs -- including the PPP industry -- contend that the Directive by itself will be adequate to control risks to humans and the environment from plant protection products.

If the Directive is not expected to sufficiently reduce such risks, the EU may need to take further risk reduction measures now, rather than waiting to see the results of Directive 91/414's implementation.<sup>7</sup>

The legal analysis conducted as part of this sub-Report was concluded prior to adoption of definitive Uniform Principles. The comments set out below should therefore be read in the light of the recently revised Uniform Principles. Several potential problem areas were identified.

- Exceptions for many environment-related criteria, *i.e.*, if scientific demonstration of no unacceptable impact under field conditions
- The need for better definition of "proper use" and "good plant protection practice"
- No provision for reduction of dependency on PPPs for plant protection

The UP's provision of exceptions for many environment-related criteria could be a potential area of concern. However, applicants wishing to avail of a particular exception will be under a considerable burden to demonstrate via field trials that a PPP not meeting the criteria will have no unacceptable impacts under field conditions. The cost of such field trials will limit the number of PPPs exceeding those criteria to those with a strong market potential and a strong likelihood of passing the field tests. It will be difficult to assess whether such exceptions will diminish the effectiveness of Directive 91/414 as a risk reduction measure until after such field trials have taken place.

Implementation of the Principle of Mutual Recognition ('MR') may also pose problems. Though MR will have positive environmental aspects, *e.g.*, PPPs that meet modern environmental criteria, less testing on animals, and so on, these gains have come at some cost. Individual

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<sup>6</sup> Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market, O.J. L 230/1.

<sup>7</sup> Due to considerations of space, readers unfamiliar with the provisions or operation of Directive 91/414 are invited to read the following section following consideration of the Directive itself or the summary of Directive 91/414 provided at pages 39-45 of the Oppenheimer Wolff & Donnelly sub-Report.

Member States wishing to establish special controls over a PPP deemed to pose a national or local risk will face the burden of having to establish non-comparability of conditions. Counterbalancing that burden is, of course, the burden on the applicant to establish comparability of conditions. Nonetheless, the loss of national flexibility in this area may increase PPP-related risks in those countries that had previously pursued aggressive re-registration programs to eliminate high-risk products.

Directive 91/414's inadequate definition of "proper use" and "good plant protection practice" is also a concern. A legal definition of "proper use" and "good plant protection practice" is particularly important, given that the risk reduction rules set forth in Directive 91/414 and the Uniform Principles assume that a PPP will be subject to "proper use". Since this is not necessarily the case, better definition would help not only enforcement efforts but would also provide a basis for educating users about how to keep risks in using PPPs at a minimum.

A final concern is that Directive 91/414's risk reduction measures are aimed only at controlling products. As such, it perpetuates the status quo of dependency on PPPs for pest control. Given the wide range of other risk reduction measures available to policy makers in this area, including measures to reduce dependency on PPPs in agriculture, it would appear prudent to consider other, more preventive risk reduction actions at EU-level.

In general, the impact of Directive 91/414 on PPP use patterns in the different Member States will depend on the number of AIs and PPPs currently authorized within each country. The general expectation among countries without use reduction programs is that the number of AIs currently on the market within the EU will significantly decrease, as will the number of PPPs and the average number of uses for an individual PPP. This phasing out of higher-risk PPPs should lead to an overall reduction of risk, but at some cost to those countries with strong PPP risk reduction programs involving use reduction goals.

Notwithstanding the issue of Directive 91/414's adequacy as a risk reduction measure, the length of time for full implementation is of serious concern. The projected period of 10-15 years may in fact be somewhat optimistic, given that the process of reviewing "old" active ingredients is still at an early stage. Assessment of the some 700 active substances on the EU market could well take longer than the allotted 10-15 years at current levels of human and technological resources. Subsequent monitoring to determine its impact on PPP-related risks could add on an additional 5 years if the decision to set in place an additional EU policy is postponed until monitoring results are available. Thus it may well be 15-20 years before the full impact of Directive 91/414's controls over active substances and PPPs can be assessed. The issue of implementation of Directive 91/414 is considered further in the sub-Report prepared by WAU, summarised below.

