STUDY SUPPORTING THE EVALUATION OF DIRECTIVE 2009/128/EC ON THE SUSTAINABLE USE OF PESTICIDES AND IMPACT ASSESSMENT OF ITS POSSIBLE REVISION

Final Evaluation Report

Written by Ramboll and Arcadia International
For the Directorate General for Health and Food Safety
October / 2021

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Arcadia INTERNATIONAL

DG SANTE

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Directorate General For Health and Food Safety
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Study supporting the Evaluation of Directive 2009/128/EC on the Sustainable Use of Pesticides and Impact Assessment of its possible revision

Final Evaluation Report

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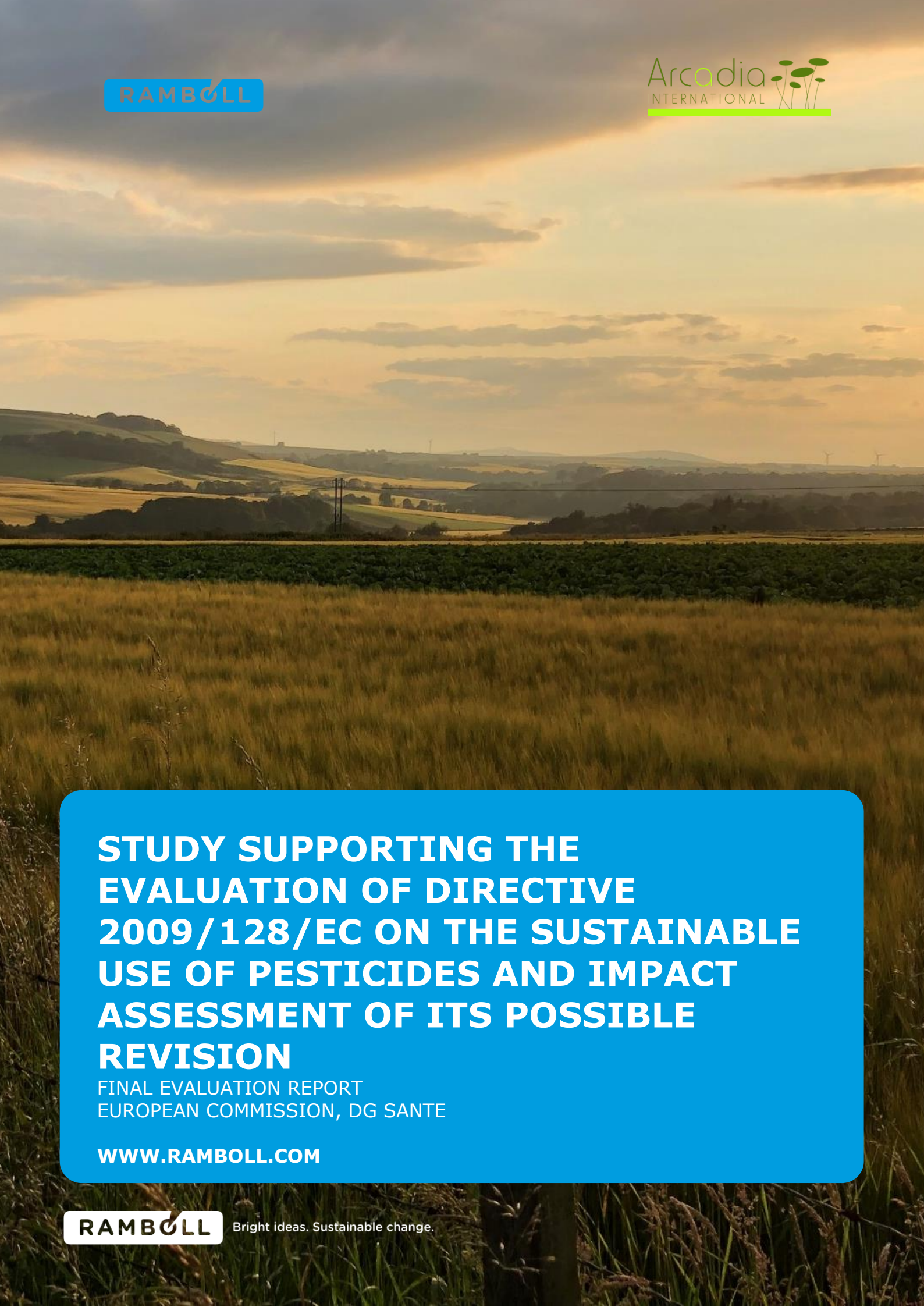

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FINAL EVALUATION REPORT
EUROPEAN COMMISSION, DG SANTE

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FINAL EVALUATION REPORT

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Abstract

The European Commission is undertaking a back-to-back evaluation of Directive 2009/128/EC on the sustainable use of pesticides (SUD) and impact assessment of its possible revision. This study, by Ramboll Management Consulting and Arcadia International, presents an analytically robust evaluation, assessing the Directive against the key evaluation criteria of effectiveness, efficiency, relevance, coherence and EU added value. It covers the period from 2011 to 2020 across the 27 EU Member States plus the UK.

Evidence from qualitative and quantitative data collection shows that the SUD has likely contributed to reducing the risk of using pesticides to human health and the environment, however it is not possible to establish the extent to which the Directive has had a direct contribution on reducing the risk of pesticide use. Member States were found to have made efforts to implement the provisions of the Directive, however specific provisions lacked implementation such as the quality and level of ambition of NAPs and little control and enforcement of IPM. However, the objectives and concept of the SUD were found to have provided added value by creating a common, harmonised framework for the sustainable use of pesticides and raising awareness.

Executive summary

Overview to the study

On the 29th of May 2020, the Commission published a combined evaluation roadmap and inception impact assessment on the SUD. This support study aims at collecting evidence to support the corresponding ex-post evaluation of the SUD and the impact assessment of the possible future SUD revision initiated by the Commission.

In line with the European Green Deal and the Farm to Fork Strategy to ensure a fair, healthy and environmentally friendly food system and complementary to the EU Biodiversity Strategy for 2030, measures will be brought forward with the aim to significantly reduce the use and risk of chemical pesticides, building on the existing evidence and the additional assessment carried out by the Commission.

In line with the evaluation criteria required by the Better Regulation Guidelines, the purpose of this evaluation is to assess the extent to which the SUD delivered against its intended objectives (effectiveness) and the underlying reasons, whether those objectives are relevant to address the current needs and problems and whether they are able to remain relevant in the future (relevance), the coherence and complementarity with other EU legislation and policies, the efficiency of the actions under the SUD as well as its EU added value.

The methodology for this study adopted a theory-based approach, aiming to establish whether the SUD delivered the expected results and impacts and what factors influenced achievements or lack thereof. Activities that were carried out as part of the study included desk research on relevant literature and statistical information and field research in the form of targeted interviews (53), three targeted surveys, seven topical case studies and a public consultation.

The time scope of the evaluation is from when the SUD was adopted in 2009 until present day (as far as data allowed it) and the geographical scope is EU27 plus UK. Additionally, the evaluation also took into account other legal acts in the European Commission 2009 legislative package of the SUD. The following sub-section presents the key findings by evaluation criterion.

Key findings from the study

Effectiveness

The reduction of risks of pesticide use and associated impacts was primarily envisaged to be implemented through all the SUD provisions in combination, adapted to the situation in each Member State through the adoption and implementation of National Action Plans (NAPs). All Member States have adopted NAPs, outlining priorities and actions in line with the SUD provisions, however the evaluation can conclude that the level of ambition and implementation has been uneven across Member States. While many of the SUD provisions have been implemented in most Member States, and likely contributed to a reduced risk of pesticide use as suggested by the decrease of HRI1 by 20% over the last five-year period (2014-2018), this finding is not consistent across other indicators (i.e., observed decrease in biodiversity in rural ecosystems, MRL exceedance trend and the increase in HRI 2), which indicates the limitations of the ability to definitively state whether there has been a reduction of risk.

Reducing the use of pesticides is not an explicit objective per se of the Directive, but it was assumed that implementation of IPM and an increased use of alternative methods to control pests would lead to a use reduction, whether this has happened remains uncertain. The level of implementation of IPM has not been possible to establish, due to the lack of consistent monitoring at Member State

level. Evidence at the national level indicated that the SUD was effective in further raising awareness of IPM as well as boosting IPM practices that were already in place prior to its entry into force.

By and large, compared to what was expected in the Impact Assessment of the Thematic Strategy, the Directive appears to have been moderately effective considering all EU Member States. Several key results have failed to materialise, such as a stronger evidence base for policy making on pesticide use and an improved knowledge about environmental and health effects of pesticide use, broad introduction of alternative techniques to control pests and improved land management.

Efficiency

The main costs from implementing the SUD have been proportionate to the likely benefits generated in terms of risk reduction. While it has not been possible to quantify the environmental, economic and social/health benefits of the achieved risk reduction, a qualitative assessment indicates that the likely benefits clearly outweigh the costs of the SUD. The benefits mainly accrue to the environment and society at large, in particular health and environmental benefits, which in turn generates economic benefits and/or reduces costs. The direct costs of SUD implementation (training, inspections, IPM) mainly fall on the professional users of pesticides, in particular farmers, who on the other hand have little or no direct economic benefit from implementing SUD provisions.

Relevance

The objectives of the SUD were and still are highly relevant to address the risk posed by pesticide use to the environment and human health. However, most of the environmental (pollinator decline, biodiversity) and health (potential exposure to pesticides) issues and needs identified at the time of adopting the Directive have remained unchanged or even been aggravated, thus further underlining the relevance of a strong legislation to regulate the use of pesticides. A stronger awareness among consumers and society at large acts as a driver for change, however the situation is uneven among Member States.

Coherence and complementarity

The internal and external coherence of the Directive is generally strong and there are no major inconsistencies or overlaps. At the level of the 2009 (EC) regulatory framework for pesticides, the evaluation found the SUD to be complementary through its role in regulating the use phase of pesticides. However, the complementarities have not been fully realised, for example the dependency of the SUD on Regulation (EC) No 1185/2009 to provide relevant statistics to the assessment of progress towards the objectives of the SUD. More broadly, the coherence with most EU legislation was assessed positively, with some exceptions for biocides legislation and the Common Agricultural Policy (CAP). The theoretical link between the SUD and the CAP is strong, but in practice could be improved, and the CAP has not been considered as a key tool to support implementation of the Directive.

EU added value

While previous measures existed at Member States level, they were varied and not harmonised across the EU. Some Member States had none or only one measure comparable to the SUD's requirements in place and no Member State had all measures contained in the SUD in place at the time of its adoption. Hence, the objectives and concept of the SUD have provided added value by creating a common, harmonised framework for the sustainable use of pesticides and raising awareness. The implementation of these elements, however, needs to further progress in order to provide added value comprehensively across the EU.

Contents

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1. Introduction

This document is the Final Evaluation Report for the "Study supporting the evaluation of Directive 2009/128/EC on the Sustainable Use of Pesticides (SUD) and impact assessment of its possible revision".

On the 29th of May 2020, the Commission published a combined evaluation roadmap and inception impact assessment on the SUD. This support study aims at collecting evidence to support the corresponding ex-post evaluation of the SUD and the impact assessment of the possible future SUD revision initiated by the Commission.

The following report presents the main results of the evaluation part of the assignment covering the evaluation questions for the study on effectiveness, efficiency, relevance, coherence and EU added value of the SUD. The evaluation findings are based on primary and secondary evidence collected to date, including desk review, interviews with key stakeholders, case studies and the Public Consultation.

The time scope of the evaluation is from when the SUD was adopted in 2009 until present day (as far as data allowed) and the geographical scope is EU27 plus UK. To the extent relevant to answer the evaluation questions, the study also took into account other legal acts in the 2009 'EU pesticide package'.

With regards to the structure of the report, the background section and baseline has been included in an annex. In addition, additional stakeholder consultation reports are presented in accompanying documents to this report. They include the Public Consultation Synopsis report and the interview notes.

The report is organised across the following structure, as shown in the table below.

Chapter No.	Chapter title
2	Methodology
3	State of play in implementation of the SUD
4	Evaluation findings
5	Conclusions

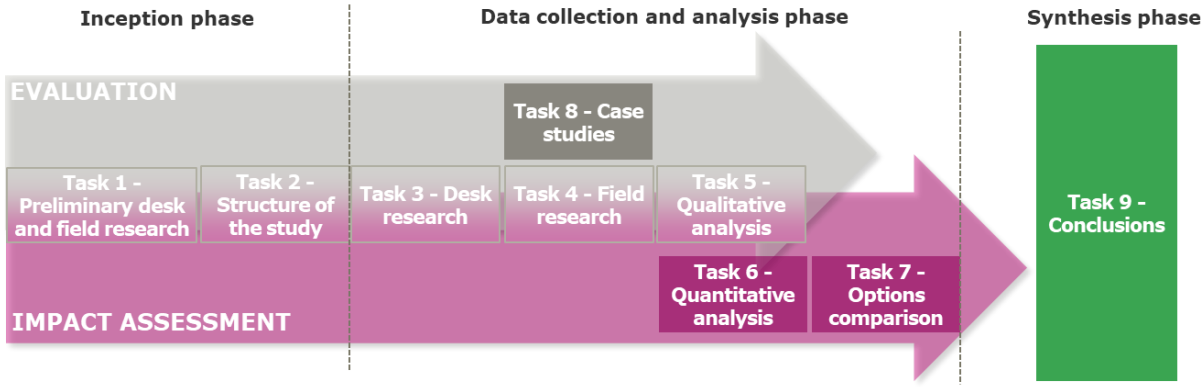
2. Methodology

This chapter aims to provide an overview of the methodology that was applied in this study. As such, it presents the different phases and accompanying tools, as well as a brief overview of the mitigations and limitations of the study. The full methodology can be found in Appendix 3.

2.1 Overall design and methods used

This study is part of a back-to-back evaluation and impact assessment, to evaluate the Directive after nine years of implementation (considering that Member States were to comply with the SUD as of November 2011). As such, the methodological approach to the Study contains activities that feed into both the evaluation and impact assessment parts. The figure below illustrates the back-to-back process and the data collection activities in relation to both the evaluation and the impact assessment parts.

Figure 2.1. Overview of tasks under the back-to-back study



With the aim of carrying out a robust and sound evaluation study, a structured evaluation approach was created using an elaborated intervention logic (see Appendix 1), an evaluation questions matrix (see Appendix 2), stakeholder consultation activities and case studies.

The evaluation part of the study is principally structured around the evaluation questions matrix developed on the basis of the questions provided in the initial terms of reference of this study. This matrix advances from the core questions by further operationalising them into sub-questions with corresponding indicators and judgement criteria (shown in Appendix 2). The matrix was developed in tandem with the intervention logic, depicting what the SUD aims to achieve and how.

The intervention logic presented in Appendix 1 provides a framework for monitoring and evaluating the Directive's performance. It depicts the complex sequence of causal links between the activities developed, the outputs, results and final impact of an intervention. The intervention logic thus presents the main assumptions and anticipated results that the Directive was envisaged to have, and its actual final impact.

The evaluation questions on effectiveness address most links shown in the intervention logic. In short, they look at the progress made towards the achievement of the objectives of the SUD, looking for evidence of why, whether or how these changes are linked to it. Ultimately, it is assessed if and to what extent the main objective of the SUD (protecting human health and the environment from possible risks associated with the use of pesticides) is achieved and to what extent the SUD contributed to this through its actions (and subsequent outputs and results). In more detail, the analysis assesses the contribution of the SUD to its objectives through the key actions such as the establishment of NAPs, promotion of IPM and others. The assessment focuses on the assessment

of the status quo (i.e. where are we in the achievement of objectives in EQ1, also compared to the expected ones as part of EQ3) and also looks at possible reasons for the level of achievement (in EQ4). The analysis also assesses the effectiveness of pesticide statistics towards achieving the objectives, thus broadening the scope to include Regulation (EC) 1185/2009 when it comes to the provision of statistical data for the implementation of the SUD directive. The assessment of effectiveness is structured, where relevant, at the action level (i.e. focusing the different Articles / provisions of the Directive) while attempting to develop an aggregate picture of the SUD's achievements. The case studies conducted as part of the project to this end 'dive' into different provisions and analyse (through desk research) and collect (through targeted interviews) in-depth data.

Efficiency is a measure of the relationship between the achieved results and impacts and the resources invested by the different relevant stakeholder groups (e.g. the European Institutions, Member State authorities, professional pesticide users and others) in the implementation of the provisions of the Directive which are depicted in the inputs and actions in the intervention logic. In addition, this criterion also assesses the costs of partially meeting or not meeting some of the objectives and requirements of the SUD.

The assessment of relevance explores the extent to which the objectives shown in the intervention logic correspond with the current problems and needs in the sustainable use of pesticides in the EU; it also explores the future development of the current needs and problems.

The coherence aspect is depicted in the intervention logic though the addition of other processes running in parallel to the revision of the SUD as well as other relevant legislation.

The study is divided into nine key tasks. Apart from the tasks pertaining to the design of the study and synthesis of evidence, the remaining tasks included a number of different sets of analysis and data collection activities. Data collection activities included desk research on relevant literature and statistical information and field research in the form of targeted interviews, three targeted surveys, seven topical case studies and a public consultation. Analysis tasks included analysing the state of implementation, the evaluation baseline and the public consultation, as well as the evaluation questions.

2.2 Overview of stakeholder consultations

The following table provides an overview of the stakeholder consultations, the dates of distribution and the number of responses.

Table 2.1. Consultation activities

Consultation method	Stakeholder activities/ groups	Dates	No. of responses	Part of the Evaluation or Impact Assessment
Targeted interviews	• EU Commission services and agencies • Member State authorities • International organisations • Consumer organisations • Economic stakeholders - PPP producers and distributors • NGOs • Research and Academia • Other economic stakeholders impacted by SUD	5th-31st March 2021	53 interviews with 82 persons	Both

Consultation method	Stakeholder activities/ groups	Dates	No. of responses	Part of the Evaluation or Impact Assessment
	• Workers organisations			
Targeted surveys (3)	• Survey questionnaire to Member States, Iceland and Norway SUD competent public authorities and related authorities	18th June-23rd July 2021	53 responses from 29 countries	Both
	• Survey questionnaire to professional users of PPP and other industry stakeholders	19th July - 27th August 2021	147 completed and 47 partially completed responses	
	• Survey questionnaire to environmental NGOs, Consumer Organisations and civil society organisations		21 completed and 11 partially completed responses	
Focus groups (6)	• Identifying environmental and human health impacts of the policy options	6th July 2021	2 EU institution representatives, 1 academic and 1 environmental consultant	Impact Assessment
	• Identifying impacts of policy options on non-EU countries (trade flows, sustainable farming practices, development)	7th July 2021	3 international institutions, 1 international private sector initiative and 1 academic	
	• Identifying macroeconomic impacts of the policy options		2 EU institution representatives, 1 public research institute and 2 think tank representatives	
	• Identifying (microeconomic) costs of the policy options	N/A	Replace with targeted interviews	
	• Increasing the uptake of IPM (including enforcement) and monitoring of progress	1st Sep 2021	2 academics, 4 research institutes	
	• Contribution of drones and precision farming to reduction of pesticide risk and use	1st Sep 2021	2 academics, 4 research institutes	

Consultation method	Stakeholder activities/ groups	Dates	No. of responses	Part of the Evaluation or Impact Assessment
Workshops (4)	• SUD Study – Validation Workshop on the evaluation and future revision of the SUD.	4th May 2021	59 participants	Evaluation (with implications for the Impact Assessment)
	• 2nd remote stakeholder event on the evaluation of the sustainable use of pesticides Directive 2009/128/EC and impact assessment of its possible revision[1]	25th June 2021	250 participants	Impact Assessment
	• 3rd remote stakeholder event on the evaluation of the sustainable use of pesticides Directive 2009/128/EC and impact assessment of its possible revision[3]	5th October 2021	220 participants	Evaluation and Impact Assessment
	• SUD Study – Validation Workshop on the evaluation and impact assessment findings of the SUD.	6th October 2021	79 participants	Evaluation and Impact Assessment
Public Consultation	• Public Consultation (PC) on the evaluation and impact assessment of Directive 2009/128/EC establishing a framework for community action to achieve the sustainable use of pesticides.	18th January - 12th April 2021	1640 responses across all stakeholder groups	Both

2.3 Discussion on the limitations of the methodology and findings

While the evidence base available to answer the evaluation questions overall is considered to be fair, several points merit being mentioned as discussed below. An overview of the data triangulation adopted in this report is presented in the stakeholder consultation report in Appendix 6.

- The SUD is a Directive which aims to 'achieve a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives of pesticides' (Article 1). It does not have as an explicit objective to reduce the use (volumes) of pesticides per se. However, in interviews with stakeholders, the (lack of) reduction in pesticide use was often brought up as an example of where the Directive has not performed as intended, e.g., confounding the risk reduction objective with use reduction. This is possibly due to the complexity of the risk concept as compared to use (and the difficulty to measure risks). In addition, confusion can arise with the Farm to Fork targets which include the term "use" associated to the "risk". As a consequence, the SUD tends to be judged by stakeholders towards objectives it was not designed to achieve in the first place.
- On a similar note, there is limited evidence or knowledge about actual use of pesticides and the risks it represents to human health and the environment. Although there is a mounting body of evidence related to the effects and risks of pesticides, the current knowledge base leaves ample

[1] https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/food_safety_and_quality/documents/event_sante_pesticides_sud_20210621_agenda.pdf

room for interpretation and does not provide clear answers on the nature and magnitude of harmful effects. This is reflected among stakeholders, where there are often starkly differing opinions, ranging from seeing all pesticides to being inherently harmful and "bad", to viewing pesticide use as a safe and effective means to protect yields and incomes of farmers and to ensure access to good quality food at a reasonable cost for consumers in Europe. In the absence of "hard evidence", stakeholder opinions appear unlikely to shift and become more nuanced. Hence, this will likely continue to be a challenge in the future policy development and implementation.

- The objectives of the SUD are closely linked to other pieces of EU legislation, notably the Plant Protection Product Regulation (Regulation (EC) No 1107/2009) and other legal acts included in the 2009 'EU Pesticides Package'. While this close connection is analysed in the evaluation criterion of coherence, it also leads to stakeholders commenting on wider pesticide policies. The partial overlap (for example, when it relates to HRI 1) and influencing factors for the SUD have been considered in this assessment where necessary, even though the provisions and effects may not be caused by the SUD itself.
- Evaluating the effects of the SUD are subject to an **attribution challenge**. This means that when relevant changes can be observed (e.g., changes in quantity of sold pesticides) it is not a given that those changes can be attributed to the implementation of the SUD. This has a number of reasons. Firstly, there are external factors which can also influence observable trends. In the example from above (changes in quantity of sold pesticides), the sales could be influenced by an increased uptake of IPM. However, for example, they can also be influenced by changing climatic conditions (e.g., hotter or wetter conditions leading to an increase of pest occurrences). Secondly, other EU legislation influences the field of pesticides (see Appendix 4 which provides an overview of the legislative framework the Directive is embedded in). This includes for example Regulation (EC) No 1107/2009 which governs which PPPs are authorised which can change use patterns and Regulation (EC) No 1185/2009 on pesticide statistics, both a part of the 2009 'EU Pesticides Package'. In the preliminary findings those points are accounted for where relevant by lining out potential factors which might have influenced observable trends.
- There also **temporal challenges** linked to the evaluation of the SUD. This includes the somewhat recent implementation of some of the provisions of the SUD and that between the production, sale, application and complete break-down of pesticides in the environment there can be long time periods. Following the approval of the text of the Directive by the Council of the European Parliament (EP) amendments at 2nd reading in September 2009, the SUD was adopted in October 2009; the date of entry into force was November 2009. The deadline for transposition of the SUD was December 2011. The legal act includes deadlines for the implementation and enforcement of several provisions as presented in Table 3.1. Some of the obligations only needed to be met as late as 2015 (Article 6 on requirements for sales of pesticides) or even December 2016 (under Article 8 Member States had to ensure that pesticide application equipment has been inspected at least once). On the basis that the use of pesticides (primarily by farmers) is commonplace to treat their crops to combat pests, (to maximise yields and to mitigate price pressures from the agricultural value chain), any behavioural and practice changes should be taken into account when assessing the impact of the SUD. This aspect needs to be kept in mind when interpreting evidence for this evaluation. Another temporal challenge stems from the fact that some pesticides (e.g., POPs) can stay for several years in the environment where they can still impact the environment and health and be observable. Thus, there might be a considerable delay in observable changes in the environment, also if pesticide use changes.
- The polarisation of views across stakeholders also presented a challenge in providing fair and evidence-based results. Differences in stakeholder positions (i.e., users and non-users) often created diverse points of view across all of the stakeholder consultations, specifically on what

the SUD has and/or should have achieved. Thus, under many of the evaluation questions, results were presented only where data triangulation could be achieved from two or more sources in order to validate results and reduce the bias imposed by opinions from specific groups of stakeholders.

3. State of play in implementation of the SUD

This section describes the baseline and the current state of play of the implementation of the SUD in the Member States that forms the descriptive basis for the analysis of the evaluation criteria in Section 4. The background of the Directive is presented in Appendix 4, along with its logic of intervention (Appendix 1).

3.1 Baseline and points of comparison

Prior to the establishment of the baseline, it is first useful to note the contents and purpose of the SUD. A regulatory framework for pesticide use (use phase) as lifecycle stage between authorisation and residue in products for consumption was established with the Directive 2009/128/EC (Sustainable Use Directive, short SUD). The 'pesticides package' from 2009 is completed by three further legal acts: Regulation (EC) 1107/2009 on the placing on the market of plant protection products, Regulation (EC) 1185/2009 concerning statistics on pesticides and Directive 2009/127/EC with regard to machinery for pesticide application. Additionally, Regulation (EC) 396/2005 on maximum residue levels complements the EU pesticide legislation.

The SUD is comprised of 25 Articles, of which Articles 4-15 set out the main provisions of the Directive under the objective of achieving a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives to pesticides (Art. 1). Across each of these Articles, sub-objectives are presented which can be categorised across three overarching objectives:

1. Securing the optimal use of pesticides according to their conditions of use (Art. 5 & 8)
2. Implementing provisions to reduce the risk and dependency of pesticide use (Art. 6, 7, 9, 10, 12, 13 & 14)
3. Improving the monitoring processes (Art. 11 & 15)

As part of the evaluation part of the assignment, the baseline has been derived from the Impact Assessment of the Directive[2], in two steps:

- Firstly, the state of play is measured against the baseline (or *status quo* situation at the time before the entry into force of the SUD), i.e., assessing what Member States have done to respond to the requirements of SUD.
- In a second step, the results of these actions are compared to what was expected in the Impact Assessment, to reflect on the achievements made towards the objectives of the Directive and assess whether the preferred options have performed as expected.

The overview of status quo and expected development under the provisions of the SUD is presented in Appendix 6. The expected results and impacts from the Impact Assessment are presented in the findings, when relevant and feasible, making a comparison between expected and actual developments. The Impact Assessment outlined and compared the expected impacts of the policy options, with quantitative estimates of costs. It did not attempt to quantify expected health and environmental benefits, due to methodological challenges. Hence, the estimation of environmental and health benefits was based on qualitative assessments.

The evaluation has not attempted to estimate the no change scenario, e.g., what would have happened in the absence of the Directive, but it is assessed likely that the situation would have

[2] European Commission (2006). SEC(2006) 894 Impact assessment of the Thematic Strategy on the Sustainable Use of Pesticides

continued to evolve with Member States taking action nationally to regulate the use of pesticides. In the Impact Assessment this scenario was consistently assessed as "neutral", e.g., producing no positive or negative impacts.

3.2 Implementation of the Directive in Member States

3.2.1 Timeline

Following the approval of the text of the Directive by the Council of the EP amendments at 2nd reading on the 24th of September 2009, the adoption of the SUD, under co-decision procedure, took place on the 21st of October 2009 by the President of the EP and by the President of the Council. The date of publication in the Official Journal of the European Union was on the 24th of November 2009 (OJ L 309, 24.11.2009, p. 71-86) and therefore according to Article 24 of the SUD, the date of entry into force was on the 25th of November 2009, with a deadline for transposition of SUD obligations by the 26th of November 2011.

The initial legal act includes deadlines for the implementation and enforcement of several provisions giving Member States (MS) time to develop their national strategy and NAPs, as presented in the table below.

Table 3.1. Main deadlines for implementation of SUD provisions as listed in the initial legal act

Article	Title	Enforcement date	Obligation
23	Transposition	14 Dec 2011 (*Corrected to 26 Nov 2011*)	Deadline for transposition of the SUD obligations into national laws, regulations, and administrative provisions
4	NAPs	14 Dec 2012 (*Corrected to 26 Nov 2012*)	MS shall communicate their NAPs to the EC and other MSs
		14 Dec 2014 (*Corrected to 26 Nov 2014*)	COM shall submit to the EP & the Council a report on information communicated by the MSs in relation to NAPs
		14 Dec 2018 (*Corrected to 26 Nov 2018*)	COM shall submit to the EP & Council a report on experience gained by MSs on the implementation of national targets
5	Training	14 Dec 2013 (*Corrected to 26 Nov 2013*)	MSs shall establish certification systems and designate CAs responsible for their implementation
6	Requirements for sales of pesticides	14 Dec 2015 (*Corrected to 26 Nov 2015*)	(1) Member States shall ensure that distributors have sufficient staff in their employment holding a certificate on training (Article 5(2))
		14 Dec 2015 (*Corrected to 26 Nov 2015*)	(2) MSs shall take necessary measures to restrict sales of pesticides authorised for professional use to persons holding a certificate referred to in Article 5(2)
7	Information and awareness-raising	14 Dec 2012 (*Corrected to 26 Nov 2012*)	COM, in cooperation with MSs, shall develop a strategic document on monitoring and surveying of impacts of pesticides use on human health and the environment
8	Inspection of equipment in use	14 Dec 2016 (*Corrected to 26 Nov 2016*)	MSs shall ensure that pesticide application equipment has been inspected at least once.
9	Aerial spraying	As from 2013	Aircraft shall be equipped with accessories that constitute the best available technology to reduce spray drift

Article	Title	Enforcement date	Obligation
14	IPM	30 June 2013	MSs shall report to the COM on the implementation of measures to promote IPM (Articles 14(1) and 14(2))
		01 Jan 2014	MSs shall describe in their NAPs how IPM principles are implemented by professional users
17	Penalties	14 Dec 2012	MSs shall notify provisions to the COM on penalties applicable to infringements of the national provisions adopted pursuant to the SUD

Most of these initial deadlines were corrected[3] to adapt the initial deadlines to the date of entry into force of the SUD.

To date, The SUD has been amended three times by:

- Regulation (EU) No 652/2014[4] which lays down provisions for the management of expenditure relating to the food chain, animal health and animal welfare, and relating to plant health and plant reproductive material. Article 52 of Regulation (EU) No 652/2014 also deletes Article 22 of Directive 2009/128/EC regarding expenditures,
- Commission Directive (EU) 2019/782[5] which completes Annex IV of the SUD and establishes harmonised risk indicators based on obligations of Article 15(1) of the SUD; and,
- Regulation (EU) 2019/1243[6] which introduced Article 20a in the SUD addressing the modifications of the legal framework governing the powers conferred on the Commission by the legislator as foreseen in the Treaty of Lisbon. The Treaty introduces a distinction between powers delegated to the Commission to adopt non-legislative acts of general application to supplement or amend certain non-essential elements of a legislative act (delegated acts), and the powers conferred on the Commission to adopt acts to ensure uniform conditions for implementing legally binding Union acts (implementing acts).

Member States have brought into force the laws, regulations, and administrative provisions necessary to comply with Article 23 of the SUD which sets the deadline for the transposition of the SUD to 26 of November 2011.[7] Member States transposed the Directive into national measures using different approaches. Several Member States (BG, DE, IE, EL, IT, CY, and MT) have adopted a single measure while others (e.g. BE, LT, and CZ) have adopted more than 40 measures to transpose the SUD. The following graph shows the variability of approaches taken by Member States in transposing the SUD.

[3] Corrigendum, OJ L 161, 29.6.2010, p. 11 (2009/128/EC)

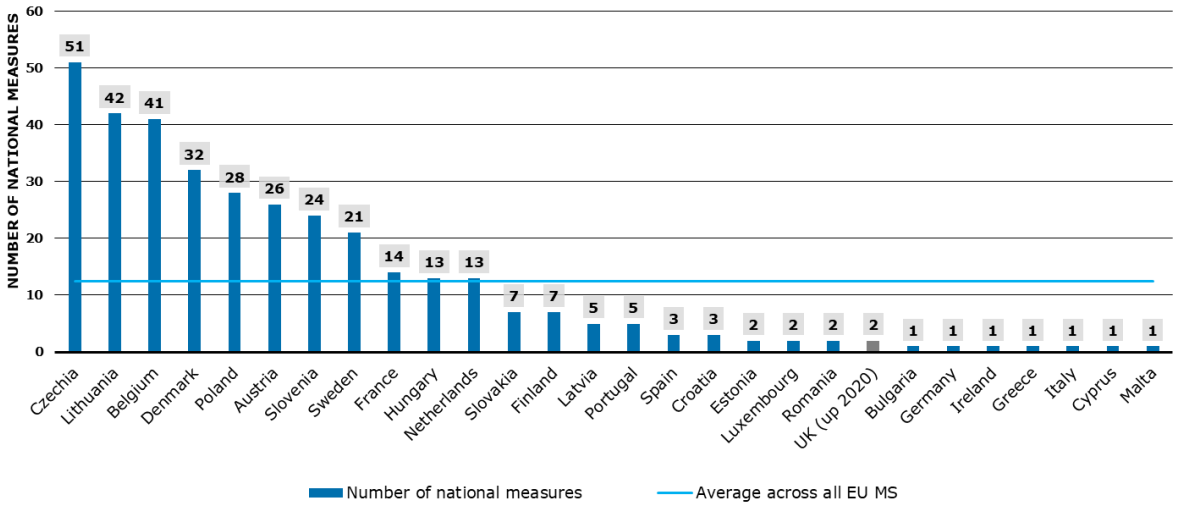
[4] Regulation (EU) No 652/2014 of the European Parliament and of the Council of 15 May 2014 laying down provisions for the management of expenditure relating to the food chain, animal health and animal welfare, and relating to plant health and plant reproductive material, amending Council Directives 98/56/EC, 2000/29/EC and 2008/90/EC, Regulations (EC) No 178/2002, (EC) No 882/2004 and (EC) No 396/2005 of the European Parliament and of the Council, Directive 2009/128/EC of the European Parliament and of the Council and Regulation (EC) No 1107/2009 of the European Parliament and of the Council and repealing Council Decisions 66/399/EEC, 76/894/EEC and 2009/470/EC

[5] Commission Directive (EU) 2019/782 of 15 May 2019 amending Directive 2009/128/EC of the European Parliament and of the Council as regards the establishment of harmonised risk indicators (Text with EEA relevance.)

[6] Regulation (EU) 2019/1243 of the European Parliament and of the Council of 20 June 2019 adapting a number of legal acts providing for the use of the regulatory procedure with scrutiny to Articles 290 and 291 of the Treaty on the Functioning of the European Union

[7] For Croatia, the deadline for transposition has been postponed to 01 July 2013 due to late accession of Croatia to the EU (December 2013)

Figure 3.1. National transposition measures per Member State



Source: European Commission (2021). National transposition measures communicated by the Member States. Available at: https://eur-lex.europa.eu/legal-content/EN/NIM/?uri=CELEX:32009L0128&qid=1611301630493

However, the transposition of the SUD was performed with delays in a high number of Member States. In 2012, after the deadline for transposing the Directive had passed, the Commission initiated infringement procedures on the SUD with 17 Member States (still including the UK at the time)[8]. Reasoned opinions followed for 7 Member States later in 2012[9]. Similarly, the development and communication of National Action Plans (NAP) was delayed in several Member States. As Table 3.2 shows, the deadline of the 14th of December 2012 was missed by many Member States**,** which had not produced NAPs by the end of 2012. In 2013, the Commission initiated pilot investigations on the failure to submit the NAP against 8 Member States[10]. In the following period, all Member States developed NAPs, ensuring compliance with the provision from 2013 onwards.

3.2.2 Implementation of the SUD provisions

Member States have subsequently worked to implement the provisions of the SUD. The figure below summarises the implementation status as presented in 2020 Commission report[11]. It should be noted that this assessment was conducted by the Commission and is not fully shared or agreed by all Member States.

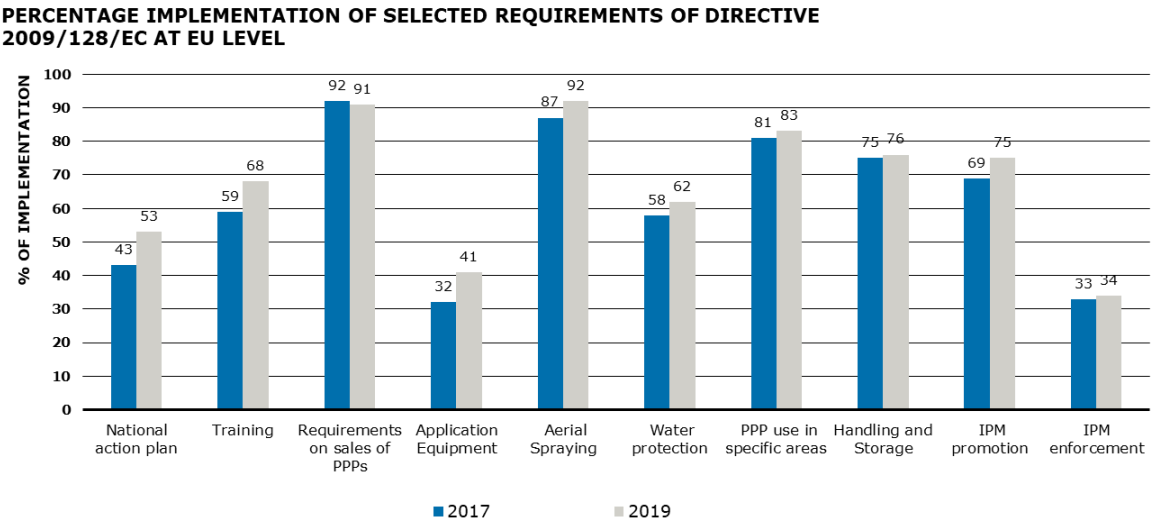
[8] European Parliamentary Research Service (2018) Directive 2009/128/EC on the sustainable use of pesticides; European Implementation Assessment. Edited by M. Remáč. Brussels, Belgium: Ex-Post Evaluation Unit.

