IMPACT ASSESSMENT ON THE PROPOSED CHANGES FOR AUTHORISATION AND USE OF PESTICIDES
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Report for

The European Crop Protection Association

Submitted by

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Executive summary

The key elements of the research for this impact assessment were undertaken in the period April-August 2008. The work was undertaken by means of desk research and interviews with industry stakeholders and a sample of Competent Authorities who are currently acting as rapporteur Member States (or who are potential rapporteurs for the future) as well as those acting as rapporteurs for new active substances submitted since 2005. In addition, where appropriate, impacts were quantified using a (discounted) cash flow model to assess the overall implication for investment of PPP producers in R&D. The main conclusions of this work in respect to the key elements of the European institutions’ proposals to amend Directive 91/414/EEC and on the Thematic Strategy for Pesticides are presented below.

National Provisional Authorisations

The European Commission’s proposal for a Regulation concerning the placing of plant protection products on the market abolishes the possibility for Member States to grant provisional authorisations prior to Annex 1 inclusion of an active substance. Using a (discounted) cash flow model, it is estimated that due to the likely time lags in authorisation which will take place for a ‘typical’ active substance over a 25 year investment period, the removal of national provisional authorisations would result in a substantial adverse effect for industry and potentially for new product development in that it would result in:

- a reduction in the net present value (NPV) of the cumulative net cash flow of the investment by €22.3 million (79.8%) from €27.95 million to €5.64 million;
- the internal rate of return (IRR) falling from 12.7% to 9.1%; and,
- the payback period from product discovery increases by 4.47 years (4 years 6 months), from 17.8 years to 22.3 years.

To mitigate these effects and speed up the product authorisation process the Commission proposes that strict deadlines (25 months) for assessing active substances be introduced and that Member States start to evaluate applications for authorisation of plant protection products during the EU evaluation of the active substance. If this were to be achievable, and generally the Competent Authorities questioned on this considered that with better programming of work it could be, then the impact on time taken to placing plant protection products (PPP) on the market, and hence new product development, would not be affected. This having been said, the PPP industry takes the view that the European Commission’s timeline does not consider all the processes necessary to gain Annex I inclusion (e.g. votes in the Standing Committee, the need for national authorisation of product dossiers) and therefore ECPA estimates 51 months would need to be added from dossier submission to first sales thereby adding 22 months to the time taken for national authorisations at present. Using the (discounted) cash flow model this in turn would result in:

- a reduction in the net present value (NPV) of the cumulative net cash flow of the investment by €10.1 million (36.2%) from €27.95 million to €17.86 million;
• the internal rate of return (IRR) falling from 12.7% to 11.0%; and,
• the payback period from product discovery increases by 4.28 years (4 years 3 months), from 17.8 years to 22.1 years.

While less substantial than the effects indicated above without the inclusion of the Commission deadlines, the potentially adverse effect on new product development is nevertheless significant and in this context it is important to note that the European Parliament did not consider the Commission’s timelines to be realistic therefore proposing that the system of national provisional authorisations be maintained. This would avoid the potential risks and costs outlined above.

**Zonal authorisation**

The Commission proposal introduces a system of compulsory mutual recognition of authorisations between Member States belonging to the same geographical zone (3 geographical zones are proposed). The view of the competent authorities contacted on the issue of zonal authorisation was that this was welcome as it would reduce the variability in availability of PPPs between Member States. Most Member States considered that this measure would result in a reduction in aggregate workload for the Competent Authorities under any zonal arrangement, although it was also noted that the ‘safeguards’ allowing Member States to take extra risk mitigation measures/impose additional authorisation conditions would require extra work to provide the necessary justification.

In terms of impact on agriculture, some stakeholders considered that the introduction of zonal authorisation could potentially increase the availability of PPPs for minor uses which would be potentially beneficial for agriculture. However, as with other elements of the proposals a critical element is whether the introduction of zonal authorisation is likely to increase or decrease the period of time taken to product launch. The view taken on this by competent authorities with experience of mutual recognition was that there was no significant risk of substantial delays although it was noted that to an extent this would depend on the degree to which additional national ‘safeguards’ or risk mitigation measures were being sought. This having been said, it is evident that if the procedure were to lead to any delay in authorisation this would adversely affect the economics and attractiveness of new product development and potentially adversely affect new product development and availability of PPP. For every month delay to product launch for a ‘typical’ active substance, then the:

• NPV of the cumulative net cash flow would be reduced by €568,000 over the 25 year investment period;
• IRR would fall by 0.1%; and,
• payback period would be extended by approximately 1 month.
Comparative assessment and cut-off criteria

The European Commission’s proposal for a Regulation concerning the placing of plant protection products on the market provides tighter criteria for the approval of active substances including ‘hazard triggers’. In addition, the proposal provides new rules for the operation of a system of comparative assessment and substitution. The cut-off criteria for the approval of active substances, include toxicity ‘hazard triggers’ for: CMR category 1 and 2 substances (i.e. those that are carcinogenic, mutagenic or toxic for reproduction); substances that are considered to have endocrine disrupting properties; PBT substances (persistent, bio-accumulative or toxic); and vPvB substances (very persistent or very bio-accumulative). In its first reading, the European Parliament introduced additional ‘cut-off’ criteria, including the introduction of environmental criteria. The impact assessment reports on the findings of the UK’s Pesticides Safety Directorate’s (PSD) assessment of the potential impact of the proposed cut-off criteria and comparative assessment and substitution provisions.

The potential impact of the European Commission’s proposals on the proportion of active substances that would likely be affected is estimated at between 5% and 15% of active substances of all PPPs under the cut-off criteria and an additional 24% of the remaining substances for comparative assessment. With respect to the European Parliament’s amendments the PSD estimates that under the cut-off criteria, between 35% and 40% of active substances of all PPPs are not likely to be approved while under comparative assessment a further 71% of the remaining substances would be affected. Overall, it is estimated that up to 85% of all PPPs may be lost from the market comprising 92% of insecticides, 80% of herbicides and 91% of fungicides.

Based on the results presented and discussions with a sample of competent authorities and other industry stakeholders, there is real concern that the severity of the European Parliament’s amendments would have the effect of making agriculture as it is currently practised effectively no longer possible. It is noted that in recent years, the availability of active substances has already fallen substantially as a result of the European Commission’s review programme under Directive 91/414/EEC. In addition, ECPA points out that the European Parliament’s proposals would, inter alia greatly undermine the competitiveness of EU based agricultural production, reduce production options available to farmers and lead to increased risk of resistance to remaining products, making medium to long-term pest and disease control more difficult.

Reduction of pesticide use in no-spray buffer zones

The assessment of the economic impact of one aspect of Article 11 (reduction of pesticide use in sensitive areas) of the proposal for a Directive establishing a framework for Community action to achieve a sustainable use of pesticides specifically looks at the issue of the reduction of pesticide use in no-spray buffer zones close to areas used by the public and particularly sensitive populations including parks, sportsgrounds, schools, etc. The impact is measured by estimating the area of agricultural land likely to be affected. Given that statistics on the area or length of field boundaries adjacent to such populations are not readily available, the current study draws on a study carried out for the UK’s Royal Commission on Environmental Pollution on the risk to bystanders from spray
drift from arable land and orchards. Estimates are presented which suggest that the introduction of a 10 metres wide no-spray buffer zone would affect 339,863 ha of agricultural land throughout the EU-27, equivalent to 0.19% of total UAA and 0.25% of UAA on which pesticides are commonly used (i.e. areas used for arable and horticultural production (including set-aside) and grassland). The introduction of a wider no-spray buffer zone of 50 metres would affect a total of 1,699,313 ha of agricultural land, equivalent to 0.93% of total UAA and 1.32% of UAA on which pesticides are commonly used. It is noted that the cost of introducing no-spray buffer zones is likely to have a discriminate impact at the individual farm level depending on location, production type and gross margins; and will be relatively lower for livestock producers than for arable and horticultural enterprises. It is also noted that there may be potential to mitigate some of the costs involved for farmers, by using such uncropped areas as set-aside or as part of cross compliance requirements or other agri-environment schemes, which in part compensate farmers for any negative impact on production.

Reduction of pesticide use in sensitive areas: Natura 2000

The assessment of the economic impact of a further aspect of Article 11 (reduction of pesticide use in sensitive areas) of the proposal for a Directive establishing a framework for Community action to achieve a sustainable use of pesticides specifically looks at the issue of the reduction of pesticide use in Natura 2000 areas. The assessment is undertaken by quantifying the impact of prohibiting or strongly restricting the use of pesticides in special conservation areas on the area of agricultural land that would be affected. The study reviews the results of research carried out on behalf of the European Commission (DG ENV) by the Beratungsgesellschaft für integrierte Problemlösungen (BiPRO) to assess the economic impacts of specific measures of the Thematic Strategy on the Sustainable Use of Pesticides. This study suggested that pesticides were used for crop protection on 10-14% (7-10 million hectares) of the EU-15’s total Natura 2000 area, equivalent to 20% of the EU-15’s crop production area.

However, these findings overestimate the area and volume to which pesticides are likely to be used in Natura 2000 areas. Our analysis suggests that the extent to which pesticides could be restricted in special conservation areas would be much less than previously suggested by the BiPRO study undertaken for the European Commission. While it is agreed that only approximately 12% of the overall EU Natura 2000 areas pesticides are likely to be used; these areas are likely to account for just 6.3% of arable cropped land (including set-aside) and only 3.8% of utilised agricultural area. Furthermore, pesticide use in these Natura 2000 areas is likely to be much lower due to restrictions. The extent to which any further restrictions could be implemented would depend on the extent to which pesticides are seen as promoting biodiversity as it is acknowledged that pesticides can have a positive role in meeting environmental objectives.