## **2.8 SELECTING OPTIONS FOR AN ADDITIONAL EU POLICY**

This section draws on the findings of individual country studies to consider whether any of the common concerns and motives identified therein could provide a platform for further work to develop an additional EU policy. It also considers whether any objectives derived from national programs could be relevant at EU-level, and reviews the various parameters identified to assess their viability at EU-level.

### **2.8.1 Common Concerns or Motives**

Six concerns were highlighted as priorities for most of the countries surveyed and therefore most likely to form a common basis for further discussion as summarised in Table 8, overleaf.

**Table 3: Common concerns**

<b>Common concerns</b>	<b>Combined Rank</b>	<b>Countries with Use Reduction</b>	<b>Countries w/o Use Reduction</b>
Contamination of water resources used for human consumption	1	1	1
Possible adverse effects on the ecology, e.g., non-target species	2	2	4
Risks to consumers of food with residues	3	4	1
Effects of exposure to residues in water, soil and air	4	4	5
Contamination of surface water or marine environments	5	3	7
Risks to users of agricultural chemicals	5	10	1

A similar process was used to derive rankings for possible motives, though it should be noted that the information on which these rankings are based is much less robust than that for possible concerns. Table 3 nonetheless provides an overview of the responses received.

**Table 4: Possible motives**

Possible motives	Combined Rank	Rank for Countries with Use Reduction	Rank for Countries w/o Use Reduction
General public demand for PPP use reduction	1	1	3
Increase agricultural productivity by, <i>inter alia</i> , development of IPM	2	6	1
Export market requirements, <i>e.g.</i> , maximum residue levels for foodstuffs	3	6	2
Opportunity to strengthen admissions policies by reducing PPP dependency	4	2	5
International commitment to reduce chemical emissions	4	2	5
Opportunity for more integrated approach towards pest control	4	6	3

Overall, because of the general lack of agreement about motives as a factor underlying a country's choice of risk reduction policies, the rankings overleaf provide only limited information about motives shared across EU Member States. On the other hand, the top five concerns listed above do appear to tap into a strong common vein.

### 2.8.2 Relevant Objectives

Table 10 below lists the top six objectives identified in the course of this study. A comparison of the rankings of the risk reduction objectives identified via the country studies reveals a remarkable homogeneity, at least towards the top of the rankings. This held true whether rankings were made on the basis of groupings of countries with pesticide use reduction strategies, countries without such strategies, or all six countries together.

A comparison of Tables 8 and 10 also reveals considerable correspondence between the top-ranked objectives and the top-ranked concerns. For example, the top-ranked objective of "reduction of risk to consumers through protection of drinking water resources" corresponds to the top-ranked concern -- "contamination of water resources used for human consumption", while the second-place objective of "reduction in emissions to environment" compares to the second-ranking concern of "possible adverse effects on the ecology".

**Table 5: Possible objectives**

Possible objectives	Combined Rank	Rank for Countries with Use Reduction	Rank for Countries w/o Use Reduction
Reduction of risk to consumers through protection of drinking water resources	1	1	1
Reduction in emissions to environment	2	2	2 (tie)
Reduction of load to surface waters and/or marine environment	3	3	2 (tie)
Reduction of risk to consumers from residues on food	4	4	6
Promotion of alternative methods of pest control, <i>e.g.</i> , research support	5 (tie)	7 (tie)	2 (tie)
Improvement of technological base for, <i>inter alia</i> , application of PPPs	5 (tie)	7 (tie)	2 (tie)

### 2.8.3 Relevant Parameters

Since respondents to the survey of PPP policies in the six countries were not invited to weigh various parameters against each other, a ranking as such cannot be produced from this study. Nonetheless, some basic themes relevant for an EU-level discussion can be drawn.

Each of the three countries with use reduction goals have relied on the parameter reduction in total amount of active ingredient by weight. To reflect differences among PPPs on the basis of biological potential, however, these countries have used this parameter in combination with other parameters.

Variances on this parameter that were targeted to address specific problems -- *e.g.*, amount of AIs used by sector or for specific crops -- had broader support. All of the countries in the study (except Germany) have used or are discussing the value of such a parameter. The parameter of reduced number of registered products -- a parameter which could well be used to measure progress in implementation of Directive 91/414 -- was considered relevant by most of the countries surveyed.