[9] Ibid.

[10] Ibid.

[11] European Commission (2020). COM(2020) 204 final, Annex.

Figure 3.2. Overview of implementation status of the provisions of the SUD



Source: European Commission (2020). COM(2020) 204 final, Annex. Available at: https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sud_report-act_2020_annex_en.pdf

The section below shortly presents, where available, additional evidence on the implementation status. This information has been combined with interviews conducted with a sample of Competent Authorities in Member States and views from other stakeholder groups.

Article 4: National Action Plans

In its first implementation report[12], the European Commission highlighted that Member States had different starting points for the development of the NAPs. Six had previously developed action plans, whereas for all others, this was their first plan. Several Member States were delayed in communicating their NAP to the European Commission, and subsequent revisions as required in the SUD are not uniformly undertaken. Table 3.2 provides an overview of the current status of NAPs and updates (in italics Member States which already had action plans in some form according to the impact assessment). Not all NAPs have a defined five-year timeline, when this is the case the year of adoption/revision has been stated (when clearly stated).

Table 3.2. Overview of Member States National Action Plans[13]

Country	First NAP	Revisions
Austria (AT)	2017-2021[14]	
Belgium (BE)	2013-2017	2018-2022
Bulgaria (BG)	2012-2017	2018-2022
Croatia (HR)	2013-2023	
Cyprus (CY)	2013-2017	2018-2022
Czech Republic (CZ)	2013-2018	2018-2023

[12] European Commission (2017). On Member State National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides

[13] Accessed at https://ec.europa.eu/food/plant/pesticides/sustainable_use_pesticides/nap_en

[14] Prior to 2017, multiple action plans were developed for the period of 2012 – 2016 by the Austrian Laender. These are not available on the Commission website. Some previous Laender NAPs are available de-centrally through the websites of the respective Laender.

Country	First NAP	Revisions
Denmark (DK)	2013-2015	2017-2021
Estonia (EE)	2013-2018	2019-2023
Finland (FI)	2011-2020	2018-2022
France (FR)	(2008) 2015	2018
Germany (DE)	2013	
Greece (EL)	2013-2018	2020
Hungary (HU)	2012	
Ireland (IE)	2013	2019
Italy (IT)	2012	
Latvia (LV)	2013-2015	2019-2023
Lithuania (LT)	2013	2019, 2020
Luxemburg (LU)	2013	2018
Malta (MT)	2013-2018	2019-2023
Netherlands (NL)	2013-2018	
Poland (PL)	2013	2018
Portugal (PT)	2013	2018
Romania (RO)	2013	2019
Slovakia (SK)	2012	
Slovenia (SI)	2012-2022	2018-2022
Spain (ES)	2013-2017	2018-2022
Sweden (SE)	2013-2017	2019-2022

In the first implementation report, the European Commission expressed concerns about the "huge diversity in their completeness and coverage" (p.4). The main weaknesses highlighted were:

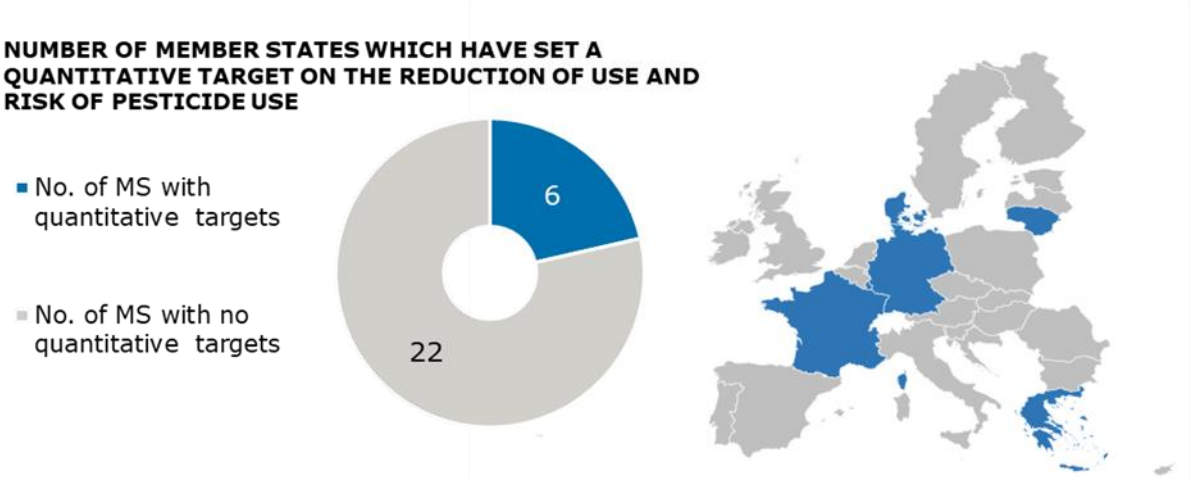
- NAPs varied greatly in terms of detailing how exactly they planned to implement measures pursuant to Articles 5-15 of the Directive.
- NAPs were inconsistent as regards establishing quantitative objectives, targets for risk reduction, measurements and timetables for the various action areas. In around 80% of cases, action plans did not specify how the achievement of targets or objectives will be measured.
- All the NAPs included some measures on the promotion of IPM, in particular to encourage availability of IPM guidelines, and the provision of training or demonstration farms. Nevertheless, the plans did not specify how the application of IPM by farmers would be measured, do not set targets or indicate how implementation would be ensured.

In the second implementation report[15], the European Commission reiterates the concerns in relation to the first NAPs, remarking that revisions had not taken into account comments to ensure measurable and meaningful targets. Building on the review of NAPs conducted by the Commission in 2020[12] on the implementation of national targets, a secondary review was carried out to assess whether there had been changes in Member States which had revised their NAP. Crucially the review looked for quantitative indicators on both the reduction of risk and use. As shown in Figure 3.3, only a small proportion of Member States have set clear quantitative targets, with only the six countries (EL, LT, DE, FR, LU and DK) presenting a clear percentage reduction target for either risk

[15] European Commission (2020). Report from the Commission to the European Parliament and the Council on the experience gained by Member States on the implementation of national targets established in their National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides.

or use of pesticides. France is the only Member State with a clear use reduction target (50% use reduction by 2025 and phasing out of glyphosate by end 2022).

Figure 3.3. Assessment of NAP on quantitative targets for a reduction in use and risk of pesticide use



Source: European Commission (2021). National Action Plans. Available at: https://ec.europa.eu/food/plant/pesticides/sustainable_use_pesticides/nap_en

Further issues surrounding the implementation of NAPs and the SUDs impact on the reduction of risks and impacts more generally, were described in interviews with stakeholders. In particular, a theme which emerged from several stakeholders was that while there are many different measures in place per Member State, it is very difficult to ascertain whether these measures have been translated into tangible outcomes[16]. For example, it was noted that when assessing the impact of NAPs at the EU level, it is very difficult to ascertain the effectiveness of the actions set out by each Member State, primarily due to the lack of consistent and quantifiable data.

Articles 5, 7, 8, 9 & 13

The following points provide a summary of the state of play with regard to Articles 5, 7, 8, 9 & 13 of the Directive.

- **Article 5 - Training**: This article aimed to ensure that professional users, distributors and advisors have access to appropriate training by bodies designated by the competent authorities. In addition, it required Member States to establish certification systems and designate the competent authorities responsible for their implementation. The evaluation shows that training activities have been organised in the large majority of Member States pursuant to obligation of this Article. National certification schemes have also been implemented (e.g., Certiphyto in FR, Phytolicence in BE, etc.). Statistics exist on the number of professional users that have been trained per Member State, however there is no indication whether or not such training has led to e.g. an improvement of the respect of the conditions of use by farmers. This situation led some stakeholders (mainly NGOs) to criticise the quality of the trainings. The Annex to the second COM report to the EP highlights these issues by assessing the percentage of implementation of Article 5 to 59% in 2017 and 68% in 2019.
- **Article 7** - **Information and awareness-raising**: This article aimed to take measures to inform the general public and to promote and facilitate information and awareness raising

[16] This view was emphasised by 2 EU level interviews, 3 economic stakeholders impacted by SUD and 4 Member State Authorities out of 50 interviews.

programmes and the availability of accurate and balanced information relating to pesticides for the general public, in particular regarding the risks and the potential acute and chronic effects for human health. In addition, it required Member States to put in place systems for gathering information on pesticide acute poisoning incidents, as well as chronic poisoning developments. The analysis of the NAPs performed during the evaluation study of the SUD for the EP in 2018 shows that the majority of theme presents general information on how this obligation is fulfilled. Most communication is done via websites and dedicated web portals in addition to dedicated communication campaigns (DE, DK, LU, LV, MT, PL). Ten NAPs (BE, CY, DE, EE, EL, ES, FR, IT, SK, and SE) indicate that methods are in place to collect information on acute poisoning incidents and eight on chronic poisoning developments (BE, CY, EL, ES, FR, IT, SK, and SE). As of 2018, seven other Member States (BG, CZ, LV, LU, MT, PL, and SL) indicated that national competent authorities had the objective of creating a centre aiming at recording acute poisoning incidents and chronic poisoning developments.

- **Article 8** - **Inspection of equipment in use**: This article aimed to ensure that pesticide application equipment in professional use shall be subject to inspections at regular intervals (3 years). In addition, it required Member States to ensure that pesticide application equipment has been inspected at least once by December 2016. After this date only pesticide application equipment having successfully passed inspection shall be in professional use. All 28 NAPs include information related to inspection of equipment of use. However, 10 NAPs (BE, CY, CZ, EE, EL, FI, RO, SE, SI, and the UK) do not include clear timelines and planning. Only three NAPS (BE, CY, and MT) indicate in their NAP that new protocols and new standards have to be developed in cases of newly marketed equipment (e.g., devices intended for ultra-low volume applications, foggers, and devices for the application of a PPP as a solid substance, and drones). Based on SANTE audits and fact-finding missions, the Annex to the second COM report to the EP indicates that the percentage of implementation of "application equipment" is low (32% in 2017 and 41% in 2019). This assessment should be considered carefully as the total number of sprayers in use in the EU is not known as there is no register of PAE to date across all Member States.
- **Article 9 - Aerial spraying**: This article aimed to ensure that aerial spraying is prohibited. Obligations regarding Article 9 of the SUD seems to have been well implemented as reported by both the EPRS report[17] on the SUD and annex to the second COM report to the EP in 2020[18] (87% implementation in 2017 and 92% in 2019). Information on aerial spraying is included in 22 NAPs (not included for CZ, DK[19], EE, EL, ES and RO).
- **Article 13 - Handling and storage of pesticides and treatment** of their packaging and remnants: This article aimed to ensure the necessary measures to ensure that operations were in place by professional users and where applicable by distributors so to not endanger human health or the environment. This obligation also seems to be correctly implemented as highlighted in both reports mentioned above. All 27 MS except AT have provided information on handling and storage of pesticides and on the treatment of their packaging and remnants in the NAP. It should also be highlighted that the PPP industry is contributing to the implementation of this obligation and many national initiatives are led by national PPP industry representatives and associations.

[17] European Parliamentary Research Service, "Directive 2009/128/EC on the Sustainable Use of Pesticides. European Implementation Assessment," 2018, https://www.europarl.europa.eu/RegData/etudes/STUD/2018/627113/EPRS_STU(2018)627113_EN.pdf.

[18] European Commission, "On the Experience Gained by Member States on the Implementation of National Targets Established in Their National Action Plans and on Progress in the Implementation of Directive 2009/128/EC on the Sustainable Use of Pesticides," 2020, https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sud_report-act_2020_en.pdf.

[19] In DK, aerial spraying has been banned since 1981 and no derogations have been granted for the last 20 years.

Article 14: IPM

A cornerstone of the Directive is to achieve a sustainable use of pesticides consistent with crop protection needs, through promoting the use of IPM, crop management practices and alternative approaches or techniques such as non-chemical alternatives to pesticides. To promote IPM, Member States have put in place a range of different measures that are required by the SUD and designed to support or incentivise professional users in the use of alternatives to chemical plant protection. These strongly vary between Member States in existence and design, but include crop specific IPM guidelines, training and certification of professional users and advisory systems. In some Member States, mechanisms not required in the SUD such as taxation, prescriptions systems or demonstration farms are designed to support lower use of chemical pesticides in line with the IPM principles.

However, the 2020 review by the EC[20] showed that the assessment of IPM uptake at farm level by Member States, was the weakest points of implementation across the EU, with only moderate improvement of the situation between 2017 and 2019. While actions have been taken to various degrees in the Member States to promote IPM, controlling its implementation is a central weak spot. This is also reinforced by the fact that ten out of 17 interviewed stakeholders[21] that expressed a specific view on IPM enforcement held negative views. From the EU institutions perspective, the interviewees noted that IPM had been implemented across Europe to some degree however measuring to what extent and what effects this has had is unknown. Similarly, it was emphasised by those stakeholders that the lack of clear results they had expected from mandatory IPM could reside in the lack of clear definitions of what IPM includes, as well as a lack of incentive for farmers to adopt IPM principles. This issue was also reiterated by six Member State Authorities which added the dimension of the control and enforcement of IPM principles, specifically that a voluntary form of implementation does not act as a comprehensive precautionary risk management procedure. For further analysis on the issues surrounding the implementation of IPM see section 4.1.1.2.

3.3 Actions undertaken by the European Commission

Below is a short description of what has been done by the Commission to support and control the implementation of SUD.

- **Guidance documents.** The EC produced a few guidance documents to support the implementation of the SUD[22]. This includes a guidance document on monitoring and surveying of impacts of pesticide use on human health and the environment[23] published in 2017. Furthermore, the EC financed the study "Study on existing monitoring and surveillance activities, communication of the results of these activities to the public and awareness raising programmes put in place by Member States on the impacts of use of plant protection products on human health and the environment"[24] published in 2012. In stakeholder interviews with Member States these documents were not mentioned spontaneously and uptake appears limited (as evidenced by the lack of monitoring and surveying impacts of pesticide use).
- **Launch and maintenance of web portal on the SUD[25].**

[20] European Commission (2020). Report from the Commission to the European Parliament and the Council on the experience gained by Member States on the implementation of national targets established in their National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides. COM(2020) 204 final. Online: https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sud_report-act_2020_en.pdf

[21] This comprised of three EU level representatives, one economic operator and six Member State Authorities.

[22] Article 22(c) of the SUD states that the EC may finance such studies.

[23] See: https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sup_monitoring-guidance_en.pdf

[24] See: https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sup_ppp-report_monitoring-study_20120712.pdf

[25] See: https://ec.europa.eu/food/plant/pesticides/sustainable_use_pesticides_en

- **Training of government officials.** The EC finances trainings to government officials engaged in food and feed safety inspection of EU Member States as part of the "Better Training for Safer Food" programme[26]. Some topics pertinent to the SUD are covered as part of these trainings, including IPM and pesticide equipment testing. Both courses were launched in 2018. A one-off remote BTSF workshop on the SUD also took place in November 2020, in which relevant Commission services exchanged with Member States and EFTA countries on experiences with the implementation of the SUD. The trainings have been welcome but given the broad scope of the legislation it is uncertain whether it has had any kind of result.
- **Adoption of standards on the inspection of spraying equipment**[27] in 2015 as per Article 20 of the SUD.
- **Development and calculation of harmonised risk indicators**[28] as of 2019, after several years delay. It is unclear what caused the delay in developing and agreeing on indicators, the perceptions appear to differ between the Commission and Member States.
- **Audits.** Commission staff carried out audits in RO, EL, LT, CY, AT, IE, and PT (all in 2019), BG, FR, HU and ES (all in 2018) and fact-finding missions in SE, PT, IT, DK, NL and DE (all in 2017) to evaluate the implementation of the SUD[29]. Audit and fact-finding missions significantly increased since 2017.
- **Initiation of infringement procedures** against the two Member States (Bulgaria and Luxemburg) that, by 2012, had not yet transposed the SUD as highlighted in the 2020 ECA report[30]. The infringement register[31] shows in total 17[32] cases which were all opened in 2012; however, all cases were closed as of 2015.
- **Implementation reports as per provision of the Directive**. As per Article 4(1) the Commission submitted to the European Parliament and to the Council a report on the information communicated by the Member States in relation to the NAPs (deadline as per SUD December 2014; report was published in October 2017) and a report on the experience gained by Member States on the implementation of national targets established under the SUD (deadline as per SUD December 2018; report was published in May 2020). As per Article 16 of the SUD the EC should also "regularly submit to the European Parliament and to the Council a report on progress in the implementation of this Directive, accompanied where appropriate by proposals for amendments". No time intervals have been defined for those reports and, besides the two aforementioned reports, no other reports have yet been prepared.
- **Organisation of events.** This included e.g. a forum on sustainable use of pesticides in June 2012, and a workshop on pesticide statistics (incl. harmonised risk indicators) in November 2019.
- **Expert group on the thematic strategy on the sustainable use of pesticides**. As per Article 18 of the Directive states that "The Commission shall put forward as a priority for discussion in the expert group on the thematic strategy on the sustainable use of pesticides the exchange of information and best practice in the field of sustainable use of pesticides and integrated pest management". This is based on the Thematic Strategy which called for

[26] See: https://ec.europa.eu/chafea/food/trainings/index_en.htm.

[27] See: https://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/pesticide-application-equipment/

[28] https://ec.europa.eu/food/plants/pesticides/sustainable-use-pesticides/harmonised-risk-indicators_en

[29] See: https://ec.europa.eu/food/audits-analysis/audit_reports/index.cfm

[30] European Court of Auditors (2020): Sustainable use of plant protection products: limited progress in measuring and reducing risks (Special Report). Online: https://www.eca.europa.eu/Lists/ECADocuments/SR20_05/SR_Pesticides_EN.pdf

[31] See: https://ec.europa.eu/atwork/applying-eu-law/infringements-proceedings/infringement_decisions/?lang_code=en

[32] Besides Bulgaria and Luxemburg also Belgium, Cyprus, Czechia, Denmark, Finland, Hungary, Ireland, Italy, Lithuania, Poland, Romania, Slovenia, Spain, Sweden and the UK.

establishing a system of information exchange at Community level involving Member States and all other relevant stakeholders in order to continuously develop and update appropriate guidance, best practice and recommendations. One meeting of the expert group was organised in June 2009 with approx. 80 participants. A second meeting was foreseen for June 2010 but did not take place. Regular/bi-annual meetings with Member State competent authorities also take place in the framework of the SUD working group.

- **In support of the implementation of the SUD, the EU supports research through FP6, FP7 and Horizon2020**. Research on alternative pest management methods and low-risk PPPs are financed through Horizon2020[33][34]. Further research included the HArmonised environmental Indicators for pesticide Risk (HAIR) project[35] and other initiatives such as ENDURE[36] and C-IPM[37]. The EC also finances the "European Innovation Partnership for Agricultural productivity and Sustainability"[38].

As can be seen by the overview, most actions of the EC took place after 2015, i.e. six years after the adoption of the Directive; this is also confirmed by the recent ECA report which attests that "The first steps in putting the directive into practice were delayed" but that "The Commission has taken increased action since 2016".[39] It should be noted that after the adoption of the SUD the responsibility for the Directive was moved from DG ENV to DG SANTE in 2014, and then also within SANTE between units E4 and F3. It is within the policy responsibility of the current unit in DG SANTE (F.3) since 2016.

[33] Under programme H2020_SFS-04-2019-2020. See: https://cordis.europa.eu/programme/id/H2020_SFS-04-2019-2020

[34] Also under prior EU research programmes projects related to pesticides were financed (710 in total mentioning the word "pesticides" but no detailed assessment was undertaken by the study team on the exact topical coverage of those. See: https://cordis.europa.eu/search?q=contenttype%3D%27project%27%20AND%20(%27pesticides%27)&p=1&num=100&srt=Relevance:decreasing

[35] FP6-POLICIES (2007). Final Report Summary - HAIR (HArmonised environmental Indicators for pesticide Risk)

[36] See: http://www.endure-network.eu/endure/endure_a_resource_for_ipm_projects2

[37] See: https://www.era-learn.eu/network-information/networks/c-ipm

[38] See: https://ec.europa.eu/eip/agriculture/en/european-innovation-partnership-agricultural

[39] European Court of Auditors (2020): Sustainable use of plant protection products: limited progress in measuring and reducing risks (Special Report). Online: https://www.eca.europa.eu/Lists/ECADocuments/SR20_05/SR_Pesticides_EN.pdf

4. Evaluation findings

This section presents findings from the evaluation, based on information collected to date and analysis of this information building upon the work carried out in the 1st Interim Report.

4.1 Effectiveness

As per the Better Regulation Guidelines, an assessment of effectiveness looks at the progress made towards the achievement of the objectives of a policy intervention, looking for evidence of why, whether or how these changes are linked to it[40]. The assessment of effectiveness assesses whether the intended outcomes have been achieved (or are likely to be achieved in the future). At a broader level, the analysis assesses the contribution of the SUD in relation to the key actions, such as the establishment of NAPs, promotion of IPM and others. The analysis also assesses the effectiveness of pesticide statistics towards achieving the objectives, thus broadening the scope to include Regulation (EC) 1185/2009 when it comes to the provision of statistical data for the implementation of the SUD directive.

The following box provides a summary of the findings under the effectiveness criterion.

Box 1. Summary of findings under the criterion of effectiveness

Article 1 in Directive 2009/128/EC states that that the objective is to achieve a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as nonchemical alternatives to pesticides. The reduction of risks from pesticide use and associated impacts was primarily envisaged to be implemented through all the SUD provisions in combination, adapted to the situation in each Member States through the adoption and implementation of National Action Plans (NAPs). All Member States have adopted NAPs, outlining priorities and actions in line with the SUD provisions, however the evaluation concludes that the level of ambition and implementation has been uneven across Member States.

While many of the SUD provisions have been implemented in most Member States, and likely contributed to a reduced risk of pesticide use as suggested by the decrease of Harmonised Risk Indicator (HRI) 1 by 20% over the last five-year period (2014-2018), it is not possible to establish the extent of risk reduction or whether the Directive has had a direct contribution to reducing risk of pesticide use. Comprehensive European indicators related to the potential environmental and health impacts of pesticide do not exist or are not available, hence the evaluation cannot establish whether potential harmful effects of pesticide use have decreased. There are a few indications of improvements, such as less pesticides and metabolites found in water bodies, but the data available is not complete and makes it difficult to draw conclusions on an EU level. Indications based on sales data show that a shift has occurred from more hazardous to less hazardous pesticides (as measured by the HRI 1 developed for the SUD). However, this needs to be contrasted with an increasing use of so called emergency authorisations (use of non-authorised products) and relatively stable overall sales figures.

The second key objective of the SUD relates to the promotion of Integrated Pest Management (IPM) as a mandatory practice, as a means to reduce dependency on pesticide use. Reducing the use of pesticides is not an explicit objective per se of the Directive, but it was assumed that implementation of IPM and an increased use of alternative methods to control pests would lead to a use reduction, whether this has happened remains uncertain. The level of implementation of IPM

[40] European Commission, Better Regulation Guidelines, Chapter III, Evaluation (including fitness checks) p. 59

has not been possible to establish, due to the lack of consistent monitoring at Member State level. Evidence at the national level indicated that the SUD was effective in further raising awareness IPM as well as boosting IPM practices that were already in place prior to its entry into force. The evaluation finds that awareness and knowledge about IPM has likely improved, however whether this has translated into a change in practices at farm level is more uncertain.

By and large, compared to what was expected in the Impact Assessment of the Thematic Strategy, the Directive appears to have been moderately effective. Several key results have failed to materialise, such as a stronger evidence base for policy making on pesticide use and an improved knowledge about environmental and health effects of pesticide use, broad introduction of alternative techniques to control pests (IPM) and improved land management.

4.1.1 Contribution of the SUD's envisaged actions in achieving its objectives [EQ 1]

This evaluation question looks at six key areas ("objectives") covered by the SUD (as listed in the ToR for this study) in an effort to minimise the impact of pesticides on human health and the environment through reduced dependency, and the increased use of low risk and non-chemical pesticides[41]. The box below presents EQ 1 in its entirety.

EQ 1: To what extent have the actions envisaged by the SUD contributed to achieving the following objectives? *(a). EQ 1.1 Reducing dependency on pesticide use and reducing the risks and impacts of pesticide use on human health and the environment; (b). EQ 1.2 Achieving a sustainable use of pesticides consistent with crop protection needs, including promoting the use of IPM, land management practices and alternative approaches or techniques such as non-chemical alternatives to pesticides; (c). EQ 1.3 Complementing existing EU legislation and addressing the use phase of pesticides; (d). EQ 1.4 Improving the behaviour and practices of pesticide users; (e). EQ 1.5 Improving the accuracy of pesticide application equipment; (f). EQ 1.6 Improving monitoring of pesticide use and of the associated*

The following sections present an examination of the main trends and changes in the use of pesticides and the subsequent risk they present per sub-question as presented in the box above. It is through this examination that an assessment can be made of the degree to which the actions envisaged by the SUD contributed to said changes.

It should be noted that measuring the impact and determining to what extent the reduction is a result of the SUD is challenging and is further exacerbated by inconsistencies in data being gathered and other external effects (i.e. other pieces of legislation). This finding was also reported in the European Parliamentary Research Service's 2018 report, where it was noted that it was difficult to quantify and/or measure the impacts of the SUD due to it not being the only piece of European legislation which manages and monitors pesticides[42]. Thus, this caveat should be taken into account under each of the sub-evaluation questions (see section 2.3 for further information on the main challenges under this study).

4.1.1.1 Reducing dependency on pesticide use and reducing the risks and impacts of pesticide use on human health and the environment [EQ 1.1]

Prior to the discussion on this EQ, it is first important to describe the understanding behind the sub-question in relation to the legal texts of the SUD. As this sub-question covers three main areas (reducing dependency, reducing the risks of pesticide use and impacts of pesticide use on human

[41] European Commission (2020). The experience gained by Member States on the implementation of national targets established in their National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides.

[42] EPRS (2018). European Implementation Assessment.

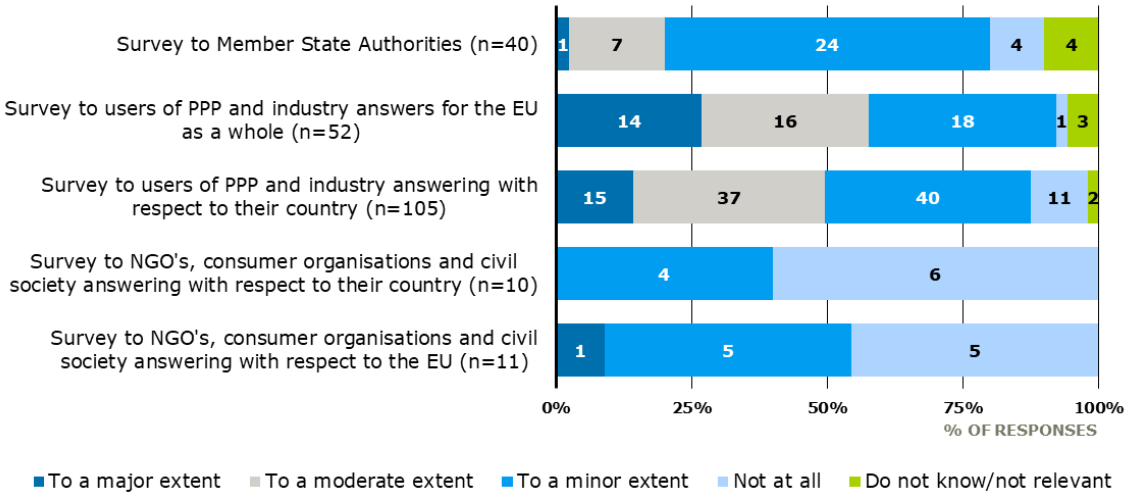
health and the environment), it is important to understand them in turn. Firstly, with regards to reducing the dependency on pesticide use, this aspect is mentioned under Article 4 in the context of implementation of the National Action Plans (NAPs) and Integrated Pest Management (IPM). Similarly, with regards to reducing the impact of pesticide use on human health and the environment, this specific aspect is only listed under Article 15 in the context of indicators, reporting and information exchange. The final element of reducing the risks of pesticide use on human health and the environment, is included under the broader objectives of the SUD, as listed under Article 1.

The following section will be divided into three main sections in order to answer each part of the sub-question in-turn. The three sections will seek to answer the degree to which the actions envisaged by the SUD contributed to [1] reducing the dependency on pesticides, [2] reducing the risks of pesticide use on human health and the environment and [3] reducing the impact of pesticide use on human health and the environment.

Degree to which the actions envisaged by the SUD contributed to reducing the dependency on pesticide use

From review of the available quantitative and qualitative data, there is sparse evidence to suggest that the actions envisaged by the SUD directly contributed to a reduction on the dependency on pesticide use. Member State authorities responding to the targeted survey see this objective as the least achieved out of the list in the box above. 70% of respondents, who answered this question (28 out of 40), expressed (at most) a limited contribution of the SUD to the objective. This view was shared by NGOs, consumer organisations and civil society which presented an almost unanimous view of the SUD only contributing to a minor extent/ not at all. Interestingly, there were varying results from users of PPP and industry which presented a more positive outlook on the contribution of the SUD in reducing the dependency of chemical pesticides, as shown in the figure below.

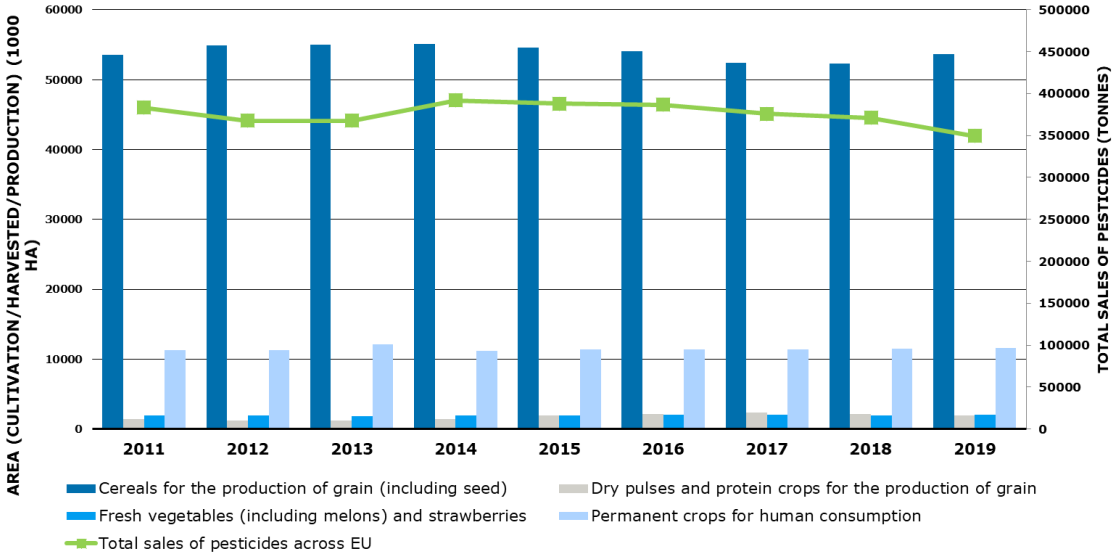
Figure 4.1. Targeted survey results: *In your opinion, to what extent has the SUD contributed to achieving the following objectives in your country/ the EU - Reducing the dependency on use of chemical pesticides*?



As detailed under Article 4 of Directive 2009/128/EC, a reduction of dependency of pesticides was foreseen to be achieved through the adoption of NAPs and the development and introduction of IPM and alternative approaches and techniques. As shown in Figure 3.3 in Section 3.2.2, only a small proportion of Member States set clear quantitative targets to reduce the use and dependency of pesticides in the future. Thus, prior to assessing the degree of implementation of IPM and its impacts

on reducing dependency of pesticides, it is first important to assess the current state of play with regard to the sales of pesticides. The figure below presents the development of overall sales of pesticides[43], put in context of the overall volume of agricultural production over the years 2011–2019.

Figure 4.2. Total amount of sales of pesticides compared to overall volume of agricultural production, 2011–2019 EU 27



Source: Eurostat (2021). Pesticide sales. Pesticide sales, Dataset: [aei_fm_salpest09] and Crop production in EU standard humidity dataset [apro_cpsh1]

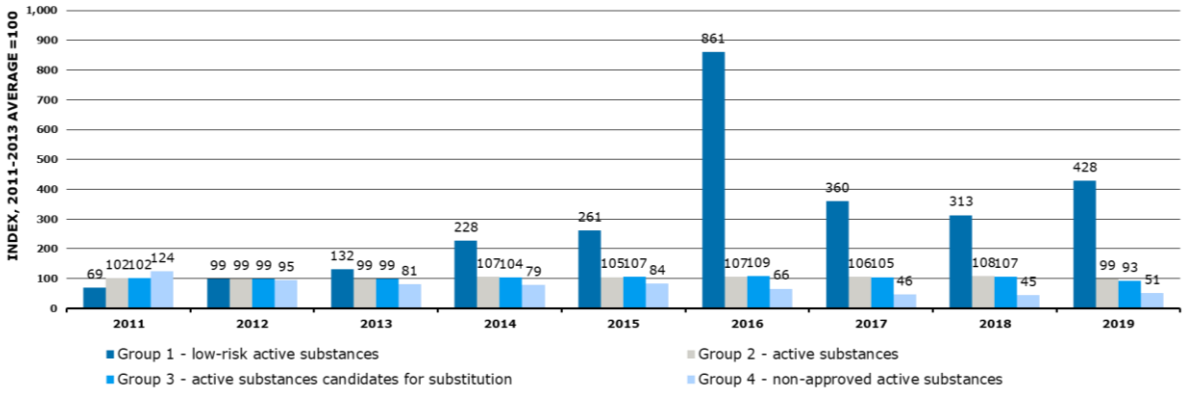
As shown above, sales data highlights no clear downward trend, although statistically there has been a 10% reduction between 2011 and 2019 levels.

The figure below zooms in on the trends in the risk of pesticides by group. More specifically it shows the trends in the quantities of active substances contained in pesticides placed on the market for each group used in the calculation of Harmonised Risk Indicator 1 (thus the index value in the Y axis is set at the 2011-2013 average, as used in HRI 1). As such, the index highlights that for Group 4 (non-approved active substances), the consumption is decreasing between 2011 and 2019.

Both Groups 1 and 2 are comprised of micro-organisms and chemical active substances while Group 3 includes the substances classified as 'candidates for substitution' (CFS) based on a set of seven criteria as listed under Regulation (EC) No 1107/2009 of which, but not only, but the classification of these active substances also as regards their carcinogenic, repro-toxic and endocrine disrupting properties. Finally, Group 4 refers to non-approved active substances that are used in the context of emergency authorisations only.

[43] Note that some of sold pesticides are used outside agriculture, by private and professional users (private and public gardens, parks, traffic areas, golf courses etc.)

Figure 4.3. Trends in the risk of pesticides by group across EU 28



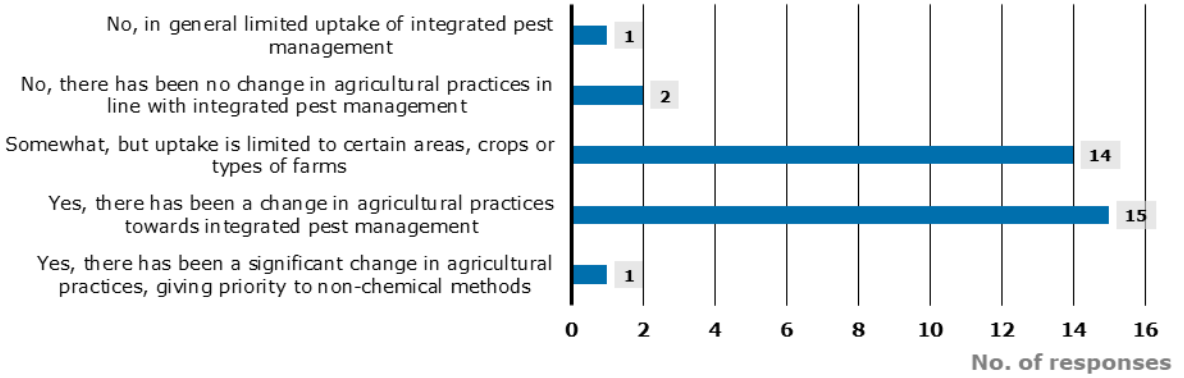
Source: Eurostat (2022). Harmonised risk indicator 1 for pesticides by categorisation of active substances (Directive 2009/128/EC) [AEI_HRI]

As can be seen, there was a considerable increase of the index of low-risk pesticides and a significant decrease in the index of Group 4 substances. Such figures suggest a reduction of risks even if it is recognised that the volumes of active substances sold under each of these two groups are rather limited. The majority of sales are from substances from Group 2 and Group 3. Since 2015 and the establishment of the CFS listing, several substances of Group 3 have not seen their approval renewed. The volumes of these substances have been replaced by either other CFS substances or by Group 2 substances which are presenting a less hazardous profile. However, such details and 'transfers' of volumes from Group 3 to Group 2 which would lead to reduction and impacts are not known.