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1. Introduction

1.1. Background

In July 2006, the European Commission published three proposals which will cover the authorisation
and use of pesticides under the Thematic Strategy for the Sustainable Use of Pesticides. These
proposals include: the replacement of Directive 91/414/EEC with a new Regulation covering the
authorization of pesticides; a new Framework Directive on the Sustainable Use of Pesticides; and a
new Statistics Regulation.

In October 2007, the European Parliament completed its 1st reading on both the new Regulation to
replace Directive 91/414 and the new Framework Directive in the plenary session where all MEPs
voted on amendments to the European Commission’s proposed text. The European Parliament’s
2nd reading for both the new Regulation and the Framework Directive is due to take place in the
final quarter of 2008.

1.2. Objectives

The objective of this report is to provide an economic impact assessment of the European
Parliament’s amendments to the European Commission’s proposals. Specifically, this report focuses
on assessing the impact of aspects of: national provisions authorisation of PPPs containing new active
substances; mutual recognition and zonal authorisation; cut-off criteria and comparative assessment;
and, the reduction of pesticide use in sensitive areas.

1.3. Structure of the report

The report is structured in two parts. Part A provides an impact assessment of the European
Commission proposal to replace Directive 91/414/EEC together with the European Parliament’s
amendments, focusing on the impact of national provisional authorisations (Section 2), zonal
authorisation (Section 3) and cut-off criteria and comparative assessment (Section 4).

Part B provides an impact assessment of the European Commission’s proposal for a Directive on the
sustainable use of pesticides together with the European Parliament’s amendments, focusing on the
reduction of pesticide use in sensitive areas, namely no spray buffer zones around residential areas
(Section 5) and in special conservation areas (Natura 2000 areas) (Section 6).
2. National provisional authorisations

2.1. Introduction

The European Commission’s proposal for a Regulation concerning the placing of plant protection products on the market abolishes the possibility for Member States to grant provisional authorisations prior to Annex 1 inclusion of an active substance. The aim of this Section is to assess the economic impact of removing the current system of national provisional authorisations on the speed to approval for new products and product availability.

2.2. Background

When Directive 91/414/EEC was adopted, it was recognised that the Community evaluation process for new active substances was both lengthy and complex. To facilitate the evaluation process and minimise the time taken to launch pesticides containing new active substances onto the market, a system of national provisional authorisation was introduced. Provisional authorisations for new active substances can currently be granted by individual Member States in advance of a Community decision on whether the active substance should be included in Annex I to Directive 91/414/EEC (i.e. the time at which the active substance has secured Community-wide approval). In essence, the current legislation allows national provisional authorisation to be granted once a Member State has concluded that the active substance can be expected to satisfy the Community conditions.

2.3. Legislative proposals

The European Commission’s proposal for a Regulation concerning the placing of plant protection products on the market abolishes the possibility for Member States to grant provisional authorisations prior to Annex I inclusion of an active substance. The proposal notes that strict deadlines introduced for assessing an active substance will substantially reduce the period for decision making to 25 months, which will compensate for the abolition of national provisional authorisations.

In its first reading, the European Parliament voted to maintain a system of national provisional authorisations, and introduced Article 49 (a) which allows Member States to grant national provisional authorisations for up to 3 years if the EU evaluation of a new active substance has not been completed within 2.5 years for technical reasons. In reaching this decision, the European Parliament noted that experience to date with Directive 91/414/EEC suggests that the European Commission’s assumption that Annex I inclusion of an active substance can be achieved within 25 months is unrealistic (Table 2.1).

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Table 2.1: Article 49 (a) [NEW] of the proposal for a Regulation concerning the placing of plant protection products on the market

<table>
<thead>
<tr>
<th>Text proposed by the Commission</th>
<th>First Reading Amendment by Parliament</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notwithstanding the provisions of Article 28, a Member State acting with the aim of facilitating the access of users to new plant protection products may authorise the marketing of a plant protection product for a period of not more than three years if, for technical reasons, two and a half years after submission of the application pursuant to Article 7(1) no decision has yet been made on the active substance and there is no indication that the active substance or the plant product may be harmful.</td>
<td></td>
</tr>
</tbody>
</table>


2.4. Impact assessment

2.4.1. Methodology

To assess the economic impact of removing the current system of national provisional authorisations on the speed to approval for new products and product availability, discussions were held with industry stakeholders and a sample of Competent Authorities who are currently acting as rapporteur Member States (or who are potential rapporteurs for the future) as well as those acting as rapporteurs for new active substances submitted since 2005. In addition, these impacts were quantified using a (discounted) cash flow model\(^3\) to assess the overall implication for investment of PPP producers in R&D.

2.4.2. Impact on agriculture

Since the adoption of Directive 91/414/EEC, the system of national provisional authorisations has become the standard practice for placing new PPPs containing new active substances on the market. This has been particularly so in those Member States which have large crop protection markets and/or potential for the sale of certain PPPs. With national provisional authorisation, it is common for PPPs containing new active substances to gain Annex 1 inclusion within 23 months (from submission of the Dossier) with first sales achieved 6 months later at 29 months\(^4\).

In contrast, where national provisional authorisations are not sought for PPPs containing new active substances (e.g. in Member States having relatively small crop protection markets and/or where the potential for the sale of certain PPPs is relatively low), Annex 1 inclusion is delayed significantly. According to ECPA\(^5\), without national provisional authorisations the Community evaluation process

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\(^5\) Ibid, p.3.
takes on average 60 months for PPPs containing new active substances to gain Annex I inclusion (from submission of the Dossier). First sales are achieved some 12 months later, at 72 months, after national authorisation for the product is achieved. Thus, the current system of national provisional authorisations allows PPPs to be marketed on average 43 months earlier than would otherwise be the case without national provisional authorisations.

Based on the above assumptions, the impact of removing the current system of national provisional authorisations, without any change to the current time it takes to achieve first sales on the market without national provisional authorisations, is summarised in Table 2.2 and presented graphically in Figure 2.1. In essence, for a ‘typical’ active substance over a 25 year investment period, the removal of national provisional authorisations would result in:

- a reduction in the net present value (NPV) of the cumulative net cash flow of the investment by €22.3 million (79.8%) from €27.95 million to €5.64 million;
- the internal rate of return (IRR) falling from 12.7% to 9.1%; and,
- the payback period from product discovery increases by 4.47 years (4 years 6 months), from 17.8 years to 22.3 years.

**Table 2.2: Status quo compared to a system without national provisional authorisations – discounted at 8%**

<table>
<thead>
<tr>
<th></th>
<th>Status quo with national provisional authorisations</th>
<th>Without national provisional authorisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV (€ million)</td>
<td>€27.95</td>
<td>€5.64</td>
</tr>
<tr>
<td>IRR (%)</td>
<td>12.7%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Payback period (years from product discovery)</td>
<td>17.79</td>
<td>22.26</td>
</tr>
<tr>
<td>Payback period (years from product launch under status quo)</td>
<td>7.79</td>
<td>12.26</td>
</tr>
</tbody>
</table>

Source: Agra CEAS
Under this scenario, the economics and attractiveness of new product (active substance) development is significantly adversely affected. Furthermore, the results are highly sensitive to the average peak sales level; for those active substances that generally have a lower average peak sales value such as those active substances that are specifically targeted at niche markets (e.g. fruit and vegetables), it is likely that the economics and attractiveness of research and development will be seriously affected. This could lead to R&D based companies becoming more selective when deciding which active substances to develop.

To speed up the product authorisation process the European Commission has introduced strict deadlines for assessing active substances and Member States must start to evaluate applications for authorisation of plant protection products during the EU evaluation of the active substance\(^4\). These changes are designed to substantially reduce the period for decision making, thereby compensating the industry for the abolition of provisional authorisations. The European Commission believes that active substances could potentially be included in Annex I within 25 months based on the proposed timelines set out in Table 2.3; as discussed above, without national provisional authorisations new active substances take on average 60 months to gain Annex I inclusion.

Table 2.3: European Commission’s proposed timelines for Annex I inclusion

<table>
<thead>
<tr>
<th>Process</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dossier acceptability</td>
<td>1</td>
</tr>
<tr>
<td>Evaluation by the rapporteur Member State</td>
<td>12</td>
</tr>
<tr>
<td>Peer review by the European Food Safety Authority</td>
<td>6</td>
</tr>
<tr>
<td>European Commission review report submitted</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>


Discussions held with a number of Competent Authorities agree that the European Commission’s proposed timelines are achievable. That said, the Competent Authorities noted that in practice these timings have not been achieved for a variety of reasons, with the most often cited reason being the fact that the European Food Safety Authority (EFSA) has been ‘pre-occupied’ with the review of existing active substances under Directive 91/414/EEC and therefore working on new actives has been a lower priority. The Competent Authorities believe that better work programming is therefore required if the 25 month timeline is to be achieved.

If these timelines are respected, the general view is that PPPs containing new active substances will be able to gain Annex I inclusion in line with the current time it takes with national provisional authorisations. In addition to the benefits of eliminating the duplication of administrative efforts between competent authorities and applicants, the economics and attractiveness of new product development should therefore remain unaffected.