The notion of a pesticide load index or other type of environmental indicator was regarded by officials from all six countries in the study as potentially one of the most valid parameters and appears to be the parameter potentially most closely linked to the objectives of ‘protection of drinking water resources’ and ‘reduction of load to surface waters’, and it is noteworthy that the concentration limits for pesticides found in both the Drinking Water Directive and the Surface Waters Directive already serve as "trigger values" to activate policy responses.

The limit of this kind of index, however, is that response occurs only after a certain impact on the environment has already occurred. A ‘trigger value’ would therefore have to be set well below the point of significant impact, so as to avert the possibility of a damage.

The most relevant parameters among those identified in the study with regard to the objective "reduction in emissions to the environment" would appear to be those related to reductions in quantity of PPPs used. However, given the variances among the Member States in uses of PPPs and quantities used, common quantifiable goals may not be feasible -- or indeed even scientific. A more viable approach may be to consider a range of quantified targets. The Packaging Directive which sets minimum and maximum targets for recovery and recycling of packaging waste could serve as an example.<sup>8</sup> Alternatively, Member States could be required to identify possibilities for risk reduction within their own goals, similar to the scheme in the proposed Directive on ecological quality of water, whereby Member States would be required to set their own "operational targets for maintaining and/or achieving good ecological quality."<sup>9</sup> Both of these approaches would also be in accordance with principles of subsidiarity.

Progress towards the objective "promotion of alternative methods of pest control" could be measured by such parameters as percentage of pesticide users trained in IPM or amount of investment in low-input v. higher-input agriculture. These parameters are under discussion in several countries in the study. These issues are examined further in the sub-Report prepared by Produce Studies, summarised at Section 4 below.

## **2.9 OPTIONS FOR AN ADDITIONAL EU POLICY**

As the national reports in this study reveal, a range of policy options and policy instruments aimed at reducing risks from PPP use are currently in place among the Member States. Some of these were identified and discussed in the first phase of the "Possibilities for future E.C. environmental policy on plant protection products" project.<sup>10</sup> To provide a focus for the Phase 2 discussions, various policy options and instruments are set out below in six "packages":

Each of these packages is focused on one or more risk reduction objectives, as indicated, and discussed on the basis of the information gathered during the comparative studies of six Member States. The key elements guiding discussions<sup>11</sup> include the extent to which underlying concerns are shared by the various Member States; whether an option is perceived as "effective" in terms of achieving the identified objective; the existence of a relevant parameter for measuring progress in risk reduction; whether the option will be politically acceptable to Member States. The options, and the measures listed under each, should be viewed as stages along a risk reduction continuum. Unrestricted use of PPPs would be at one end of the continuum and PPP-free agriculture - the ultimate measure to reduce risk from PPPs - would represent the other end. Both far ends of the continuum are unrealistic, and Options are not mutually exclusive, therefore suggesting that indeed a 'package' of measures will be required.

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<sup>8</sup> Directive 94/62/EC of 20 December 1994 on packaging and packaging waste, O.J. L 365 of 31 December 1994, at 10.

<sup>9</sup> Proposal for a Council Directive on the ecological quality of water, COM (93) 680 final - 94/0152 (SYN).

<sup>10</sup> E.g., Centre for Agriculture and Environment (CLM), Towards a Future EU Pesticide Policy (1994).

<sup>11</sup> The criteria above are certainly not the only criteria which may be relevant. Rather, they are derived from the information which has been gathered for this study during the research phase. Indeed, it will be seen from the Questionnaire annexed to this synthesis Report that in the light of the conclusions of the other sub-Reports to this Project, resulting options have been modified to produce seven possible strategies for an additional EU PPP policy.

### 2.9.1 Option 1: Speed Up Directive 91/414 Implementation

*Relevant measures:* - Additional resources for implementation, *e.g.*, financing, within the European Commission and Member States

*Relevant priority objective(s):* - Reduction of risk to consumers through drinking water resources and residues on food, and improvement of technological base for, *inter alia*, application of PPPs

Though technically increasing resources would not be a policy measure "additional" to the current system of authorization of PPPs, it would nevertheless represent a cost-effective way to ensure that PPPs posing unacceptably high levels of risk are taken off the EU market, or their use restricted. Since Directive 91/414 has already been agreed by the Member States, this option would likely have a high level of acceptance.