With regards to the implementation of IPM and alternative approaches or techniques, there is little quantitative evidence to point towards a clear increase in the use of IPM, and a subsequent reduction in the dependency of pesticides, even though awareness was found to have increased. In 2020, a review by the European Commission (EC)[44] found that the provision of IPM was one of the weakest areas of implementation across the EU, with only a small percentage of improvement of the situation between 2017 and 2019. Member State authorities that participated in the targeted survey overwhelmingly report changes in agricultural practices or some changes focused on specific regions or crops. The figure below presents the distribution of the 33 responses to the question.

[44] European Commission (2020). Report from the Commission to the European Parliament and the Council on the experience gained by Member States on the implementation of national targets established in their National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides. COM(2020) 204 final. Online: https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sud_report-act_2020_en.pdf

Figure 4.4, Member States survey: *In your view, did SUD lead to an uptake of integrated pest management in your Member State/Country?* (N=33)



N.B. Out of the 33 responses, 23 Member States + Iceland is represented.

The Commission's review[45] specifies that Member States undertake activities to promote IPM to differing degrees. For example, the table below shows that the development of crop specific IPM guidelines that can help professional users in the uptake of IPM has taken place in most Member States, even though at varying extent and level of detail. However, the assessment through controls and the corresponding enforcement are found to be weak, which creates limited evidence on the effective implementation of IPM across the EU. From stakeholder consultation, qualitative assessments from stakeholders pointed to agreement with this initial assessment by the Commission. These points are supported by the findings of the case study on IPM and lead to a limited evidence base to verify the responses made by Member State authorities, a point also expressed by 76% (13 out of 17) targeted survey respondents who see limited changes in IPM practices.

Table 4.1 Development of IPM guidelines in the Member States

Member State	Number of IPM guidelines	Crops for which guidelines have been developed	% of utilized agricultural area (UAA) for which IPM guidelines have been developed (if available)
Austria	2	Cereals, vineyards	-
Belgium	3	No further detailed information	-
Bulgaria	47	Guidelines approved in 2008, and have not been updated since; updating of the Guidelines was an action under Measure 6 of the NAP, but it was re-scheduled for the end of 2022	90%
Croatia	4	Field crops, vineyards	6.8%
Cyprus	1	Vineyards	-
Czechia	31	Range of field crops, permanent crops and vegetables	95%
Denmark	60-70	Guidelines covering all major crops	
Estonia	26	No further details available	49.7%
Finland		No information, states that IPM Guidelines are available, and these were developed by private stakeholder, but no specific information on number and crops	-
France	5	Guidelines for arable crops, viticulture, vegetable growing, fruit growing and tropical crops	-
Germany	17	Fruit and vegetables; golf courses; sugar beet; home gardening; medicinal and	-

[45] Ibid.

Member State	Number of IPM guidelines	Crops for which guidelines have been developed	% of utilized agricultural area (UAA) for which IPM guidelines have been developed (if available)
		aromatic plants/herbs; urban greening; gardening, landscaping and sportsground construction; maize; railway tracks; nurseries; woods/forests; storage protection; potatoes; arable farming; vineyards; hops; ornamental plants	
Greece	7	Vineyards, tobacco, cherry, rice, kiwi, olives and cotton	24%
Hungary	40	-	90%
Ireland	3	1 general Guidance document, and 2 crop-specific Guidance documents; however, both crop-specific ones are focused on crop management in general rather than specifically on IPM	-
Italy	Developed at regional level	E.g., 78 crop-specific IPM protocols (55 for arable crops, 16 for fruit trees and 7 for medicinal plants) in Campania, and 98 in Tuscany	95%
Latvia	25	No further details available	Almost 100%
Lithuania	20	Winter wheat, spring wheat, spring barley, peas, winter oilseed rapes, winter triticale, oats, potatoes, carrots, apples, beans, winter rye, spring oilseed rape, corn, buckwheat, beet, cabbage, onions, black currants and strawberries	-
Luxembourg	0	-	-
Malta		Reported that guidelines are available but no further details on the number and/or crops covered	-
Netherlands	60	Mainly crop/pest control measures listed, without giving emphasis on non-chemical alternatives; in addition, crop-specific Guidelines were available, which are developed by other stakeholders	-
Poland	68	Covering a wide range of crops, forestry, mushroom production and gardening for non-professional users	98%
Portugal	72	1 general and 71 crop-specific guidelines	-
Romania	1	General IPM guidelines, crop specific guidelines under development	-
Slovakia	0	-	-
Slovenia	4	No further details on crops/groups of crops covered	-
Spain	26	Guidelines including forestry and agricultural crops	80%
Sweden	10	-	36%

Source: EU Commission data based on 2017 web survey among Member States, complemented with audits and fact-finding missions

The findings described above are also consistent with the results from the European Court of Auditors report[46]. In particular, interviewed farmers were perceived to have a high degree of awareness, however since the proportion of users complying with the IPM principles was not recorded during inspections, it was not possible to assess the true implementation of IPM at the Member State level. This was also confirmed in the Public Consultation where both professional and non-professional users of pesticides answered that they have a strong awareness of any other

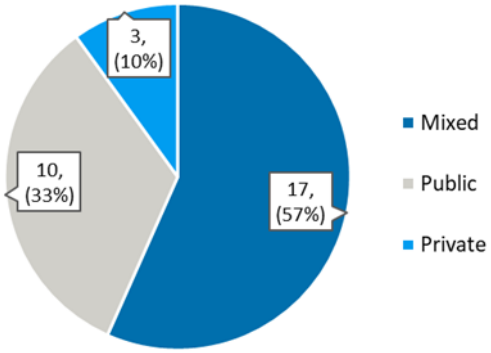
[46] European Court of Auditors (2020). Sustainable use of plant protection products: limited progress in measuring and reducing risks Online: https://www.eca.europa.eu/Lists/ECADocuments/SR20_05/SR_Pesticides_EN.pdf

control techniques, apart from pesticides use (97% and 92% respectively[47]). However, when asked why other control techniques are not used instead of pesticides, the main response from both user groups was that pesticides are more effective and provide better and more reliable control of pests[48]. This is not necessarily at odds with IPM if these pesticides are used as a last resort, a question that was not covered by the public consultation questionnaire.

Interestingly, out of those that responded positively to the implementation of IPM principles[49], the theme of the lack of definitions and awareness was also raised. It was noted that while there are examples of where the implementation of IPM at the EU level appears to present positive results, at the level of individual farmers, the state of implementation is much more complex. Training activities and peer-to peer learning was seen as an important driver in the implementation of IPM, however its application across all Member States is not consistent, thus limiting the effectiveness of IPM and the SUD more generally, particularly in reducing the dependency of pesticide use.

Information gathered through the Member State survey provided an indication of the reasons behind differences in the application of trainings across all Member States. Most notably, each Member State was found to set their own standards and accreditations for training providers with some being public, some private and some being a mixture of providers (as shown in the figure below). Furthermore, some Member States were found to not set standards for training, thus this variation in the provision of trainings provides one possible explanation for the differences in training and peer-to-peer support across the EU.

Figure 4.5. Member State survey: Is the training provider a public or a private sector body? (n=30)



Degree to which the actions envisaged by the SUD contributed to reducing the risks and impact of pesticide use on human health and the environment

From review of the available quantitative and qualitative data, there is evidence which indicates that there has been a reduction in terms of the risks of pesticide use on human health and the environment. This finding is not consistent across other indicators (i.e., ecological evidence, MRL data and the HRI 2) and sources, further highlighting the issues in being able to definitively state whether there has been a reduction of risk to all aspects of the environment (i.e., contamination of soil, water, turf, and other vegetation as well as impact on biodiversity).

It should be reiterated that the objective of reducing the risks of pesticide use on human health and the environment is included under the broader objectives of the SUD, as listed under Article 1 in

[47] Out of 470 participants (professional users + non-professional users)

[48] 291 out of 362 Professional users ranking it 1 and/or 2 on a scale from 1 to 5 (1 being most important, 5 being least important), 64 out of 79 Non-professional users ranking it 1 and/or 2 on a scale from 1 to 5 (1 being most important, 5 being least important).

[49] This comprised of 1 Pesticide user, 3 "other" industries impact by SUD and two Member State Authorities.

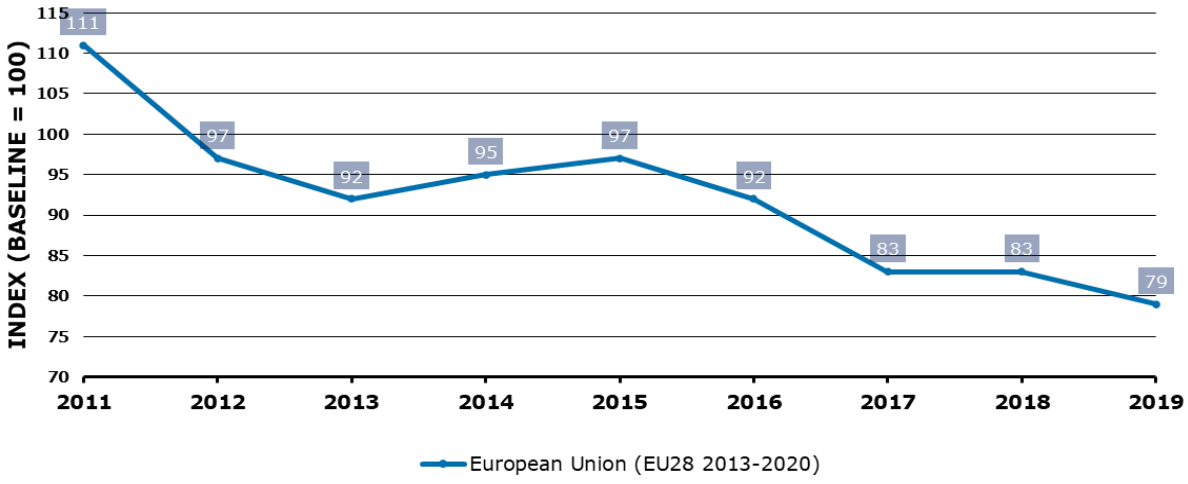
Directive 2009/128/EC. Thus, reducing the risks of pesticide use was primarily envisaged to be implemented through the collective action of all SUD activities.

One of the ways in which the Commission monitor and calculate the risks associated with pesticide use is through Harmonised Risk Indicators (HRIs). Harmonised Risk Indicator 1 is calculated by multiplying the quantities of active substances placed on the market in plant protection products by a weighting factor. Active substances are grouped into four categories as described in Figure 4.3. The weightings applied to each category are intended to reflect policy on the use of pesticides and to support the goal of the SUD to reduce the risk and impact of pesticide use and promote alternative approaches or techniques. Further the weighting should also be noted for reflecting the hazardous properties of active substances. The following sections will discuss in turn the role of the SUD in contributing to the reduction of overall risks and human health and environmental risks and impacts.

Overall risks

As shown in HRI 1, since 2011-2013 there has been a steady reduction in the level of risk across Member States of 21%[50] as depicted in the figure below. In this respect, the SUD could be said to have contributed to a reduction in the risk to human health and the environment from pesticides in the European Union in the period from 2011 to 2018, with no significant change between 2017 and 2018.

Figure 4.6. Trends in Harmonised Risk Indicator 1, established under Commission Directive (EU) 2019/782 (2011-2019)



N.B. The HRI 1 baseline value (100) is based on the average from 2011-2013. It should also be noted that the EU composition in 2011-2012 was EU-27, and 2013-2018 was EU-28 with the introduction of Croatia in 2013.

While there has been an overall 21% reduction in risk at the EU-level, looking at the Member State specific HRI 1 values over time, it is clear that this overall trend is composed of high contrasting ranges in Member States[51]. One of the main causes for the varying ranges in HRI 1 values per Member State lies in the levels of Groups 3 and 4 substances which represent the more hazardous active substances[52] as well as active substances that are not approved. This was found to be

[50] As shown in the Commission Report (2020). COM(2020) 204 final, p.8.

[51] Eurostat (2021). Harmonised risk indicator 1 for pesticides by categorisation of active substances (Directive 2009/128/EC). Dataset AEI_HRI. Available at: https://ec.europa.eu/eurostat/databrowser/view/aei_hri/default/table?lang=en

[52] Group 3 are the more hazardous active substances (active substances that meet the cut-off criteria as set out in points 3.6.2. to 3.6.5 and 3.8.2 of Annex II to Regulation (EC) No 1107/2009 or are identified as candidates for substitution in accordance with the criteria in point 4 of that Annex)

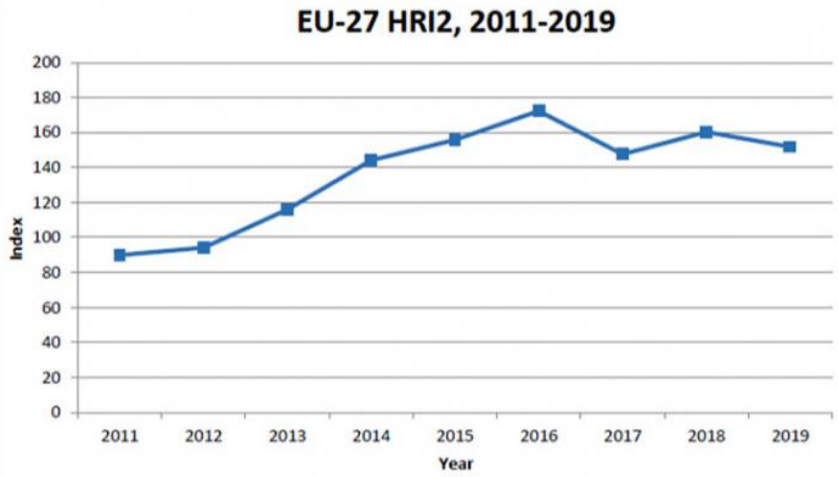
particularly the case for countries such as Bulgaria (with a significant spike in 2011)[53], Estonia, Latvia, Cyprus, Lithuania and Finland. Other contextual factors may also have had an impact on these differences, such as an increase in agricultural production which was observed in Latvia for example, however this trend was not consistent across all respective countries. Furthermore, from interviews, several stakeholders highlighted that this reduction in risk could be attributed to other pieces of EU legislation (primarily Regulation (EC) No 1107/2009) or existing national initiatives that were in operation prior to the SUD[54].

When interpreting the level of risk presented under HRI 1, it is important to note that the indicator does not segregate the level of risk across different risk areas such as environmental and human health. Thus, while HRI 1 presents an overall decreasing trend, it does not specifically show the progress made (particularly by the SUD) in reducing the risk in specific areas.

HRI 1 is calculated by multiplying the quantities of active substances placed on the market by weighting factors. The weightings applied to each category are intended to reflect policy on the use of pesticides and to support the goal of the Sustainable Use of Pesticides Directive to reduce the risk and impact of pesticide use and promote alternative approaches or techniques. HRI 2 is based on the number of emergency authorisations granted under Article 53 of Regulation (EC) No 1107/2009 by each Member State. Similar to HRI 1, active substances are grouped into 4 categories, and weightings are applied to each category. The same baseline average (2011-2013) is also applied and used as the starting point against which subsequent values are compared.

By contrast to HRI 1, HRI 2 presents a 56% increase in the period from 2011 to 2018, and an 8% increase compared to 2017, but remains 17% below the peak of 2016, as shown in the graph below. It should be noted that the sophistication of HRI 2 is limited due to a limited number of Member States who have recorded the scale of emergency authorisations. However, guidance on emergency authorisations was updated with effect from the 1st of March 2021, so that Member States are now required to report the area treated in each case. This data could be used to develop a more sophisticated version of HRI 2.

Figure 4.7. Harmonised Risk Indicator 2



Source: European Commission (2021). Trends in Harmonised Risk Indicators for the European Union[55]

[53] Eurostat is investigating the Bulgarian 2011 data in co-operation with Bulgarian statistical office.

[54] This view was expressed by 2 EU level representatives, 2 Member State Authorities and 3 "other" industries impacted by SUD

[55] https://ec.europa.eu/food/plants/pesticides/sustainable-use-pesticides/harmonised-risk-indicators/trends-eu_en

Reducing risks and impact on human health

In assessing the risks on human health, it is important to state that concerns on the use of pesticides and their impact on human health and possible effects have long been identified. Furthermore, it is important to separate the risks to human health for both the [1] users of pesticides (professional and non-professional) and [2] citizens living close to areas where pesticides are applied as well as consumers of food products.

Risks and impact to human health for users of pesticides

While there are no clear aggregated data at the EU level on the level of risk specifically for users of pesticides, **several meta-analyses of academic and scientific literature point to similar and recurring conclusions on the risks and possible impacts**[56]. In particular, from the available data gathered through the meta-analysis conducted by Inserm (2021), it was found that there is a strong presumption of there being a link between exposure to pesticides and six main pathologies. These include non-Hodgkin's lymphoma (NHL), multiple myeloma, prostate cancer, Parkinson's disease, cognitive disorders, chronic obstructive pulmonary disease and chronic bronchitis. These findings are further supported from toxicological studies which point towards mechanisms of action of active substances and families of pesticides that are likely to lead to the health effects demonstrated by epidemiological studies.

Across many of these identified diseases, evidence from academic studies[57] and EFSA annual reports arrive at similar conclusions that it is difficult to categorically link specific pesticides with increased or decreased risk to human health. Despite this, currently available data from meta-analysis by Inserm (2021) points to greater links between the risk of diseases and the use of herbicides and insecticides compared to other categories.

Taking into account that the original intention of the SUD's actions were to contribute to the reduction of risk of pesticide use on human health, findings across data sources point to the SUD having a more in-direct contribution. For example, training activities under Article 5 of the SUD lays down the requirement for all MSs to establish certification systems and designate CAs responsible for their implementation. From interviews, out of the 25 stakeholders that discussed the topic of training activities, 17[58] acknowledged the importance of such activities in raising awareness and improving practices. This was further confirmed in the Public Consultation where the majority[59] of pesticide users confirmed that they had completed a training course concerning the safe use of pesticides. Furthermore, the majority of users were of the view that following the training courses, they believed that their knowledge on the safe use of pesticides as well as minimising human exposure had improved a lot.

Thus, on the assumption that more training activities could lead to increased knowledge and awareness of the risks to human health, the requirement by the SUD for trainings to be conducted in all Member States has an in-direct effect on reducing the risk of pesticide use. Notwithstanding this, the lack of EU level data both on human health impacts for users and on the level of awareness

[56] Inserm (2021). Arnold, T. Tilton, L. Pesticides and effects and health; New data, doi: 10.5749/j.ctvg251hk.27.

[57] Nicolopoulou-Stamati, P. et al. (2016) 'Chemical Pesticides and Human Health: The Urgent Need for a New Concept in Agriculture', Frontiers in Public Health, 4(July), pp. 1–8. doi: 10.3389/fpubh.2016.00148;

Damalas, C. A. and Eleftherohorinos, I. G. (2011) 'Pesticide exposure, safety issues, and risk assessment indicators', International Journal of Environmental Research and Public Health, 8(5), pp. 1402–1419. doi: 10.3390/ijerph8051402;

Kim, K.-H., Kabir, E. and Jahan, S. A. (2017) 'Exposure to pesticides and the associated human health effects', *Science of The Total Environment*, 575, pp. 525–535. doi: 10.1016/j.scitotenv.2016.09.009.

[58] This included 6 Member State representatives, one international organisation, two EU representatives, one NGO, Four "other" industries affected by the SUD. 1 pesticide producer and two pesticide users.

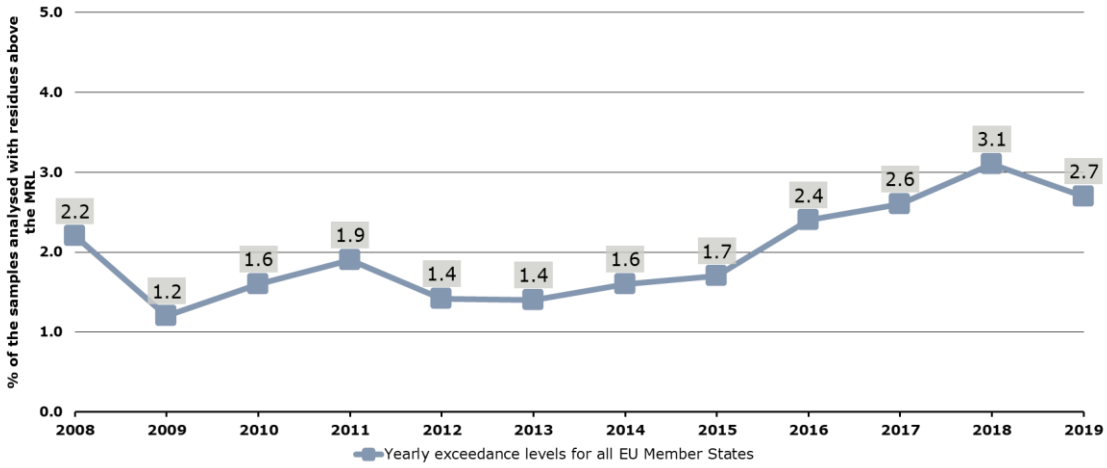
[59] 373 out of 391 respondents which answered as users of pesticides

among farmers of the human health risks, makes it difficult to directly correlate the introduction of the SUD and its effects on reducing the risk to human health for pesticide users.

Risks and impact to human health for non-users of pesticides

The second part under the area of human health relates to the risks and impacts for non-users of pesticides, including citizens/ consumers as well as those who live or are close to areas where pesticides are applied. Regarding consumers in particular, one of the main sources of data originates from reporting conducted by EFSA on the Maximum Residue Levels (MRL), specifically on the levels of exceedance rates. In assessing the average MRL exceedance levels[60] from 2008-2019 provided by EFSA, data presents an overall fluctuating trend as shown in the graph below. It should be noted that the targeted nature of samples as a basis for MRL checks limits the possibility to draw direct links to broader pesticide use.

Figure 4.8. Average Maximum Residue Level Exceedance rates for samples with origin in EU countries



Source: EFSA (2020). European Union report on pesticide residues in food (2008-2019). N.B. This graph displays the average across all EU 27 Member States + UK of the MRL exceedance rates for samples grown in reporting countries. These numbers should be interpreted with caution due to different priorities in the design of each MS's national monitoring plans.

It should be caveated however that these averages should be interpreted with caution when comparing rates across Member States due to the differences in national monitoring activities (i.e., in the levels of risk-based sampling, different food trade interests and patterns of pesticide use). It should also be noted that these averages only present the reported exceedances for samples with an origin in the EU-28, while the rate for non-EFSA reporting countries is noticeably higher[61]. Similarly, the increase in MRL from 2014 onwards could be linked to improvements in the targeted nature of residue sampling, however it is not clear from EFSA reporting to what degree this has accounted for increases in MRLs[62]. Despite this, MRL testing is undertaken as a compliance check and does not aim for representativeness or comprehensiveness. The number of samples that were tested also changed year on year, thus this may also have an impact on the average exceedance rates.

[60] MRLs for pesticides are based on good agricultural practices and dangerous exposure thresholds for vulnerable consumers. In this respect, their exceedance represents a health concern for vulnerable groups rather than for the entirety of consumers. See: https://www.efsa.europa.eu/en/topics/topic/pesticides#group-maximum-residue-levels-

[61] EFSA (2020). European Union report on pesticide residues in food (2008-2019).

[62] Annual reports from EFSA. Available at https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2021.6491

Despite this however, on acute exposures to pesticides, it was concluded across the annual assessments conducted by EFSA that the probability of being exposed to pesticide residues which could lead to adverse health effects are low. It should be noted that for chronic exposure, at present there is not a significant evidence base in which to definitively state the possible long terms effects.

With regards to the possible contamination of living areas and exposure to those living in the proximity of "use" areas, similar to studies conducted on chronic exposure, the evidence is in-conclusive. For example, some studies have found that residents living close to spraying areas are exposed to higher pesticide levels compared to reference groups (i.e., residents who do not live near areas that are sprayed with pesticides)[63]. The degree to which these local spraying events have an effect on human health of local populations is however inconclusive, with comparable studies finding no conclusive effects to human health that can be linked to specific timeframes of pesticide application[64].

Data availability on pesticide use in areas with high potential for exposure of non-users is limited. The targeted survey to Member States found that in the countries of a majority of respondents (22 out of 35) monitoring systems to collect information on pesticide use in sensitive areas are not in place or not known to the respondent. In those Member States[65] that indicate that data collection is performed, the use of the data often requires an approval.

Similar to the previous sub-section, considering that the intentions of the SUD's actions were to contribute to the reduction of risk of pesticide use on human health, findings across data sources point to SUD having more of an in-direct contribution. For example, under Article 7 of the SUD, it states that "Member States shall take measures to inform the general public and to promote and facilitate information and awareness raising programmes and the availability of accurate and balanced information relating to pesticides for the general public, in particular regarding the risks and the potential acute and chronic effects for human health".

While interviews with stakeholders did not uncover specific insights in the impact of the SUD on improving human health per se, results from the Public Consultation highlighted that 81% of respondents felt that they were informed of the impacts that pesticides currently used in the EU may have on the environment, human and animal health. Thus, while data on MRL exceedance levels, as well as from HRI 2 highlight that dependency on pesticides persists in the EU, it is through measures such as raising awareness and training that the SUD may have had an in-direct impact on reducing the risks and impacts to human health. However, the lack of sufficient data and methodologies to calculate this assumption with statistical certainty hinders the ability to state the true effectiveness of the SUD in this regard.

Similarly, evidence from the targeted surveys outlined further divisions between users and non-users of PPP. For example, users of PPPs were of the view that the SUD had contributed to a reduction of risks and impacts of pesticide use on human health, which was also broadly supported by Member State authorities. NGOs, consumer organisations and civil society on the other hand largely disagreed as shown in the figure below.

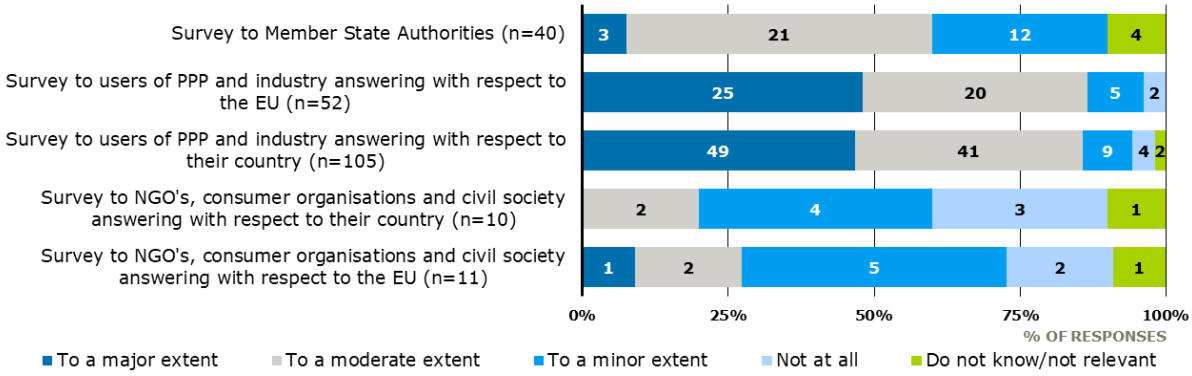
[63] Dereumeaux, C. et al. (2020) 'Pesticide exposures for residents living close to agricultural lands: A review', Environment International. Elsevier, 134(September 2019), p. 105210. doi: 10.1016/j.envint.2019.105210.

Damalas, C. A. and Eleftherohorinos, I. G. (2011) 'Pesticide exposure, safety issues, and risk assessment indicators', International Journal of Environmental Research and Public Health, 8(5), pp. 1402–1419. doi: 10.3390/ijerph8051402.

[64] Galea, K. S. et al. (2015) 'Urinary biomarker concentrations of captan, chlormequat, chlorpyrifos and cypermethrin in UK adults and children living near agricultural land', Journal of Exposure Science and Environmental Epidemiology. Nature Publishing Group, 25(6), pp. 623–631. doi: 10.1038/jes.2015.54.

[65] This includes Austria, Belgium, Croatia, Cyprus, Denmark, Finland, Germany, Greece, Iceland, Ireland, Latvia, Netherlands, Poland, Romania, Spain, Sweden

Figure 4.9. Targeted survey results: *In your opinion, to what extent has the SUD contributed to achieving the following objectives in your country/ the EU - Reducing the risks and impacts of pesticide use on human health?*

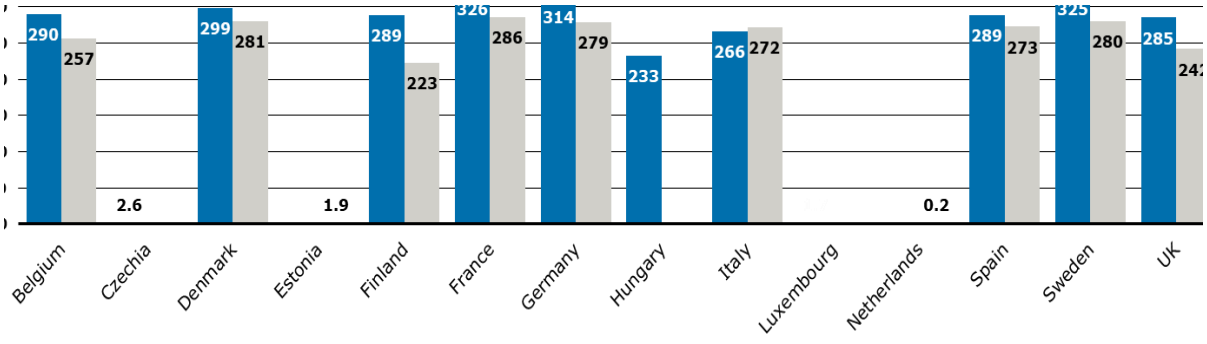


Reducing risks on the environment

Along with human health, the SUD also states the objective to reduce the risks and impact of pesticides on the environment. With respect to the pollution of pesticides in ground water, data from the first (2009-2015) and second (2016-2021) River Basin Management Plans under the Water Framework Directive[66] displayed a 21% drop in the levels of pesticides reported. It should be noted that this data only represents 14 Member States which reported the presence of active substances in pesticides, including their relevant metabolites, degradation and reaction products. The development per Member State is shown in the figure below.

In addition, data from the 2020 EEA report on pesticides in European surface and ground water[67] highlighted that for surface waters, insecticides presented the highest rate of exceedances in the time period 2007 to 2012 (between 22% in 2007 and 48% in 2012), while post 2012, the rate of exceedance of insecticides decreased significantly (to less than 10%). For ground water, the highest rates of exceedances were found from herbicides, however this trend is decreasing by 7-8% from 2015-2017.

Figure 4.10. Area of groundwater polluted by pesticides per reporting Member State, (Data from 1st and 2nd RBMP assessments – EU 14)



With regards to the risks and impact of pesticides on air quality, while there are scarce regulatory values for this area at the national level, across scientific literature and in some countries, they are

[66] European Commission (2000). Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy.

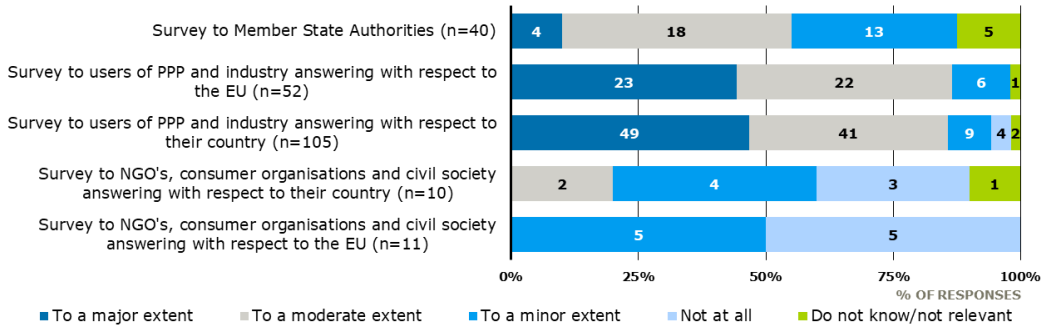
[67] EEA (2020). Pesticides in European rivers, lakes and groundwaters – Data assessment. ETC/ICM Technical Report 1/2020

well documented. In France for example, the PhytAtmo database[68] indicate that from 2002 to 2017, around 40 to 90 active substances were detected annually in rural and urban areas. It should be noted that for the impact on soil, no systematic or consistent soil health data is currently available.

The documented impacts of pesticides on air, soil and water quality also present and exacerbate the impacts that pesticide use can have on biodiversity. Similar to other data sources, while there is no clear aggregated EU level data or indicators on the levels of biodiversity and the impact that pesticides may have, specific scientific articles and research provides a collective view of the observed impacts on biodiversity, with there being widespread agreement of pesticide application having an adverse impact upon biodiversity. As noted in the 2018 report by the Commission[69], results at the national level highlight a deterioration of biodiversity in rural landscapes. For example, in Germany a decline of more than 70% of insect biomass in protected areas was documented, along with the halving of farmland bird populations in Europe and effects on pollinators[70]. It should be caveated from this research however, that protected areas in this context may be affected by pesticide use and indirect exposure of non-target species. While there are other factors which can be attributed to this decline (i.e., habitat loss, intensive agriculture and urbanisation, introduction of pathogens and species as well as climate change), further research has identified pesticide application as a likely driver with high importance for the worldwide decline in insect populations[71].

Acknowledging that the use of pesticides is therefore a key element in biodiversity loss as well as negative impacts on the environment, it is difficult to assess the extent to which the SUD has contributed to the reduction in the risk and impact of pesticide use on the environment. Evidence from the targeted survey (shown in the figure below) outlined divisions in opinion between users and non-users with the majority of users being of the view that the SUD had contributed to a reduction of risk on the environment. This was also broadly supported by Member State authorities, however NGO's, consumer organisations and civil society were more greatly of the opinion that the SUD has not had an impact.

Figure 4.11. Targeted survey results: *In your opinion, to what extent has the SUD contributed to achieving the following objectives in your country/ the EU - Reducing the risks and impacts of pesticide use on the environment?*



[68] The Phytatmo database is run by the French National authorities and compiles the measurements of pesticides in the ambient air of AASQA from 2002; 321 active substances sought, and 6837 samples taken at 176 sites throughout mainland France and overseas.

[69] European Commission (2018). Science for Environment Policy: Flying Insects in West German Nature Reserves Suffer Decline of More Than 76% (1973–2000). European Commission DG Environment News Alert Service. Available online at: https://ec.europa.eu/environment/integration/research/newsalert/pdf/flying_insects_west_german_nature_reserves_suffer_decline_more_than_76pc_1973_2000_511na1_en.pdf

[70] Hallmann, C. et al. (2017). More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PLoS ONE. 12:e0185809. doi: 10.1371/journal.pone.0185809

[71] Sánchez-Bayo, F., and Wyckhuys, K. A. (2019). Worldwide decline of the entomofauna: a review of its drivers. Biol. Conserv. 232, 8–27. doi: 10.1016/j.biocon.2019.01.020

Despite this, data and studies consistently point to overall declines in the levels of biodiversity across Europe and indeed the world. Thus, the importance of protecting biodiversity is of great importance and further underlines the significance of alternative farming practices and an overall transition to a more sustainable use of pesticides. For example, studies and experiments have long pointed to the role of organic farming and rewilding in providing important empirical evidence to support biodiversity conservation strategies[72].

As aforementioned, the lack of specificity in the HRI's does not allow the assessment of a reduction in risk to specific areas of the environment. For example, the pesticides sales data used in the HRI's does not currently include specific information on actual application and toxicity of the substances involved, along with monitoring data on their occurrence in environmental media and human exposure[73].

4.1.1.2 Achieving a sustainable use of pesticides consistent with crop protection needs, including promoting the use of IPM, land management practices and alternative approaches or techniques such as non-chemical alternatives to pesticides [EQ 1.2]

As in the previous sub-question, EQ 1.2 explores the degree to which the envisaged actions of the SUD have effectively achieved or contributed to the achievement of a sustainable use of pesticides consistent with crop protection needs, specifically through three main areas. These include the [1] promotion of IPM, [2] land management practices and [3] alternative approaches or techniques. The following section will explore each area in turn.

Promoting the use of IPM

Under Article 14 of Directive 2009/128/EC, it states that Member States "*shall take all necessary measures to promote low pesticide-input pest management*" with low pesticide-input pest management including Integrated Pest Management (IPM) as well as other techniques such as organic farming. Further, Member States are also required to provide the necessary conditions for the implementation of IPM, along with establishing appropriate incentives to encourage professional users to implement crop or sector specific guidelines for IPM. Thus, as stated under Article 14, the achievement of a sustainable use of pesticide was foreseen through the action of Member States in the encouragement and implementation of IPM.

In the 2020 Commission report[74] the implementation status of a variety of requirements of the Directive (see Figure 3.2), such as IPM promotion and enforcement between 2017 and 2019 was set out. Most notably, it showed a percentage change of 6% (from 69% to 75%) in the level of implementation for IPM *promotion* (2017-2019). Despite this however, the implementation of IPM *enforcement* is noticeably lower, with only a change of 1% (2017-2019), from 33% to 34%. Thus, the SUD had been partially effective in the promotion of the use of IPM, but the enforcement is significantly lacking, thus undermining the overall effectiveness of the SUD in achieving a sustainable use of pesticides consistent with crop protection needs.