However, ECPA argues that the European Commission’s timeline does not consider all the processes necessary to gain Annex I inclusion, such as the time required for the vote in the Standing Committee and the time required for publication and entry into force of the Annex I inclusion decision. ECPA estimate that this would add a further 11 months to the European Commission’s proposed timeline, totalling 36 months to Annex I inclusion. Having achieved Annex I inclusion, ECPA note that in the absence of national provisional authorisations, national authorisation of product dossiers will be required before the product can be marketed at the Member State level; ECPA estimate that this would add an additional 12 months to the timeline plus a further 3 months to actually place the product on the market. This would suggest that it is likely to take 36 months for a PPP containing a new active substance to gain Annex I inclusion and 51 months to place a product on the market (Table 2.4). Furthermore, some of the Competent Authorities interviewed suggested that the maximum residue limit (MRL) review programme could affect the timeline further.
Table 2.4: Proposed and expected timelines for Annex I inclusion and first sales (i.e. without a system of national provisional authorisations)

<table>
<thead>
<tr>
<th>Stage of Authorisation</th>
<th>European Commission</th>
<th>ECPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dossier acceptability</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Evaluation by the rapporteur Member State</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Peer review by the European Food Safety Authority</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>European Commission review report submitted</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
<td><strong>25</strong></td>
</tr>
<tr>
<td>Standing Committee vote</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Publication and entry into force of Annex I</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><strong>Total – Dossier submission to Annex I inclusion</strong></td>
<td><strong>36</strong></td>
<td></td>
</tr>
<tr>
<td>Authorisation of the product at the Member State level</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Placing on the market</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total – Dossier submission to first sales</strong></td>
<td><strong>51</strong></td>
<td></td>
</tr>
</tbody>
</table>


If national provisional authorisations are abolished and replaced with an authorisation procedure that results in a PPP containing a new active substance to be placed on the market in 51 months, then first sales would be achieved some 22 months later than would otherwise be the case with the current system of national provisional authorisations. Based on these timelines, the impact of replacing the current system of national provisional authorisations is summarised in Table 2.5 and presented graphically in Figure 2.2. In essence, for a 'typical' active substance over a 25 year investment period, the removal of national provisional authorisations would result in:

- a reduction in the net present value (NPV) of the cumulative net cash flow of the investment by €10.1 million (36.2%) from €27.95 million to €17.86 million;
- the internal rate of return (IRR) falling from 12.7% to 11.0%; and,
- the payback period from product discovery increases by 4.28 years (4 years 3 months), from 17.8 years to 22.1 years.

Table 2.5: Status quo compared to a system without national provisional authorisations which respects the timelines set out in Table 2.4 – discounted at 8%

<table>
<thead>
<tr>
<th></th>
<th>Status quo with national provisional authorisations</th>
<th>Without national provisional authorisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV (€ million)</td>
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<tr>
<td>IRR (%)</td>
<td>12.7%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Payback period (years from product discovery)</td>
<td>17.79</td>
<td>22.07</td>
</tr>
<tr>
<td>Payback period (years from product launch under status quo)</td>
<td>7.79</td>
<td>10.07</td>
</tr>
</tbody>
</table>

Source: Agra CEAS
Under this scenario, the economics and attractiveness of new product (active substance) development is affected to a lesser degree compared to the current evaluation system when national provisional authorisations are not used. Nevertheless, it still has a sizeable impact on the time to market and therefore on the length of time that an active substance can be sold during its patented life. The previous analysis has demonstrated that any delay in delivering an authorisation would result in delayed sales and reduced profitability. Therefore, any policy proposal that impacts on the time to market a PPP has a twofold effect in terms of profitability and competition; any delay to the placing of a PPP with a new active substance on the market will likely decrease the attractiveness of future investments in PPPs in terms of reduced patent protection and the investments’ expected NPV/IRR. This could have implications for the future innovation and availability of PPPs.

The European Commission’s proposal to replace national provisional authorisations by a streamlined Community evaluation system could, in principle, alleviate these disadvantages, provided that the European Commission’s timelines are achieved. While the Competent Authorities believe that they are achievable, the European Parliament suggests that they are unrealistic given the experience to date with Directive 91/414/EEC. Recognising that provisional national authorisations allow users to

7 on a net present value (NPV) basis.
have early access to innovative and more environmentally friendly plant protection products, the European Parliament has effectively proposed to maintain a system of national provisional authorisation, albeit time triggered. If adopted the EP proposal goes some way to alleviate the aforementioned disadvantages.
3. Zonal authorisation

3.1. Introduction

The European Commission’s proposal for a Regulation concerning the placing of plant protection products on the market introduces a system of compulsory mutual recognition of authorisations between Member States belonging to the same geographical zone. The aim of this Section is to assess the economic impact of zonal authorisation on product availability and administrative burden.

3.2. Background

The current system of authorising plant protection products under Directive 91/414/EEC is based around each Member State issuing authorisations for individual products after they have been included in Annex 1. In addition, Article 10 of Directive 91/414/EEC contains an optional provision for Member States to mutually recognise PPP authorisations from other Member States. Most Member States agree that the application of mutual recognition would save resources at the national level and speed up the authorisation procedures.

3.3. Legislative proposals

To increase co-ordination and work sharing within the product evaluation process, the European Commission’s proposal for a Regulation concerning the placing of plant protection products on the market introduces a system of compulsory mutual recognition of authorisations between Member States belonging to the same geographical zone. Three zones have been proposed, comprising Member States with similar agricultural and climatic conditions:

- North zone: Denmark, Estonia, Latvia, Lithuania, Finland, Sweden;
- Centre zone: Austria, Belgium, Czech Republic, Germany, Hungary, Ireland, Luxemburg, Netherlands, Poland, Slovakia, Slovenia, United Kingdom; and,
- South zone: Cyprus, France, Greece, Italy, Malta, Portugal, Spain.

In its first reading, the European Parliament rejected zonal authorisation, and proposed that authorisation remain at the Member State level.

3.4. Impact assessment

3.4.1. Methodology

To assess the impact of the introduction of a zonal authorisation procedure, interviews were conducted with a selection of national Competent Authorities, farmers’ organisations and the crop protection industry. A review of relevant literature on this subject was also undertaken.

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3.4.2. Impact on agriculture

The view of the majority of Competent Authorities interviewed on the issue of zonal authorisation was that this proposal was welcome as it would reduce the variability in availability of PPPs between Member States as well as leading to a raising of the harmonised standard. Particularly for those Member States with relatively small PPP markets, this could have a significant impact on the availability of PPPs than is currently the case. It was noted that the availability of PPPs in different Member State markets within the same theoretical zone are not currently homogenous; larger Member State markets tend to have a higher number of PPP authorised. Having said that, harmonisation across Member States is less of an issue than it once was as a consequence of the re-registration process under Directive 91/414/EEC. However, some Member States noted that they may not be keen on being forced to accept certain pesticide.

The introduction of zonal authorisation could potentially increase the availability of PPPs for minor uses especially in smaller markets which may not be currently served well. However, the degree to which this occurs will depend on the extent to which the crop protection industry makes use of the mutual recognition procedure. Assuming it is more extensively used, farmers regard the potentially increased availability of PPPs for minor uses beneficial in terms of being able to cultivate minor crops. Greater availability of PPPs in some areas could at least in theory also lead to increased competition and possibly lower product prices.

While the zonal concept was generally welcomed, doubts were expressed as to whether the proposed compulsory three zone system was optimal. Some expressed concern that this rigid zone approach is contradictory to the principles of Good Agricultural Practice, food safety and the protection of the environment and nature. This is because Member States in the same zone have a diverse range of different geographical, climatic, environmental and agricultural conditions; it is considered impossible to realise a uniform system and practice of food safety, environmental risk assessment and Good Agricultural Practice. Given these assumptions and uncertainties, ECPA believes that the impact of such proposals if adopted should be subject to review after a period of implementation. For these reasons, a number of Competent Authorities noted their preference for a flexible zonal system.

As with other elements of the European Commission’s proposals, a critical element of zonal authorisation is whether the introduction of zones is likely to increase or decrease the period of time taken to product launch as this in turn affects the return on investment from new product development. The view taken on this by the Competent Authorities interviewed that had experience of mutual recognition was that there was no significant risk of substantial delays. That said, it was noted that to an extent this would depend on the degree to which additional national ‘safeguards’ or risk mitigation measures were being sought. Member States which had little or no experience of mutual recognition were unable to provide a firm view on this issue. This having been said, it is evident that if the procedure were to lead to any delay in authorisation this would adversely
affect the economics and attractiveness of new (active substance) product development and thus potentially adversely affect the availability of PPPs on the market.

Figure 3.1 quantifies the impact of a delay in the date of product launch on the attractiveness of new product development. In essence, for every month delay to product launch for a ‘typical’ active substance, then under the assumptions of the model regression analysis found that:

- The NPV of the cumulative net cash flow would be reduced by €568,000 over the 25 year investment period;
- IRR would fall by 0.1%; and,
- Payback period would be extended by approximately 1 month.

![Figure 3.1: Impact on the cumulative discounted net cash flow of a 'typical' new active substance (baseline scenario - 4% discount rate) of a delay in the date of product launch](source: Agra CEAS)

**3.4.3. Impact on administrative burden**

Most Member State authorities considered that this measure would result in a reduction in aggregate workload for the Competent Authorities under any zonal arrangement in the medium to long-term and hence a reduction in the aggregate cost of registration. That said, in the short to medium term, some Member States took the view that in the first years after the system was introduced there would possibly be an initial increase in workload. It was also noted that the ‘safeguards’, allowing Member States to take extra risk mitigation measures/impose additional authorisation conditions if
they deem these necessary in particular national circumstances (e.g. to protect groundwater), would require extra work to provide the necessary justification.