Relevant parameters for measuring progress could be numbers of active substances and PPPs reviewed under Directive 91/414's guidelines and criteria, and reduction in numbers of authorized active ingredients and plant protection products. Environmental indicators such as concentration levels of PPPs in groundwater could also be useful for monitoring progress.

### 2.9.2 Option 2: Controls Over Risks in Distribution and Use of Plant Protection Products

*Relevant policy instruments:* - Training and certification requirements: - accreditation of dealers and distributors; certification of farmers and professional users of PPPs; access to high-risk PPPs restricted to certified users; essential requirements/inspection for equipment. Record keeping requirements: - registration of PPP sales; mandatory farm-level logs of PPP usage.

*Relevant objective(s):* - Reduction in emissions to the environment; improvement of technological base for, *inter alia*, application of PPPs; reduction of risk to chemical workers or users of PPPs; reduction of risks to consumers of food with residues.

The Fifth Environmental Action Program proposed measures to control the sale and use of pesticides by 1995. Option 2 focuses on training and certification of all those involved in the chain of marketing and use of PPPs, from distributors to users, and includes components to upgrade equipment for application of PPPs, and for keeping records both of sales and of PPP usage at farm-level.

EU-wide measures to require minimum training and certification of PPP users, and to upgrade equipment standards, are also among the recommendations made by the Farming Methods Working Group at the October 1995 OECD/FAO Workshop on Pesticide Risk Reduction in Uppsala, Sweden.<sup>12</sup>

Relevant parameters for measuring progress would include: number of distributors certified; number of PPP users trained and certified; number of PPP-related occupational poisonings reported; number of sprayers meeting essential requirements and/or inspected.

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<sup>12</sup> It is worth noting in this context that the so-called Nitrates Directive provides for the possibility of Member States including record keeping requirements in the Code(s) of Good Agricultural Practice for reducing pollution by nitrates.



Most of these measures, with the possible exception of farm-level record keeping, bear a high probability of being acceptable to most Member States. In some ways Option 2's package of risk reduction measures could be viewed as the minimum step for an additional EU policy.

### 2.9.3 Option 3: Water Protection Programs/Measures Reducing Specific Ecosystem Risks

*Relevant policy instruments:* Watershed monitoring programs; area-based bans or restrictions on use of PPPs in ecologically vulnerable zones, *i.e.*, well heads or streamside areas; nature protection reserves, *etc.*; restrictions and/or bans on pesticides with high mobility; setting of limits for PPP residues in surface and ground water.

*Relevant priority objective(s):* - Reduction of risk to consumers' health through protection of water resources used for human consumption; reduction of load to surface waters and/or the marine environment.

The policy measures grouped together in Option 3 address various water-related (contamination) concerns, ranked high in the survey of all six Member States.<sup>13</sup>

Area-based bans or use restrictions are in place in Denmark, Germany and the Netherlands. Use of designated water protection zones is also viewed as an effective measure in, *e.g.*, Germany, where water companies consider it more cost-effective to pay farmers to change their practices with respect to PPPs than to allow the water to be polluted and then clean it afterwards. Note that Community nature protection legislation, *e.g.*, the Birds Directive and the Habitats Directive, already require Member States to take requisite measures to prevent pollution of certain protected areas. Moreover, the forthcoming EU Groundwater Action Plan and the proposed Ecological Quality of Water Directive also propose watershed monitoring.

Standards for surface waters are also prefigured in the Ecological Quality of Water Directive, which would have Member States set standards at levels of 'no-effect', leaving Member States the burden of proof. It should be noted that quality standards already exist under the Directive on quality of surface water intended for drinking water. Relevant parameters for this option would include pesticide load in surface and groundwaters. Indeed, the measures in this option may be regarded as the direction of future EU-level water quality protection legislation.

### 2.9.4 Option 4: Voluntary/Mandatory Programs on Pesticide Emission Use/Reduction

*Relevant policy instruments:* - Codes of Good Plant Protection Practice; Codes of Best Environmental Practice; promotion of Integrated Pest Management or Integrated Crop Management; restricted access to certain high-risk PPPs; charges or taxes on active ingredients; increased financial support for research and extension on integrated pesticide management; voluntary agreements with farmers' organizations to reduce dependency on PPPs, with specific targets by sector or crop; overall pesticide use reduction targets.