Evidence from the targeted surveys with users of PPP and NGO organisations found that users of PPP are of the view that the SUD did lead to an increase of uptake of IPM in their country and across

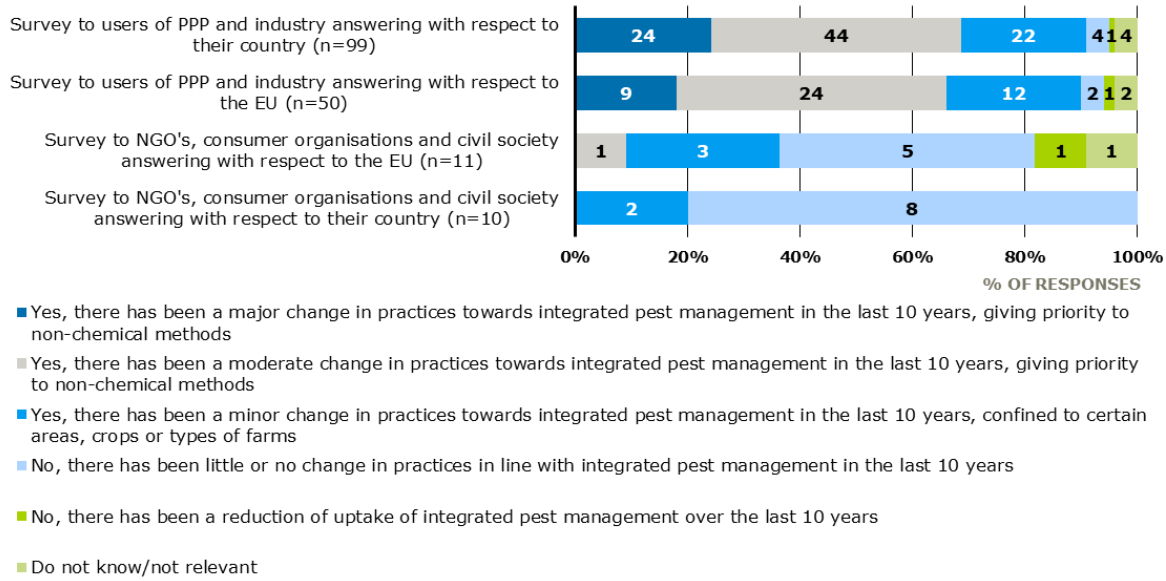
[72] Norton, L, et.al. (2009). Consequences of organic and non-organic farming practices for field: farm and landscape complexity. Agric Ecosyst. Environ. 129, 221–227.; Garrido, P. et al. (2019) 'Experimental rewilding enhances grassland functional composition and pollinator habitat use', Journal of Applied Ecology, 56(4), pp. 946–955. doi: 10.1111/1365-2664.13338.; Froidevaux, J. S. P., Louboutin, B. and Jones, G. (2017) 'Does organic farming enhance biodiversity in Mediterranean vineyards? A case study with bats and arachnids', Agriculture, Ecosystems and Environment. Elsevier, 249(August), pp. 112–122. doi: 10.1016/j.agee.2017.08.012.

[73] EEA (2018). Pesticide sales; Briefing. Published 29 Nov 2018, modified 26 Nov 2019

[74] European Commission (2020). COM(2020) 204 final, Annex.

the EU. This is, by contrast, opposed by NGO's, consumer organisations and civil society, that were largely of the view that the SUD only contributed to a limited extent/ not at all.

Figure 4.12. Targeted survey results: *In your view, did the SUD lead to an increase of uptake of integrated pest management in your country/ the EU?*



Despite this, evidence at the national and farm levels point to examples of where IPM has been implemented. For example, as detailed in the specific IPM case study, several Member States (including Belgium, Denmark, Germany, France and the Netherlands) have displayed significant efforts in focussing on the adoption of wide-spread IPM. In response to the targeted survey to Member States, 17 respondents (out of 27 who answered the question) indicate that specific research on IPM support was funded by the state in the last ten years. One crucial distinction however was that many of the Member States with notable successes in IPM already adopted IPM as a national objective prior to the implementation of the SUD. That being said, as documented in the previously mentioned 2020 Commission report, for these specific Member States, the implementation of IPM was intensified with the entry into force of the SUD.

Interestingly, further research of national level implementation of IPM found a correlation between the uptake of IPM practices and the size of farms[75]. Specifically, research conducted in Poland uncovered that the success of the uptake of IPM was also linked to the level of awareness and knowledge of IPM, which was predominantly found to be present among large scale farms. Thus, just as the implementation of IPM principles are important in achieving a sustainable use of pesticides, so too is the level of awareness and knowledge of IPM among users. Thus, in assessing the effectiveness of the SUD in promoting the use of IPM, it is by default also important to understand the SUDs role in raising awareness and increasing knowledge among users. It should be noted however, that a "correct" level of IPM implementation does not necessarily translate into a reduction in pesticide use, and an achievement of a sustainable use of pesticides has to remain consistent with crop protection needs. In addition, monitoring of the uptake of IPM measures at farm level remains difficult as no satisfactory guidelines for controlling IPM

[75] Sawinska, Z. et al. (2020) 'Agricultural practice in Poland before and after mandatory IPM implementation by the European Union', Sustainability (Switzerland), 12(3). doi: 10.3390/su12031107.

implementation have been drafted. This distinction was also uncovered across the interviews with stakeholders which detailed a more complex picture[76] of IPM implementation.

While there was some agreement that IPM had been implemented, the main hindering factor was in measuring the true implementation on the ground as well as the effects it has had. In particular, one EU institution representative noted that in speaking with Member States, it was often very difficult to understand the implementation of IPM due the differences in existing practices across Member States. For example, as found in the case study analysis, prior to the introduction of the SUD, some Member States had pre-existing pieces of national legislation similar to that of the SUD which had already been implemented. Overall, since there are no clear definitions and/or criteria on IPM as well as no monitoring of IPM implementation and of the effects of IPM implementation by Member States, it is not possible to assess potential achievements.

While it was raised that there was a lack of monitoring data on IPM to judge its implementation and effectiveness, there was a small group of interviewees[76] who were of the view that national IPM guidelines were well developed and accepted by many users. To further promote the implementation of IPM, as found in scientific studies (aforementioned) it was suggested that increased peer-to-peer learning among farmers, encouraging demonstration farms and fostering exchange between farmers would act as a key motivator. This approach of increased advisory services was shown to work by one Member State Authority in Spain, where they noted that in Almeria, they were able to significantly reduce plant health products through promoting biocontrol and other measures, specifically through peer-to-peer support. This finding was also observed in other secondary reports, such as the 2020 European Economic and Social Committee report[77] which found that the SUD helped to inform and raise awareness of IPM to all the actors in the chain who are directly involved.

Thus, while there is no sufficient EU level data on the implementation and results on its effectiveness across all Member States, evidence from national level research points to the SUD having an impact in further raising awareness of the concept of IPM as well as boosting IPM practices that were already in place prior to entry into force of the SUD.

Promoting the use of land management practices

Land management practices can be understood as the way in which land is used, particularly in improving the land use outcomes (i.e., economic, environmental and/or social). This can take the form of practices such as crop diversification, maintenance of permanent grassland to support carbon sequestration as well as dedicated areas for biodiversity and rewilding. In this context, while Directive 2009/128/EC does not detail the promotion of land management practices directly, it is rather covered in part under the Principles of IPM[78], namely Principle 1 on the prevention and/or suppression of harmful organisms.

On review of data from the EEA 2020 report[79] on the changes in land use across Europe from 2000-2018, the overall land area for agricultural production decreased by ca 14532 Km2 in the EEA-39, accounting for a loss of ca 0.6% of the initial stock of farmland. Most noticeably, from the period 2006-2012 to 2012-2018, agricultural land declined by around 25% (see Figure 4.13 below). It should be noted that part of this decrease can be attributed to normal changes in farming practices

[76] This was noted by 3 EU level representative, 6 Member State Authorities and 2 "other" industries impacted by SUD, 2 pesticides producers and 1 international organisation.

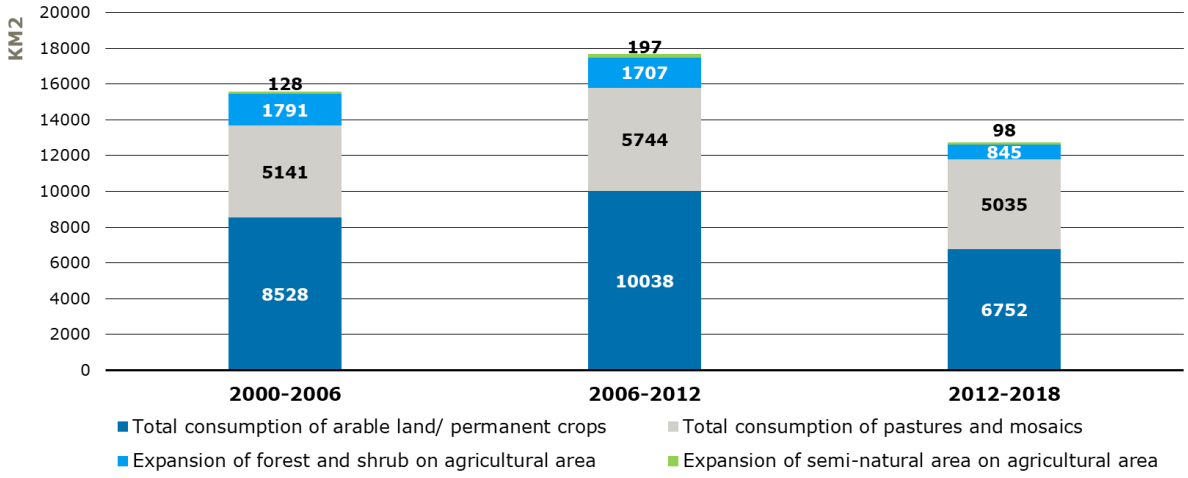
[77] EESC (2020). Evaluation of the Sustainable Use of Pesticides Directive. Information report, Section for Agriculture, Rural Development and the Environment.

[78] https://ec.europa.eu/food/plants/pesticides/sustainable-use-pesticides/integrated-pest-management-ipm_en

[79] European Environmental Agency (2020). Land and ecosystem accounts for Europe Towards geospatial environmental accounting.

(i.e., the process of converting agricultural land to long term fallow land is however part of standard rotations), however the main drivers of change were due to urban diffuse, residential sprawl and the sprawl of economic sites and infrastructures.

Figure 4.13. Comparison of the consumption of arable land/permanent crops to pastures/mosaics and expansion of forests, shrubs and other semi-natural areas on agricultural land, 2000-2006, 2006-2012, 2012-2018 (EEA-39).



Source: EEA (2021). Land cover and change statistics 2000-2018, [lcf62] Expansion of semi-natural area on agricultural area

As shown above, over the full period from 2000-2018, more forest and shrubland expanded to agricultural areas than semi-natural areas. Semi-natural areas can be understood as land management involving grazing, mowing, burning, and the removal of trees and shrubs, but it crucially does not include ploughing, substantial fertilizing, liming, drainage, or pesticide use. Despite the low conversion rate for agricultural land to semi-natural areas, there are geographical hotspots of activity, for example in southern Portugal, Ireland and the Netherlands. These trends however highlight that changes in land practices, particularly agricultural, are not nessesarily changing to areas such as permanent grassland or dedicated areas for biodiversity and rewilding, but rather the increase in urban sprawl and expansion of infrastructure accounts for the land change.

While EU level data shows steady levels in grasslands and pastures over the period 2000-2018, it is difficult to attribute the possible impacts of IPM implementation to the expansion of semi-natural areas. Thus, it is not possible to fully detail the extent to which the SUD was able to achieve a sustainable use of pesticides consistent with crop protection needs, including the promotion of land management practices.

From stakeholder consultations, very few interviewees provided specific insights into the effectiveness of the SUD in the promotion of land management practices. From the two Member State Authorities which answered, they were of the view that while the SUD worked well in the promotion of IPM, it lacked the same ambition with regard to land management specifically. This is further hindered by concerns regarding the economic viability of land management. The example was provided of buffer zones, where regional authorities as well as farmers were concerned about the economic cost of removing land from agricultural production.

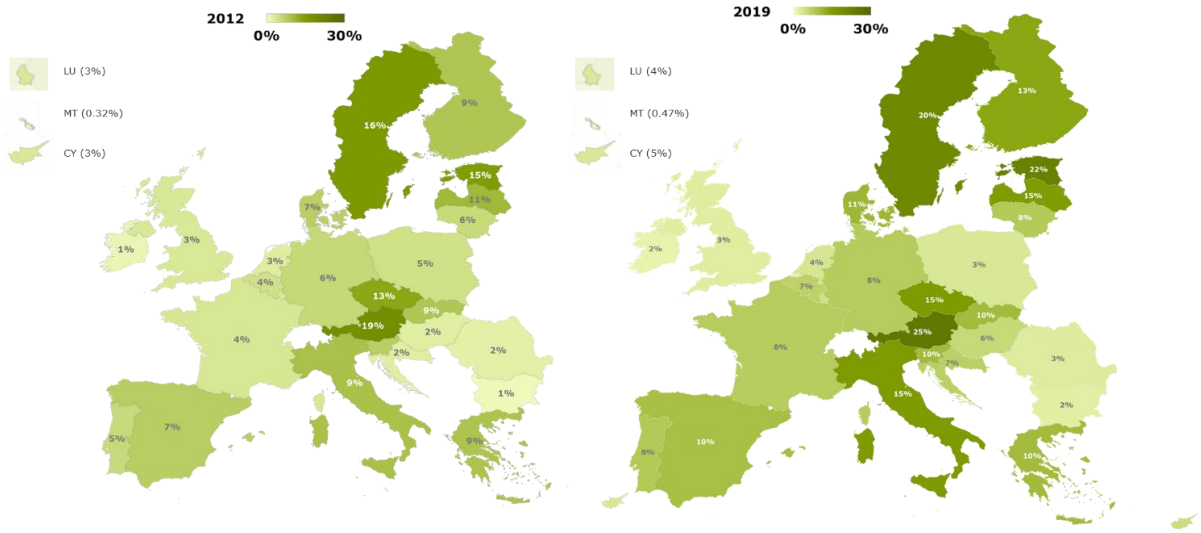
Promoting the use of alternative approaches or techniques

Under Article 1 of Directive 2009/128/EC, it states that "[the] *Directive establishes a framework to achieve a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of […] alternative approaches or techniques such as non-chemical alternatives to pesticides*". It is also mentioned under Article 4 of the Directive on the adoption of National Action Plans (NAPs) whereby Member States are obliged to adopt NAPs that encourage the development and introduction of alternative approaches or techniques. Thus, it is through these contexts that the effectiveness of the SUD can be judged under this specific area.

Alternative approaches or techniques to pesticide control include (but are not limited to) methods such as biological control, natural chemical control as well as management techniques such as IPM and organic farming. As documented in the 2018 European Parliament report[80], evaluating the use of alternative approaches or techniques is very complex and difficult to calculate. One main alternative approach is the transition to organic farming and practices.

From review of data on the areas of farming land in the EU which has been converted into organic crops and production methods uncovered a 46% increase[81] from 2012-2019 (as shown in Figure 4.14). However, the extent to which this improvement had resulted from the implementation of the SUD is not clear and potentially indirect. Other factors that could also influence the implementation could be related to an evolving public opinion and consumer demand[82] on the growing concerns of sustainable food production and the possible impacts of pesticides on human health (see Section 4.3.3 for further details).

Figure 4.14. Percentage of organic crop areas, total fully converted and under conversion to organic farming



Source: Eurostat (2021). Organic crop area by agricultural production methods and crops (from 2012 onwards), Dataset: ORG_CROPAR. Available at: https://ec.europa.eu/eurostat/databrowser/view/org_cropar/default/table?lang=en

[80] European Parliamentary Research Service (2018) Directive 2009/128/EC on the sustainable use of pesticides; European Implementation Assessment. Edited by M. Remáč. Brussels, Belgium: Ex-Post Evaluation Unit.

[81] Eurostat (2021). Organic farming statistics, Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Organic_farming_statistics

[82] See for example European Parliament (2016). Short food supply chains and local food systems in the EU. https://www.europarl.europa.eu/RegData/etudes/BRIE/2016/586650/EPRS_BRI(2016)586650_EN.pdf and also private sector initiatives such as Slow Food or Too Good To Go.

Despite this change, differences in the ability to adopt alternative approaches were found across secondary reports and primary data from stakeholder consultations. As detailed in the 2020 report from the UK Government[83], there are a number of specific examples across Europe of where alternative methods have been applied and been successful. These include examples from ENDURE research[84], PURE projects[85], Hortlink in the UK[86], LEAF[87], and a number of country-based, farm-advisor led research projects[88]. It should be noted however, that while successes have been noted from these initiatives, they often operate at the farm or local level with significant amounts of support from advisory services, thus making the finding difficult to extrapolate at the EU level. Indeed, this distinction is where the crux of the problem lies, with many industry stakeholders along with pesticide users and advisory services highlighting a different perspective on the SUD's ability to promote the use of alternative approaches or techniques.

Evidence from the interviews with stakeholders, the Public Consultation, and EU level reports[89] outlined that one of the main areas of contention, particularly for users, manufacturers and advisory services for pesticide use, is the lack of available alternatives to conventional PPP. For example, in the 2018 Parliament report[80], it was noted that the availability of economically viable alternative controls is an issue, with there being the need for alternative approaches or techniques to be as efficient as the chemical solutions they aim to replace. These findings were confirmed in the Public Consultation where 81% of professional and non-professional users[90] answered that they used pesticides instead of other control techniques due to available pesticides being considered as more effective than other control techniques. Similarly, from closed questions and analysis of the written responses submitted under the Public Consultation, the overarching theme was the need for more available alternatives to chemical pesticides.

Correspondingly, from the interviews, 23 interviewees[91] that answered on this specific area were of the view for the SUD to promote the use of alternative approaches and techniques, it is first important for there to be available alternatives to use. In particular, while environmental organisations and NGO's[92] highlighted the availability of alternatives such as biocontrol, the overarching consensus was the lack of research and prioritisation in making alternative approaches or techniques on the market more available.

4.1.1.3 Complementing existing EU legislation and addressing the use phase of pesticides [EQ 1.3]

While section 4.4.5 will examine the degree to which the SUD has been complementary to existing EU legislation in more detail, part of this section will provide a brief overview of the extent to which the actions envisaged by the SUD contributed to complementing existing EU legislation. It is important to note that the SUD legal texts do not state a specific "objective" on the complementarity

[83] DEFRA (2020). Review of Evidence on Integrated Pest Management. Final Report.

[84] Endure (2021). Diversifying crop protection. Available at: http://www.endure-network.eu/

[85] PURE (2019). Pesticide Use-and-risk Reduction in European farming systems with Integrated Pest Management. Available at: https://cordis.europa.eu/project/id/265865

[86] DEFRA (2021). UK Department for Agriculture project scheme on a wide variety of topics. Available at: http://randd.defra.gov.uk/Default.aspx?Module=ProjectList&AUID=1315

[87] Linking Environment and Farming (2021). Available at: https://leaf.eco/

[88] Barzman, M. et.al. (2015) 'Eight principles of Integrated Pest Management'. Agronomy for Sustainable Development, 35. Pp. 1199-1215.

[89] European Court of Auditors (2020) Sustainable use of plant protection products: limited progress in measuring and reducing risks.

[90] Number of responses (n=357) which ranked this option both 1 and 2 on a scale from 1-5 on the degree of importance.

[91] This view was held by 6 Member State Authorities, 2 EU representatives, 1 international organisation, 1 interviewee from academia, 4 "other" industries impacted by the SUD, 4 pesticide users, 1 consumer organisation and 1 pesticide producer.

[92] This view was held by 3 environmental organisations and 1 NGO

of the SUD with existing EU legislation, however it is mentioned under paragraph 3 of the preamble to the Directive. Specifically, it states that:

> *The measures provided for in this Directive should be complementary to, and not affect, measures laid down in other related Community legislation, in particular Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds, Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 on the placing of plant protection products on the market. These measures should also not prejudice voluntary measures in the context of Regulations for Structural Funds or of Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)."* (Directive 2009/128/EC, p.1, para 3)

Nevertheless, it is important to understand the SUD in the context of a regulatory framework for pesticide use, including a legislative package consisting of Directive 2009/128/EC, Regulation (EC) 1185/2009 concerning statistics on pesticides and Directive 2009/127/EC with regard to machinery for pesticide application.

As described in EQ 19 (see section 4.5.1) and supported by evidence from interviews with stakeholders, the nature of the SUD as a Directive was found to not pose a significant barrier in complementarity with other EU legislations. One primary reason for this was due to the flexibility that the form of a directive provides to Member States to adapt measures to national circumstances. However, this flexibility can also result in the lack of implementation of the provisions of the SUD as shown in Figure 3.2. Most noticeably, the implementation assessment conducted by the Commission in 2020 outlined significant limitations in the implementation of National Action Plans, Application equipment and IPM enforcement. Thus, while the SUD was found to be complementary to other EU legislation, the nature of the form of a Directive could be said to have had an impact on the SUDs ability to meet its overarching objective to reduce the risks and impacts of pesticide use on human health and the environment.

From the interviews, only six responses were provided[93]. Overall, all of the interviewees noted that the Directive complements well other existing pieces of EU legislation, particularly in its connection with Regulation 1107/2009. Indeed, an important aspect of the SUD in this regard is the importance of other pieces of legislation and the outputs they provide. This is outlined no more so than in Regulation 1107/2009 where the changing list of authorised substances has a direct impact on the SUD's ability to reach its intended objectives.

With respect to the extent to which the actions envisaged by the SUD contributed to addressing the use phase of pesticides, it is important to note that while it is not listed as a specific objective under the Directive, it can be seen more as an overarching strategy for the Directive. In particular, the creation of the SUD aimed to address a policy area which has not been previously regulated. As such it was the first time that the EU has adopted a regulatory framework related to the use phase of pesticides with a focus on risk reduction.

Member State authorities that responded to the target survey see a contribution of the SUD to the objective of complementing EU legislation. 68% of respondents (24 out of 35) declare a contribution of at least a certain extent to this objective.

[93] This was noted by 1 EU level representative, 3 Member State Authorities and 1 "other" industry impacted by SUD and 1 pesticides producer.

However, in assessing the contribution of the Directive, in tandem with other legislative packages in addressing the use of risks of pesticides, it could be argued that the hindering aspects of the SUD (as discussed in section 4.1.4.4) have negatively impacted the complementarity of the SUD compared to what was envisaged from its inception. For example, issues in the implementation of the SUD and the lack of monitoring data have impacted the SUD's ability to accurately document the risk of pesticide use and also the prevalence of risk across Europe. This hindering factor thus limits the contribution of the SUD in relation to other pieces of legislation. This was also emphasised by interviewees where, as mentioned in the above sections, some interviewees pointed to the lack of data to be able to establish the true effect of the SUD on the use phase, particularly on its ability to understand the effect on biodiversity and wildlife.

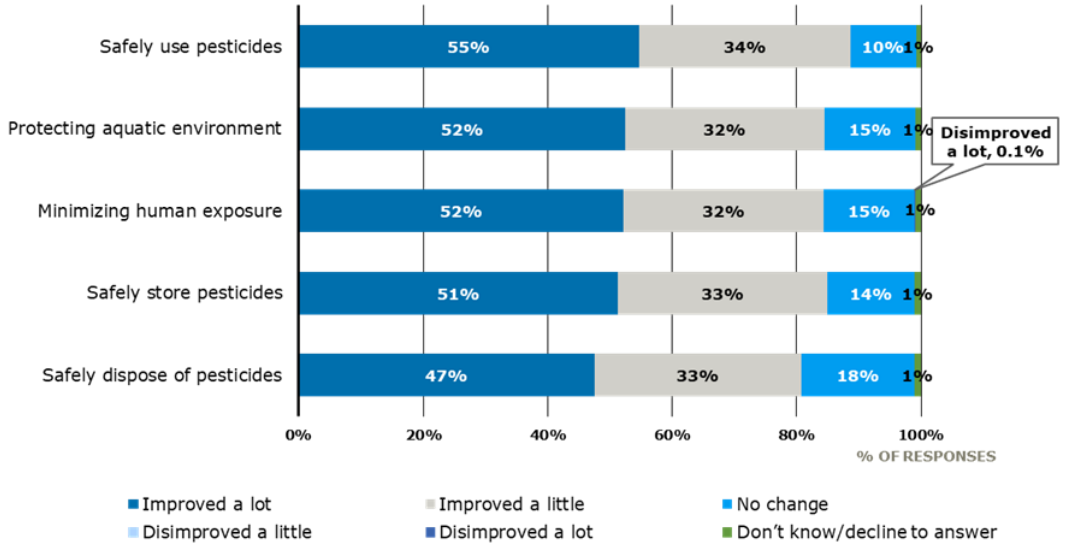
4.1.1.4 Improving the behaviour and practices of pesticide users [EQ 1.4]

In assessing the extent to which the envisaged actions of the SUD contributed to improving the behaviour and practices of pesticide users, it is important to note that while it is not a specific objective of the SUD, it is covered in part under a series of different areas. For example, it is included under Article 5 on training, sales of pesticides, information and awareness-raising, Article 9 on specific practices and uses, Article 13 on the handling and storage of pesticides and treatment of their packaging and remnants as well as Article 15 on IPM.

As mentioned in previous sections on the 2020 Commission report, the implementation status on the requirements of sales of PPPs rose by 2% from 2017-2019, while the percentage of implementation on training rose by 14%. When looking specifically at the effectiveness of Article 5 of the Directive on training activities, evidence from the Public Consultation outlined a significant majority of professional and non-professional users (416 out of 500 - 83%) who had completed a training course on the safe use of pesticides. Similarly, those that had completed a training course answered in a majority that their knowledge on the safe use of pesticides had improved, as shown in the figure below. Member State authorities[94] responding to the targeted survey indicated with high majority that more than 75% of advisors, distributors and professional users have been trained in their Member State. However, two respondents each estimated the share of trained advisors, distributors, and professional users at being below 25%.

[94] This question gathered responses from Iceland and 19 Member States: Austria, Belgium, Croatia, Cyprus, Czechia, Denmark, Finland, Germany, Greece, Ireland, Latvia, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovenia, Spain, Sweden

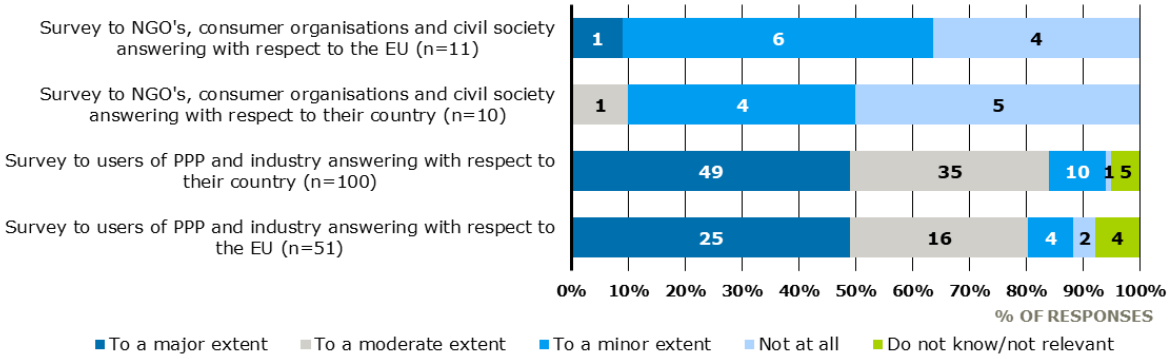
Figure 4.15. Public Consultation: *How do you believe that your knowledge of how to safely use, store and dispose of pesticides changed as a result of completing this training course? (n=861)*



Note: The "n" value includes all of participants which answered that they had completed a training course. Therefore, it includes both users and non-users.

Under Article 13 on the handling and storage of pesticides and treatment of their packaging and remnants, the Public Consultation also gathered evidence of pesticide packaging disposal from users. Again, the majority of users answered that they dispose of empty pesticide containers through triple-rinsing and sending them to a collection centre for empty pesticide packaging (223 out of 369 – 60%). Similarly, the majority of users answered that when using pesticides, they wear gloves (72%), while only 41% wore facemasks. While there is not a comparable baseline on the data related to the handling, use and disposal of pesticides, the results from the Public Consultation provide evidence of where the SUD may have contributed to improving the behaviour and practices of pesticide users. Similar findings were also presented in the targeted surveys whereby users of PPPs were largely of the view that measures to ensure that storage, handling, dilution, and disposal of pesticides had been implemented both at the national and EU level. This view was not supported by NGO's, consumer organisations and civil society however, who were of the view that they had only been implemented to a minor extent/ not at all.

Figure 4.16. Targeted survey results: *In your opinion, to what extent are the following elements of the current SUD actually being implemented in your country/ the EU - Measures to ensure that storage, handling, dilution, and disposal of pesticides before and after application does not endanger human health or the environment.*



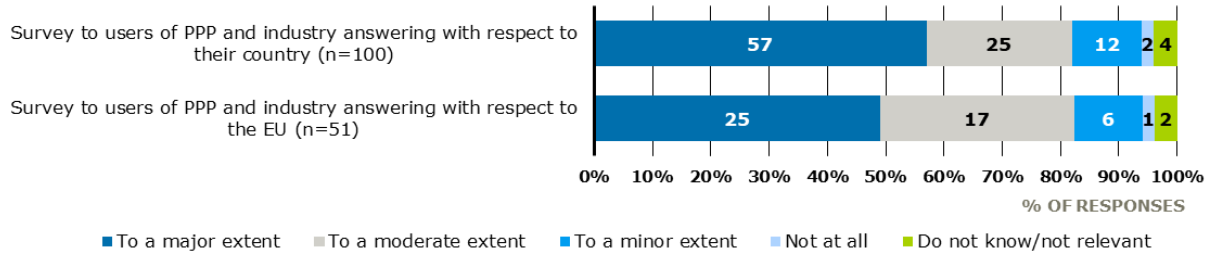
From the interviews, a more ambiguous picture was presented with the SUD being seen to provide more indirect benefits rather than clear, measurable effects. The SUD was seen to have an important impact on informing and raising awareness of sustainable pesticide use, particularly through Integrated Pest Management (IPM). This was confirmed in six interviews[95] where it was noted in particular by one Member State Authority that while the SUD does not have a clear impact on reducing human health risks of using professional PPPs, it had helped in reducing the risk of PPPs for non-professional users by raising awareness on risk of pesticide use.

In addition, some stakeholders[96] acknowledged the SUD as being a key driver in raising the importance and overall relevance of pesticide risks across Member States and economic stakeholders. This was primarily achieved through raising awareness, dissemination of knowledge, and development of educational and training campaigns, as well as more guidance or controls on the use of PPPs. This point was contested however, with some stakeholders[97] answering that there is a lack of understanding and/or awareness of the risk of pesticide application for the users and the surrounding environment.

4.1.1.5 Improving the accuracy of pesticide application equipment [EQ 1.5]

In the context of the legal text of the SUD, the improvement of the accuracy of pesticide application equipment are covered under Article 8 on the inspection of equipment in use. As mentioned in a 2020 Commission report[98] the implementation of the requirements for application equipment rose by 30% from 2017 to 2019 (see Figure 3.2). From a small number of interviewees[99] that answered, it was noted that the SUD had played a role in improving the accuracy of equipment, however it is difficult to determine to what extent this was the case due to a variety of variables, such as the type and age of equipment used and the proficiency of the user. However, 21 out of 35 respondents to the question in the targeted survey to Member States experience a contribution of at least some extent to this objective. Similarly, the results from the targeted survey to users of PPPs and industry were largely of the view that provision of the SUD for PAE in professional use to be inspected regularly was implemented to a major/ moderate extent, as shown below.

Figure 4.17. Targeted survey to users of PPP and industry: *In your opinion, to what extent are the following elements of the current SUD actually being implemented in your country/ the EU - Pesticide application equipment in professional use must be inspected regularly*



[95] This view was expressed by 4 Member State Authorities and 2 "other" industries impacted by SUD

[96] This view was expressed by 3 Member State Authorities, 1 "other" industry impacted by SUD and 1 alternative to pesticides producer.

[97] This view was expressed by 4 Member State Authorities, 1 "other" affected industry impacted by SUD and 1 pesticide producer.

[98] European Commission (2020). COM(2020) 204 final, Annex.

[99] This was noted by 3 Member State Authorities and 2 "other" industry impacted by SUD and 1 pesticides producer.

Periodical PAE inspections were seen as being a key aspect for improving pesticide application, along with other technological developments. This was also found in several scientific articles[100], where the importance of testing and inspections of equipment was found to be of great importance for the protection of human health and the environment. For example, the study carried out by Stas, et.al (2017) of PAE testing in Belgium found that PAE types already inspected in Belgium[101], proved to be the most effective in reducing the risks to human health and the environment (i.e., residual risk).

However, the 2018 SPISE Survey[102] outlined issues with the consistency and quality of the inspections taking place, with the extent to which trainings are being carried out across all Member States to address this issue being unclear. The report also concludes that the lack of national PAE registers limits the ability to effectively carry out inspections. This is supported by the fact that in the survey conducted with Member States for this study, only 8 respondents were able to indicate the number of PAE in their Member State.

As shown in the figure below on the actual performed inspections across EU and EEA countries (2010-2017), the 2018 SPISE survey found that there were large disparities in and between countries on a yearly basis. Certain Member States displayed steady annual results, while Member States such as Germany, Poland and Slovakia presented more variation across the period. It should be noted that in some countries, only data for more recent years has been provided thus highlighting the emergence of new inspection systems. The targeted survey conducted with Member State authorities for this evaluation and impact assessment study found that 50% (14 out of 28) of respondents estimate the share of inspected PAE at 75% or above[103]. Two respondents, however, estimate inspection rates of less than 25%, while eight respondents answer with "do not know". This underlines the variations in coverage in addition to the quality.

This data thus indicates two differing perspectives on the effectiveness of the SUD. On the one hand, the emergence of new inspection systems points towards the SUD having a possible positive impact on improving the accuracy of pesticide application equipment. On the other hand, the differences within and between countries also highlights the lack of harmonisation in the enforcement of Article 8(1) whereby Member States shall ensure that pesticide application equipment in professional use shall be subject to inspections at regular intervals.

Part of the harmonisation is also the mutual recognition of PAE inspection certificates. Half of the respondents of the Member State survey (14 out of 28) mention that this is the case, either generally or on a case-by-case basis. A further 10 respondents answered, "do not know" and only four with "no". However, one of these respondents without recognition explains that there simply has never been an application for recognition. Thus, the mutual recognition of PAE is vastly in place, despite the differences between Member State's inspection systems outlined above.

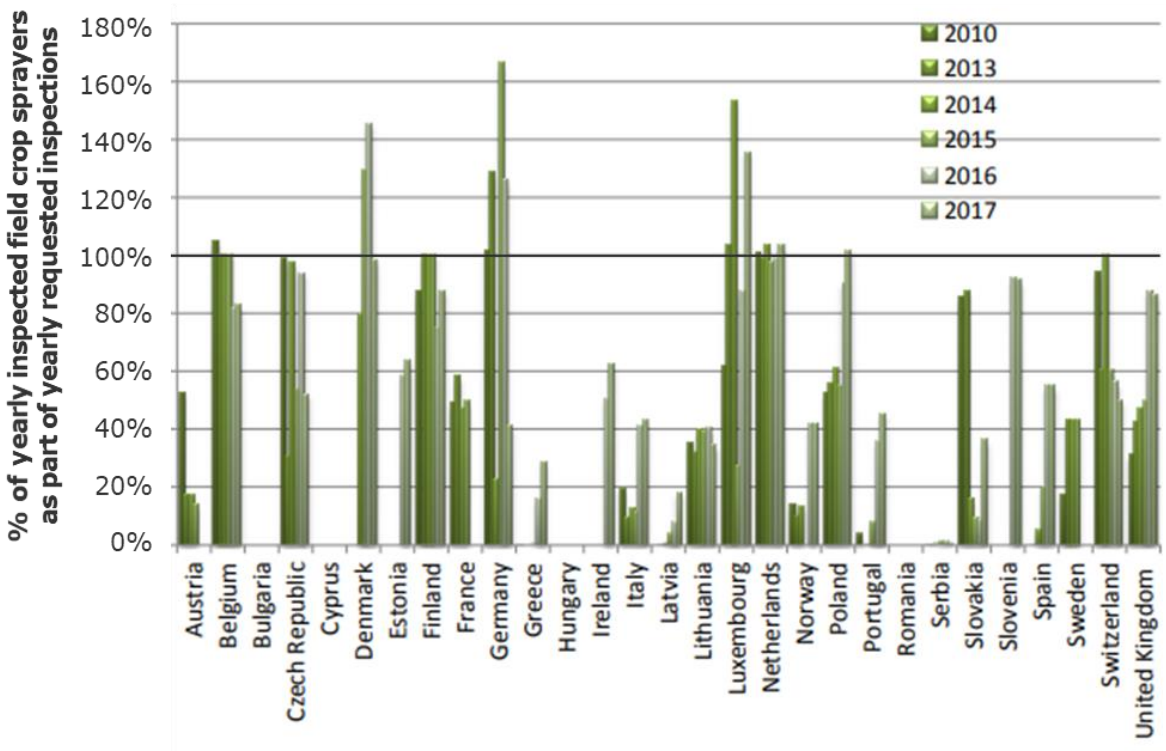
[100] Stas et.al (2017). New approach to fulfil art 8 of Directive 2009/128: a risk assessment procedure for pesticide application equipment, Dimitrovski (2017). Inspection of pesticide application equipment, Cerruto, Manetto, Longo and Papa (2020). Sprayer Inspection in Sicily on the Basis of Workshop Activity

[101] Including inspections of PAE for field crops, orchards, fixed and semi mobile and disinfection equipment

[102] Wehmann, H. J. (2018). Status Quo of Inspection in EU: The Results of SPISE Enquiry. In 7th European Workshop on Standardised Procedure for the Inspection of Sprayers–SPISE 7. Athens, Greece. (September 26–28, 9–22)

[103] This answer was represented by 14 Member States: Belgium, Croatia, Czechia, Denmark, Finland, Germany, Hungary, Latvia, Luxembourg, Netherlands, Poland, Slovenia, Spain, Sweden

Figure 4.18. Yearly inspected field crop sprayers as percentage of yearly requested inspections in the European Countries



Source: SPISE 7, 7th European Workshop on Standardized Procedure for the Inspection of Sprayers in Europe, Athens, Greece, September 26-28, 2018. It should be noted that not all Member States are represented in this figure due to the lack of available data in the survey

In addition to the general provisions relating to PAE, another action to improve the accuracy of pesticide application specifically targeted under the SUD is the prohibition of aerial spraying in Article 9. The most recent report on the implementation of the SUD found declining areas treated by aerial spraying and improved requirements for aerial applications concerning training of operators and inspection of equipment[104]. In response to the targeted survey to Member States, roughly two thirds of respondents (15 out of 23)[105] indicate that derogations to allow aerial spraying are possible. However, only two Member States report substantial areas of agricultural or forestry production that are treated aerially. Most respondents are not able to provide data, or their Member States did not receive any requests for derogation since the entry into force of the SUD.