The Competent Authorities interviewed welcome the initiative to increase co-ordination and work sharing within the product authorisation process. It was noted that they are already to an extent sharing work, typically in the form of bilateral agreements, but agree that further co-ordination is needed (probably under EFSA auspices) to achieve ‘harmonised approaches to risk assessment’ (i.e. parameters on this between Member States) and ensure the efficient flow of information between Member States. However, there were some Competent Authorities that while agreeing with the need for increased co-ordination, work sharing and cooperation in the process of authorisation among Member States, expressed doubt as to whether the proposed form of a strict zonal system would provide the optimal solution.
4. Cut-off criteria and comparative assessment

The European Commission’s proposal for a Regulation concerning the placing of plant protection products on the market provides tighter criteria for the approval of active substances including ‘hazard triggers’. In addition, the proposal provides new rules for the operation of a system of comparative assessment and substitution.

The aim of this Section is to assess the economic impact of moving from a ‘risk based’ to a ‘hazard’ based authorisation system (i.e. cut-off criteria) and to a system whereby certain products will be removed from the market if it is perceived that other products pose a lower risk (i.e. comparative assessment and substitution) on the number of products likely to be affected. In addition, the likely administrative burden of comparative assessment and substitution is assessed.

4.1. Background

In addition to the positive effects that plant protection products have for agriculture and society in general, PPPs can also have non-beneficial effects. Most pesticides are hazardous by design as their function is to control pests and diseases. Thus, their use may involve risks for humans, animals and the environment, especially if placed on the market without having been officially tested and authorised and if incorrectly used\(^\text{10}\).

Harmonised rules already exist under Directive 91/414/EEC on the placing on the market of plant protection products which limit the risks to humans, animals and the environment. An active substance can be approved if it can be demonstrated during the evaluation procedure that a specific use does not have a harmful effect on human or animal health or any unacceptable influence on the environment. That said, an approval of an active substance does not mean that the active substance is without risk to human and animal health or the environment\(^\text{11}\).

In addition, under Directive 91/414/EEC there is no attempt to compare active substances or products to determine whether one is safer than the other; certain products would then be removed from the market if it is perceived that other products pose a lower risk. Measures designed to encourage comparative assessment and substitution are used in regimes for biocides and to some extent general chemicals, which in the case of REACH take into account the economic and technical viability of alternatives.

4.2. Legislative proposals

Based on its objective of minimising the hazards and risks from the use of pesticides to human and animal health and the environment, the European Commission’s proposal for a Regulation concerning

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the placing of plant protection products on the market introduces cut-off criteria for the approval of active substances, including toxicity 'hazard triggers' for: CMR category 1 or 2 substances (i.e. those that are carcinogenic, mutagenic or toxic for reproduction); substances that are considered to have endocrine disrupting properties; PBT substances (persistent, bio-accumulative or toxic); and vPvB substances (very persistent or very bio-accumulative). This means that if the active substance has a particular property which triggers the cut-off criteria (e.g. they are carcinogenic or an endocrine disruptor), then the active substance will be banned regardless of the risk.

In its first reading, the European Parliament introduced additional ‘cut-off’ criteria', including the introduction of environmental criteria. These additional criteria included: no substances considered to cause a risk of developmental neurotoxic or immunotoxic properties; changes to the POP criteria and taking each of the criteria separately rather than together as in the Commission proposal; inclusion of C and M category 3 substances as a reason to classify substances as T in the PBT criteria; hazard quotient for bees not higher than 50; and no substances on the priority list for water in Directive 2000/60/EC.

In addition, the European Commission's proposal for a Regulation concerning the placing of plant protection products on the market provides rules for the operation of a system of comparative assessment and substitution. Under this proposal, Member states are required to perform a comparative assessment before authorising a product containing an active substance. The proposal includes certain criteria for identifying active substances as 'candidates for substitution', namely: meeting one criterion to be a PBT; prone to leaching to groundwater; and, having potentially endocrine disrupting, neurotoxic or immunotoxic properties. Active substances meeting these criteria will be identified as 'candidates for substitution' and substituted for alternative products when: the uses of particular products coincide; one product presents a significantly higher risk than another; and there is no case for retaining more than one product to prevent the emergence of resistance. In its first reading, the European Parliament extended the scope of this to cover all PPPs and that candidates for substitution be approved once only for a period of five years.

4.3. Impact assessment

4.3.1. Methodology

To assess the economic impact of the proposed cut-off criteria and comparative assessment and substitution provisions on the number of active substances affected and administrative burden, discussions were held with industry stakeholders and a sample of Competent Authorities.

Based on these discussions and a review of the relevant literature, the reported impact of the proposed cut-off criteria and comparative assessment provisions were found to vary significantly\(^\text{12}\). These differences depended on inter alia: the sample size (i.e. the number of active substances

\(^{12}\) See for example the respective conclusions of ECPA and the European Commission presented at the ECPA Regulatory Conference held in Cyprus in October 2006.
analysed); the extent to which already established classification, rather than potential for classification, has been applied; whether it was the European Commission’s proposals that were being assessed or the European Parliament’s amendments; and whether the impact assessment included both the impact of the proposed cut-off criteria and comparative assessment provisions.

This impact assessment reports on the findings of the UK’s Pesticides Safety Directorate’s\textsuperscript{13} assessment of the potential impact of the proposed cut-off criteria and comparative assessment and substitution provisions. In total, the PSD examined 286 active substances included in Annex I to Directive 91/414/EEC as well as existing active substances currently being reviewed under the Directive (including those that are to be withdrawn voluntarily under Commission Regulation 1095/2007)\textsuperscript{14} to identify the likely number of active substances that would be affected.

### 4.3.2. Impact on agriculture

The potential impact of the European Commission’s proposals on the proportion of active substances that would likely be affected in the UK, by way of example, is shown in Table 4.1. For cut-off criteria, between 5% and 15% of active substances of all PPPs are not likely to be approved, with fungicides likely to be more severely affected (8-32%) than insecticides (6-10%) and herbicides (4-10%). Of those active substances remaining, it is likely that 24% of them would be affected by comparative assessment and substitution, with the remaining insecticides more severely affected (38%) than fungicides (20%) and herbicides (24%).

Table 4.2 presents the potential impact of the European Parliament’s amendments to the European Commission’s proposals on the proportion of active substances that would likely be affected in the UK. For cut-off criteria, between 35% and 40% of active substances of all PPPs are not likely to be approved, with insecticides likely to be more severely affected (65%) than fungicides (31-43%) and herbicides (25-40%). Of those active substances remaining, it is likely that 71% of them would be affected by comparative assessment and substitution, with the remaining herbicides more severely affected (86%) than fungicides (64%) and insecticides (77%).


\textsuperscript{14} A number of active substances were excluded from the analysis, including: active substances which are likely not to be included in Annex I and may be withdrawn immediately, as a result of the procedure in Commission Regulation 1095/2007; substances on list 4 of the review programme (these include microorganisms, plant and animal extracts, attractants and repellents, rodenticides and commodity substances); and, new active substances not yet included in Annex I.
Table 4.1: Impact of the European Commission’s proposals for cut-off criteria and comparative assessment

<table>
<thead>
<tr>
<th></th>
<th>Cut-off criteria</th>
<th>Comparative assessment and substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insecticides</td>
<td>6-10%</td>
<td>38%</td>
</tr>
<tr>
<td>Fungicides</td>
<td>8-32%</td>
<td>20%</td>
</tr>
<tr>
<td>Herbicides</td>
<td>4-10%</td>
<td>24%</td>
</tr>
<tr>
<td>Total PPPs</td>
<td>5-15%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Notes:  
1 the higher figure includes possible endocrine disruptors;  
2 candidates for substitution expressed as a percentage of what remains assuming lower figure for losses through non-approval  

Table 4.2: Impact of the European Parliament’s amendments for cut-off criteria and comparative assessment

<table>
<thead>
<tr>
<th></th>
<th>Cut-off criteria</th>
<th>Comparative assessment and substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insecticides</td>
<td>65%</td>
<td>77%</td>
</tr>
<tr>
<td>Fungicides</td>
<td>31-43%</td>
<td>64%</td>
</tr>
<tr>
<td>Herbicides</td>
<td>25-31%</td>
<td>86%</td>
</tr>
<tr>
<td>Total PPPs</td>
<td>35-40%</td>
<td>71%</td>
</tr>
</tbody>
</table>

Notes:  
1 the higher figure includes possible endocrine disruptors;  
2 candidates for substitution expressed as a percentage of what remains assuming lower figure for losses through non-approval  

Based on the findings of the Pesticide Safety Directorate (Table 4.1 and Table 4.2), both the European Commission’s proposals and the European Parliament’s amendments are expected to have a massive impact on the proportion of PPPs remaining on the market. Of particular significance is the extent to which the European Parliament’s amendments are expected to raise considerably the proportion of active substances affected.

The combined impact of the European Commission proposals, and the European Parliament’s amendments, on the cut-off criteria and comparative assessment and substitution are presented in Table 4.1. Overall, it is estimated that up to 85% of all PPPs may be lost from the market:

- **Insecticides**. The results suggest that up to 92% of PPPs could be lost. These would include all pyrethroids, organophosphates and carbamates as well as most neonicitinoids. For example:
  - The loss of organophosphates would cause a major problem for Brassica growers as there would be no suitable alternative to control Cabbage Root Fly resulting in crop
failure. Similar problems would arise in the case of Carrot Fly which is the major pest for both carrots and parsnips.\textsuperscript{15}

- **Fungicides.** The results suggest that up to 80\% of PPPs could be lost. These would include all the triazoles, dithiocarbamates and chlorothalonil and a number of strobilurins. For example:
  
  o The main PPPs used for disease control in cereals and oil seed rape have triazole compounds (possible endocrine disruptors) as their active ingredient. Triazoles are essential for the control of, for example, septoria in wheat and Rhynchosporium in barley. Yields responses from the alternative chlorothalonil are approximately 30\% of that obtained for triazoles in winter wheat and the use of alternative control products will likely impair quality.\textsuperscript{16}

- **Herbicides.** The results suggest that up to 91\% of PPPs could be lost. These would include all dinitroanilines and pyridines and many FOPs would be at risk. For example:
  
  o The loss of linuron, metribuzin, fluazifop and propaquizafop would greatly reduce weed control options open to carrot and parsnip growers.\textsuperscript{17} The Pesticide Safety Directorate\textsuperscript{18} goes as far as stating that there would be effectively no herbicide options for the control of weeds in horticultural crops; in addition, chemical control of black-grass in cereals would become virtually impossible.