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<sup>13</sup> Given the EU's water quality requirements such as those in the Drinking Water Directive, these concerns are no doubt important in other Member States as well. It should be noted also that the Fifth Environmental Action Program called for the progressive replacement of harmful pesticides and progressive use limitations, as examples of measures needed to protect groundwater.

*Relevant priority objective(s):* - Reduction in emissions to the environment; reduction of risk to consumer's health from residues on food; improvement of technological base for, *inter alia*, application of PPPs.

The long list of measures under Option 4 represent a variety of approaches aimed at, *inter alia*, reducing unnecessary use of plant protection products. Together, they address virtually all of the priority concerns identified in this study. Several of the measures are voluntary, *e.g.*, Codes of Good Plant Protection Practice, implementation of which would require strong Member State commitment, as well as commitment at farm-level. The effectiveness of such measures is therefore open to some doubt. For example, the EU's Nitrates Directive calls for a Code of good agricultural practice, but implementation in a number of Member States is far behind schedule.

One of the strongest arguments for a Code of Good Plant Protection Practice is that it addresses Directive 91/414's failure to define "proper use" and thus would be complementary to the EU's current admissions legislation. A Code of Best Environmental Practice is more controversial, in that some critics see it as a single-issue measure which does not take into account other aspects of plant protection practices, such as farmer profitability. Nonetheless, it is under discussion in a number of countries.

Charges and taxes are considered effective elements in Sweden. Both Denmark and Sweden mentioned charges and taxes as important not only as measures which can reduce pesticide use because of their price effect, but as potential sources of funding for the research and extension programs needed to promote Good Plant Protection Practice, IPM, and so forth. The possibility that such charges and taxes could have a negative impact on the competitiveness of agriculture and the income of farmers would need to be considered. It seems likely that such measures would, however, incur significant opposition from the pesticides industry.

Relevant parameters under this option would include the various volume-based reduction targets, but in particular the sub-measures, such as amount of active ingredient used per hectare, by sector or for specific crops. A number of these elements would seem to have high political acceptance among the Member States and industry participants, especially Codes of Good Plant Protection Practice, promotion of IPM, and increased financial support for research and extension on IPM.

#### 2.9.5 Option 5: Further Promotion of Low-Input or PPP-Free Agriculture

*Relevant measures:* - EU eco-label for PPP-free agricultural products; increased financial support for research and extension on low-input or PPP-free agriculture; subsidies or tax break for switching to organic farming or for set-asides and extensification.

*Relevant priority objective(s):* - Reduction of emissions to the environment; promotion of alternative methods of pest control.

Option 5 would build on EU Regulation 92/2078 by providing further support for environmentally conscious agriculture and for the development of an EU-wide market for organically produced foodstuffs, by, *inter alia*, the development of an EU "green label" (although it is accepted that the sub-Report prepared by WAU, summarised at Section 3 below arrives at a different conclusion in relation to the efficacy of a green labeling scheme). It supports the Fifth Environmental Action Programme's proposal for promotion of "Integrated control" (in particular training activities) and promotion of bio-agriculture. Measures to increase

the use of biologically based farming methods are among the recommendations made by the Farming Methods Working Group at the October 1995 OECD/FAO Workshop on Pesticide Risk Reduction in Uppsala.

The primary concern(s) underwriting this option are risks to consumers of foods with residues, dependency of agriculture on chemicals for pest control, and possible adverse effects on the ecology.

Relevant parameters for measuring progress under this option would be number of acres in biological farming or in other agri-environmental programs. Whether the EU market for organic food will become substantial enough to support a significant switch from conventional to biological practices is, however, a major uncertainty with regard to this option.

#### **2.9.6 Option 6: Integration of Environmental Concerns into the Common Agricultural Policy**

*Relevant measures:* - Removal of support for crop prices and other subsidies based on productivity; compensation for sustainable agriculture measures; support for research & extension focusing on sustainable agricultural measures.

*Relevant priority objective(s):* - Reduction of emissions to the environment; promotion of alternative methods of pest control; improvement of technological base for, *inter alia*, application of PPPs.