4.1.1.6 Improving monitoring of pesticide use and of the associated risks [EQ 1.6]

This sub-question looks at the improvements in the monitoring or pesticide use and of the associated risks through the legal context of Articles 7(2) and 7(3) of the Directive. This includes the requirement for Member States to put in place systems for gathering information on pesticide acute poisoning incidents, as well as chronic poisoning developments where available (Art. 7(2)), as well as for the Commission in cooperation with Member States to develop strategic guidance

[104] European Commission (2020). Report from the Commission to the European Parliament and the Council on the experience gained by Member States on the implementation of national targets established in their National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides. COM(2020) 204 final. Online: https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sud_report-act_2020_en.pdf

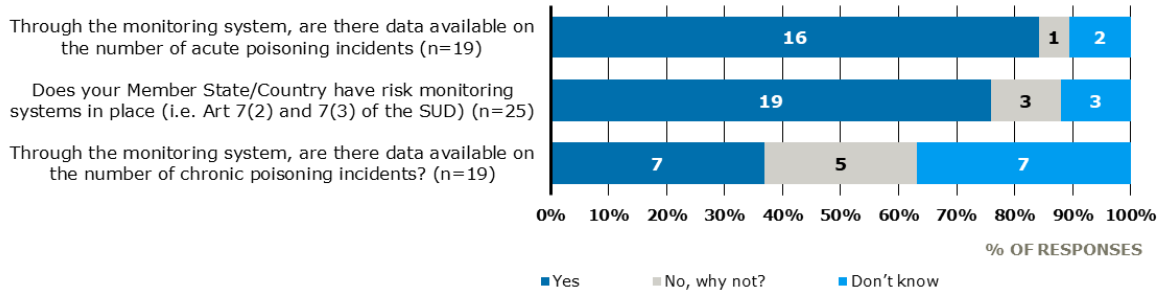
[105] This represented by 13 Member States including: Belgium, Croatia, Cyprus, Czechia, Finland, Germany, Greece, Iceland, Luxembourg, Netherlands, Poland, Romania, Spain

documents on monitoring and surveying of impacts of pesticide use on human health and the environment.

From a review carried out by the EPRS (2018), it was found that ten National Action Plans (NAPs)[106] mentioned specific methods for the collection of information and data on acute poisoning incidents, with eight[107] NAPs that included methods to gather information on chronic poisoning developments. Seven other Member States[108] were noted for indicating that national competent authorities have an objective to create a centre for recording acute poisoning incidents and chronic poisoning developments.

This finding was also observed in the specific case study on the National Action Plans of specific Member States. From review of five Member States[109], each NAP had in place some form of provisions under Article 7, however none of the measures or indicators were quantitative in nature and did not set specific targets to monitor and reduce cases of acute and chronic poisonings. Information from the targeted survey to Member State authorities found that 19 out of 25[110] respondents acknowledged that their country has risk monitoring systems in place under Art. 7(2) and (3). Of those that answered that their country did have a system in place, the majority answered that it does collect data on the number of acute poisonings, however there was uncertainty over data being available for chronic poisonings.

Figure 4.19. Targeted survey to Member State authorities on monitoring systems for acute and chronic poisonings



A crucial finding under this evaluation question however is the lack of available data to effectively monitor pesticide use and associated risks in terms of acute and chronic poisonings. With regards to Art. 7(3), it should be noted that the Commission published guidance documents on monitoring and surveying of impacts of pesticide use on human health and the environment in 2017[111].

[106] Belgium, Cyprus, Germany, Estonia, Greece, Spain, France, Italy, Slovakia, and Sweden

[107] Belgium, Cyprus, Greece, Spain, France, Italy, Slovakia, and Sweden

[108] Bulgaria, Czech Republic, Latvia, Luxembourg, Malta, Poland, and Slovenia

[109] Austria, Belgium, Bulgaria, Ireland and Poland

[110] This was noted by 15 EU Member States and 1 non-EU country: Austria, Germany, Croatia, Cyprus, Denmark, Finland, Greece, Iceland, Ireland, Latvia, Netherlands, Poland, Romania, Spain, Sweden

[111] European Commission (2017) Commission Notice of 10.10.2017. Guidance on monitoring and surveying of impacts of pesticide use on human health and the environment under Article 7(3) of Directive 2009/128/EC establishing a framework for Community action to achieve the sustainable use. Brussels.

4.1.2 *Effectiveness of currently available pesticide statistics to monitor the progress on the sustainable use of pesticides [EQ 2]*

This evaluation question looks into the effectiveness of currently available pesticides statistics, particularly in the monitoring of pesticide use and associated risks. Crucially it looks into the indicators and elements that are missing to monitor pesticides use and associated risks to human health and the environment. The full evaluation question is listed in the box below.

EQ 2: Are the currently available pesticide statistics provided under Regulation (EC) No 1185/2009 in addition to those proposed in the planned review of agricultural statistics under the Strategy for agricultural statistics for 2020 and beyond, sufficient to monitor effectively the progress on the sustainable use of pesticides and to provide input for the HRI?

Which type of statistics, data or indicators, if any, are missing for an effective monitoring of pesticides use and associated risks to human health and the environment?

The SUD does not detail the explicit statistical data and/or indicators that should be gathered by Member States, as this is primarily covered under Regulation (EC) No 1185/2009 on pesticide statistics, which is part of the 2009 legislative package on pesticides. Regulation (EC) no 1185/2009 covers annual amounts of pesticides placed on the market (hereafter pesticide sales) and the use of pesticides in agriculture, collected every 5 years.

A particular characteristic of Regulation (EC) No 1185/2009 is that Article 3(4) obliges the Commission "[…] *for reasons of confidentiality, to aggregate the data before publication in accordance with the chemical classes or categories of products indicated in Annex III, taking due account of the protection of confidential data at the level of individual Member State. Because of this the data by active substance cannot be published; hence the publicly available data are aggregated by chemical classes and categories of products".*

Regulation (EC) No 1185/2009 stipulates that for the statistics on agricultural use of pesticides, each Member State shall choose the crops to be covered during the five-year reporting period so that the selection is representative of the crops cultivated in the Member States and of the substances used. Thus, the choice of crops to report is a national decision which has been quite diverse in practice. The reference period used when reporting shall be a period of a maximum of 12 months covering all plant protection treatments associated directly or indirectly with the crop, during the five-year period. Member States may choose the reference period at any time during the five-year period, and the choice can be made independently for each of the crops reported.

It should be noted that Regulation 1185/2009 is currently under review as part of the 'Strategy for agricultural statistics 2020 and beyond'. The Commission has made a proposal for a Regulation of the European Parliament and of the Council on statistics on agricultural input and output and repealing Regulations (EC) No 1165/2008, (EC) No 543/2009, (EC) No 1185/2009 and Council Directive 96/16/EC (known also as Proposal for SAIO Regulation). When adopted by the legislators, this will repeal Regulation (EC) No 1185/2009. The Commission proposal includes provision of annual pesticide sales and use in agriculture statistics.

With regards to the SUD's provisions in this area, under Article 15 on indicators, it states that Member States shall calculate harmonised risk indicators by using statistical data collected in accordance with the Community legislation concerning statistics on plant protection products together with other relevant data (Art 15(2.a)). In addition, the Commission are also required under the Directive to calculate risk indicators at Community level in order to estimate trends in risks from pesticide use (Art 15(4)). Thus, it is in this context that the effectiveness of currently available pesticide statistics can be assessed.

4.1.2.1 Overall effectiveness of available pesticide statistics

A clear finding from the data gathered was that the currently available pesticide statistics are not sufficient to effectively monitor the progress on the sustainable use of pesticides. This was raised by the majority of interviewed stakeholders[112], who emphasised the lack of pesticide use data as well as data on effects on human health and the environment. The available information is limited to sales data, and the current Regulation 1185/2009 entails aggregation requirements (no active substance level data can be disseminated) which make it impossible to analyse and compare across Member States. In terms of use data, the data collection is not harmonised and frequent enough (every 5 years) to be useful for assessing risks or developing policy at an EU level.

At the EU level, EU institution representatives highlighted a lack of detailed sales data in tandem with the limitations with regards to the Regulation (EC) No 1185/2009 on statistics on pesticides (sales and agricultural use). This issue was raised by several stakeholders and in literature, concerning the manner in which the data is reported and categorised, which does not allow for EU-wide comparisons or analysis by single active substances. This was noted by industry representatives[113] who highlighted how the absence of comparable data also significantly impacts the ability of stakeholders to understand and be informed on the progress on the sustainable use of pesticides[114].

These issues are acknowledged, and have been reported by the Commission[115] and the Court of Auditors[116]. In addition the European Commission strategy for Agricultural Statistics 2020 and beyond[117] states the lack of harmonised and coherent data collection for pesticide use in agriculture. The potential for improvement, in particular for statistics on pesticide use in agriculture is clear. However, it would require efforts from Member States to collect data which is already being produced under Regulation (EC) No 1107/2009 (Article 67 on record-keeping) for the production of statistics under Regulation (EC) No 1185/2009. Thus there is a need for systematic collection of existing data on use of pesticides from farmers to Member State authorities, at the granular level and their transfer and aggregation at EU level.

The European Commission has already taken action to improve the future provision of statistics on pesticides by making a proposal for a Regulation of the European Parliament and of the Council on statistics on agricultural input and output (see previous section for further details).

Numerous stakeholders[118] also noted issues surrounding the use of indicators, as well as suggesting other alternatives that could be adopted. The primary issue on the use of indicators, particularly the HRIs, is that the indicators do not clearly reflect the actual impacts of pesticides on the environment and human health. For example, the use of data on sales of pesticides does not determine the rate of application nor the method of application or area of land to which the pesticides have been applied.

[112] This was expressed by 26 out of 27 stakeholders.

[113] This was expressed by 4 Pesticides users, producers, distributors and 4 other industries impacted by SUD.

[114] This was also raised in the Eurostat workshop (2019). Pesticides statistics and indicators. Report from workshop held on 12 November 2019

[115] Report from the Commission to the European Parliament and the Council on the implementation of Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides COM/2017/0109 final.

[116] European Court of Auditors (2020). Sustainable use of plant protection products: limited progress in measuring and reducing risks Online: https://www.eca.europa.eu/Lists/ECADocuments/SR20_05/SR_Pesticides_EN.pdf

[117] European Commission (2017). Evaluation accompanying the document Strategy for Agricultural Statistics 2020 and beyond and subsequent potential legislative scenarios. Commission Staff Working Document.

[118] This was expressed by 19 stakeholders; 5 EU institution representatives, 5 "other" industries impacted by SUD, 2 NGOs and 7 Member State Authorities.

In light of these issues, one of the main suggestions that was raised by stakeholders was for alternative indicators to take a more holistic view, enabling the use of pesticides to be monitored in the context of other parameters (i.e., drift reduction, Pesticides Application Equipment (PAE) testing and training and buffer zones). To further explore the need for better statistics, the following sub-sections outline the main factors that hinder the use of statistics for both pesticide sales and pesticide use data.

4.1.2.2 Factors hindering the use of pesticide sales data

Evidence from desk research and interviews revealed that, pursuant to Article 3.4 of Regulation (EC) No 1185/2009, additional layers of confidentiality have been introduced that require aggregation of pesticide sales data before publication in accordance with chemical classes or categories of products, thus preventing the publication of data at active substance level. Furthermore, as discussed in the Commission 2017 Report to the Council and to the European Parliament[119], it was found that Member States collect sales data directly from authorisation holders, thus for most active substances, the data only originates from one data provider which leads to information becoming confidential.

Confidentiality limits the use and dissemination of sales data for the definition and calculation of HRI, **making it impossible, at EU level, to identify the active substances driving changes in the HRI, which in turn limits the information available to inform and target policy on PPP use**. However, Member States authorities have access to this information and can use it to develop and assess their strategy and national actions. In addition, statistics on PPP sales are publicly available in several Member States. Although lifting additional aggregation requirements for publishing the data from Regulation (EC) No 1185/2009 would not eliminate the problem entirely since some sales data would still fall under normal statistics confidentiality clauses (around 1% of data), the expectation from the stakeholders interviewed is that it would go a long way towards reducing data gaps.

The main statistics which are used by the Commission are for the development of the Harmonised Risk Indicators (HRIs) to monitor the effectiveness of the SUD is the sales of pesticides across the EU (see Figure 4.2). Several stakeholders[120] noted that the changes in the sales of pesticides do not provide an accurate picture of the effectiveness of the SUD in achieving its objectives. Crucially, one of the main limitations of sales data is that while it provides a picture of relative changes by group of active substances being sold in Member States and the EU, the lack of data on specific active substances makes it difficult to assess progress on risk reduction.

It should be acknowledged that these challenges were partly addressed in the creation of the HRI 1. Notwithstanding this, the use of this data in the development of the HRI highlights issues in the use of this indicator in the monitoring the progress on the sustainable use of pesticides. For example, considering that the sales data is based on the volume of pesticides sold, it does not allow for the estimation of the evolution of risks from pesticide use. Furthermore, changes in the market from a purely chemical based market towards a more balanced chemical and non-chemical market is not well reflected in the sales data, thus impacting its effectiveness to monitor the progress of the sustainable use of pesticides.

[119] European Commission (2017). Implementation of Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides. COM(2017) 109 final

[120] This was noted by 1 EU level representative, 2 Member State Authorities and 2 "other" industries impacted by SUD, 1 pesticides producers, 1 NGO and 1 International organisation.

4.1.2.3 Factors hindering the use of pesticide use data

Regulation (EC) No 1185/2009 also requires the Member States to transmit data on the use of pesticides in agriculture every five years. The data is not harmonised as the Member States can select the crops and reference periods individually to be useful for their National Action Plan, therefore no EU-aggregates on pesticide use can be calculated for any reference year[121].

Under Article 67 on Regulation (EC) No 1107/2009, professional users are required to keep records, however the process is not automated, and data are not collected in electronic formats in one system. It can also be the case that there is a reluctance from some farmers to provide such data, as mentioned in one Farmers' organisation interview. More specifically they highlighted their concerns on how this data would be used, and who shall "own" such data. Currently, use data is based on surveys, which are cost-intensive and add unnecessary burden on the farmers, and cover various shares of the total pesticide use. This data thus frequently represents indirect or estimated information compared to sales data.

More generally, the usability of data on pesticide use and its effects on the environment and human health are impacted by the lag time between the cause and effect. Still, systematic collection in Member States on use of pesticides would increase the ability for the statistics to be used in a meaningful way.

4.1.3 Comparison between the achieved results and impacts with the expected ones [EQ 3]

This evaluation question (shown in the box below) assesses the extent to which the SUD lived up to the expectations in terms of results and impacts stemming from its implementation. The reply to the question is structured around the expected results and impacts as depicted in the intervention logic (see Appendix 1) and, where available, detailed with information from the impact assessment of the thematic strategy.

EQ 3: How do the achieved results and impacts compare with the expected ones (cf. impact assessment of thematic strategy and intervention logic)?

For each of the results and impacts, we present the expectations (incl. quantitative expectations where available) and then compare them to available data on actual results and impacts as well as findings from the stakeholder consultations.

The effectiveness of the SUD's key elements has been analysed in the previous sections. Building on this, the initial logic of the SUD was to promote the sustainable use of pesticides by providing information on IPM and risk reduction to professional users of pesticides, which was expected to lead to an increase in introduction of alternative pest management practices in line with the IPM principles. Furthermore, the SUD was expected to ensure [1] the safety of pesticide application equipment and [2] the safe disposal of pesticide packaging and remnants, which in turn was meant to lead to a reduced risk of pesticide use on human health and the environment.

All these elements were expected to be monitored to determine progress and review actions as necessary. This chain of actions envisaged by the SUD is assessed in the following, based on the effectiveness evaluation carried out in this report.

[121] Eurostat (2019). Research paper; Statistics on agricultural use of pesticides in the European Union

- ***Result*: Professional and non-professional users are informed about alternatives to pesticides, IPM, biological control, all actors are informed on health and environmental risks linked to pesticide use and safety instructions.**
  - ***Impact***: Increased knowledge on legislation, health and environmental risks, IPM, organic farming etc.

Before the SUD was implemented, most EU25 Member States already had training and certification schemes in place; in 17 Member States[122] this included compulsory schemes and in 6 Member States[123] voluntary schemes. In countries with compulsory schemes, usually all groups like retailers, distributors, farmers and other users were concerned. The schemes varied widely in terms of repeating frequency, spanning from every 2 years (in CY) to one-off schemes in which no renewal of training and certification was required[124].

As per Article 5 of the SUD (enforcement date 2013), Member States need to ensure that all professional users, distributors and advisors have access to appropriate training by bodies designated by the competent authorities and that certification systems are in place for those user groups; that trainings (and certification) are renewed. The SUD also defines minimum standards for the content of trainings (i.e. subjects listed in Annex I of the SUD). As presented in Section 4.1.1.4, a large number of professional users, advisors and distributors have been trained. The findings from the online Public Consultation and the targeted survey with Member States confirm each other in this respect. The quality of the trainings is more difficult to assess but accreditation systems for trainers (27 out of 30 responses) and national standards on the contents (24 out of 30) are widespread.

In addition, Article 6 (enforcement date 2015) of the SUD prescribes that distributors have sufficient certified staff in their employment and that professional users can only purchase pesticides if they are certified as per Article 5. The 2020 implementation report[125] confirms that by then, most Member States had established comprehensive systems for training and certification. Given that Annex I of the SUD provides an overview of training subjects (including alternatives to pesticides, IPM, biological control, all actors are informed on health and environmental risks linked to pesticide use and safety instructions) it follows that most relevant stakeholders (incl. professional and non-professional) have learned about those topics.

However, this is not the case in all Member States. For example, the 2019 audit in Romania found that no system for training and certifying distributors, advisors and professional users had been established and that the necessary legislation had only been in place since March 2019[126]. A subsequent action plan by the Member State authorities from January 2021 confirms that trainings will be started and that it is assumed that by end 2023 all operators will have received initial training[127]. Also, little or no information is available on the quality of those trainings and what impacts they can generate.

[122] AT, BE, CY, DE, DK, EE, ES, FR, EL, IT, LT, LV, NL, PL, SE, SI, UK; Source: BiPRO (2004). Final Report; Assessing economic impacts of the specific measures to be part of the Thematic Strategy on the Sustainable Use of Pesticides

[123] EE, FI, FR, IE, PT, UK; Source: BiPRO (2004). Final Report; Assessing economic impacts of the specific measures to be part of the Thematic Strategy on the Sustainable Use of Pesticides

[124] BiPRO (2004). Final Report; Assessing economic impacts of the specific measures to be part of the Thematic Strategy on the Sustainable Use of Pesticides, Figures 9-1 and 9-2.

[125] European Commission, "On the Experience Gained by Member States on the Implementation of National Targets Established in Their National Action Plans and on Progress in the Implementation of Directive 2009/128/EC on the Sustainable Use of Pesticides."

[126] See: https://ec.europa.eu/food/audits-analysis/act_getPDF.cfm?PDF_ID=14969

[127] See: https://ec.europa.eu/food/audits-analysis/act_getPDFannx.cfm?ANX_ID=9862

- ***Result*: Professional users introduce alternative pest management measures and comply with IPM principles.**
  - ***Impact***: Increased use of approaches or techniques alternative to pesticides, such as biological control and low-risk pesticides.
  - ***Impact***: Reduced dependency on the use of pesticides

The achievements in relation to this expected result are extensively discussed in Section 4.1.1.2 "Achieving a sustainable use of pesticides consistent with crop protection needs, including promoting the use of IPM, land management practices and alternative approaches or techniques such as non-chemical alternatives to pesticides" under EQ1.

- ***Result*: The pesticide application equipment in use is safe**

The progress on ensuring safe equipment through inspecting pesticide application equipment (PAE) and the limits in terms of consistency and completeness are discussed in Section 4.1.1.5.

- ***Result*: Professional users handle and dispose of empty packaging and remnants safely**

The achievements in relation to this expected result are extensively discussed in Section 4.1.1.4 "Improving the behaviour and practices of pesticide users during use and post-use phases" under EQ1.

- **Result: Reduced risks and impacts of pesticide use on human health and the environment.**
  - **Impact**: Improved protection of the environment and human health including reduction in pesticide related ill-health in workers and users[128]

Risks of pesticide use on human health and the environment occur when humans or unintended organisms are exposed to pesticides. The intended objective of the SUD was to reduce those risks through a number of provisions. It is important to emphasise that the use reduction, on the other hand, is not a stated objective of the SUD. However, many of the provisions identified in the Impact Assessment were expected to lead to use reductions; together with a reduction of 11% to 16% (meaning 31,000 t to 44,000 tonnes of active substances per year) in the mid to long term.

In terms of reduced risk, the HRI1 shows a clear downwards trend (see Figure 4.6), indicating a reduced risk across the EU. It should be considered to what extent this may be attributed to particular pesticides being removed from the market over this period. There does not seem to be a trend towards use reduction (see Figure 4.7).

- ***Result*: The Commission and Member States are able to monitor progress achieved and review their actions accordingly.**
  - ***Impact*: Information on pesticide use available to policy makers and the public to adjust policies/behaviour if needed**

The SUD includes a requirement to 'calculate harmonised risk indicators […] by using statistical data collected in accordance with' the EU's pesticide statistics regulation, although Member States are allowed to retain their own national indicators or adopt others in addition to the harmonised ones.[129] Towards addressing this obligation, the Commission published Commission Directive (EU) 2019/782[130] as regards the establishment of harmonised risk indicators (HRI) in May 2019. They are based on data collected under Regulation (EC) No 1185/2009 of the European Parliament and

[128] There are some overlaps between this aspect and EQ7 where more information is provided on the health aspects.

[129] Art 15(1) first sub-paragraph of SUD.

[130] Commission Directive (EU) 2019/782 of 15 May 2019 amending Directive 2009/128/EC of the European Parliament and of the Council as regards the establishment of harmonised risk indicators

of the Council, of 25 November 2009, concerning statistics on pesticides[131] which was also prepared as part of the Thematic Strategy on the Sustainable Use of Pesticides.

The Thematic Strategy on the Sustainable Use of Pesticides highlighted the intention of the EC to adopt a legislative proposal on "Improved systems for the collection of information on **distribution** and **use** of plant protection products, at the **level of active substances**, and regular reporting to tackle the lack of reliable data in particular with a view to the calculation of risk indicators". Also, the Impact Assessment states that "for the assessment of the sustainability of PPP use and the effects of the Thematic Strategy, the "real use" data at farm level are of crucial importance."[132]However, this has not been achieved in a satisfactory manner.

As discussed in Section 4.1, issues on the confidentiality and aggregation of pesticide sales data hinders the ability to assess trends overtime. Feedback from interviews reveals that as Article 3.4 of Regulation (EC) No 1185/2009 adds additional obligatory layers of aggregation of **pesticide sales data**, it prevents the publication of data at active substance level. This obligation thus limits the use and dissemination of sales data, particularly in the calculation of HRI which in turn has an impact on the ability to assess the effectiveness of the SUD actions (i.e., effectiveness of PPP and IPM). Similarly, the use of data on **pesticide use** is limited through the lack of systematic and harmonised data collection and time series data at the Member State level to make meaningful comparisons overtime across the EU.

Consequently, availability of pesticide use data are highly variable. In order to achieve the pesticide reduction targets, the views from interviews conducted is that radical shifts are required. Robust data on which to anchor targets and enforcement mechanisms needs to be generated and disclosed, alongside clear incentives, support to farmers for implementation, and full integration and alignment with other policies on e.g., agricultural production, biodiversity, the Water Framework Directive, and consistent and effective land planning policies.

- ***Result*: Increased knowledge about the effects of pesticide use on human health and the environment.**

As per Article 7 of the SUD "Member States shall put in place systems for gathering information on pesticide acute poisoning incidents, as well as chronic poisoning developments where available, among groups that may be exposed regularly to pesticides such as operators, agricultural workers or persons living close to pesticide application areas." However, there is little indication that the implementation of the SUD has directly led to increased knowledge about the effects of pesticide use on human health and the environment.

In the survey with Member States, respondents indicate that monitoring systems are in place for poisoning risks and incidents. However, relatively few respondents (9 out of 19) are able to provide further information on acute poisonings and even less on chronic ones. These findings indicate that knowledge on specific aspects like acute poisonings is created in some Member States but not consistently throughout the EU.

[131] See: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009R1185

[132] Impact Assessment.

4.1.4 The key contributing and hindering factors in achieving the intended objectives of the SUD [EQ 4]

This evaluation question primarily looks at the characteristics of the SUD, taking into account its intended output and exploring the areas which have hindered the SUD from achieving these intended outcomes. The following box presents the full evaluation question and sub-questions.

EQ 4: Which were the key contributing and hindering factors in achieving the intended objectives, *in particular to what extent has the form of a Directive been a contributing or hindering factor in achieving the intended objectives [EQ 4.1-4.3], to what extent has the SUD been transposed by Member States in a way that allows the effective implementation of the SUD [EQ 4.4], which are the factors hampering the implementation, to what extent are these factors influenced by regional and national conditions and to what extent has the lack of a definition of 'sustainable use' hampered the effectiveness of the SUD [EQ 4.5-4.7]?*

4.1.4.1 The key contributing and hindering factors in achieving the SUD's intended objectives [EQ 4.1-4.2]

As aforementioned in section 4.1.1, the SUD's core objective, as stated in the legal texts, is to "achieve a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives to pesticides" (Art. 1). It is therefore under this context that the key contributing and hindering factors can be understood.

As outlined above, while it was not possible to uncover direct benefits of the SUD's actions, the SUD was seen to provide more in-direct benefits through the prism of increasing awareness of the impact of pesticides on human health and the environment. This increased awareness was seen to be an important factor in the implementation of training activities as well as the importance of alternative methods and techniques. Furthermore, the nature and form of the SUD, being one of the first pieces of legislation specifically to tackle the use phase of pesticides created an impetus across Europe to work towards a more sustainable use of pesticides.

One of the main hindering factors that arose from evaluation questions 1-3 discussed in the preceding sections, pointed to a lack of implementation of the SUD's actions at the national, regional and farm levels. This was seen in the case of IPM where evidence pointed to varying levels of implementation as well as a lack of monitoring data in which to properly judge its success. The lack of implementation of the SUD was also raised in other sources such as across EU level reports[133] and interviews with stakeholders, as shown in following sections.

Another possible hindering factor which was raised by interviewees was that Member State Authorities responsible for the implementation may not always be best suited to properly enforce the SUD, thus in these scenarios, there is a need for greater supervision from the Commission in order to ensure that Member States implement and enforce the measures set out in their national legislation and NAPs. This is also coupled with the fact that in several Member States, it was highlighted in interviews that the lack of communication or organisation between respective departments, hinder the proper implementation of the SUD.

[133] European Court of Auditors (2020) Sustainable use of plant protection products: limited progress in measuring and reducing risks.

European Commission (2017) COM(2017) 587. Report from the commission to the European parliament and the council on Member State National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides.

The case studies conducted in the scope of this study confirm the factors of limited implementation and enforcement mentioned in the previous paragraphs. These points are found to be limiting factors for water protection and IPM implementation in the in-depth assessments performed in the case studies on these topics. For instance, water authorities and utilities are obliged to comply with the water directives, whereas pesticides generally fall under the regulation of agricultural authorities, making it critical to interlink the two. In three Member States, due to its cross-cutting nature and the involvement of different administrations, no single entity can be classified as competent authority for Article 11 of the SUD, while this is possible for the Water Framework Directive. This exemplifies the challenges in cooperation between authorities relevant to the SUD at the national level.

At a more practical level, an overarching hindering factor is the lack of data in which to assess the achievements of the SUD in reducing dependency and reducing the impacts of pesticide use on human health and the environment. As outlined in section 4.1, the inability to monitor the implementation and enforcement of the SUD's actions significantly impacts the degree to which achievements can be measured at an EU level. Instead, more fragmented pieces of evidence are brought about which often conflict and limit the ability for conclusions to be drawn. These factors are further discussed in the following sections of this evaluation question.

4.1.4.2 Extent to which the form of a Directive has been a contributing or hindering factor in the SUD achieving its intended objectives [EQ 4.3]

The majority of interviewed stakeholders were of the view that the form of a Directive did not hinder the SUD's ability to achieve its intended objectives. As stated in the original impact assessment of the SUD[134], the form of the Framework Directive was chosen, amongst other factors, to provide a level of flexibility to Member States in order to adapt to the local needs and circumstances. Out of the 19 interviewees which provided information, the majority answered that it should remain in the form of a Directive (13 out of 19)[135]. Similar to the original Impact Assessment, the need for flexibility at the national level was an important proponent for keeping the policy form as a directive. In particular, it was noted that this form provides the means to adapt to differing national and regional situations across Europe, of which a regulation may not be able to achieve the same type of flexibility. The instrument of NAPs is meant to reflect the differences in situations. However, the NAPs show substantial differences in the level of detail and comprehensiveness as well, which represents the challenge described above.

From the small number of interviewees that preferred the option of a Regulation[136], the main causal factor for their view is the uneven levels of implementation of the Directive across Member States. Thus, a harder policy approach would help to harmonise and provide a more level playing field. Interestingly, the concept of achieving a level playing field was also raised by those who were in favour of a directive, with most of the interviewees noting that the form of a directive does not significantly hinder the ability of the SUD to achieve its intended objectives. Rather, it's the issues surrounding its implementation which poses the most significant barrier.

[134] European Commission (2006). Commission staff working paper accompanying the proposal for a Directive of the European Parliament and of the Council establishing a framework for community action to achieve a sustainable use of pesticides, {COM(2006) 373 final}, the Impact Assessment of the thematic strategy on the sustainable use of pesticides. (p.189)

[135] This view was held by 5 Member State Authorities, 3 NGOs and Academia, 1 EU institution representative, 2 Pesticides users, producers and distributors and 2 "other" industries impacted by SUD

[136] This view was held by 2 Pesticides producers and/or distributors and 2 "other" industries impacted by SUD

4.1.4.3 The extent to which the SUD has been transposed by Member States in a way that allows the effective implementation of the SUD [EQ 4.4]

Following the entry into force of the SUD in 2009, the Directive included deadlines for the implementation and enforcement of several provisions giving Member States time to develop their national strategy and NAPs. From a review by the Commission in 2021 of national measures, it found that there were varying levels of transposed measures and variations in the approaches used in transposing the measures. As shown in Figure 3.1, several Member States (BG, DE, IE, EL, IT, CY, and MT) adopted a single measure while others (e.g. BE, LT, and CZ) have adopted more than 40 measures to transpose the SUD. It should be noted however, that several Member States may have had pre-existing measures in place prior to the entry into force of the SUD. Thus, the number of transposed measures at least partly reflects national traditions and structures and does not indicate the level of ambition.

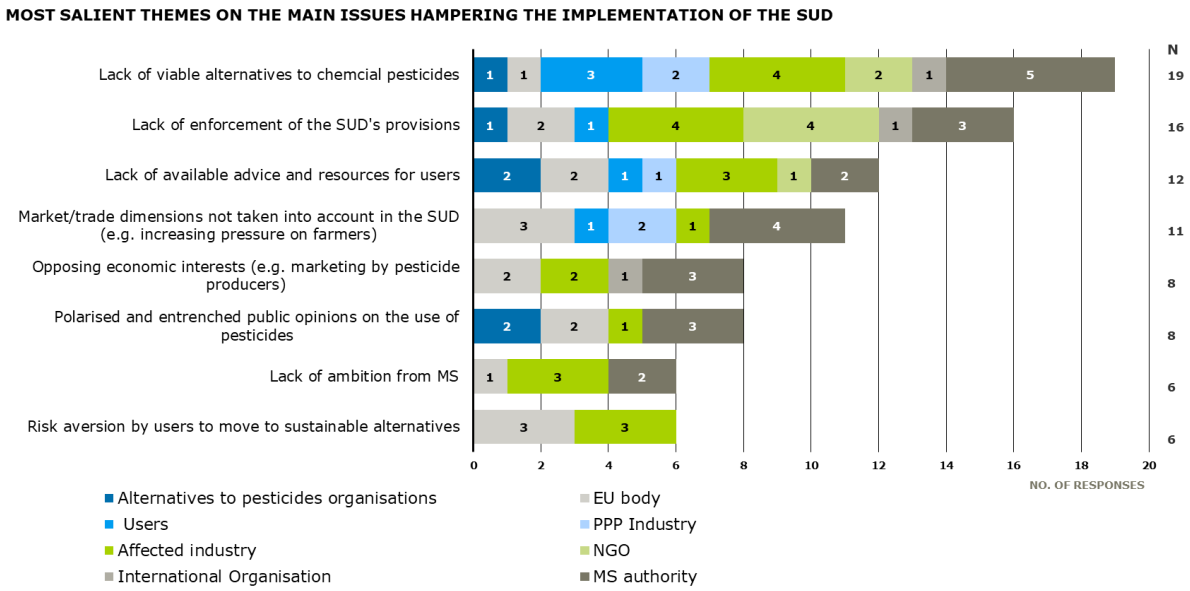
However, the low implementation rates found by the Commission's assessment of national implementation of the SUD's provisions indicates that the effectiveness of transposition varies between Member States. Besides NAPs and IPM enforcement, which have been discussed above, the percentage of implementation of training, water protection and PAE inspection is between 40 and 70%, which is lower than the remaining provisions. The implementation is found to be better in Member States with multiple measures to transpose the SUD. Member States with only one measure are assessed at implementation percentages between 35 and 60%, except for Germany who has the highest percentage at above 90%.

Based on this data it can be concluded that transposition is not consistent in supporting effective implementation and some Member States appear to have selected overly simplistic measures to transpose the SUD, which hampers the effectiveness of the Directive.

4.1.4.4 Which are the factors hampering the implementation of the SUD [EQ 4.5]

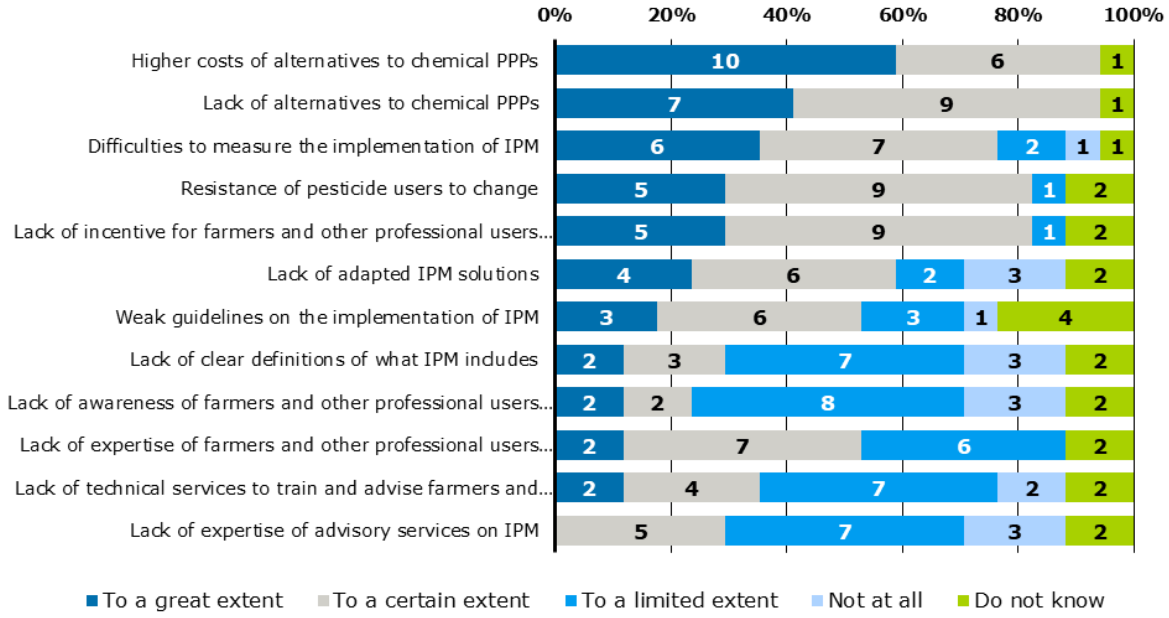
The majority of interviewed stakeholders and evidence from literature highlighted that the SUD had not been fully implemented. The majority of interviewees answered that the SUD had not been fully implemented (19/24), with this view mainly being held by "other" industries impacted by the SUD, NGOs and academia and Member State Authorities. To better understand the reasons behind this lack of implementation, the interviewees were invited to further explain their answer, as shown in the figure below.