### Table 4.3: Overall impact of the European Commission’s proposals and the European Parliament’s amendments for cut-off criteria and comparative assessment

<table>
<thead>
<tr>
<th>Number of active substances affected (%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Insecticides</td>
<td>92%</td>
</tr>
<tr>
<td>Fungicides</td>
<td>80%</td>
</tr>
<tr>
<td>Herbicides</td>
<td>91%</td>
</tr>
<tr>
<td>Total PPPs (excluding micro-organisms)</td>
<td>82% (85%)</td>
</tr>
</tbody>
</table>

Notes: \textsuperscript{1} the higher figure includes possible endocrine disruptors; \textsuperscript{2} candidates for substitution expressed as a percentage of what remains assuming lower figure for losses through non-approval


The extent of the potential loss of active substances from the proposed cut-off criteria and comparative assessment and substitution, particularly resulting from the European Parliament’s amendments, will have a significant impact on the availability of PPPs. Based on the results presented

\textsuperscript{15} Teagasc (2008). Proposed change to agrochemical regulation will wipe out Irish crop protection. Briefing Document for Minister.

\textsuperscript{16} Ibid

\textsuperscript{17} Ibid.

and discussions with a sample of competent authorities and other industry stakeholders, there is real concern that the severity of the European Parliament’s amendments would have the effect of making agriculture as it is currently practised effectively no longer possible. In recent years, the availability of active substances has already fallen substantially as a result of the European Commission’s review programme under Directive 91/414/EEC. ECPA\(^{19}\) notes that these additional and substantial losses will lead to:

- substantial yield reductions;
- fewer pest and disease control options which will make it difficult for farmers to meet retailers’ and processors’ quality expectations;
- tougher conditions for farmers to implement Good Agricultural Practice, which play an essential role in Integrated Pest Management and quality assurance schemes;
- increased risk of resistance to remaining products, making medium to long-term pest and disease control more difficult;
- increased risk of the illegal import of pesticides which do not meet the safety criteria applied to authorised pesticides which can actually damage healthy crops; and,
- increased imports of food from outside the EU as retailers seek top quality produce to meet customer expectations.

However, the European Parliament believes that the potential loss of active substances from the proposed cut-off criteria and comparative assessment and substitution, and its subsequent impact on agriculture, would not be as severe as suggested by some industry estimates. We would note that ultimately the extent to which active substances are removed from the market is a matter of how the cut-off and candidates for substitution criteria are interpreted.

### 4.3.3. Impact on administrative burden

In addition to the significant loss of PPPs from the market, there is concern that the introduction of comparative assessment will increase administrative burden. Whether there will be an increase in administrative burden and the extent to which this is ‘manageable’ clearly depends on the percentage of active substances subjected to such an assessment and what timeframe would be applied for such an assessment. A majority of Competent Authorities contacted indicated that assuming there is a 10 year approval period and if more than 10% of active substances were going to be subjected to comparative assessment, the workload expected would require additional resources. In contrast, a minority of Competent Authorities contacted indicated that up to 20% of active substances and a 10 year approval period would be ‘manageable’ in terms of resources. This contrasting view is likely to reflect the differing administrative capacities and perspectives on future workloads in relation to Directive 91/414/EEC amongst Member States.

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Overall the responses suggest that if a higher percentage of active substances were going to be subject to comparative assessment, this would generally be seen as increasing the administrative burden. Based on the results presented in Table 4.1 and Table 4.2, the administrative burden of both the European Commission’s proposals and the European Parliament’s amendments are likely to increase the level of administration burden, with the European Parliament’s amendments resulting in a significant increase.
5. Reduction of pesticide use in sensitive areas: no-spray buffer zones

5.1. Introduction

This Section assesses the economic impact of the European Parliament’s amendment to Article 11(a) (reduction of pesticide use in sensitive areas) of the proposal for a Directive establishing a framework for Community action to achieve a sustainable use of pesticides. Specifically, the aim of this Section is to quantify the impact of introducing no-spray (buffer) zones next to residential areas on the area of agricultural land that would be affected.

5.2. Background

The risk posed to people living in the countryside from pesticide spray drift is assessed as an integral part of the pesticide approvals process; the authorisation of pesticides under the European Directive 91/414/EEC requires a risk assessment of exposure to bystanders under the proposed conditions of use. The risk assessment assumes bystanders are exposed at the same daily level for three months, which is far greater than those living next door to a treated field would actually experience; the UK’s Advisory Committee on Pesticides has considered exposure of residents to sprays during the cropping season from nearby fields, and concluded that the current approach is protective of long-term bystander exposure. Furthermore, specific conditions of use for individual pesticide products are supplemented by guidance on best practice.

Although the regulative scientific advice is that the risk assessment currently used provides adequate protection to bystanders, there is a competing body of research linking community exposure to agricultural pesticides and a range of health impacts. Consequently, some people are extremely concerned about their potential exposure to pesticides, either because they occupy properties adjacent to farmland or because they have (or have had) access to such land, for example when using footpaths.

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20 The risk assessment takes into account various factors such as: wind direction and strength; mode of application; rate of spray volume; droplet size and uniformity; speed of sprayer vehicles used; and the width of sprayer mechanisms.
21 A bystander is a person who is located within or adjacent to an area where pesticides are being applied or has just been applied, but whose presence is quite incidental and unrelated to the application of the pesticide (Matthews and Hamey, 2003).
23 Ibid, p211.
5.3. Legislative proposals

According to the European Commission\(^{27}\), the risk to the general public from exposure to pesticides in places such as public parks, sports grounds or children’s playgrounds are high. Consequently, Article 11(a) of the European Commission’s proposal suggests that the use of pesticides in areas used by the general public, such as parks or playgrounds, should be prohibited or restricted to the minimum necessary (Table 5.1). In its first reading, the European Parliament proposed that the list of areas in which pesticides should be prohibited or restricted should include all areas used by the general public, including residential areas. Furthermore, the European Parliament suggested that ‘substantial’ no-spray zones be introduced around these areas. Although no reference was made to the size of these no-spray zones, the European Parliament noted in its justification that no-spray zones in the USA can be as large as 2.5 miles around schools.

Table 5.1: Article 11 (a) of the proposal for a Directive establishing a framework for Community action to achieve a sustainable use of pesticides

<table>
<thead>
<tr>
<th>Text proposed by the Commission</th>
<th>First Reading Amendment by Parliament</th>
</tr>
</thead>
<tbody>
<tr>
<td>the use of pesticides shall be prohibited or restricted to the minimum necessary in areas used by the general public or by sensitive population, at least in parks, public gardens, sports grounds, school grounds and playgrounds</td>
<td>the use of pesticides shall be prohibited in all areas used by the general public or by sensitive population, at least in residential areas, parks, public gardens, sports and recreation grounds, school grounds and playgrounds and in the vicinity of public healthcare facilities (clinics, hospitals, rehabilitation centres, health resorts, hospices), as well as in substantial no-spray zones including in fields around these areas, particularly, although not exclusively, to protect sensitive groups such as babies, children, pregnant women, the elderly and those with pre-existing medical conditions and who may be taking medication. In all these areas non-chemical alternatives should be used; local inhabitants shall always be informed about the time, the place and the possible effects of the sprayings</td>
</tr>
</tbody>
</table>


5.4. Impact assessment

5.4.1. Methodology

Analysing the impact of introducing no-spray zones in fields around areas used by the public and particularly by sensitive populations is difficult to quantify given that statistics on the area or length of field boundaries adjacent to such populations are not readily available. As such, little research has been carried out on this issue to date.

However, as part of a study carried out for the Royal Commission on Environmental Pollution in 2005 on the risk to bystanders from spray drift from arable land and orchards, the Centre for Ecology and Hydrology estimated the total length of field boundaries between residential land and arable and horticultural land in Great Britain. These estimates were based on Countryside Survey data for Great Britain, by collecting data for linear boundary features and land cover from 569 1 km$^2$ field survey samples across Great Britain. These 1 km$^2$ field survey samples were chosen using a gridded, random stratified sampling strategy based on the ITE Land Classification. Spatial analysis was performed on all 569 1 km$^2$ samples across Great Britain using ESRI ArcInfo Geographic Information System. Geo-processing tools were used to identify the linear lengths that formed boundaries between land classified as residential and land used for arable and horticultural crop production. Lengths identified were written to a single Great Britain dataset and summed for each 1 km$^2$ sample. From these, national estimates were produced using parametric statistical procedures for stratified sample surveys and bootstrapping techniques. These national estimates are presented in Table 5.2, suggesting that field boundaries between residential land and arable and horticultural land measure 20,670 km in Great Britain.