Option 6 would aim to achieve a flexible and environmentally friendly agriculture by supporting sustainable farming measures. It would aim to complete the reform of CAP initiated in the early 1990s by extending and intensifying the EU's existing agri-environmental schemes. This would include further reduction of price supports for those input-intensive crops subject to CAP supports, such as cereals and oilseeds -- unless farmers shifted to other crops not subject to CAP supports, but still requiring intensive use of PPPs and other inputs. To counter this latter possibility, Option 6 would aim to shift farmers to more sustainable agricultural practices, through compensation for taking certain environmentally sound measures.

One important outstanding issue is whether current levels of food production could be maintained under this option without bringing more land under the plough. If the level of food production dropped considerably, there could be a need for support for farmers' incomes and for importing foods no longer produced within the EU. Similarly, it has been questioned whether the land remaining available would be cultivated more intensively, resulting in an increase in PPP application. This issue is discussed further in the sub-Reports prepared by both WAU and Produce Studies.

### **2.10 CONCLUSIONS**

Re-registration programs using strict environmental criteria have been important measures for taking overly risky pesticides off the market. In that regard, Directive 91/414 is a significant step forward for the EU in that it requires all Member States to apply up-to-date criteria, including environmental criteria, when taking decisions concerning PPPs. In many Member States, the numbers of active ingredients and PPPs are expected to be significantly lower at the end of Directive 91/414's implementation. Speedy implementation of Directive 91/414, as per Option 1 above, would eliminate higher-risk PPPs from the EU market and thereby reduce current levels of risk from PPP use.

However, as the discussion of Directive 91/414 indicated, there remain a number of areas where Directive 91/414's coverage may be incomplete, *e.g.*, with regard to groundwater protection. Thus, even if Directive 91/414 is implemented speedily, additional risk reduction measures may still be needed to address underlying concerns about risks from PPP use within the EU.

In this regard it is important to note that every country surveyed for the OWD sub-Report has undertaken some type of program aimed at reducing risks from use of plant protection products that was *in addition* to its program of authorization for such products. This is especially true for the countries with the most intensive review and re-registration programs.

Legislation providing for controls over risks in distribution and use of plant protection products is in place in some form or other in most countries. Such controls are especially important, given the length of time expected before Directive 91/414 will be fully implemented.

Targeted measures to protect groundwater and surface waters from PPP-related risks, as in Option 3, would be compatible with current discussions on the direction for future EU-level water quality protection legislation.

The lack of guidance provided by Directive 91/414 concerning "proper use" of PPPs has also been flagged in this study. Some of Option 4's measures -- in particular, a Code of Good Plant Protection Practices -- would help provide the guidance and definition needed to bridge this gap. Voluntary and mandatory programs on Best Environmental Practice, Integrated Crop Protection and other measures to minimize pesticide emissions would be important complementary measures.

Options 1-4 may in many ways be seen as minimum steps towards reducing risk to humans and environment from PPP use. They are already in place in some form in the three countries with pesticide use reduction programs. They are in place or under consideration in the three larger countries without use reduction programs but with large areas in agricultural production. They would provide a framework of risk reduction measures designed to minimize remaining risks accompanying the use of PPPs in agriculture. An EU-level additional program based on these options would have high acceptability among the Member States.

Options 5 and 6 are aimed at reducing agricultural dependency on the use of PPPs -- Option 5 through further promotion of low-input agriculture, and Option 6 through integration of environmental concerns into the Common Agricultural Policy. Insofar as these measures would promote sustainable agricultural production practices, they may represent the best long-term direction for EU action.

As this study has noted, those countries with pesticide use reduction programs have defended such programs as necessary for distilling risk reduction goals into measurable objectives, and for increasing the effectiveness of their overall programs. Because of the usefulness of such goals for mobilizing the support of farmers and the general public for environmentally sound agriculture, an EU-level pesticide use reduction program should continue to be given careful consideration. Given the variances among the Member States with regard to PPP practices, such a program would of course need to be tailored by country, by agricultural sectors and perhaps by crops.

An observable trend in EU lawmaking is to set criteria and targets for Member State action, but to then leave it to each country to determine the optimal means for achieving the common goal

at national level, *e.g.*, the Packaging Directive and the proposed Ecological Water Quality Directive. Such an approach would be in line with the principle of subsidiarity and could help to address the concerns of individual Member States regarding their own agricultural and environmental situation.