Figure 4.20. Most salient themes from interviewed stakeholders (N=36)



The most salient theme which emerged from the interviews was the absence of less hazardous alternatives to pesticide products. From the 19 responses to this theme, it was noted that while there has been a noticeable reduction in the number of hazardous pesticides being available on the market, it has not had a significant impact on reducing the reliance on such products. As Figure 4.21 shows, the respondents to the targeted survey to Member State authorities confirm the themes to a large extent.

Figure 4.21 Member State survey: Hindering factors to the implementation of IPM (N=17).



It is important to caveat that the provisions for the removal of pesticides from the market and the placing of viable alternatives fall under Regulation (EC) No 1107/2009. The SUD does however stipulate that it will promote the use of IPM and of alternative approaches or techniques, such as non-chemical alternatives to pesticides (Article 1). Similarly, it also includes the prohibition of aerial

spraying. It is this aspect that interviewees, along with reports such as from the Court of Auditors (2020), noted that the SUD could be more effective in highlighting non-chemical alternatives and provide increased support such as advice or incentives for farmers in transitioning to a more sustainable use of pesticides. To increase this support, a small number of interviewees suggested that the SUD could provide for more assessments on how alternative approaches or techniques could be adopted following removal of a chemical pesticide from the market. This could include an examination into its implications for all stakeholders and highlighting the steps to be taken to reduce the use of hazardous substances.

This relates to the fourth most salient theme of the lack of available resources, specifically in farm support services. In addition, interviews with EU institution representatives highlighted how across Member States, the level of advice and support is not consistent, with their often being a lack of advice to farmers on the ground on the areas of IPM and alternative methods. Overall, there is some agreement that the SUD has had an impact on raising awareness, primarily through increased advisory services. With regards to training activities, interviewees broadly agreed that the SUD had an impact on increasing activities across the EU, however some stakeholders debated whether these training activities had been carried out in all Member States consistently.

Another central theme which emerged was the lack of enforcement of the SUD, coupled with a lack of ambition from Member States to implement the SUD fully. This view was expressed by 16 out of 36 and 8 out of 36 stakeholders respectively. Interestingly, while there is general view that the form of a directive is best placed for the actions of the SUD, there was a view that there needs to be tougher enforcement from the Commission on Member States who are in non-compliance with the SUD. More specifically, with advancements in application technology over the past decade, the implementation of IPM was seen to not be consistent across all Member States, thus more should be done to enforce the principles of IPM.

The case study on the governance of the SUD in Member States reveals that in many countries, competences are dispersed between different ministries, national agencies or federal and regional levels. This impacts the ability to collect data, create consistent legislation and an understandable legal framework for pesticide use in combination with protection of water quality, biodiversity and human health and subsequently also impacts the enforcement of the SUD's provisions.

As described in Section 4.1, the lack of consistent and reliable data has also an important impact on the ability to assess the effectiveness of the SUD. This nuance was raised by several stakeholders where they noted that the SUD should contain greater provisions to improve the exchange of information between stakeholders at all governance levels so to better enforce the SUD, particularly IPM. This point was further reiterated in the 2017 Commission implementation report to the European Parliament and Council and in the Court of Auditors 2020 report.

4.1.4.5 The extent to which factors which hamper the implementation of the SUD were influenced by regional and national conditions [EQ 4.6]

From interviews with stakeholders, the main finding was that the factors which hamper the implementation of the SUD are highly dependent upon national and regional contexts. In particular, two main distinctions were raised: [1] geographic differences, and [2] differences in farming practices across countries. Several stakeholders[137] highlighted the geographic differences that impact the implementation of the SUD. This mainly pertained to the view that, given the number of variations and approaches in farming practices across the EU, implementing rules that impact all Member States can create differing approaches of implementation.

[137] This included 4 Member States authorities, 1 NGO, 2 "other" industries affected by the SUD, 2 pesticide users.

In several cases the differences between farm types operating in the South of Europe (i.e. vineyards) compared to other crops in the North of Europe were raised, emphasising the differing levels of dependency on pesticides. Interestingly however, those who were of this view also acknowledge that further restrictions and increased regulation from the SUD may not lead to a reduced dependency and may impact on the beneficial aspects the current SUD has on subsidiarity.

With regards to differences in farming practices, a similar view[138] was presented where the variations in the current approaches used by farmers (i.e. in the use of IPM, aerial spraying and monitoring) impact on the implementation of the SUD. In particular it was noted that maintaining a level playing field on the provisions of the SUD is challenged by differences such as cropping systems, agroclimatic conditions, governance of the agricultural supply chain and the market size of PPP. These differences can vary at both the national and regional levels.

Interestingly, this finding is consistent with the findings of the 2008 report[139] on the development of establishing IPM principles where it was noted that the selection of measures always depends on the present regional conditions (e.g. characteristics of soil, macro and micro climatic conditions, water supply, topographic structures, cultivated plants including cash crops or cops of lower priority). Thus, in assessing the impact of national and regional contexts, the recurring theme from 2008 remains, that a "one-size-fits-all" for pest management does not necessarily lead to a greater implementation of the SUD.

4.1.4.6 The extent to which the lack of a definition of 'sustainable use' hampered the effectiveness of the SUD [EQ 4.7]

Views on the extent to which the lack of a definition of 'sustainable use' hampered the effectiveness of the SUD were divided. In particular, the main areas of division lay between those who were of the view that the definition was clear and those who believed it was not. It should be noted that under the legal texts the SUD, there is no current definition of what "sustainable use" means in the context of pesticide use. For those interviewees that believed the lack of a definition did hamper the effectiveness of the SUD[140], it was acknowledged that creating a definition has long been and remains an issue. With no definition, it can result in different stakeholders and countries interpreting "sustainable use" in different ways and in differing magnitudes.

For example, differing viewpoints can understand "sustainable use" as a long-term aspiration, with others viewing it as a cause for immediate action. These differences thus impact on the level of ambition and priority that the implementation of the SUD is given at both the national and regional levels. Notably, in order to clarify this definition, NGO's and pesticide users noted that the principles of IPM provided a form of definition, however it was understandably not comprehensive to cover all of the provisions of the SUD.

On the corresponding side of the question, a similar number of stakeholders[141] acknowledged that a lack of a definition did not hinder the effectiveness of the SUD. In relation to the findings under EQ 4.6, the concept of sustainability is innately broad and difficult to define under any context, thus in the case of the SUD the lack of a definition in fact supports subsidiarity across Member States. As one EU level PPP association noted, the number of many parameters leads to difficulties in creating an EU definition. These differences, such as the landscapes and climates, have an impact

[138] This included 5 Member State authorities and 1 "other" industry affected by the SUD

[139] European Commission (2009) Development of guidance for establishing Integrated Pest Management (IPM) principles. Final Report. 07.0307/2008/504015/ETU/B3. Brussels.

[140] This included 4 Member State authorities, 1 EU institution representative, 3 NGO's, 2 "other" stakeholders affected by the SUD and 2 pesticide users.

[141] This included 5 Member State authorities, 1 EU institution representative, 1 PPP industry and 1 pesticide user.

on this definition, thus the approach adopted by the SUD to set out "sustainable use" through each of the SUD's measures provides a more flexible approach.

4.2 Efficiency

This section seeks to assess the efficiency of the SUD in terms of its cost-effectiveness, i.e. whether the desired effects are reached at a reasonable cost. As per the Better Regulation Guidelines[142], the section looks at both, costs and benefits, of the EU intervention as they accrue to different stakeholders. These benefits are then measured against the costs in order to assess the extent to which the desired effects have been achieved at reasonable costs.

Data on costs was collected through literature review, interviews, and the survey to different stakeholder groups. It should be noted that it was not possible to collect representative data on all categories throughout the EU. This is however not considered an obstacle for replying to the questions as the goal is not to put a precise "price tag" on each activity triggered by the Directive, but rather to get insights on the magnitude of costs and more specifically on instances where the costs may be unjustifiably high.

Benefits are hard to quantify, and significant knowledge and data gaps exist. The impact assessment of the SUD acknowledged that environmental and social (mainly health) benefits will likely accrue from the SUD but did not attempt to quantify them. In terms of economic benefits, the main bulk was expected to benefit farmers due to a reduction in the use of pesticides (while acknowledging that this is not a stated objective of the SUD). However, as shown earlier, pesticide sales did not diminish significantly over the past decade, thus it can be expected that those benefits did not accrue; this is explained in more detail in the following sections.

Finally, and as explained in the above chapter on effectiveness, there are also large uncertainties attached to the extent to which impacts can be attributed to the implementation of the SUD. However, as for costs, this is not considered a shortcoming for replying to the study. This is explained in more detail in EQ6.

The following box provides a summary of the findings under the efficiency criterion.

Box 2. Summary of findings under the criterion of efficiency

The evaluation found that the main costs from implementing the SUD have been proportionate to the likely benefits generated in terms of risk reduction. *While it has not been possible to quantify the environmental, economic and social/health benefits of the achieved risk reduction, a qualitative assessment indicates that the likely benefits clearly outweigh the costs of the SUD. The benefits mainly accrue to the environment and society at large, in particular health and environmental benefits, which in turn generates economic benefits and/or reduces costs.*

The direct costs of SUD implementation (training, inspections, IPM) mainly fall on the professional users of pesticides, in particular farmers, who on the other hand have little or no direct economic benefit from implementing SUD provisions. *This is likely one element hindering or challenging the full implementation of the Directive at farm level. Costs for other stakeholders have been limited, in several Member States SUD measures were already implemented and the EU legislation did not bring significant additional costs.*

[142] European Commission, Better Regulation Guidelines, p. 60

4.2.1 *The main costs to implement the SUD for the different actors concerned [EQ 5]*

The scope of this evaluation question includes identifying the **main costs** stemming from the implementation of the SUD per stakeholder group and to get an understanding of the magnitude of the costs. The degree to which administrative costs can be considered inefficient or disproportionately high is not included in the scope of this question, however; this falls within the scope of EQ9. The box below presents EQ 5 in its entirety. The results are structured by stakeholder group.

EQ 5: What have been the main costs (e.g. implementation costs, staff time in preparing, revising and implementing Member States' national action plans, training and certification for advisers, distributors and users of pesticides etc.) to implement the SUD for the different actors concerned (e.g. Commission, Member States, farmers, professional users etc.)? What were the factors driving these costs?

EU Institutions

Several activities were undertaken by the European Commission. This includes follow-up actions to the provisions in the development of HRI indicators[143], enforcement actions[144], training of government officials, as well as information and outreach actions[145]. A detailed overview of the activities undertaken by the Commission to support and control the implementation of the SUD is provided in Chapter 3.3. There is no evidence that those activities have entailed major costs for the European Commission or that the costs are above those originally estimated as part of the original European Commission proposal of the SUD[146].

The EU has also financed relevant research in support of the implementation of the SUD ,, including through Horizon2020 and by financing the "European Innovation Partnership for Agricultural productivity and Sustainability" (EIP-AGRI) [147]. Also, under prior EU research programmes projects related to pesticides were financed (710 in total mentioning the word "pesticides"[148]) but no detailed assessment was undertaken on the exact topical coverage of those. Under Horizon2020 at least 30 research projects related to plant health have been financed with an overall volume of approx. 160 million EUR[149].

[143] Development of harmonised risk indicators as per Article 15; adaption of standards on the inspection of spraying equipment as per Article 20; development of a strategic guidance document on monitoring and surveying of impacts of pesticide use on human health and the environment as per Article 7 as well as additional guidance documents as per Article 22; drafting of implementation reports as per Article 4 and Article 16; the establishment of an expert group on the thematic strategy on the sustainable use of pesticides as per Article 18

[144] Audits and infringement procedures

[145] Launch and maintenance of a web portal on the SUD, and organisation of events.

[146] See: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2006:0373:FIN:EN:PDF

[147] See: https://ec.europa.eu/eip/agriculture/en/european-innovation-partnership-agricultural

[148] See: https://cordis.europa.eu/search?q=contenttype%3D%27project%27%20AND%20(%27pesticides%27)&p=1&num=100&srt=Relevance:decreasing

[149] See: https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/factsheet-agri-plant-health_en.pdf Cut-off date of information provided in this source is July 2019.

For EIP-AGRI, some statistics on Operational Groups are available even though they might not be specifically on IPM. In total, around 10 million EUR have been made available in this context[150], the main source of funding is Rural Development 2014-2020 funding for Operational Groups[151].

There are also costs associated with the preparation of the SUD, incurred by the Commission. This falls out with of the scope of the question and there has been no indication that that the costs incurred were disproportionate to the achieved outcome, nor whether there is potential for efficiency gains in the process. It should be remarked that the policy process leading to the Thematic Strategy on the Sustainable Use of Pesticides stretched over several years (the first proposal was published in 2002 and the Directive was adopted in 2009); this is, however, not considered disproportionate, given the innovative nature of a Directive on the use phase of pesticides, and the diverse stakeholder framework.

Member State authorities

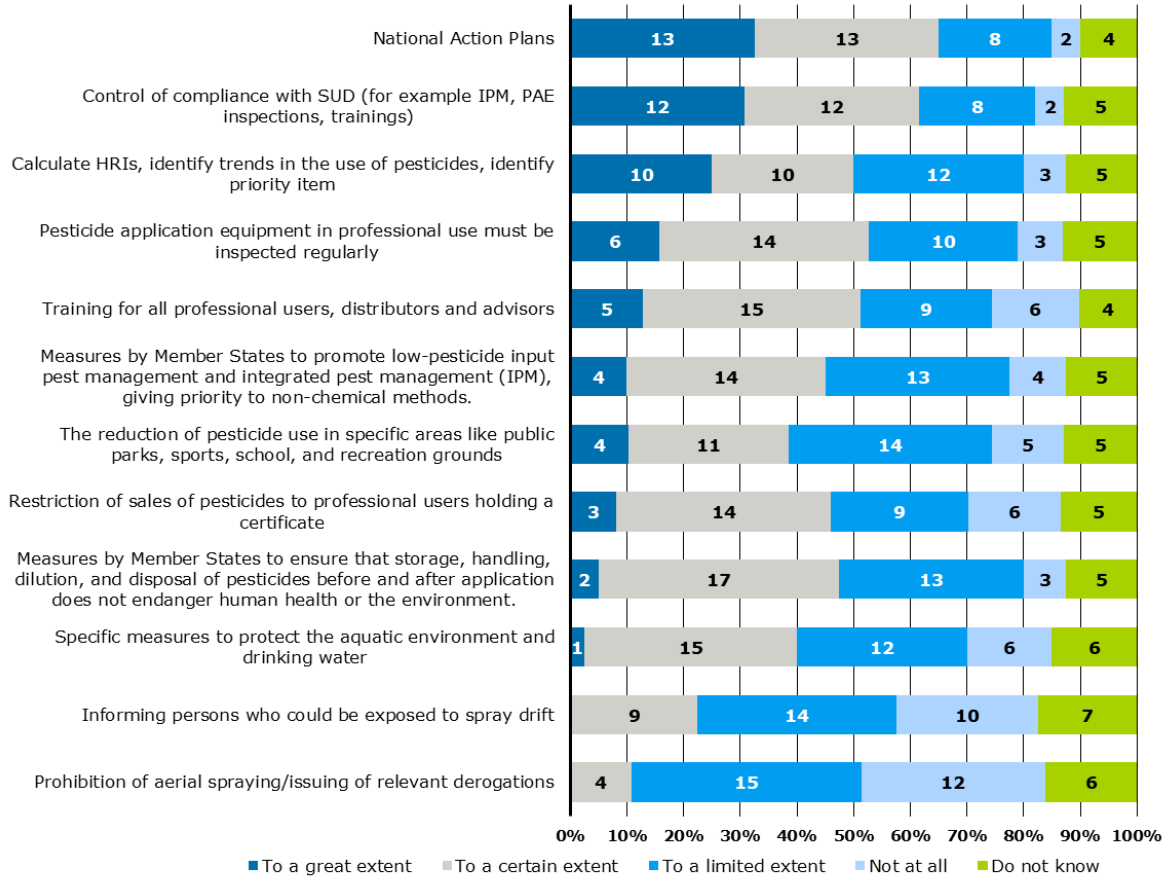
General overview

Member States have implemented the provisions of the SUD through national legislation. Data on the cost of those implementing actions has been collected through interviews, a dedicated survey, and literature review. The below Figure shows the replies of the survey with Member State authorities regarding the elements of the SUD creating a burden.

[150] This is based on a search conducted on https://ec.europa.eu/eip/agriculture/en/find-connect/projects using the pre-defined key-word "integrated pest management (IPM)".

[151] In the sense of Art 56 of Reg.1305/2013

Figure 4.22 Survey with Member State authorities: *In your opinion, to what extent are the following elements of the SUD an administrative burden (administrative costs incurred by public authorities in meeting legal obligations of the SUD) for you or your administration?"*



The Figure above shows that NAPs are considered to be the greatest burden by Member State authorities, even somewhat more than general compliance costs. As can be seen from the distribution of replies, however, there is little agreement on the extent to which the SUD created a burden in the Member States but in general it does not seem like the provisions of the SUD are considered overly burdensome by a majority of the authorities. This has also been found in the 2019 evaluation study on the SUD for the European Parliament[152] where survey results showed that only 20% of respondents considered the implementation of the SUD to cause overly high administrative costs[153].

It is important to keep in mind that some provisions were already in place in some Member States before the SUD (see Appendix 5); this can be considered the baseline for the cost assessment. The additional costs of the SUD for Member States and stakeholders depend very much on the prior existence of similar provisions. This also played into the assessment shown in the Figure above and was also pointed out by several[154] Member State officials through the survey as shown in the examples below[155]:

[152] Evaluation of the implementation of Directive 2009/128/EC on the sustainable use of pesticides

[153] Approx. 35% of the respondents replied with "no" while the remaining respondents replied with "I don't know" or did not submit an answer.

[154] Mentioned in seven replies

[155] The replies have been anonymised.

> *"Many of the provision were already in place in [MS] before the SUD. Therefore, adaptation was required which kept the burden relatively limited or to a certain extent"*
>
> *"In [MS] we have had national action plans since [several years]. Therefore, it has not become an additional burden to produce new national action plans after the SUD came into force. […] The same counts for the question on training, since we have had requirements for training for many years before the SUD came into force. […]The same counts for the measures to protect the aquatic environment, reduction in pesticide use in public areas, and IPM implementation."*

One reply in particular mentioned that costs for some of the provisions are recovered through fees and are thus not considered a financial burden to the Member States. One reply also pointed out the difficulty to distinguish tasks under 1107/2009 and the SUD.

National Action Plans

In the context of **Article 4** (NAPs, all), all Member States had to establish their first NAP by November 2012; only one third of them were submitted within the deadline. It can be expected that they created some burden, also since public participation was part of the preparation of the plans (as per Article 4(5)). It should be highlighted, however, that NAPs are seen as a good coordination tool by most Member States. In addition to the insights from the survey shown above, in interviews, two Member States singled out the NAPs as creating a burden[156]. It can be expected that costs were higher in those countries that did not have any prior plan in place (see Appendix 5).

Costs for the preparation of NAPs have not been estimated as part of the impact assessment predating the SUD. As part of the survey, estimates have been collected on the cost of developing the first NAP.

Some replies highlighted again that no costs occurred since some form of NAPs had already been prepared before[157]. Two replies highlighted that due to the complexity of the process behind the NAP it is not possible to estimate costs. One reply mentioned that the preparation of the NAP itself was not costly but that several measures introduced by the NAPs (e.g., IPM research projects) are cost intensive. For those replies that indicated costs the estimates vary widely:

- In terms of FTE, estimates range between 0.2 FTE and 5 FTE for a year; the median[158] of replies mentions cost between 1 and 3 FTE for 1 – 1.5 years. In the estimations there does not seem to be a correlation between the size of the agricultural sector of a Member State and the magnitude of costs.
- In terms of additional costs, one reply mentions that the pesticide reduction programme resulting from the NAP amounted to 7 million EUR of additional resources; another reply mentions 0.5 million EUR in follow-up costs.

Member States had to review and, if needed, update their NAPs within 5 years of their preparation which causes additional costs. As noted in the report by the European Court of Auditors, nearly three-quarters of the Member States were late with their review[159].

[156] All Member States have been consulted.

[157] Mentioned in three replies

[158] Mentioned in five replies

[159] European Court of Auditors (2020): Sustainable use of plant protection products: limited progress in measuring and reducing risks (Special Report). Online: https://www.eca.europa.eu/Lists/ECADocuments/SR20_05/SR_Pesticides_EN.pdf

Estimates provided through the survey again, show a wide array:

- In terms of FTE, the estimates range from 0.1 FTE to 5 or even 10 FTE. Most replies mention costs of 1 FTE or below. In the estimations there does not seem to be a correlation between the size of the agricultural sector of a Member State and the magnitude of costs.
- Two replies highlighted that monitoring and evaluation of the NAP is a constant effort.

Training and certification

As regards training (**Article 5**) most Member States already had training and certification schemes in place before the SUD as shown in the 2006 Impact Assessment so only low costs were assumed for Member States in adopting existing systems. This assumption was confirmed in a 2011 survey by DG SANTE (then SANCO) among 20 Member States which showed that 19 already had a system to give access to training to all professional users, distributors and advisors. However, most of them have planned a revision to introduce certain adjustments to properly comply with the provisions of the SUD[160].

Through the survey, estimates were collected on the costs of setting up a training and certification scheme. In total five replies provided an estimation, each of them around 1 to 2 FTE for one year, for setting up the scheme for their respective central governments.

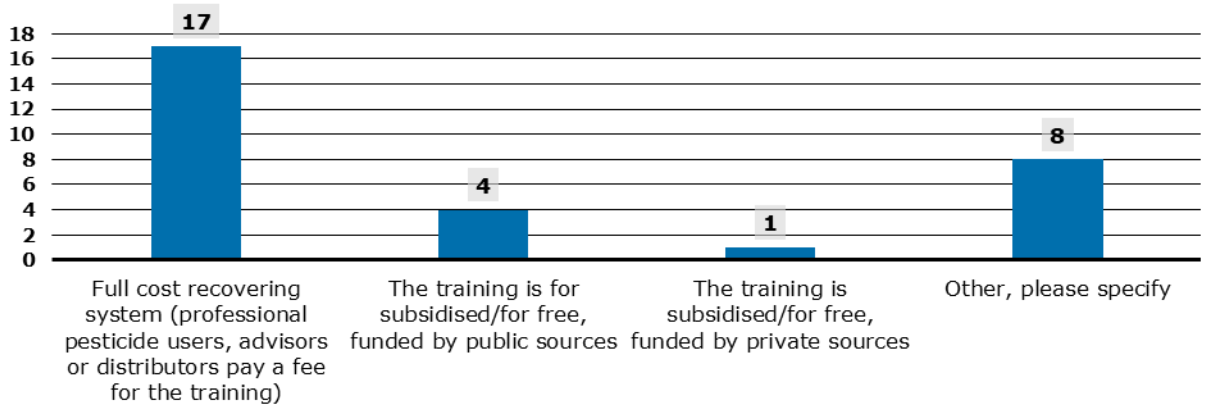
In terms of maintaining the training system, estimates again average at 1 FTE, stretching from 0.1 to 3 FTE. According to the replies, this covers evaluation of content and approval of training sessions as well as overall quality assurance; processing applications for certificates; and supervision of the training and certification system. Additional costs for Member State authorities that were mentioned include the following:

- Costs for outsourcing the training and certification to external providers (annual costs in the reply have been estimated to be at around 150 thousand EUR)
- Costs for IT support, brochures and alike (annual costs in this case were estimated at 20 thousand EUR)

The graph below provides an overview of answers to the survey on the question of how the training system is financed in the Member States.

[160] See: https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sup_survey_status-of-implementation_2011.pdf

Figure 4.23 Survey with Member State authorities: *Please provide information on how the training and certification system is financed (e.g., through fees, taxes)*



As can be seen, in most cases, the training and certification system is financed through fees from professional pesticide users, advisors and distributors which thus cover the main costs of the provision.

In the "other" category, several replies[161] pointed out that within one Member State there are different models that co-exist, as illustrated by the two examples below:

> *Most training centres are subsidised by the authorities. For these, most training courses are free of charge or include a small contribution (which is capped through the regulation) to costs. Some private centres charge for training in full. Some centres offer free training for their members and ask for a contribution to costs for non-members.*
>
> *Training is free when organised by the public administration, but some private training centres (which are recognised by the public authorities) can involve fees.*

Two of those replies also mentioned that the systems are decided on and differ between the regions in the respective Member State. One reply pointed out that there are differences between stakeholder groups, i.e., that distributors have to pay for training while it is free for professional users. The costs for the different stakeholder groups are described in more detailed further below.

Inspection of spraying equipment

The costs for the inspection of equipment in use (**Article 8**) includes costs for setting up and operating the system. The costs for Member States authorities (including controlling institutions) vary widely depending on whether a comparable system was already in place, before the SUD, that Member States could build on[162]. As shown in Appendix 5, before the SUD, only ten countries have established a compulsory control system and seven have introduced inspection schemes on a voluntary basis in place.

Through the survey, Member State authorities were asked to estimate the costs for setting up and maintaining the system for testing spraying equipment. For setting up the system, three replies highlighted that the system was in place before the SUD and that implementing the provisions thus did not entail any costs or only limited ones to adapt the then existing system. Several replies[163] provided estimations combined for setting up the system. Four of those replies state that between

[161] Mentioned in five replies

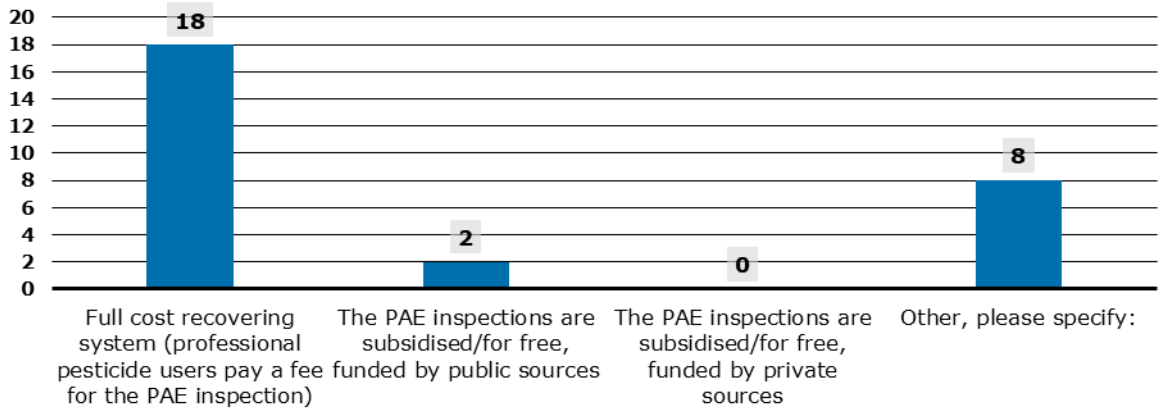
[162] BiPRO (2004). Assessing economic impacts of the specific measures to be part of the Thematic Strategy on the Sustainable Use of Pesticides.

[163] Ten replies

0.25 and 2.5 FTE are allocated at central government level for the inspection system. Two replies mention material costs for setting up the system which include costs for purchasing mobile test stations, software, reference sprayers and nozzles, and laboratory equipment.

For maintaining the system, five estimates were provided by Member State authorities, which range from 0.5 FTE to 800 thousand EUR annually. Two replies point out that the Member State does not face costs since they are fully recovered through fees. As shown in the figure below, this seems to be the most prominent model used across Member States.

Figure 4.24 Survey with Member State authorities: *Please provide an overview of how the inspection system is financed (e.g. through fees, taxes).*



As can be seen, most replies state that inspection systems are financed through fees from professional pesticide users. In the "other" category two replies pointed out regional differences. Other replies describe that there is a mix of public subsidies and private fees. Concerning the fees for professional users, more information is provided further below.

It was estimated in the Impact Assessment that controlling institutions (it should be noted that in some Member States the inspections are not conducted by the public authorities but through private companies or institutes; in those cases, the costs of those bodies are recovered through fees.), would face costs of around 45 EUR per inspected sprayer but that those costs would be recovered from fees from farmers. As shown above, it seems that this is indeed the case. More information on the costs per inspection is provided below.

Prohibition of aerial spraying

For Member States in which derogations on the ban of aerial spraying can be granted, costs were found to have been accrued in assessing requests for derogations. These costs depend on the number of requests received. All of the replies received providing more detailed feedback highlight that only very few or no derogations are requested.

Integrated Pest Management

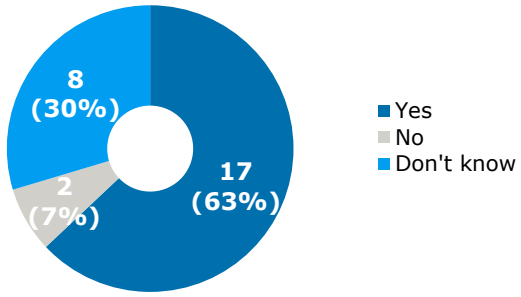
As per Article 14(1) of the SUD, Member States "shall take all necessary measures to promote low pesticide-input pest management" and as per Article 14(2), they "shall establish or support the establishment of necessary conditions for the implementation of integrated pest management. In particular, they shall ensure that professional users have at their disposal information and tools for pest monitoring and decision making, as well as advisory services on integrated pest management".

These two obligations can be met by a wide array of different actions. As discussed in section 4.1.1.2 (promoting the use of IPM), it seems that Member States have taken some action to support the

implementation of IPM, even though the effectiveness of those measures and the eventual implementation of IPM is hard to measure.

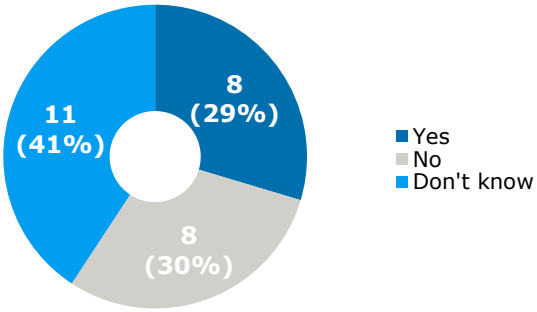
As per Article 14(3), Member States had to submit to the Commission reports on the implementation of the provisions under the Article. Very few Member States provided assumptions of associated costs; however, those cannot be compared with each other since they have different scopes. The Impact Assessment of the original SUD estimated that no specific costs would apply to Member State authorities for the implementation of this Article except a shift of R&D budget towards IPM support of approx. 75 million EUR – 500 million EUR.

Figure 4.25 Survey with Member State authorities: *Have authorities in your Member State/Country initiated specific R&D projects for IPM support during the last 10 years? (n=27)*



No baseline on IPM of R&D budget in Member States before the SUD is available, however from the survey with Member State authorities, most replies confirmed that research on IPM is being financed. Concrete numbers given range from 400 thousand EUR annually to 5 million EUR annually. Other replies point out that grants and funding are provided in the Member State without providing quantitative estimations. Member States might also decide to implement specific financial support schemes for farmers that apply certain IPM standards. Member State authorities were been asked through the survey if such support schemes exist in their respective Member State, as shown in the figure below.

Figure 4.26 Survey with Member State authorities: Did your Member State/Country establish financial support schemes for farmers that apply IPM in the last 10 years? (n=27)



As shown, only a few replies point to the existence of such support schemes and there seems to be a lot of uncertainty, given that most respondents are not aware if such schemes exist in their Member State. In the Member State survey, respondents replying positively to this question were asked to provide more information, incl. an approximate budget, on the support schemes. However, only one respondent provided more information, stating that support is provided under the CAP framework for farmers which apply full, mechanical weed control.

In addition, most Member States developed IPM guidelines as summarised in section 4.1.1.2 above; however, no estimations on the costs of developing those guidelines are available.

Other costs faced by Member State

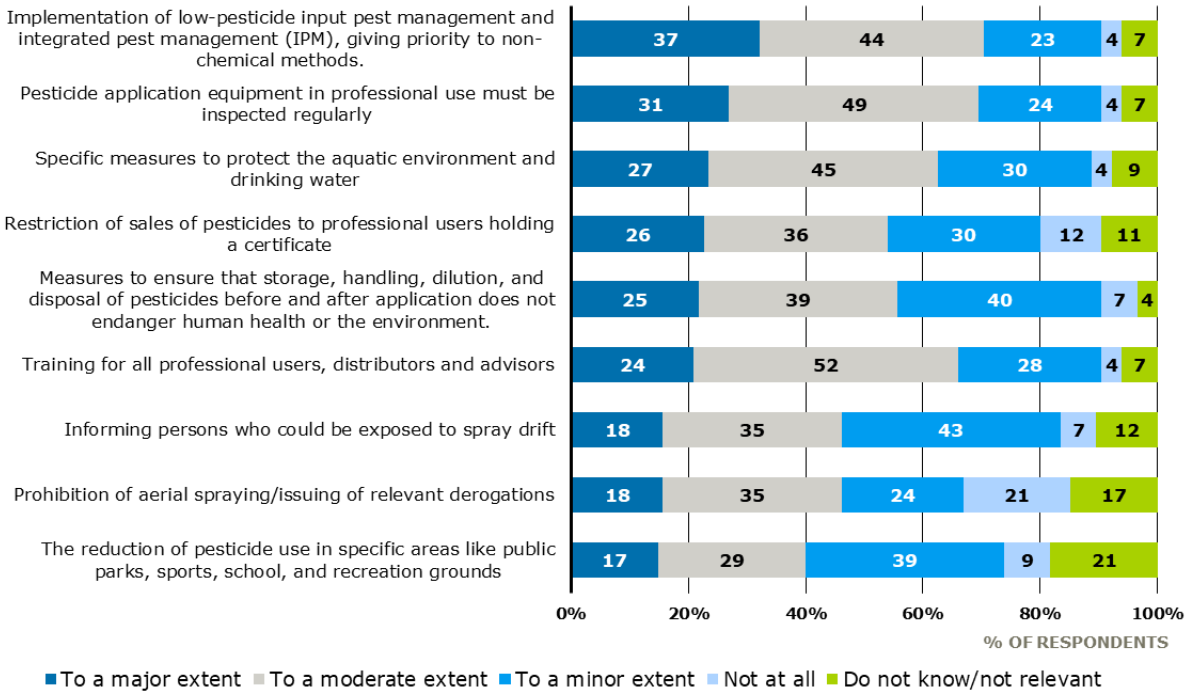
Member State authorities also face costs for the collection of data of pesticide use and sales. However, those activities do not fall under the scope of the SUD. During interviews, one representative of Member State authorities mentioned that Member States face high costs due to the need of coordination between the different administrations involved in the implementation and enforcement of the SUD. This is confirmed through the case study on governance, which shows that in the selected case study countries the governance structure on implementing the SUD is in general very complex with a wide range of ministries involved at national levels and (where relevant) at the regional level.

Farmers[164]

General overview

Farmers are the largest group affected by the SUD and also directly responsible for following up on the provisions of the SUD, e.g. by attending trainings or having their PAE inspected. The below Figure shows the replies of the survey with farmers regarding the elements of the SUD creating a burden.

Figure 4.27 Survey with user of PPPs and Industry: *In your opinion, to what extent are these elements of the current SUD a significant compliance cost or burden in your field of activity?* (n=115)



The graph shows that overall, the implementation of the provisions of the SUD is considered on average to be much more burdensome for famers than by Member State authorities (see Figure 4.22 as a comparison). Within the provisions, the training and certification obligation is considered to create the highest burden, followed by the requirement for inspections of PAE and the prohibition

[164] Farmers is in this context used synonymously with professional users of pesticides in agriculture/horticulture

of aerial spraying. Interestingly, the implementation of IPM was considered to be the least burdensome provision from the SUD.

Training and certification

As mentioned, most Member States already had training and certification schemes in place before the SUD. Thus, fees on training and certification might have already applied before to farmers. However, no baseline on the extent and the magnitude of those fees is available.

As shown above[165] it seems that in most Member States the costs of training and certification are fully or partly recovered through fees. A 2013 survey by DG SANTE (then SANCO) among 21 Member States also showed that 14 of those planned to recover costs for training and certification through fees[166].

As part of the survey with Member State authorities the respondents were asked[167] to provide estimates of the average costs for farmers for training and obtaining a certificate. Below is an overview of the provided estimates:

- Four respondents highlighted that the training for farmers is free or almost free of charge; one of them clarifies that the training is free since it is part of farmer education; if it is taken as a single course then costs of approximately 160 EUR apply
- Two respondents pointed out that the costs depend on the region within the Member State and on the training centre; the latter was estimated to cost between 0 and 240 EUR
- Six replies estimated between 25 and 65 EUR
- Three replies estimated between 150 and 300 EUR
- Two replies estimated between 500 and 1,000 EUR

The Impact Assessment of the SUD assumed that farmers would have to pay the fees (as suggested under Article 19 of the SUD) with an estimated average of around 400 EUR per farmer per training. As can be seen, it seems that the average costs are likely lower than that. However, it should be pointed out that farmers consider training and certification to be the largest burden stemming from the SUD, as explained in more detail below in this section. During interviews, one representative from a Member State authority mentioned that the trainings, including costs, are "quite accepted by farmers and authorities". No stakeholder mentioned the cost from training and certification obligations to be unjustified or particularly high.

Inspection of spraying equipment

The SUD prescribes inspections of PAE at least every three years. As shown above, also the inspection of PAE seems to be predominantly financed through fees. As part of the survey with Member State authorities[168] most estimates provided[169] ranges between 25 and 150 EUR. Four replies highlighted that the costs depend on several factors such as the equipment, travel cost (distance to farm) or the inspection company.