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29 The Countryside Survey is a long-term, large scale ecological monitoring programme carried out by the Centre for Ecology and Hydrology (on behalf of the UK Department for the Environment, Food and Rural Affairs (Defra)). It monitors the extent and condition of the countryside, using satellite mapping census techniques and field-survey sampling techniques.
32 Residential areas cover all domestic living areas, except farm houses (which are classified as agricultural). They account for around half of all areas in the Countryside Survey’s ‘Built-up & Gardens’ classification, which includes built-up land, buildings, gardens and public open space. The definition of residential areas used is those areas distinct from agricultural areas, industrial areas and commercial areas.
33 Land used for arable and horticultural crop production includes all arable crops such as different types of cereal and vegetable crops, together with orchards and more specialist operations such as market gardening and commercial flower growing. Freshly ploughed land, fallow areas, short-term set-aside and annual grass leys (under Improved Grassland) are also included in this category. Results from the Countryside Survey 2000 show that arable and horticultural land under this definition accounted for 22% of the total territory of Great Britain.
34 Results were weighted up using standard statistical procedures, whereby the mean extent of a feature was calculated for each land class (or stratum) along with its standard error. National totals were calculated by multiplying the land class sample mean by its full geographic area and then summing all the land class totals.
35 Bootstrapping is a repeated random re-sampling of the collected information, each repetition is then used to produce an estimate and together the estimates describe statistical distribution of the values. The mean of the estimates produced matches the figures derived by parametric methods, but improve on those values by providing a description of the level of confidence in the results. Each value shown for each variable is derived from 1,000 bootstrapped calculations. Ranking the values in order of magnitude and reading off the 25th and 975th value produces the 95% confidence intervals.
Table 5.2: Length of field boundaries between residential land and arable and horticultural land in Great Britain

<table>
<thead>
<tr>
<th>Boundaries</th>
<th>Length of boundary (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>England and Wales</td>
<td>18,540</td>
</tr>
<tr>
<td>Scotland</td>
<td>2,130</td>
</tr>
<tr>
<td>Great Britain</td>
<td>20,670</td>
</tr>
</tbody>
</table>


To assess the impact of introducing no-spray buffer zones on the amount of agricultural land affected, the estimates presented in Table 5.2 were adjusted to account for all temporary grassland under five years old, on which pesticides are commonly used. It was assumed that the spatial distribution of residential areas bordering temporary grassland is the same as that bordering land used for arable and horticultural crop production. The area of permanent pasture (rough grazing) was excluded from the analysis (as was other utilised agricultural areas such as woodland), as little or no pesticides are typically used in such areas. In contrast, the area of rotational set-aside was included in the analysis, as the European Commission has proposed to abolish mandatory set-aside as part of the Health Check of the Common Agricultural Policy; the abolition of mandatory set-aside would increase the area of arable production, on which pesticides are used. Based on these assumptions, the length of field boundaries between residential land and arable and horticultural land (including temporary grassland) in Great Britain was estimated at 25,052 km (Table 5.3).

Table 5.3: Length of field boundaries between residential land, and arable and horticultural land and temporary grassland in Great Britain

<table>
<thead>
<tr>
<th>Boundaries between residential land and:</th>
<th>Length of boundary (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arable and horticultural land (including set-aside)¹</td>
<td>20,670</td>
</tr>
<tr>
<td>Arable and horticultural land (including set-aside) and all temporary grassland under five years²</td>
<td>25,052</td>
</tr>
</tbody>
</table>


This estimate was then used to assess the impact of introducing no-spray buffer zones on the amount of agricultural land affected throughout the EU. The average length of field boundary per resident (population) living in rural areas adjacent to fields where pesticides are commonly used (i.e. agricultural land used for arable and horticultural production (including set-aside) and temporary grassland) was used as a proxy for extrapolation to the EU level. This assumes that the spatial distribution of rural residents (i.e. the composition of the rural residents living adjacent to utilised agricultural areas (UAA), on which pesticides are commonly applied) in each Member State is similar to that of Great Britain.

Based on population data and the proportion of population living in rural areas, data on the size of rural areas and the size of utilised agricultural areas within rural areas, the amount of agricultural land
likely to be affected from the introduction of no-spray buffer zones was estimated for each EU-27 Member State, including an EU-27 aggregate. These are presented in Table 5.4. Although the European Parliament did not make reference to the size of the proposed no-spray buffer zones, the estimates assume no-spray buffer zone widths of 10 metres and 50 metres.

5.4.2. Impact on agriculture

Based on the estimates presented in Table 5.4, the introduction of a 10 metres wide no-spray buffer zone would affect 339,863 ha of agricultural land throughout the EU-27, equivalent to 0.19% of total UAA and 0.25% of UAA on which pesticides are commonly used (i.e. areas used for arable and horticultural production (including set-aside) and grassland). While the impact on crop production will differ by crop and region, assuming that the entire area was cropped with wheat this would be equivalent to 1.4 million tonnes of wheat production\textsuperscript{36}. The introduction of a wider no-spray buffer zone of 50 metres would affect a total of 1,699,313 ha of agricultural land, equivalent to 0.93% of total UAA and 1.32% of UAA on which pesticides are commonly used. Similarly, to put this area into context and given the aforementioned assumptions, this would be equivalent to 6.8 million tonnes of wheat production.

Observed differences between Member States in Table 5.4 are a function of, \textit{inter alia}, the proportion of agricultural land on which pesticide is commonly applied, rural-urban areas; and, rural-urban population as this dictates population density in the countryside.

Within Member States, the introduction of no-spray buffer zones is likely to have a discriminate impact at the individual farm level. Farms located in more densely populated areas are likely to be more affected than farms in more remote areas (a recent UK study\textsuperscript{37} estimated that the proportion of fields per farm bordering residential properties ranges from 10% in more rural areas to over 50% in more built up areas). That said, any impact will also depend on the type of farm enterprise affected and the decision on whether to crop the no-spray buffer zone. This decision will depend on the individual crop grown in the no-spray buffer zone and the likely yield response from non-pesticide use and subsequent impact on revenue:

- On \textit{livestock enterprises}, the introduction of no-spray buffer zones on temporary grassland bordering residential areas will most likely have no impact on the decision to crop; these buffer zones would most likely remain cropped although unsprayed.

- In contrast, on \textit{arable and horticultural enterprises} farmers will most likely choose to leave no-spray buffer zones uncropped\textsuperscript{38}; although it is possible to grow crops without pesticides using different

\textsuperscript{36} This assumes an average EU-27 wheat yield of 4 tonnes per ha, slightly less than the overall EU-27 average given that buffer zones are by nature situated on the edge of fields and generally have lower yield potential due to shadowing, higher pest and disease occurrences from hedgerows, etc.


production methods, the cost of these alternate methods on relatively small areas of land and the resultant lower yield potential may discourage farmers from cropping no-spray buffer zones.
### Table 5.4: Impact of introducing no-spray buffer zones around residential areas on the amount of agricultural land affected

<table>
<thead>
<tr>
<th></th>
<th>10 metre wide buffer strip</th>
<th>50 metre wide buffer strip</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of UAA on which pesticides are commonly used</td>
<td>% of UAA on which pesticides are commonly used</td>
</tr>
<tr>
<td>Austria</td>
<td>4,123 0.13% 0.28%</td>
<td>20,616 0.64% 1.42%</td>
</tr>
<tr>
<td>Belgium</td>
<td>837 0.06% 0.10%</td>
<td>4,183 0.30% 0.48%</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>5,877 0.11% 0.18%</td>
<td>29,385 0.57% 0.88%</td>
</tr>
<tr>
<td>Cyprus</td>
<td>439 0.26% 0.27%</td>
<td>2,196 1.30% 1.34%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>8,451 0.24% 0.30%</td>
<td>42,256 1.18% 1.52%</td>
</tr>
<tr>
<td>Denmark</td>
<td>3,971 0.15% 0.16%</td>
<td>19,857 0.74% 0.81%</td>
</tr>
<tr>
<td>Estonia</td>
<td>468 0.06% 0.08%</td>
<td>2,340 0.31% 0.41%</td>
</tr>
<tr>
<td>Finland</td>
<td>1,096 0.05% 0.05%</td>
<td>5,481 0.24% 0.24%</td>
</tr>
<tr>
<td>France</td>
<td>47,590 0.16% 0.23%</td>
<td>237,949 0.81% 1.16%</td>
</tr>
<tr>
<td>Germany</td>
<td>65,914 0.39% 0.55%</td>
<td>329,571 1.94% 2.73%</td>
</tr>
<tr>
<td>Greece</td>
<td>8,541 0.26% 0.28%</td>
<td>42,707 1.31% 1.41%</td>
</tr>
<tr>
<td>Hungary</td>
<td>15,459 0.27% 0.32%</td>
<td>77,293 1.33% 1.61%</td>
</tr>
<tr>
<td>Ireland</td>
<td>3,013 0.07% 0.26%</td>
<td>15,063 0.35% 1.29%</td>
</tr>
<tr>
<td>Italy</td>
<td>60,708 0.41% 0.55%</td>
<td>303,540 2.06% 2.76%</td>
</tr>
<tr>
<td>Latvia</td>
<td>1,168 0.06% 0.10%</td>
<td>5,840 0.31% 0.48%</td>
</tr>
<tr>
<td>Lithuania</td>
<td>2,890 0.10% 0.15%</td>
<td>14,452 0.52% 0.75%</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>175 0.14% 0.28%</td>
<td>876 0.68% 1.42%</td>
</tr>
<tr>
<td>Malta</td>
<td>83 0.83% 0.83%</td>
<td>416 4.16% 4.16%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>9,672 0.51% 0.88%</td>
<td>48,358 2.55% 4.38%</td>
</tr>
<tr>
<td>Poland</td>
<td>51,158 0.32% 0.40%</td>
<td>255,789 1.60% 2.01%</td>
</tr>
<tr>
<td>Portugal</td>
<td>8,507 0.23% 0.42%</td>
<td>42,537 1.13% 2.12%</td>
</tr>
<tr>
<td>Romania</td>
<td>35,748 0.25% 0.37%</td>
<td>178,738 1.27% 1.87%</td>
</tr>
<tr>
<td>Slovakia</td>
<td>5,875 0.30% 0.42%</td>
<td>29,376 1.52% 2.09%</td>
</tr>
<tr>
<td>Slovenia</td>
<td>838 0.17% 0.42%</td>
<td>4,188 0.85% 2.11%</td>
</tr>
<tr>
<td>Spain</td>
<td>30,662 0.12% 0.17%</td>
<td>153,310 0.60% 0.86%</td>
</tr>
<tr>
<td>Sweden</td>
<td>689 0.02% 0.03%</td>
<td>3,447 0.11% 0.13%</td>
</tr>
<tr>
<td>UK</td>
<td>25,794 0.15% 0.23%</td>
<td>128,968 0.77% 1.17%</td>
</tr>
<tr>
<td>EU-27</td>
<td>339,863 0.19% 0.26%</td>
<td>1,699,313 0.93% 1.32%</td>
</tr>
</tbody>
</table>

Note: These estimates quantify the likely area of land affected by introducing no-spray buffer zones around residential areas. It is highly likely that some land currently adjacent to residential areas is currently not sprayed with pesticides as part of, for example, existing agri-environmental schemes (e.g. field margins) and initiatives next to watercourses (e.g. LERAPS).

Source: Agra CEAS

Therefore, the cost of introducing no-spray buffer zones will be relatively lower for livestock producers; although areas of grassland in buffer zones will be left unsprayed, they can still be fertilised and grazed by livestock. In contrast, the cost to arable and horticultural enterprises will be
relatively higher as a result of the loss of production, and subsequent revenue forgone, in the uncropped buffer zones. The revenue forgone will be equivalent to the gross margin potential in the buffer zones, as the area taken out of production is unlikely to affect the fixed cost structure of the arable or horticultural enterprise; gross margins in buffer zones may be relatively lower than in other parts of the field, as production in field headlands (where buffer zones are likely to be located) is often less than in the main part of the field due to, *inter alia*, relatively higher levels of compaction and weed populations, and relatively lower nutrient and moisture levels. Depending on the size of the no-spray buffer zones, there is the potential that these costs could be mitigated by using such uncropped areas as set-aside or as part of cross compliance requirements or other agri-environment schemes, which in part compensate farmers for any negative impact on production. That said, current rules do not necessarily allow any one scheme to be applicable in all situations\(^3\).

6. Reduction of pesticide use in sensitive areas: Natura 2000

6.1. Introduction

This Section assesses the economic impact of aspects of Article 11 (reduction of pesticide use in sensitive areas) of the proposal for a Directive establishing a framework for Community action to achieve a sustainable use of pesticides. Specifically, the aim of this Section is to quantify the impact of prohibiting or strongly restricting the use of pesticides in special conservation areas on the area of agricultural land that would be affected.

6.2. Background

The EU has a clear policy which aims to protect biodiversity within the EU, with a commitment to halt biodiversity loss by 2010. According to the European Commission, the EU’s rich biodiversity (such as over 500 wild bird species) has been facing severe threats for many years. For example, bird habitats have been reduced as a result of urban sprawl and the growth of transport infrastructure, and intensive agriculture, forestry and fisheries and the use of pesticides have diminished their food supplies.

Two Directives constitute the backbone of the EU’s internal policy on biodiversity protection. These are the Habitats Directive (Council Directive 92/43/EEC) on the conservation of natural habitats and of wild fauna and flora and the Birds Directive (Council Directive 79/409/EEC) on the conservation of wild birds. Together, these Directives form an EU-wide network of more than 26,000 nature protection areas covering all the Member States with a total area of around 850,000 km², representing more than 20% of the EU’s total territory.

- The **Birds Directive** recognises that habitat loss and degradation are the most serious threats to the conservation of wild birds. It places great emphasis on the protection of habitats for endangered as well as migratory species, through the establishment of a coherent network of **Special Protection Areas (SPAs)** comprising all the most suitable territories for these species.

- The **Habitats Directive** protects over 1,000 animals and plant species and over 200 so called ‘habitat types’, which are of European importance. It places great emphasis on the protection of those habitats that are most threatened and/or that are of most importance in conservation terms, through the establishment of a coherent network of **Sites of Community Importance (SCI)**, which Member States then designate as **Special Areas of Conservation (SCA)**.

Figure 6.1 shows the location of the network of Natura 2000 sites (SCIs and SPAs) throughout the EU. By visually comparing the location of the different Natura 2000 sites, it is clear that there are

sites which are designated as both SCIs and SPAs, therefore summing the total area or total number of sites would overstate the total size of the Natura 2000 network.

Figure 6.1: Natura 2000 network sites (September 2006)
Source: EEA – ETC/BD

6.3. Legislative proposals

According to the European Commission⁴³, the use of pesticides can be particularly dangerous in very sensitive areas, such as Natura 2000 sites. Consequently, Article 11(b) of the European Commission’s proposal suggests that the use of pesticides in special conservation areas should be prohibited or restricted to the minimum necessary (Table 6.1). In its first reading, the European Parliament largely agreed with the direction of the European Commission’s proposal. However, they placed more emphasis on the extent to which pesticide use should be restricted (i.e. strongly) as well as widening the scope of the areas in which pesticide use should be prohibited or strongly restricted to conservation areas (although no reference as to what constitutes a conservation area was provided) (Table 6.1).

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Table 6.1: Article 11 (b) of the proposal for a Directive establishing a framework for Community action to achieve a sustainable use of pesticides

<table>
<thead>
<tr>
<th>Text proposed by the Commission</th>
<th>First Reading Amendment by Parliament</th>
</tr>
</thead>
<tbody>
<tr>
<td>the use of pesticides shall be prohibited or restricted in special conservation areas or other areas identified for the purposes of establishing the necessary conservation measures in accordance with Articles 3 and 4 of Directive 79/409/EEC and Articles 6, 10, and 12 of Directive 92/43/EEC.</td>
<td>the use of pesticides shall be prohibited or strongly restricted in conservation areas or other areas identified for the purposes of establishing the necessary conservation measures in accordance with Articles 3 and 4 of Directive 79/409/EEC and Articles 6, 10, and 12 of Directive 92/43/EEC.</td>
</tr>
</tbody>
</table>


6.4. Impact assessment

6.4.1. Methodology

Limited data is available on the area of agricultural land on which pesticides are used in Natura 2000 areas. However, a study carried out by Beratungsgesellschaft für integrierte Problemlösungen (BiPRO) on behalf of the European Commission (DG ENV) to assess the economic impacts of specific measures of the Thematic Strategy on the Sustainable Use of Pesticides provides some estimates on how much, where and for what purposes pesticides are used in Natura 2000 areas, to get an idea of the reduction potential that might be achieved at the EU-15 level. Given that a lack of quantitative data exists on the area of agricultural land and the use of pesticides in Natura 2000 areas, the findings of this study have effectively formed a baseline for policy decisions.

The same case study sample of Natura 2000 areas in Nordrein-Westfalen (Germany) was therefore examined. The methodology and results of the aforementioned study were reviewed and modified to quantify the area and type of agricultural land that would be affected by prohibiting or strongly restricting the use of pesticides in special conservation areas (i.e. Natura 2000 areas); the results were extrapolated up to the EU-25 level.

6.4.2. Impact on agriculture

As discussed above, SPAs and SACs (SCIs) form an EU-wide network of more than 26,000 nature protection areas covering all the Member States and representing more than 20% of the total EU territory. However, not all Natura 2000 areas will be affected by the proposal to prohibit or restrict to the minimum necessary the use of pesticides in special conservation areas. This is because within Natura 2000 areas there are significant nature protection areas where pesticides are effectively prohibited by virtue of its designated habitat class as there is (little or) no potential for their use. Typical examples include: marine areas and sea inlets; salt marshes, salt pastures and salt

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45 http://ec.europa.eu/environment/nature/index_en.htm
steppes; and, inland rocks, screes, sands and permanent snow and ice. Due to data limitations, previous research has assumed that such areas account for around 50% of all Natura 2000 areas46.

This implies that agricultural areas form a share of the remaining 50% of Natura 2000 areas, on which pesticides may be used. However, the use of pesticides within such agricultural areas will vary considerably given that not all agricultural production necessarily uses pesticides (e.g. areas under organic management); some agricultural production makes little use of pesticides (e.g. permanent pasture) or Natura 2000 management plans already limit their use.

According to BiPRO47, the Natura 2000 habitat classes that are located in agricultural areas in which pesticides would be more commonly used are: extensive cereal cultures (including rotation cultures with regular following); rice fields; improved grassland; humid grassland and mesophile grassland; and other arable areas. In contrast, pesticide use is unlikely in the other agricultural area habitat classes, such as: dry grassland and steppes; and, alpine and sub-alpine grassland.

Table 6.2 provides a classification of 310 Natura 2000 habitat sites within the Nordrhein-Westfalen Länder of Germany. This region is not necessary representative of a region with a typical mix of habitat sites (if there is such a region in the EU) as it has no coastline or high mountains, suggesting that it may have a greater proportion of agricultural land and woodland. Consequently it may overstate the area of land on which pesticides are used in an ‘average’ sample area of Natura 2000 sites.