The Impact Assessment of the SUD assumed that the average cost of an inspection ranges from 10 to approx. 350 EUR, which appears to be in line with the findings from the survey.

[165] See "Training and certification" under the discussion of cost of Member State authorities in the same section.

[166] See: https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_sup_overview-sud-training-certification-systems-2013.pdf

[167] Question: *Please provide an estimation of the average cost for participants for training and obtaining a certificate for the following stakeholder groups? Professional pesticide user.*

[168] Question: *Please provide an estimation of the average cost for an inspection of PAE?*

[169] Ten replies

A detailed account of average costs per inspection is also provided by the SPISE working group[170] in the workshop report of the 7th SPISE workshop, held in 2018 in Athens[171]. Estimates range from 50 to 500 EUR per inspection. It should be noted that there are considerable differences between the costs in the Member States.

In addition to the inspection itself, farmers might also face additional costs for repairs and maintenance. The SPISE report cited above provides information on the percentage of inspected sprayers with a defect. Those percentages differ considerably and range from 5 to 92 % and the report states that it is likely that the question might have been misunderstood by some respondents to the survey underlying the report. However, the numbers still show that there seems to be a large percentage of PAE that requires repairs. While some of those repair costs may occur anyway, it is likely that others are needed to pass the inspections.

As mentioned earlier, before the SUD, only ten countries had established a compulsory control system and seven had introduced inspection schemes on a voluntary basis. Thus, while no detailed baseline on this exists, it can be assumed that in many Member States across the EU this provision led to additional repair costs for farmers. However, it is challenging to provide estimates on the magnitude of the repair costs. The Impact Assessment of the SUD estimated an average of 50 EUR of annual repair costs necessary after controls, half of which it attributes to the controls. Those numbers could not be verified in the evaluation due to the complex nature of the question.[172]

It should be noted that the Impact Assessment of the SUD assumed that this provision on the inspection of PAE would overall lead to savings for users since the improved maintenance leads to use reduction of pesticides.[173] However, given that sales of pesticides have not decreased since the SUD was adopted while the volume of agricultural production also remained relatively stable (see Figure 4.2), it can be assumed that those savings were not realised.

Other stakeholder groups

Pesticide producers and distributors were predicted to face the highest cost from the SUD in form of forgone sales and based on the expectation that pesticide sales would be reduced across the EU. However, as shown in Figure 4.2, no clear downwards trend of pesticide sales can be observed, thus it can be assumed that the predicted losses/costs (loss in turnover of between 770 million EUR and 1,100 million EUR) did not occur to that extent.

Distributors and advisors are also subject to training obligations through the SUD. Through the Member State survey, respondents provided estimates on average training costs of those. The table below summarises the detailed replies and contrasts them with the costs for professional users/ farmers. It only shows replies where estimates have been provided for all three stakeholder groups. Replies have been sorted in ascending order based on the costs for professional users.

Figure 4.28 Estimates of training and certification costs for different stakeholder groups

Professional pesticide user	Distributor	Advisor
Free	Free	Free
Free	230 EUR	Free

[170] "The Standardised Procedure for the Inspection of Sprayers in Europe" Working Group.

[171] See: https://www.openagrar.de/servlets/MCRFileNodeServlet/openagrar_derivate_00016900/JKI_Bericht_196_Druckdatei.pdf p.12 f

[172] Through the Member State survey one estimate was provided that costs for repairs may reach 3,000 EUR in a single inspection but this should not be understood as being and average or representative.

[173] It was assumed that the average pesticide use reduction potential resulting from regular control is in the range of 5 to 10% of overall quantity used, without any loss in crop production.

Professional pesticide user	Distributor	Advisor
25 EUR	75 EUR	75 EUR
40 EUR	40 EUR	40 EUR
40 EUR	40 EUR	40 EUR
40-50 EUR	40-50 EUR	40-50 EUR
50 EUR	Free	Free
66 EUR	398 EUR	165 EUR
165 EUR	110 EUR	235 EUR
Basic course: 175 EUR Follow-up course: free	Basic course: 400 EUR Follow-up course: free	Basic course: 400 EUR Follow-up course: free
Between 0 and 240 EUR (depending on training center)	Between 0 and 360 EUR (depending on training center)	Between 0 and 360 EUR (depending on training center)
280 EUR	255 EUR	450 EUR
300 EUR	300 EUR	300 EUR
Basic course: 500 EUR Follow-up course: 200 EUR	Basic course: 500 EUR Follow-up course: 200 EUR	Basic course: 500 EUR Follow-up course: 200 EUR
1,000 EUR	250 EUR	250 EUR
Depends on the provider of the training	Depends on the provider of the training	Depends on the provider of the training

As can be seen, in most Member States there are differences between the training costs for different stakeholder groups and typically the costs for professional users are lower than for the other stakeholder groups. Only in three cases the professional users face higher cost than one or both of the other stakeholder groups.

Insights into overall costs of chemical legislation on pesticides industry

In 2016, DG GROW published the study "Cumulative Cost Assessment for the EU Chemical Industry"[174] with the aim of providing an analysis of the cumulative costs of the most relevant EU legislation with a bearing on the chemical industry in the EU Member States. The assessment also includes an assessment of costs for the PPP production industry[175].

The costs for this industry stemming from chemicals legislation was assessed as part of the study. The term "chemicals legislation" in the study groups refers to "regulations whose overall objective is to improve the assessment and monitoring of hazards associated with certain chemical substances and to manage the potential risks of using them in certain applications, with a view to protecting human health and the environment". This includes most notably the REACH regulation[176], but also a range of other legislation, including PPP legislation comprised which also encompassed the SUD[177].

The study found that chemicals legislation is a high cost for the industry, representing equivalent to 13% of the subsector value added. It further states that the main sources of this cost within the

[174] European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (2016): Cumulative Cost Assessment for the EU Chemical Industry (Report). Online: https://op.europa.eu/en/publication-detail/-/publication/8eb1b47a-ee94-11e6-ad7c-01aa75ed71a1/language-en

[175] NACE code 20.20 — pesticides and agrochemical products

[176] Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). See: https://eur-lex.europa.eu/legal-content/en/TXT/HTML/?uri=CELEX:02006R1907-20210101

[177] Others included Regulation No 1107/2009, which repeals the Council Directive 91/414/EEC, concerning the placing of plant protection products on the market (including daughter or associated legislation on the approved list of substances — Regulation EU No 540/2011, data requirements for active substances — Regulation EU No 283/2013 — and plant protection products — Regulation EU No 284/2013), Biocides Directive (Directive 98/8/EC) and subsequent Biocide Product Regulation concerning the placing on the market and use of biocide products (Regulation EU No 528/2012).

chemicals legislation is PPP legislation, and in particular the Regulation (EC) No 1107/2009 and its predecessor the Council Directive 91/414/EEC concerning the placing of plant protection products on the market.

Since the legislation was grouped together when assessing the costs, no single quantitative estimations of the impact of the SUD can be given. However, the study stated that "The Directive on sustainable use of pesticides generates significant information obligations to pesticides users, agrochemicals distributors and farmers."[178] This, however, does not seem to be confirmed by the results of the evaluation since no evidence was found that significant information obligations have been created through the SUD.

4.2.2 The benefits which have been achieved by the SUD [EQ 6]

The scope of this question includes the identification of the main benefits (social, environmental and economic) that can be reasonably attributed to the implementation of the SUD and to find information on the corresponding monetary value, where possible and relevant to estimate. The box below presents EQ 6 in its entirety.

EQ 6: What social, environmental and economic benefits has the SUD achieved and what is the corresponding monetised value, where possible and relevant to estimate?

The objective is to compile evidence on the benefits from the observable effects that can be attributed to the implementation of the SUD (which are described in effectiveness). The objective is also to compile the perceived benefits by stakeholders which have been collected through the stakeholder consultations. The results of this exercise are then (in EQ7) compared to the main costs stemming from the implementation of the SUD.

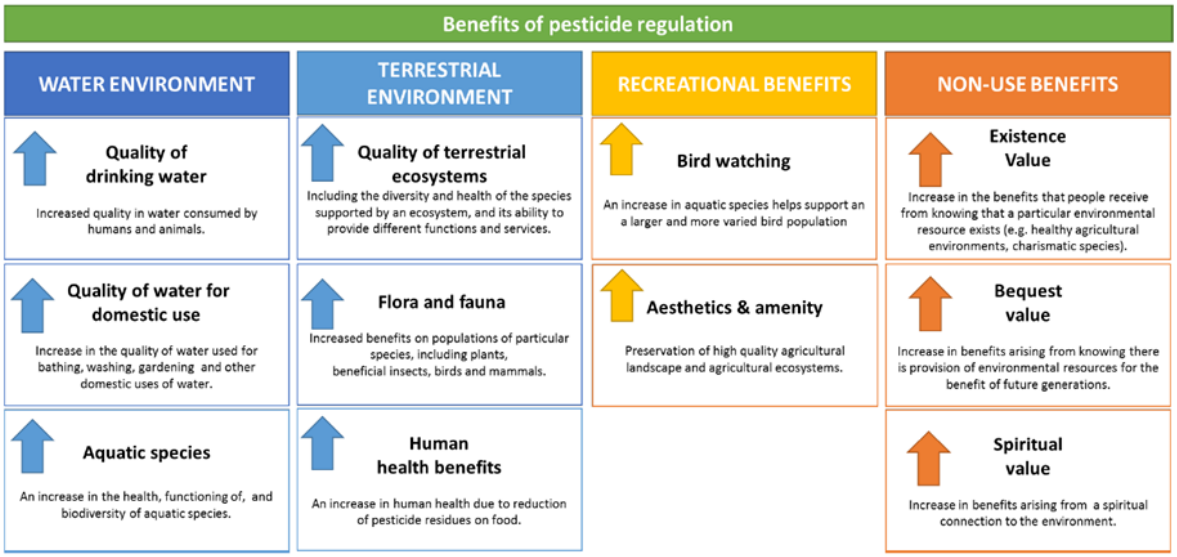
Overview of expected benefits

A wide range of social, environmental and economic benefits can be expected from a well working SUD. A recent study published by DG ENV[179] summarised the benefits as presented in the Figure below.

[178] The assessment also found that "in particular the Regulation (EC) No 1107/2009 and its predecessor the Council Directive 91/414/EEC concerning the placing of plant protection products on the market" is a high source of costs for the industry; this, however, does not fall within the scope of this evaluation.

[179] European Commission (2017): Study on the cumulative health and environmental benefits of chemical legislation: Available at: https://op.europa.eu/en/publication-detail/-/publication/b43d720c-9db0-11e7-b92d-01aa75ed71a1/language-en

Figure 4.29 Overview of benefits of pesticide regulation



Source: European Commission (2017): Study on the cumulative health and environmental benefits of chemical legislation: Available at: https://op.europa.eu/en/publication-detail/-/publication/b43d720c-9db0-11e7-b92d-01aa75ed71a1/language-en

As is often the case however with environmental legislation, only a limited few of those can actually be quantified, and even fewer can be monetised. Also, the attribution challenge and temporal challenge mentioned in the introduction to chapter 4 are highly relevant in this regard. The recent DG ENV study estimated that the current annual human health and environmental benefits of EU pesticide regulation may be between 15 – 54 billion EUR, equating to between 70 EUR and 250 EUR per EU household. However, this estimation "should be seen as highly uncertain and simply to gauge possible orders of magnitude (i.e. that the benefits are likely to be in the order of several billions per year rather than focusing too much on the derived estimate)".[180]

The sections below look in more detail into the available evidence on social, environmental, and economic benefits. It is important to highlight that most of those benefits are linked to a reduction of use of pesticides, as well as a reduction of risk. As mentioned before, use reduction is not an objective of the SUD per se, but rather it is assumed that use reduction leads to a reduction of impacts related to health and environment. The main premises for the benefits are that:

- Overall risk is reduced, based on trend of HRI1 (see Figure 4.6)
- Overall quantities of sold pesticides have remained stable over the years (see Figure 4.3)
- Within those overall quantities, there was a considerable increase in the quantity of low-risk pesticides placed on the market (Group 1) while there was no change in the quantity of the most hazardous pesticides (Group 3); see Figure 4.6.

Evidence on environmental benefits

Environmental issues are related to the load of pesticides released to other environmental compartments (e.g. unintended treatment of other plants due to spray drift). The Impact

[180] European Commission (2017): Study on the cumulative health and environmental benefits of chemical legislation: Available at: https://op.europa.eu/en/publication-detail/-/publication/b43d720c-9db0-11e7-b92d-01aa75ed71a1/language-en

Assessment[181] did not attempt to quantify and monetise environmental benefits, given the methodological challenges attached to it.

Given that the overall risk has reduced over the years (HRI1) it can be assumed that this also led to environmental benefits, since the overall quantity of hazardous substances has been reduced.

In terms of environmental benefits, it should be mentioned that the JRC recently developed a pollination 'account'[182], which shows that the economic value of pollinating insects to crop production in the EU is around 3.7 billion EUR per year. However, while t is accepted that pesticides can and do harm pollinators, there are no reliable and agreed estimates on the extent to which pesticides are responsible for a decline in pollinators[183]. At the same time, even when assuming that only 5% or 50% of a declined could be attributed (and it should be highlighted that those numbers are fictional) this would still mean annual benefits of 185 million EUR or 1.85 billion EUR, both of which alone balance the accumulate costs for the implementation of the SUD.

In addition, the following observations can be made:

- Given that ban on aerial spraying seems to have overall been well-applied in the EU[184][185] it can be expected that the reduced spray drift due to this resulted in environmental benefits.
- The expected use reduction of pesticides[186] stemming from the provisions (e.g. IPM, training and inspection of spraying equipment) did not manifest and thus it could be assumed that at least some of the expected environmental benefits did not manifest. However, the Impact Assessment did not account for different groups of pesticides (i.e. low-risk and more-hazardous ones) and since the overall quantities have to a large extent remained stable due to an increase of less-hazardous substances in can be expected that environmental benefits have nevertheless occurred.
- As shown in EQ3, there are some indications of an overall decline of pesticide prevalence in water bodies. As shown in the case study "SUD provisions on water protection" the presence of pesticides in water bodies significantly increases the operational costs for drinking water purification since activated carbon filters have to be replaced more frequently. The reduction of pesticides in water bodies would avoid parts of those costs. While the general increase in costs for increased treatment due to pesticides is challenging to assess, the case study provides some specific insights.
  - In Wallonia, Belgium, the additional costs incurred for water treatment utilities due to pesticide pollution are around EUR 0.2 to 0.4 per m^3, primarily caused by the costs for activated carbon filters.
  - In the Netherlands, the costs associated with the treatment of water from pesticides and their transformation products corresponds to approximately 18 million EUR per year.

Evidence on social benefits

Social benefits in the context of the SUD mostly manifest through health benefits. Those include health benefits for operators (farmers and ground spraying companies) but also health benefits for

[181] European Commission (2006): SEC (2006) 894. The Impact Assessment of the Thematic Strategy on the Sustainable Use of Pesticides. Online: https://ec.europa.eu/environment/archives/ppps/pdf/sec_2006_0894.pdf

[182] See: https://publications.jrc.ec.europa.eu/repository/handle/JRC117072

[183] Also, it should be noted that a decline of pollinators (e.g. by 50%) does not necessarily mean that there will be a similar (i.e. 50%) reduction of pollination.

[184] No information has been identified pointing to Member States not implementing this obligation. Also, as shown above, derogations seem in general to be only be granted to a limited degree.

[185] And also since this provision was new in most Member States

[186] Reduction of 11% to 16% (meaning 31,000 to 44,000 tonnes of active substances per year)

the overall population. As for environmental benefits, the Impact Assessment[187] did not attempt to quantify and monetise those benefits given the methodological challenges.

In general, given that the overall risk has reduced over the years (HRI1) it can be assumed that this also led to social (health) benefits, since the overall quantity of hazardous substances has been reduced.

The provisions on training (Article 5), requirements for sales of pesticides (Article 6) and Inspection of equipment in use (Article 8) can be assumed to have a positive effect on farmers health. All three provisions seem to have been implemented well at least to some extent in most Member States. Benefits accrue since farmers are better aware of the risks in relation to pesticides through training[188] and have safer equipment; and also, since non-professional users can be briefed by certified vendors. Ideally this would be compared to trends in acute poisoning incidents as well as chronic poisoning developments which should be monitored in each Member State as per Article 7. However, no aggregated data could be identified. As mentioned earlier, through the survey with Member State authorities, recipients were asked if national monitoring systems provide data on the number of acute and chronic poisoning incidents. However, the data provided is very limited and does not allow for calculating aggregated trends.

It should be noted that, given that the ban on aerial spraying will have had increased the need for ground spraying it can be expected that more ground sprayers are exposed to pesticides, i.e. having negative health impacts. However, at the same time reduced spray drift from the aerial spraying ban can be expected to have reduced health impacts of bystanders.

The share of low-risk substances within overall sales has increased and partly replaced others which can lead to health benefits for operators as well as for bystanders and residents from spray drift.

Given that the number of MRL exceedances seem to have increased over the years it can be assumed that this limits the health benefits. However, the fact that the MRLs have been fluctuating could be linked to a list of possible factors, including better testing; thus the conclusion on health impacts in uncertain.

Evidence on economic benefits

Farmers

As mentioned in EQ5 above, farmers were expected to face the highest costs from the implementation of the SUD. It was expected that this would be compensated by the economic benefits, predominantly through a reduced use of pesticides[189]. In total it was expected that the SUD would lead to a reduction of 11% to 16%, meaning 31,000t to 44,000t of active substances per year. It was estimated that this would lead to aggregate savings (i.e. economic benefits) between 770 million EUR and 1,100 million EUR for farmers across the EU from using and purchasing less pesticide while facing no expected crop losses[190]. However, as has been shown in Figure 4.2, sales have not declined significantly in the past decade. Thus, it can be expected that many of those benefits have not manifested[191].

[187] European Commission (2006): SEC (2006) 894. The Impact Assessment of the Thematic Strategy on the Sustainable Use of Pesticides. Online: https://ec.europa.eu/environment/archives/ppps/pdf/sec_2006_0894.pdf

[188] See Annex 1 of the SUD for mandatory training requirements.

[189] It should be reminded, however, that this reduction itself was not an explicit objective of the Directive.

[190] This was one of the main premises of the Impact Assessment of the SUD that policy options should not lead to crop losses.

[191] In this context it should be kept in mind that pesticides represent a cost for farmers and thus they do not use the pesticides "because they want to" but because they expect to gain higher benefits from using them, thus exceeding the costs.

Also, as part of the Impact Assessment the following was assumed for Farmers: "*When implementing correctly general IPM requirements to be introduced in Directive 91/414/EEC their direct support payments will not change. Accepting additional specific IPM requirements could lead to support under rural development in the order of € 70 to 520 million. Specific further requirements in the framework of river basin management plans could be compensated through CAP payments (set-aside) or payments from drinking water companies*."

As mentioned earlier, the survey with Member State authorities tried to identify such support schemes for implementing certain IPM standards for farmers. However, only one such scheme was identified which allocates CAP funding to fields with full mechanical weed control.

Other stakeholders

Other economic benefits include revenues for training and certification institutions, testing and control workshops institutions for sprayers, equipment maintenance companies, and agricultural advisory services; all of these institutions benefit directly from fees paid by professional users of pesticides (and, in the case of training, fees paid by distributors and advisors).

4.2.3 *Proportionality between the SUD's costs and benefits [EQ 7]*

This question compares the evidence of EQ5 and EQ6 and aims to gauge the extent to which costs have been proportionate to the benefits. The box below presents EQ 7 in its entirety.

EQ 7: To what extent were the SUD's costs proportionate to its benefits (i.e. positive outcomes)?

Comparing the preliminary results of EQ5 and EQ6, it can be seen that even though large methodological challenges exist, especially for the benefits side, it can be expected that benefits surpass costs by a large margin when taking into account environmental and health externalities in the benefits.

Estimations on benefits (albeit subject to strong uncertainties) amount to 15 – 54 billion EUR, equating to between 70 EUR and 250 EUR per EU household. Those environmental and health benefits benefit society at large.

Looking at costs, the main costs from the SUD accrue for farmers and entail predominantly costs for training and certification (ranging from 0 – 1,000 EUR every three years per farm manager) and inspection of spraying equipment (between 50 and 500 EUR per inspection). Comparing the costs and benefits, the benefits seem to outweigh the costs by several magnitudes.

However, there seems to be a situation in which farmers bear many of the economic costs of the implementation of the Directive, while their economic benefits might not have manifested to the expected extent. At the same time, a large part of those costs also consists of payments towards services such as training, inspection, etc., meaning that the stakeholders with a positive economic outcome are mostly paid by farmers.

4.2.4 *The costs of partially meeting or not meeting some of the objectives and requirements of the SUD [EQ 8]*

This question assesses the costs of the SUD not reaching its intended objectives and the Member States not fulfilling all obligations imposed by the SUD.

EQ 8: What have been the costs of partially meeting or not meeting some of the objectives and requirements of the SUD?

The main objective of the SUD is reducing dependency on pesticide use and reducing the risks and impacts of pesticide use on human health and the environment

As shown in section 4.1.1.1, the extent to which the SUD reaches those objectives differs. There is little evidence that the SUD reduced the dependency on pesticide use, and indeed sales of active substances remained relatively stable. At the same time, there are some indicates that the risks from pesticide use on human health and the environment has been reduced, most notably demonstrated by the development of HRI1.

It is not possible to estimate the costs of not fully reaching the objectives in quantitative terms as shown in the sections above. Thus, the paragraphs below discuss the costs qualitatively.

For the objective of reducing the dependency on pesticide use, one clear cost is borne by farmers in that they pay for pesticides which is an additional expense in the production process. At the same time, however, those costs are revenues for pesticide producers and distributors.

On the objective of reducing risks, the costs are mostly borne by society at large, in the form of environmental and health impacts. While those are for the most part not quantifiable, the sections above have nevertheless shown that the environmental and health benefits of reduced pesticide risk can be expected to be higher than direct economic costs.

4.2.5 The administrative burden and/or costs of the actions of the SUD [EQ 9]

As a Directive, the provisions of the SUD oblige Member States to adopt adequate legal measures to achieve the objectives. These measures directly linked to the SUD could still create administrative burden and drive administrative costs for other actors than national authorities. Administrative burden is defined according to the Better Regulation Guidelines[192] as costs that stem from processes solely performed because of a legal obligation by either public authorities or private parties. Thus, these are costs related to the administrative compliance with rules set in or based on the provisions of the SUD. The box below presents EQ 9 in its entirety.

EQ 9: Which elements of the SUD pose an administrative burden or are overly complex? What are the administrative costs for the different actors?

As many of the mechanisms required in the SUD had been in place in some or several Member States before the adoption of the Directive (see Baseline in Appendix 5), experiences on the measures could be collected. The SUD evaluation for the European Parliament[193] did not find evidence for overly high administrative burden created by the SUD. When considering the costs in relation to societal benefits, particular burdens were not found in the evaluation. Stakeholders[194] confirm the acceptable burden of the measures of the SUD in the interviews as the current rules are accepted and not seen as unnecessary.

However, one exception from this general acceptance is found in both previous evaluation and interviews. Requesting and processing derogations from the ban of aerial spraying creates high bureaucratic burden for both the party requesting the exemption and the authority taking the decision. The planned measures were already softened in the negotiations leading up to the

[192] Better Regulation Guideline, Tool #60. The Standard Cost Model for estimating administrative costs.

[193] European Parliamentary Research Service (2018). Directive 2009/128/EC on the sustainable use of pesticides

[194] Three Member State authorities and one industry impacted by the SUD

adoption of the SUD because of an estimated burden for authorities[195]. The burden is found to be increasing with the ability of pesticide application through drones and the uncertainty whether these constitute aerial spraying[196]. Stakeholders from both user and authority perspectives[197] express the same position that decisions on the approval of derogations in the national law is the main cause for administrative burden. According to the evaluation for the European Parliament and the Member State authority, the changing technological possibilities are contributing substantially to the creation of the burden. It should be noted, however, that this point could not be confirmed through the survey with Member State authorities.

It is also important to note that the evaluation for the European Parliament[198] found that authorities in most Member States struggle to implement and enforce all measures of the SUD as foreseen. This can be seen as an indicator that other provisions than the approval of derogations from the ban of aerial spraying could be burdensome without stakeholders noticing because the implementation is weak or lacking. Enforcement and controls are emphasised in the evaluation and are often also mentioned by interviewees for costs that other authorities accrued. Thus, the inspection of pesticide application equipment may be another potential cause for administrative burden that needs to be further investigated in detail.

[195] European Council, Common Position (EC) No. 21/2008 [19 May 2008]

[196] European Parliamentary Research Service (2018). Directive 2009/128/EC on the sustainable use of pesticides

[197] One stakeholder each

[198] European Parliamentary Research Service (2018). Directive 2009/128/EC on the sustainable use of pesticides

4.3 Relevance

The assessment of relevance concerns whether the objectives of the SUD have responded to the needs and problems it was aiming to address (as identified at the time of the Impact Assessment), whether the needs and problems have evolved since then and if current and evolving needs are still being addressed by the Directive.

The following box provides a summary of the findings under the relevance criterion.

Box 3. Summary of findings under the criterion of relevance

The evaluation finds that the objectives of the SUD was and still is highly relevant to address the risk posed by pesticide use to the environment and human health. *However, most of the environmental (pollinator decline, biodiversity) and health (potential exposure to pesticides) issues and needs identified at the time of adopting the Directive have remained unchanged or even been aggravated, thus further underlining the relevance of a strong legislation to regulate the use of pesticides. A stronger awareness among consumers and society at large acts as drivers for change, however the situation is uneven among Member States.*

It can also be expected that climate change will have an influence on food production in the EU, with additional challenges, extreme weather events and altering pest pressures, which in turn may influence pesticide risks and use. COVID-19 further adds uncertainty about the future developments, although the EU agri-food sector has until now proven to be resilient facing the pandemic, with little disruption to food production and the food chain. Taking this into account, the evaluation assesses that the current Directive will likely only be moderately relevant to address future issues and needs.

4.3.1 Response of the SUD to the need and problems of the Impact Assessment [EQ 10]

As a first step to assess the relevance, this EQ looks at the response of the SUD to problems and needs at the time it was prepared and adopted. The box below presents EQ 10 in its entirety.

EQ 10: To what extent has the SUD responded to the needs and problems concerning the use of pesticides identified at the time of the Impact Assessment?

At the time of the Impact Assessment, it was acknowledged that although pesticides generate significant economic and social benefits to agriculture and society as a whole (in terms of yields, access to affordable food of good quality), there was a need to address the risks to human health and the environment better, through direct and indirect exposure to pesticides used for plant protection. The potential exposure of humans and the direct emissions into the environment was considered highest at the use and post use (e.g. remaining pesticides in sprayers and disposal of packaging) phases of the pesticide lifecycle.

Before the SUD came into place some Member States had already adopted measures to reduce the risks for health and the environment linked to pesticide use, while other had not yet taken action, leading to an unlevel playing field for pesticide users and pesticide industry, which could amount to unfair competition for economic actors in the EU. Without EU action it was considered likely that diverging trends would continue leading to different levels of protection of health and environment in the EU and diverging conditions for the main users of pesticides (farmers) as well as other actors involved in the field.

The objectives were thus defined in the thematic strategy on the sustainable use of pesticides (SEC(2006) 894) that led to the Directive as to (1) reduce the impact of pesticides on human health

and the environment and (2) more generally to achieve a more sustainable use of pesticides as well as a significant overall reduction in risks and of the use of pesticides consistent with the necessary crop protection. Although the term sustainable use is not defined, the expected results stated in the thematic strategy were reduced negative impacts from pesticide use (risk reduction) but also a reduction of overall use through farming practices that support low pesticide input, such as IPM and organic farming[199].

As summarised in the status quo at the time of the impact assessment for the thematic strategy (see section 2), the provisions of the SUD were based to large extents on existing measures that Member States had put in place. This underlines the relevance of the measures at the time of the development of the SUD by basing the selected provisions on those already in place in some countries. The stakeholders interviewed for the evaluation affirm that the objectives of the SUD were relevant to address the problems and needs. Specific points highlighted in several of the interviews relate to the need to regulate the use phase of pesticides which was missing, to protect human health and the environment, to which the SUD was aimed to respond.

However, the issue of diverging national implementations and lack of harmonised rules on the use of pesticides remains vivid despite the adoption of the SUD. Several stakeholders[200] as well as implementation reports of the EU Commission point to this divergence as a need that continues to exist. Another negative point raised relates to how the SUD ignores food trade and the impact the international food system has on agriculture (e.g. increased competition, price pressures). These arguments indicate that the Directive did not respond appropriately and successfully to these needs.

4.3.2 Evolution of problems and needs since the preparation of the SUD [EQ 11]

The following section assesses the evolution of the problems and needs from the impact assessment into current needs and likely future ones. The box below presents EQ 11 in its entirety.

EQ 11: How have the needs and problems identified at the time of preparation of the SUD evolved since then? *What are the current needs and problems related to the use of pesticides and how will they evolve (e.g. health risks to children and the most vulnerable, key environmental aspects such as soil health, biodiversity etc.)?*

As described in the assessment of the effectiveness of the SUD, despite the efforts undertaken, a large extent of the needs and problems identified at the time of preparing the SUD have remained the same. Although several more hazardous active substances have been banned from the market, there are still risks to human health and environment from the use of pesticides in agriculture and non-agriculture settings when conditions of use are not fully respected. The overall similar needs and problems can be related partly to the unclear effectiveness of the SUD with continuing negative impacts on the environment being found in recent scientific studies[201]. The case study on the implementation of IPM also highlights that progress has been slow and that different national efforts have not translated into a reduced dependency of pesticide use. At the same time, the better understanding based on monitoring technologies of impacts also increased awareness for the topic of pesticide use and the associated risk, that was not present to the same extent at the time of

[199] European Commission (2006). COM(2006) 372 final. A Thematic Strategy on the Sustainable Use of Pesticides

[200] Overall 20 stakeholders from all categories, including 6 Member State authorities and 5 interviewees from other industries impacted by the SUD.

[201] See for example: European Court of Auditors (2020). Press Release Luxembourg, 5 June 2020; Powney, G.D., Carvell, C., Edwards, M. et al. Widespread losses of pollinating insects in Britain. Nat Commun 10, 1018 (2019). https://doi.org/10.1038/s41467-019-08974-9; Hallmann, C. A., Sorg, M., Jongejans, E., Siepel, H., Hofland, N., Schwan, H., Stenmans, W., Müller, A., Sumser, H., Hörren, T., Goulson, D., and de Kroon, H. (2017). More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PLOS ONE, 12(10), e0185809. https://doi.org/10.1371/journal.pone.0185809

adoption of the SUD. Both these causes of increased relevance of the SUD are also mentioned by a wide range of stakeholders[202].

With regard to the alignment of policies across the EU, the SUD has created the framework for better harmonisation (see EU added value in Section 4.6.2). However, the limited specificity of the SUD on provisions such as trainings mean that differences between Member States remain largely in place. The Commission's audit reports from several Member States as well as stakeholders from pesticide users and Member State authorities confirm this argument. Therefore, the need to harmonise the national approaches to the sustainable use of pesticides continues to exist.

As stated in the recent Farm to Fork strategy "there is an urgent need to reduce dependency on pesticides and antimicrobials, reduce excess fertilisation, increase organic farming, improve animal welfare, and reverse biodiversity loss"[203]. Reports show that biodiversity loss is – amongst other factors – connected to the use of pesticides[204] Insect species and in particular pollinators are found to be in decline in Europe[205] and worldwide[206] while EU policy instruments have not been able to stop this trend[207].

The Farm to Fork Strategy and other recent EU strategies aim to address the issue with ambitions for future policies. The Farm to Fork strategy also sets out quantitative targets for the reduction of 50% of both pesticide use and risk to be achieved in 2030. Other EU strategies such as the Pollinator initiative[208] call for action to halt and reverse the alarming decrease in pollinators (and other insects), with intensive agriculture identified as one of the main pressures driving the decline (loss of habitat, use of pesticides), together with environmental pollution, climate change and invasive species. The Biodiversity Strategy 2030[209] highlights the urgent need to address pressures on biodiversity, to restore vital ecosystems currently being depleted by human activities.

These strategic documents reflect the decline in biodiversity and the increased understanding of the impacts. The scientific findings and changes in the EU's political ambition create the need for legal instruments to be introduced to achieve the targets by using pesticides more sustainably. In their responses to the public consultation, 64% of all respondents strongly agree or agree with the need for pesticide use and risk reduction targets set by the EU. This underlines the support in the EU society for the targets set in the strategies and thus the continued relevance to reduce risk and use of pesticides.

The evidence on health impacts is scarcer but there are growing and worrying signs of human health and human development being affected by chemicals, including pesticides. These topics have been

[202] 21 stakeholders in total: 9 mentioning low effectiveness (4 Member State authorities, 2 NGOs and academia, 1 each from EU institutions, pesticide users and other industry impacted by SUD); 10 mentioning increased awareness (4 MS authorities, 2 EU institutions, 2 other industries, and 1 each from consumer or worker organisation and international organisations)

[203] European Commission (2020): Farm to Fork Strategy - For a fair, healthy and environmentally friendly food system. Available at: https://ec.europa.eu/food/sites/food/files/safety/docs/f2f_action-plan_2020_strategy-info_en.pdf

[204] OECD (2020). Managing the Biodiversity Impacts of Fertiliser and Pesticide Use. https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/WKP(2020)2&docLanguage=En

[205] See for example: Holzschuh Potts S., Biesmeijer K., Bommarco R., Breeze T., Carvalheiro L., Franzén M., González-Varo J.P. et al., Status and Trends of Pollinators, ed. STEP Project (Sofia: Pensoft Publishers, 2015), https://www.researchgate.net/publication/272019008_Status_and_trends_of_European_pollinators_Key_findings_of_the_STEP_project.

[206] See e.g. Sanchez-Bayo, F., Wyckhuys, K. A. G. (2019), Worldwide decline of the entomofauna: A review of its drivers, Biological Conservation and IPBES (2019). Global assessment report on biodiversity and ecosystem services.

[207] European Court of Auditors (2020). Special report 15/2020: Protection of wild pollinators in the European Union - Commission initiatives have not borne fruit

[208] European Commission (2018): EU Pollinators Initiative. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0395&from=EN

[209] European Commission (2020): EU Biodiversity Strategy for 2030 - Bringing nature back into our lives. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0380&from=EN

discussed for a long time prior to the adoption of the SUD, but lasting exposure and progress in research continue to increase the relevance. Children are considered particularly vulnerable (including in-utero) due to their development status and small body mass[210]. Potential cocktail effects of exposure to several chemicals are increasingly taking into consideration, which further adds to the relevance of effects on humans, including children and foetuses, as well as other species[211].

The concerns highlighted by the evidence was aired by stakeholders[212] in interviews, primarily from environmental organisations but also some Member States, that the situation in terms of human health and the environment is not improving and rather continues to deteriorate.

Stakeholders[213] interviewed for the evaluation further emphasized an evolving public opinion and that consumer attitudes have developed since the SUD was adopted, with more awareness and concerns about sustainable food production and the impact of pesticides on human health and the environment, which can be seen as an additional driver for action. However civil society concerns are different between the Member States[214]. Further evidence for this point is provided by the analysis of responses to the public consultation, in which 55% of the respondents consider protection of the environment and water as important. However, the importance varies from environmental and consumer organisations (high importance), over EU citizens (medium importance), to businesses and research institutions (lower importance).

As one indicator, the increase in organic production provides evidence for stronger demand from consumers for sustainable food (of which organic production is one but not the only method),), which in turn can be seen as expression of the increased awareness in EU society[215]. Similarly, there is a trend towards buying locally produced food and a growing awareness of problems related to food waste, as illustrated by different initiatives from industry, retailers and consumer groups[216].

Another aspect mentioned in particular by industry and producer organisations relate to an evolving situation with fewer available active substances and a lack of alternatives for producers, leading to higher costs and loss in yields. While this is not a consequence of the SUD, it is seen as part and parcel of the challenges producers face when asked to reduce their use of plant protection products.

The outbreak of COVID-19 and the following and ongoing pandemic have had an impact on economies and societies in the EU and around the world. The agricultural and food sector in the EU, however, did not face major disruptions[217]. The effect on pesticides use and risk is only indirect and related to travel restrictions and changing food consumption pattern. Assessments during the early

[210] See HBM4EU (2020). Prioritised substance group: Pesticides. https://www.hbm4eu.eu/wp-content/uploads/2021/02/HBM4EU_AD5.4_Reporting_first_and_second_set_substances_v1.1-1-Pesticides.pdf

[211] ibid.

[212] 4 stakeholders in total: 1 Member State authority, 1 NGO, 1 international organisation and 1 pesticide user

[213] 6 stakeholders in total: 2 EU institution representative, 1 Consumer and workers organization, 2 other industry impacted by SUD, 1 Member State

[214] Use of pesticides is second biggest concern for surveyed citizens in 9 Member States (BG, FR, IT, HR, DK, LT, MT, SI and RO) and at the overall EU level. In other Member States, such as IE, FI, NL and PL, other topics of sustainable food are more important and pesticide use is less controversial. See: Eurobarometer (2020). Special Eurobarometer 505. Making our food fit for the future – Citizens' expectations. https://europa.eu/eurobarometer/api/deliverable/download/file?deliverableId=73867

[215] Eurobarometer (2021). Health, Sustainability and New Priorities Drive Organic Food Sales. https://blog.euromonitor.com/health-sustainability-and-new-priorities-drive-organic-food-sales/

[216] See for example European Parliament (2016). Short food supply chains and local food systems in the EU. https://www.europarl.europa.eu/RegData/etudes/BRIE/2016/586650/EPRS_BRI(2016)586650_EN.pdf and also private sector initiatives such as Slow Food or Too Good To Go.