Based on the five Natura 2000 habitat classes on which pesticides are considered to be more commonly used (i.e. extensive cereal cultures, rice fields, improved grassland; humid grassland and mesophile grassland; and other arable areas), Table 6.2 would suggest that there is potential for pesticides to be used to varying degrees on 42% (107,395 ha) of Natura 2000 areas in Nordrhein-Westfalen. However, based on an assessment of pesticide use on the 310 Natura sites the actual use of pesticides was found to be much lower, with pesticides found to be used on only 33 (10.6%) of the 310 Natura sites in Nordrhein-Westfalen. While these sites accounted for 34% (85,000 ha) of total Natura 2000 areas in Nordrhein-Westfalen, pesticide use was restricted to 70% (60,000 ha) of the area of these sites, i.e. 24% of Natura 2000 areas in Nordrhein-Westfalen (Table 6.3).

Table 6.2: Share of Natura 2000 habitat classes within Nordrhein-Westfalen

<table>
<thead>
<tr>
<th>Natura 2000 habitat classes</th>
<th>Area (ha)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine areas, sea inlets</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Tidal rivers, estuaries, mud flats, sand flats, lagoons (including saltwork basins)</td>
<td>6</td>
<td>0%</td>
</tr>
<tr>
<td>Salt marshes, salt pastures, salt steppes</td>
<td>23</td>
<td>0%</td>
</tr>
<tr>
<td>Coastal sand dunes, sand beaches, machair</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Shingle, sea cliffs, islets</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Inland water bodies (standing water, running water)</td>
<td>12,450</td>
<td>5%</td>
</tr>
<tr>
<td>Bogs, marshes, water fringed vegetation, fens</td>
<td>4,911</td>
<td>2%</td>
</tr>
<tr>
<td>Heath, scrub, maquis and garrigue, phrygana</td>
<td>7,145</td>
<td>3%</td>
</tr>
<tr>
<td>Dry grassland, steppes</td>
<td>2,701</td>
<td>1%</td>
</tr>
<tr>
<td>Humid grassland, mesophile grassland</td>
<td>29,197</td>
<td>11%</td>
</tr>
<tr>
<td>Alpine and sub-alpine grassland</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Extensive cereal cultures (including rotation cultures with regular fallowing)</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Ricefields</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>Improved grassland</td>
<td>25,052</td>
<td>10%</td>
</tr>
<tr>
<td>Other arable land</td>
<td>53,143</td>
<td>21%</td>
</tr>
<tr>
<td>Broad-leaved deciduous woodland</td>
<td>69,916</td>
<td>28%</td>
</tr>
<tr>
<td>Coniferous woodland</td>
<td>1,564</td>
<td>1%</td>
</tr>
<tr>
<td>Broad-leaved evergreen woodland</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Mixed woodland</td>
<td>984</td>
<td>0%</td>
</tr>
<tr>
<td>Artificial forest monoculture (e.g. plantations of poplar or exotic trees)</td>
<td>43,077</td>
<td>17%</td>
</tr>
<tr>
<td>Non-forest areas cultivated with woody plants (incl. orchards, groves, vineyards, dehesas)</td>
<td>433</td>
<td>0%</td>
</tr>
<tr>
<td>Inland rocks, screes, sands, permanent snow and ice</td>
<td>585</td>
<td>0%</td>
</tr>
<tr>
<td>Other land (including towns, villages, roads, waste places, mines, industrial sites)</td>
<td>2,839</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>254,027</td>
<td>100%</td>
</tr>
</tbody>
</table>


Table 6.3: Natura 2000 sites within Nordrhein-Westfalen and pesticide use

<table>
<thead>
<tr>
<th>Number</th>
<th>Area (ha)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sites analysed</td>
<td>310</td>
<td>254,100</td>
</tr>
<tr>
<td>Sites using pesticides (PPP)</td>
<td>33</td>
<td>85,000</td>
</tr>
<tr>
<td>• Area where pesticides are used within the 33 sites using pesticides</td>
<td>60,000</td>
<td>24%</td>
</tr>
</tbody>
</table>


BiPRO therefore concluded that pesticides were used on 24% of Natura 2000 areas in Nordrhein-Westfalen. Based on this finding (+/- 4%), and the assumption that there is (little or) no potential for pesticide use in 50% of Natura 2000 areas in the EU, BiPRO extrapolated this up to the EU-15 level, concluding that pesticides were used on 12% (10-14% factoring in a margin of error) of the overall EU-15 Natura 2000 areas (Figure 6.2).
In summary, the BiPRO study found that pesticides were used for crop protection on 10-14% (7-10 million hectares) of the EU-15’s total Natura 2000 area, equivalent to 20% of the EU-15’s crop production area, accounting for 13-18% of the total amount of pesticides sold in the EU-15 for crop production. However, these findings significantly overestimate the area and volume to which pesticides are likely to be used in Natura 2000 areas for a number of reasons:

- **Area of agricultural land affected.** It is unlikely that Natura 2000 areas on which pesticides are used equates to 20% of the EU’s cropped land. The BiPRO study assumed that all pesticides used in Natura 2000 areas were for crop production. However, only 56% of the Natura 2000 area in the 33 sites using pesticides in Nordrhein-Westfalen was likely used for arable crop production (Table 6.4). Other agricultural areas on which pesticides were likely used included humid grassland and mesophile grassland (16%) and improved grassland (13%). Assuming that pesticides were only used in these Natura 2000 habitat classes, and accounting for the fact that pesticide use was restricted to 70% of the total area of the 33 Natura 2000 sites, this would suggest that when extrapolated up to the EU-level pesticide use in Natura 2000 areas is likely to

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account for 3.8% of utilised agricultural area and 6.3% of arable cropped land (including set-aside). This is considerably lower than the 20% of arable cropped land estimated by BiPRO.

Table 6.4: Share of sample and sub-sample Natura 2000 habitat classes within Nordrhein-Westfalen

<table>
<thead>
<tr>
<th>Natura 2000 habitat classes</th>
<th>Sample share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>310 sites</td>
</tr>
<tr>
<td>Inland water bodies (standing water, running water)</td>
<td>5%</td>
</tr>
<tr>
<td>Bogs, marshes, water fringed vegetation, fens</td>
<td>2%</td>
</tr>
<tr>
<td>Heath, scrub, maquis and garrigue, phrygana</td>
<td>3%</td>
</tr>
<tr>
<td>Dry grassland, steppes</td>
<td>1%</td>
</tr>
<tr>
<td>Humid grassland, Mesophile grassland</td>
<td>11%</td>
</tr>
<tr>
<td>Extensive cereal cultures (including Rotation cultures with regular fallowing)</td>
<td>0%</td>
</tr>
<tr>
<td>Improved grassland</td>
<td>10%</td>
</tr>
<tr>
<td>Other arable land</td>
<td>21%</td>
</tr>
<tr>
<td>Broad-leaved deciduous woodland</td>
<td>28%</td>
</tr>
<tr>
<td>Coniferous woodland</td>
<td>1%</td>
</tr>
<tr>
<td>Mixed woodland</td>
<td>0%</td>
</tr>
<tr>
<td>Artificial forest monoculture (e.g. plantations of poplar or exotic trees)</td>
<td>17%</td>
</tr>
<tr>
<td>Non-forest areas cultivated with woody plants (incl. orchards, groves, vineyards, dehesas)</td>
<td>0%</td>
</tr>
<tr>
<td>Other land (including towns, villages, roads, waste places, mines, industrial sites)</td>
<td>1%</td>
</tr>
</tbody>
</table>


- **Volume of pesticides used.** In concluding that 13-18% of the total amount of pesticides sold in the EU for crop production were used in Natura 2000 areas, the BiPRO study\(^{51}\) assumed that the average use of pesticides in Natura 2000 areas (on which pesticides are used) was the same as the average used for crop production outside Natura 2000 areas (i.e. 4.2kg AS per ha). This assumption suggests that pesticide use is as intensive within Natura 2000 areas as it is outside Natura 2000 areas. This is unlikely to be the case given that restrictions exist on the extent to which pesticides can be used within Natura 2000 areas; national law\(^{52}\) restricts the use of pesticides in Natura 2000 areas in some Member States (e.g. Finland and Portugal), while in other Member States controls on the use of pesticides under Natura 2000 management agreements restrict pesticide use (e.g. the UK).

According to Eurostat, the annual dose rate of pesticides for all arable crops averaged 1.2kg AS per ha and 2.4kg AS per ha for all arable and horticultural crops. This is significantly lower than the 4.2kg AS per ha assumed in the BiPRO study. Furthermore, as discussed above, the BiPRO study did not differentiate between the area of Natura 2000 land used for arable crop production

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\(^{51}\) Ibid, p.161.

\(^{52}\) Ibid, p.151.
and that used for grassland; the amount of pesticide used on grassland is minimal (estimated at around 0.05kg AS per ha) and given that around a third of the agricultural area on which pesticides were used in the 31 Natura 2000 Nordrhein-Westfalen case study sites were grassland, this would dilute the average dose rate per ha considerably.

In summary, our analysis would suggest that the extent to which pesticides could be restricted in special conservation areas would be much less than previously suggested by the BiPRO study undertaken for the European Commission. It is estimated that on only 12% of the overall EU Natura 2000 areas pesticides are likely to be used; these areas are likely to account for 3.8% of utilised agricultural area and pesticide use in these Natura 2000 areas is likely to be much lower due to restrictions. The extent to which any further restrictions could be implemented would depend on the extent to which pesticides are seen as promoting biodiversity. While conservationists support the principle of avoiding further deterioration of natural habitats, it is acknowledged that pesticides have a positive role in meeting environmental objectives, such as using herbicides for vegetation management within Natura 2000 sites.

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