[217] See results of JRC Survey, November 2020: https://datam.jrc.ec.europa.eu/datam/mashup/COVID19_FOODCHAIN/

stages of the pandemic saw restrictions on foreign seasonal workers as a key factor[218]. As physical plant protection measures are often more labour intensive, this shortage in workforce may have had an impact on the use of pesticides. Changing consumption patterns are characterised by a sharp decrease in food away from home, combined with an increase in retail sales for private cooking[219]. As a result, some agricultural products, in particular special products for processed high value foods experienced lower demand, while organic foods saw higher demand and demand for many other food product groups did not change substantially. For farmers, also as part of the overall economy, the pandemic created uncertainty. The result on pesticide use and associated risks will need to be monitored in the coming years.

Climate change also represents an important relevant factor with the potential to change agricultural practices, crops and pests in different regions of Europe. Moreover, degradation and spread of pesticides after application is found to be altered by a changing climate[220]. However, only a small number (four stakeholders from pesticide industry and users) of interviewees mention climate change as a factor influencing the relevance of the SUD. This may indicate that the awareness of the implications is low, or that the effects are considered less important in comparison to currently existing needs to manage pests and pesticide use. Considering the main points from reports such as the one cited above, it can still be concluded that climate change will affect pesticide use in the future and needs to be considered in instruments such as the SUD.

4.3.3 Relevance of the SUD's objectives in light of current needs and future developments [EQ 12]

This sections analyses based on the previous discussion if the objectives and actions of the SUD continue to be relevant. The box below presents EQ 12 in its entirety.

EQ 12: To what extent are the SUD's objectives and required actions relevant today to address the current needs and problems and expected developments related to the use of pesticides in the EU?

The majority of consulted stakeholders[221] are of the opinion that the SUD's objectives and required actions are still relevant to address current and future needs and problems. The issues mentioned are more related to effectiveness in implementation and enforcement, than to any fundamental flaws in the objectives and the actions in the Directive. This is supported by stakeholders from all categories and reflected in responses to other questions in the interviews underlining the high salience of the view. The late and varying implementation of the SUD in the Member States indicates a similar direction. It can therefore be concluded that the key factor in increasing the relevance of the SUD is to ensure an even implementation and enforcement across the EU.

From industry representatives there are calls for clearer objectives and actions for alternatives to pesticides, to support the realisation of use reduction and risk reduction targets. While it is acknowledged that IPM is part of the solution, it was emphasised that technological development and innovation could also be strengthened and better supported, specifically the use of drones in precision farming. Currently use of drones falls under the ban on aerial spraying, which in the view

[218] See for example: European Parliament (2020). Protecting the EU agri-food supply chain in the face of COVID-19; and ARC2020 (2020). Effects of Coronavirus on Agricultural Production – a First Approximation

[219] OECD (2020). COVID-19 and the Food and Agriculture Sector: Issues and Policy Responses.

[220] EFSA (2020). Climate change as a driver of emerging risks for food and feed safety, plant, animal health and nutritional quality. doi:10.2903/sp.efsa.2020.EN-1881

[221] All 10 stakeholders from different categories responding directly to this question consider the objectives of the SUD still relevant.

of certain stakeholders hinders innovation towards precision farming as a means to achieve a (more) sustainable use of pesticides.

Many stakeholders[222], in particular Member State authorities and pesticide users consider the ban on pesticide spraying from drones as a barrier to new technology in this area. According to them, the targeted application can reduce the risk, in particular the exposure of pesticide users, and also the volume. Two interviewees[223], however, expressed a sceptic view on spraying with drones as their contribution to reducing the risk of pesticide use has not been proven. Scientific studies on the reduction of drift and higher efficacy are scarce and many are not concluded yet[224]. A Swiss study[225] on the use of drones in viticulture found that the drift is comparable to land-based spraying. This would indicate better performance than traditional aerial spraying from helicopters or planes as the spraying altitude is much lower. The efficacy of the pesticide application, however, was found not to be comparable with established technologies in the study. If more volume is necessary to achieve the necessary plant protection effect, this would be an indicator that current drone spraying technology is not yet able to reduce the risk of pesticide use. Also, stakeholders that see the opportunity of drones as sprayers emphasise the need for specific training and inspection of the drones to ensure responsible use. It should be noted that these discussions concern the use of drones able to spray pesticides remotely. Other drones are used under the umbrella term of precision agriculture to monitor crop development, weeds and other pests. As these drones are not falling under the ban of aerial spraying, the SUD is not regulating their use.

Some stakeholders[226] also see a need for promotion of the uptake of other technological developments in the area of digitalisation and precision agriculture, as this market is expected to grow and provide new ways of sensing and pest control[227]. This point is particularly salient in the responses to the public consultation. Here, it is the issue considered most important for the future of the SUD by the overall respondents, driven by business organisations, trade unions and public authorities. However, in interviews many stakeholders, including several Member State authorities, do not consider the SUD a barrier to technologies other than aerial treatment with drones. This indicates that drones are the key topic for technologies hindered by the SUD. Still, the wider range of new technologies is considered important for reducing risks of pesticide use.

4.3.4 Relevance of the SUD's objectives in light of the three main dimensions of sustainability [EQ 13]

This section discusses the relevance of the objectives in the light of the three main dimensions of sustainability, i.e. environmental, social, and economic. The box below presents EQ 13 in its entirety.

EQ 13: Based on the identified current needs and problems and expected developments, are the objectives of the SUD relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental?

[222] 17 stakeholders in total.

[223] 1 Member State authority and 1 NGO or academia

[224] See for example Projet PulvéDrone

[225] Anken, T. and Waldburger, T. (2020). Working Quality, Drift Potential and Homologation of Spraying Drones in Switzerland. In: Gandorfer, M., Meyer-Aurich, A., Bernhardt, H., Maidl, F. X., Fröhlich, G. and Floto, H. (Ed.), 40. GIL-Jahrestagung, Digitalisierung für Mensch, Umwelt und Tier. Bonn: Gesellschaft für Informatik e.V.. (S. 25-30)

[226] 1 interviewee each from pesticide users, pesticide producers or distributors and Member State authorities

[227] Jaime del Cerro et al., "Unmanned Aerial Vehicles in Agriculture: A Survey," *Agronomy* 11, no. 2 (2021), https://doi.org/10.3390/agronomy11020203.

As stated in Article 4 of the Directive, Member States are required to take into account the health, social, economic and environmental impacts of the measures envisaged, of specific national, regional and local conditions and all relevant stakeholder groups.

The UN Sustainable Development Goals (SDGs)[228] provide the international framework for sustainable development. With its objectives and actions, the SUD can be linked to a range of relevant SDGs, such as zero hunger (SDG 2), good health and well-being (SDG 3), decent work and economic growth (SDG 8), climate action (SDG 13), responsible consumption and production (SDG 12), life below water (SDG 14) and life on land (SDG 15). The range of the relevant goals shows the importance of the SUD for sustainable development, even though achieving some of the SDGs will require trade-offs with other goals (e.g. zero hunger and life on land). Still, the list makes clear that an effective SUD has high relevance also on an international level.

The overall view from interviewees[229] (of those who answered) was that, based on the identified current needs and problems, the objectives of the SUD are and continue to be relevant in addressing the three main dimensions of sustainability.

The past and continued relevance for the environmental dimension of sustainability is undisputed among stakeholders, who – across all categories – underline the importance of establishing principles for ensuring environmentally sustainable use of pesticides. As discussed above, the uneven and perceived unambitious implementation reduces the relevance for some stakeholders such as NGOs, industries impacted by pesticide use, but also some Member States.

To further the SUD's continual relevance in all three dimensions, several suggestions were raised by interviewees. One main theme which emerged was that there is a need for the SUD to place a greater focus on the social and economic dimensions. In particular, many of the stakeholders (particularly Member States) stated that there should be a greater balance in risk reduction for both people and the environment. This was highlighted by one Member State who noted that since the establishment of the SUD, there has been a greater demand from citizens for increased safety in the products they consume, thus the objectives of the SUD should align with this trend. In response to a recent Eurobarometer survey, close to one third of respondents see "little or no use of pesticides" as an important characteristic of sustainable food[230], which is also support by a BEUC survey[231] that finds that sustainability is considered by more than half of consumers in their food decisions.

On a similar note, NGOs and other industries impacted by SUD called for a greater balance between environmental and economic dimensions, making use of existing EU initiatives and legislation, to ensure its relevance in the future. According to these stakeholders, EU pesticide legislation is primarily driven by economic considerations rather than environmental ones. Opposingly, several pesticide users and producers noted that farmer revenue could be better integrated in the SUD, taking into account the constraints that producers face in terms of productivity in the promotion of economic sustainability. Interviewees from various categories[232] indicated that changing production systems is more labour intensive and may require investment in new equipment. These higher

[228] https://sdgs.un.org/goals

[229] This view was expressed by 16 interviewees: by 2 EU level representative, 5 Member State Authorities and 3 "other" industries impacted by SUD, 3 pesticides producers, 1 pesticide user and 2 NGO.

[230] European Commission (2020). Special Eurobarometer 505. https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/91035

[231] BEUC (2020). One Bite at a Time: Consumers and the Transition to Sustainable Food. https://www.beuc.eu/publications/beuc-x-2020-042_consumers_and_the_transition_to_sustainable_food.pdf

[232] 9 in total: 3 pesticide users, 2 other industries impacted by SUD, 2 Member State authorities, 1 EU institution representative and 1 NGO or academia.

production costs are difficult to recover in the system of low retail prices, so that the economic survival of farms, in particular smaller ones, may be put at risk.

An important consideration for the objectives of the SUD arises from the Farm to Fork and Biodiversity Strategies, which both foresee targets for the reduction of use of pesticides in general and of the more harmful ones in addition to the risk reduction. The current objectives of the SUD only target risk and impact reduction of pesticide use. The new strategic objectives can be related to difficulties for citizens and non-experts to understand risk developments in the context of findings about reduced biodiversity. Stakeholders from two different categories[233] report that broadly the wording of *sustainable use* was perceived as *using less* pesticides. Other stakeholders[234] criticise the lack of reduction of overall pesticide use. While stakeholders such as one Member State authority and one pesticide industry representative consider risk reduction target more appropriate the relevance of use reduction is underlined by the European Parliament evaluation as well as national initiatives such as the French EcoPhyto plan[235]. Thus, the developments in the political context warrant an inclusion of use quantity targets in the objectives of the SUD.

[233] 1 user of pesticides, 1 EU level institution

[234] 2 Consumers' and workers' associations

[235] France Ministers for Agriculture and for the Environment (2015). ECOPHYTO PLAN II. Available at: https://ec.europa.eu/food/system/files/2019-03/pesticides_sup_nap_fra-ecophyto-2_en.pdf

4.4 Coherence

The criterion of coherence assesses how well a policy instrument works together with other instruments to identify synergies or contradictions. Parts of the evaluation of coherence are the internal coherence, that focuses on the various measures within the instrument under analysis – in this case the SUD, and external coherence that assesses the relation with other interventions.

The following box provides a summary of the findings under the coherence criterion.

Box 4. Summary of findings under the criterion of coherence

The evaluation finds that the internal and external coherence of the Directive is generally strong and there are no major inconsistencies or overlaps. *The coherence with most EU legislation was assessed positively, with some exceptions for biocides legislation and the Common Agricultural Policy (CAP). The theoretical link between the SUD and the CAP is strong, but in practice it is weak and the CAP has not been considered as a key tool to support implementation of the Directive (for example through promoting/rewarding more sustainable practices). The evaluation has shown that the SUD is perceived and functions as a "stand alone" directive, with limited coordination and complementarity with broader policy actions on environment and health. Even though objectives are globally aligned, few complementary benefits can be identified. Implementation happens at Member State levels, and requires involvement of different policy fields and governance levels but effective coordination mechanisms are often lacking at Member State level, which hampers the effective implementation of the Directive.*

4.4.1 Internal coherence [EQ 14]

First, internal coherence, the coherence between the different provisions of the SUD, will be assessed. The box below presents EQ 14 in its entirety.

EQ 14: To what extent has the SUD been coherent internally (i.e. coherence between the required actions)?

The SUD is a framework directive that requires a set of action from the Member States to achieve its objective. When asked about coherence of the SUD's provisions, stakeholders express no criticism of the internal coherence. Two NGOs refer to the implementation of the actions as insufficient for the objectives.

A review of the measures and objectives finds one key inconsistency. Given the discussion on the importance of indicators, the coherence between the harmonised risk indicators (Article 15) and the promotion of IPM as one of the overall objectives raises questions on their coherence. Not including monitoring requirements on the effects of the SUD's provision, for instance the uptake of IPM practices, counteracts the provision on IPM (Article 14), as no information on progress and the impact on risk reduction is available. Moreover, the creation of HRIs based on the sales of pesticides instead of their use patterns undermines the ability to evaluate the effects of the SUD and its measures. The significance and consequences of this are discussed in detail in Section 4.1. Stakeholder from all categories shared this assessment before being asked about the internal coherence, making it a relevant consideration even though it is not brought up in the responses to the question itself.

Overall, the Directive is internally coherent for the majority of its provisions. However, the inability to adequately measure developments proves to be a weakness to the achievement of the objectives of the SUD.

4.4.2 External coherence [EQ 15]

The following section assesses the interaction of the SUD with other EU legislation. The box below presents the full EQ 15.

EQ 15: The SUD has strong links with other EU legislation and depends on these links for its implementation and achieving its objectives. *To what extent has the SUD created an effective and coherent link with other EU legislation and policies related to the use of pesticides? To which extent is the SUD dependent on implementation of the linked legislation in achieving its objectives? In particular, the link with the following legislation and policies should be explored:*

a. Regulation (EC) No 1185/2009 (statistics on pesticides);

b. Regulation (EC) No 1107/2009 (placing on the market of plant protection products);

c. Regulation (EC) No 396/2005 (maximum residue levels);

d. Regulation (EC) No 528/2012 (biocidal products), in particular Articles 17(5) and 18;

e. Regulation (EC) No 882/2004 (official controls) replaced by Regulation (EC) No 2017/625 as of December 2019;

f. Directives on health and safety of workers (Directive 98/24/EC, Directive 89/391/EEC, Directive 2004/37/EC, Directive 2009/104/EC, Directive 89/656/EEC, Directive 94/33/EC, Directive 92/85/EEC);

g. Directives on environmental protection (on water: Directive 2000/60/EC Directive 1008/105/EC, 2006/118/EC, Directive 98/83/EC, Directive 91/271/EEC, on wild birds: Directive 79/409/EEC, on natural habitats: Directive 92/43/EEC);

h. Regulation (EC) 834/2007 repealed by Regulation (EU) 2018/848 (organic production);

i. Relevant aspects of the Common Agricultural Policy (e.g. cross-compliance requirements, Regulations (EU) Nos 1306/2013, 1307/2013, 1308/2013);

j. Directive 2006/42/EC (machinery) with respect to pesticide application equipment;

Directive 2006/12/EC (waste) and Directive 91/689/EEC (hazardous waste);

l. EU policies on climate change

The SUD is part of a broad set of EU policy instruments regulating the value chain of pesticides. Additionally, it has connections with several other areas. Table 4.2 presents the separate assessment of the SUD's coherence and dependency with all these pieces of legislation.

In general, the coherence of the SUD with other EU legislation is high. For most aspects, inconsistencies are reported only by individual stakeholders that relate to the overall package of pesticide legislation which they perceive as difficult to navigate. The evaluation performed for the European Parliament[236] arrives at similar results. The coherence with most EU legislation was assessed positively, with some exceptions for biocides legislation and the Common Agricultural Policy (CAP). The main criticism from stakeholders on coherence also relates to the links with the CAP. The weak connection was mentioned in some way in interviews by 18 stakeholders from all categories. Further details are included in Table 4.2 below.

[236] European Parliamentary Research Service (2018). Directive 2009/128/EC on the sustainable use of pesticides

Table 4.2 Assessment of coherence of the SUD with other EU legislation.

EU legislation	Coherence with SUD	Dependency of the SUD
Regulation (EC) No 1185/2009 (statistics on pesticides);	Regulation 1185/2009 formed part of the pesticide package adopted together with the SUD and aimed at serving the purposes of Art. 4 and 15 of the SUD. This creates a clear connection between the two pieces of legislation, in which Regulation 1185/2009 is meant to enable the effective achievements of the SUD. In line with the Thematic Strategy for the sustainable use of pesticides[237], Regulation 1185/2009 provides statistics for the sales and the use of pesticides. However, as mentioned repeatedly throughout earlier sections, data and statistics on the use of pesticides are crucially lacking to monitor the impact of the SUD's actions. In this respect, the support of Regulation 1185/2009 for the SUD is missing as effective collection, compilation and dissemination of data in statistics has not been achieved in practice, due to additional aggregation requirements (no active substance level data can be disseminated), and lack of harmonisation and not enough data collection being frequent (every 5 years) for the pesticide use in agriculture. Two Member State representatives and one EU policymaker, express lacking support of the SUD objectives, while two other Member States and one industry stakeholder emphasise the synergy between the two.	On the one hand, both instruments are mutually dependent. The calculation of HRIs relies on the quality of statistics available on pesticides. The collection of data is best designed with the knowledge of the purpose (HRIs) in mind[238]. On the other hand, when considering the implementation of the SUD's provisions, a strong dependency of the SUD from Regulation 1185/2009 becomes apparent. The effective establishment of NAPs (Art. 4 SUD) and in particular harmonized risk indicators (Art. 15 SUD) require data and statistics that allow determining the progress made on achieving low risk use of pesticides. This dependency is already strongly emphasized in the 2006 impact assessment[239], in which it is acknowledged that accurate and up-to-date data is needed for the monitoring of progress and the effective protection of the environment and human health.
Regulation (EC) No 1107/2009 (placing on the market of plant protection products);	Regulation (EC) 1107/2009 and the SUD are strongly interlinked in the way that SUD provides for the sustainable use of active substances that have been approved under Regulation 1107/2009. Adopted as a package, both the SUD and Regulation 1107/2009 work towards less harmful pesticide application. Many synergies and reinforcing overlaps exist such as a common requirement for IPM implementation when using approved active substances or the information contained on labels to inform users. Regulation 1107/2009 also covers the gap of pesticide use data by requiring records from farmers (Art. 67 (1). However, the requirement for data collection does not include the sharing of data with authorities for aggregated statistics except in cases demands are issued. This provision thus has the potential to greatly contribute to the monitoring of impacts achieved (partly) by the SUD but is not exploited in the vast majority of Member States.	There is a strong dependency between the SUD and Regulation 1107/2009. As the Regulation regulates the approval of active substances to be used in plant protection products, the progress on the objectives of the SUD is impacted by the Regulation and the approved active substances. As has been presented (see Section 4.1), the withdrawal of active substances has prevented some high-risk substances to be applied any longer. The impact on the risk reduction is notable, according to Member State interviewees and demonstrated by the HRI1. However, the withdrawal of active substances can lead to replacements with other substances in higher dosages or more frequent applications. At the same time, the introduction of low-risk alternatives to current

[237] COM(2006) 372 final. European Communities Commission. (2006). A Thematic Strategy on the Sustainable Use of Pesticides

[238] COM(2017)109: Implementation of Regulation 1185/2009 concerning statistics on pesticides

[239] European Commission (2006). SEC(2006) 894 Impact assessment of the Thematic Strategy on the Sustainable Use of Pesticides

EU legislation	Coherence with SUD	Dependency of the SUD
		chemical pesticides depends on the requirements set in the Regulation as well. Even though alternatives to pesticides comprise many types of alternatives, low-risk pesticides fall into this group and Regulation 1107/2009 sets the key parameters for their authorisation and approval. The availability of alternatives to chemical pesticides is the most pertinent theme in position papers submitted to the public consultation. The evaluation of Regulation 1107/2009 also come to this finding, with lengthy processes being the main cause[240]. However, the Commission and some Member States (again with strong variations in the case of SUD[241]) have been taken action to accelerate and promote low-risk substances and their procedures and will continue to do so. Benefits from these actions are expected in the future[242], but are still uncertain. All this underlines the dependency of the SUD on the implementation of the Regulation for reducing the risks of pesticide use.
Regulation (EC) No 396/2005 (maximum residue levels)	Regulation 396/2005 is another piece of EU legislation that the SUD is aimed to be complementary to. In legal terms, both instruments are coherent, as an Ecorys study[243] finds. The objective and overall measures of reducing the risk associated with pesticide use is aligned with the aim of ensuring consumer protection through maximum residue levels of pesticides in food and feed. Also form the interviewed stakeholders, only two see inconsistencies between the two instruments, which reflects the general coherence. Practically, however, the Ecorys study describes a difference between the approaches and implementations. Regulation 396/2005 assesses residues of individual active substances, while the SUD takes a holistic perspective on pesticides. This means that the level of focus is different, and the SUD does not	A dependency of the SUD from Regulation 396/2005 cannot be found. Inversely, however, the observance of maximum residue levels for food and feed produced in the EU could benefit strongly from an effective SUD.

[240] European Commission (2020). Evaluation of Regulation (EC) No 1107/2009 on the placing of plant protection products on the market and of Regulation (EC) No 396/2005 on maximum residue levels of pesticides. COM(2020) 208 final.

[241] Council of the European Union. (2019). Progress report on the implementation plan to increase the availability of low-risk plant protection products and accelerate implementation of integrated pest management in Member States.

[242] European Commission (2020). Evaluation of Regulation (EC) No 1107/2009 on the placing of plant protection products on the market and of Regulation (EC) No 396/2005 on maximum residue levels of pesticides. COM(2020) 208 final.

[243] Ecorys (2018). Study supporting the REFIT Evaluation of the EU legislation on plant protection products and pesticides residues (Regulation (EC) No 1107/2009 and Regulation (EC) No 396/2005).

EU legislation	Coherence with SUD	Dependency of the SUD
	directly address specific pesticide that may lead to residues. Parameters of the systemic use of pesticides in practice are however less of focus for Regulation 396/2005. Cumulative effects that arise from the use of different pesticides are for example not investigated under this regulation[244]. This is also stressed by one Member State authority that focuses on health aspects of pesticide use.	
Regulation (EC) No 528/2012 (biocidal products), in particular Articles 17(5) and 18	According to Art. 2 (1) of the SUD, biocides have for the time being not been included in the scope of the Directive. Recital (2) of the SUD also reflects this, while anticipating the extension of the scope to also include biocides next to the already covered plant protection products. An extension of the scope was however not considered appropriate by the Commission due to the diversity in biocidal products and applications[245]. In the views of four interviewed Member State authorities, this results in inconsistency with biocide legislation as active substances used in biocidal products are not treated the same way as they are for the use in plant protection products. This notion of incoherence has also been found in the EP evaluation[246]. Considering all this, coherence between biocidal and plant protection products is missing to a large extent and requires clarification or action. Because of the different legislative provisions, the same active substances can be sold and used with more or less restrictions depending on the intended use. In addition to creating confusion and uncertainty among users, this is also reported as a challenging factor for monitoring the presence of unintended use of substances in the environment, because it cannot be determined which provisions a substance was subject to	N/A
Regulation (EC) No 882/2004 (official controls) replaced by Regulation (EC) No 2017/625 as of December 2019	Multiple provisions of Regulation (EU) No 2017/625 reinforce the provisions in the SUD by enabling controls of the implementation at farm level. Controls should take place on a risk basis. These points strengthen the role of the SUD as enforcement is possible based on the controls. However, some shortcomings remain, as IPM enforcement requires trained staff, which is challenging in the context of lacking indicators for IPM implementation. For this reason, effective controls of the SUD's provisions remain few and weak. Moreover, inspection of pesticide application equipment is not included in the scope of the official controls. Without a shared regulatory framework for these inspections and the official controls, different approached by Member States are possible that can lead to fragmented inspection systems with little harmonization between	The lack of consistent enforcement of IPM and the limited data available of the use of pesticides indicates a potential dependency between the Official Controls Regulation and the support of the SUD's objectives. The inclusion of IPM provisions in the scope of the Regulation could be one contribution to improve the data availability and (assessment of) the implementation of IPM in a harmonised way across the EU.

[244] Ibid.

[245] COM(2016) 151. Report on the sustainable use of biocides pursuant to Article 18 of Regulation (EU) No 528/2012 of the European Parliament and of the Council concerning the making available on the market and use of biocidal products

[246] European Parliamentary Research Service (2018). Directive 2009/128/EC on the sustainable use of pesticides

EU legislation	Coherence with SUD	Dependency of the SUD
	Member States. This contributes to the challenges of enforcing and monitoring IPM, which is discussed extensively in the assessment of effectiveness.	
Directives on health and safety of workers (Directive 98/24/EC, Directive 89/391/EEC, Directive 2004/37/EC, Directive 2009/104/EC, Directive 89/656/EEC, Directive 94/33/EC, Directive 92/85/EEC)	Multiple provisions of the SUD can have positive implications on the health and safety of workers, such as training, equipment inspection and handling of packaging. Coherence with workers health and safety is overall not problematic. Only one stakeholder (workers union) mentioned legislation on health and safety of workers stating that there is no focus on workers. However, the analysis of public consultation responses shows that training and information of the safe use, storage and disposal of pesticides have improved the knowledge on human exposure and measures to reduce it. This can be considered a beneficial synergy with other EU legislation on the health and safety of workers, even though ultimate impacts on safety levels cannot be quantified.	N/A
Directives on environmental protection (on water: Directive 2000/60/EC Directive 1008/105/EC, 2006/118/EC, Directive 98/83/EC, Directive 91/271/EEC, on wild birds: Directive 79/409/EEC, on natural habitats: Directive 92/43/EEC)	When assessing the coherence of the SUD with directives on environmental protection, the Water Framework Directive (Directive 2000/60/EC, short: WFD) stands out as most relevant policy piece. It is most frequently referenced in the text of the SUD and all stakeholders that responded on a relevant relationship between the two consider this the most important directive in the area of environmental protection. Overall, the legal provisions of the SUD and the WFD of legislation are found to be coherent, as described in the fitness check of the WFD[247] and stakeholders from all categories. Some stakeholders[248] describe a synergistic relationship, as the SUD sets principles to reduce the risk of pesticide contamination in water bodies (Art. 11 SUD). Results of the public consultation show high knowledge on measures to protect the aquatic environment, which can be linked to the training requirement of the SUD. 84% of respondents state that their knowledge has improved a lot or a little because of the training. The relationship between the practical implementation and the impacts on the protection of the aquatic environment is however more complex to assess. Actions taken in some Member States are considered good practices to achieve stronger	N/A

[247] European Commission (2019). SWD(2019) 439 final. Fitness check of the Water Framework Directive, Groundwater Directive, Environmental Quality Standards Directive and Floods Directive

[248] 5 stakeholder interviews in total: 3 Member State authorities, 1 EU institution representative and 1 pesticide producer/distributor

EU legislation	Coherence with SUD	Dependency of the SUD
	protection[249]. Stakeholders[250] and Commission reports[251] consider the implementation of IPM and the monitoring as insufficient to create effective coherence. The findings in the case study on water protection confirm these findings and provide further details on the synergies between objectives but lacking effectiveness of the implementation.	
Regulation (EC) 834/2007 repealed by Regulation (EU) 2018/848 (organic production)	The Regulation on organic production contains in Annex II many of the IPM principles and reinforces their applicability to producers following organic standards. Additionally, only specific active substances are allowed for the use in organic production, which are of natural origin or found to be essential to the production of certain crops. These provisions therefore provide synergies with the provisions and objectives included in the SUD. Moreover, the strong presence of compliance checks (minimum once per year) enables higher enforcement, more consistent implementation and offers the potential to data collection of the use of pesticides in organic production. As a challenge for the coherence of the two pieces of legislation, two stakeholders (one agricultural organisation and one Member State) report challenges with copper as a specific active substance available to organic producers and widely applied in different forms of agricultural production.	N/A
Relevant aspects of the Common Agricultural Policy (e.g. cross-compliance requirements, Regulations (EU) Nos 1306/2013, 1307/2013, 1308/2013)	The link between the SUD and the CAP in their current versions is mentioned by many stakeholders as the core coherence issue. Due to the still ongoing implementation of the SUD during the last CAP revision (finalised in 2013), it was not included in the cross-compliance so far[252]. The upcoming CAP revision will include the SUD as a statutory management requirement (SMR), which farmers have to comply with as part of the new conditionality[253]. Additional provisions in the new 'eco-scheme' are also planned. However, IPM as a central instrument of the SUD has so far not been included, because of the difficulties in measuring and enforcing it. The inclusion in conditionality strengthens the relevance of the SUD for farmers. Excluding IPM from the requirements, however, does not increase the enforcement and potential data collection on this aspect, where enforcement is lacking.	Given the high influence of the CAP for the EU agricultural policy, in particular for its implementation at the farm level, the assessment of coherence presented in the left column indicates a dependency. At present the connection is limited but the assessment shows that with concrete incentives from the CAP, implementation at farm level could be strengthened. In the current relationship, the findings about the implementation of the SUD's provisions and the wide agreement between stakeholders show that a dependency exits even without formal connections.

[249] European Commission (2017). Overview Report on the Implementation of Member States' Measures to Achieve the Sustainable Use of Pesticides Under Directive 2009/128/EC

[250] 6 stakeholders interviews in total: 2 Member state authorities, 2 EU institution representatives, 1 NGO and 1 industry impacted by the SUD

[251] European Commission (2019). SWD(2019) 439 final. Fitness check of the Water Framework Directive, Groundwater Directive, Environmental Quality Standards Directive and Floods Directive

[252] Regulation (EU) No 1306/2013. Joint Statement after Annex III

[253] DG AGRI (2019). The Post-2020 Common Agricultural Policy: Environmental Benefits and Simplification

EU legislation	Coherence with SUD	Dependency of the SUD
	Stakeholders from different categories (stakeholders related to environmental concerns such as NGOs, research and also four Member State authorities, not agricultural users) see a need for stronger connection between the SUD and the CAP. According to 18 stakeholders, incentives for the implementation of IPM can be created through linking CAP payments to application of IPM. Some even go beyond to call for specific financial support for the uptake of IPM measures, which is considered impossible by the EU Commission as it would finance the compliance with the minimum legal requirements from the SUD to implement IPM. The limited reflection of the SUD's objective in the CAP framework is also found in the EP evaluation[254]. The new CAP proposal includes many of the SUD's provision in the set of conditionality requirements. The impact this will have could not yet be taken into account in this evaluation. As mentioned above, the inclusion of provisions in the list of conditionalities is expected to be beneficial for their implementation, as farmers have strong incentives to comply, and controls are undertaken to check this. Based on this, it can be concluded that CAP and SUD in their previous designs do not actively contradict each other but are still only limited synergies in working towards achieving the objectives the EU has established in the SUD.	
Directive 2006/42/EC (machinery) with respect to pesticide application equipment	Coherence with the Directive on machinery relates to requirements to pesticide application equipment. Issues can be summarised as minimal. Weak synergies (Member State authority) are described on the safeguarding of pesticide application equipment (PAE), while one industry stakeholder reports missing alignment between Member States in the approval of new equipment designs which creates additional efforts to comply with all national transpositions of the Machinery Directive and the SUD.	N/A
Directive 2006/12/EC (waste) and Directive 91/689/EEC (hazardous waste)	Through article 13, the provisions of the SUD are aligned with those on (hazardous) waste, as it requires Member States to apply recovery and disposal rules in accordance with EU waste legislation avoiding duplications or contradictions. Neither the desk research, nor the consultation of stakeholders revealed any coherence issues between the SUD and EU legislation. In the public consultation, respondents indicate an increase in knowledge about the safe disposal of pesticides. Even though data on concrete impacts is not available, this points to synergies between the pieces of legislation.	N/A
EU policies on climate change	The SUD was drafted and adopted in a context when dedicated climate policies in the EU were still in its early stages. Climate considerations are not mentioned in the Directive or in the Thematic Strategy of 2006. Since then, increasingly ambitious climate targets have been set and policy instruments adopted to decrease emissions	N/A

[254] European Parliamentary Research Service (2018). Directive 2009/128/EC on the sustainable use of pesticides

EU legislation	Coherence with SUD	Dependency of the SUD
	of greenhouse gases (GHG) in the EU. However, these instruments – so far – do not address emission from agricultural machinery. Potential conflicts between the SUD and climate objectives are highlighted by stakeholders in interviews and position papers. One Member State authority and different users of PPPs mention the increase use of fuel that will be necessary for alternative means of plant protection, as well as higher emissions from soil as a result of changed tillage practices. Academic literature[255] and market reports[256] confirm the trade-off between pesticide and fuel use for tillage practices. This means that a risk of incoherence exists that requires careful balance of the different protection goals.	
Regulation (EU) 2016/2031 on protective measures against pests of plants (the plant health regulation)	The plant health regulation requires preventive or immediate response to a set of critical phytosanitary needs. This requires effective plant protection products as stressed by one EU level interviewee in particular. IPM promotes the use of pesticides based on a pest monitoring approach based on a decision-taking threshold. While widescale monitoring supports early pest awareness and control, thresholds for the use of pesticides mean that some level of pest presence is tolerable, which can be perceived as inconsistent to the approach in relation to Regulation 2016/2031 which requires an early eradication or control of any harmful organisms. Additionally, the importance given to low-risk alternatives differs between the two pieces of legislation. Alternatives to chemical pesticides are not directly promoted by the plant health regulation, because the effectiveness in protecting plant health takes highest priority.	N/A
Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment	The recent Regulation to establish a sustainable taxonomy defines economic activities that are considered sustainable if they are carried out in accordance with a set of criteria and thresholds. Two sustainability objectives of the Taxonomy Regulation, namely, to prevent and control pollution as well as protect and restore biodiversity and ecosystems, correlate with the objectives of the SUD[257]. However, the definition of the exact criteria and thresholds is still under progress and has been postponed for another objective (climate change mitigation) due to the ongoing CAP negotiations[258]. Therefore, a further assessment of coherence is not possible at this stage.	N/A

[255] Barzman, M., Bàrberi, P., Birch, A.N.E. et al. (2015). Eight principles of integrated pest management. Agron. Sustain. Dev. 35, 1199–1215. https://doi.org/10.1007/s13593-015-0327-9

[256] McKinsey (2020). Agriculture and climate change Reducing emissions through improved farming practices.

[257] Article 9, Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment

[258] European Commission (2021). C(2021) 2800/3 – Provisional version of the Delegated Regulation supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives

4.4.3 *Coordination and complementarity with wider EU action and policies [EQ 16]*

Against the assessment of coherence, the following section analyses the coordination and complementarity between the SUD and other key legislation on among others agriculture, environment and human health. The box below presents the full EQ 16.

EQ 16: To what extent has the SUD allowed for coordination and complementarity with other EU actions and policies on water, climate change, conservation of wild birds, natural habitats, wild fauna and flora, Common Agricultural Policy, protection of the environment and health including workers' health and safety, plant protection products and pesticide residues, promoting development, food and nutrition security in developing countries including sanitary and phytosanitary support (SPS) to the agri-food sector in third countries?

As has been presented and discussed in response to EQ 15, the SUD represents one piece in the EU policy landscape. It interacts with different policies as mentioned above and in this question. This section therefore assesses the level of coordination and complementarity with this broad set of policy instruments. A more focused assessment for EU pesticide policies (i.e. regulations (EC) Nos. 1185/2009, 1107/2009 and 396/2005) will follow under the criterion of complementarity in Evaluation Question 19.

The contradictions with other policy instruments are low, as has been found in response to EQ 15. More specifically, the objectives of the SUD are aligned with most of the other EU actions and policies. Table 4.3 summarises the complementarity of the SUD's objectives with those of other EU policy areas based on the assessment in EQ 15 above and the discussion in the following paragraphs.

Table 4.3 Complementarity of the SUD's objective with those of other EU policies.

EU action or policy	Complementarity of the SUD's objectives
Water protection	✓
Climate change	−
Protection of birds, habitats, flora and fauna	✓
Common Agricultural Policy	−
Health and safety of workers	✓
Plant protection product Regulation	✓
Pesticide residues	✓
Food and nutrition security in third countries	✓

✓ = positive complementarity − = limited complementarity

However, this does not represent evidence for strong coordination with these other instruments. In fact, the SUD is found to be a rather separate instrument that is only weakly connected to other EU legislation. Multiple interviewees from different categories (different industries, international and EU level institutions) share the view that the SUD is a standalone Directive that exists beside most of the other relevant instruments. Even though the SUD tries to create connections in its text, notably in recital (2), the experiences from implementation do not see these links in practice.

Most notably, coordination and complementarity with the CAP in its pre-2021 design can be improved. Professional agricultural users do not mention problems with this situation, which can be

linked to the additional minimum requirements for the payments that would be created. With the CAP being a major financial instrument, the small connection of the SUD is seen as problematic by stakeholders from industries affected by the SUD, NGOs and EU institutions. According to these stakeholders, the promotion of IPM and low risk pesticides could be greatly improved by creating enforceable links or financial support to actions reducing the use and risk of pesticides. Only one contribution to the OPC from a representative of pesticide users, who apply pesticide for others, supports this position from the users perspective. Neither links through cross-compliance nor financial support as security to mitigate the risks to yield quantity and quality farmers see in reducing pesticides have been included in the past CAP framework.

The challenges for Member States to monitor the application of IPM have prevented the creation of such links so far. An improved system of monitoring and controlling of IPM and its effects would therefore also have strong benefits in enabling coordinated and complementary action between the SUD and the CAP. Considering the available information on the latest agreement[259], the 2023-2027 CAP will include more requirements that benefit the sustainable use of pesticides (e.g. conditionality for arable land dedicated to biodiversity and non-productive elements). Eco-schemes of at least 25% of each Member States' budget are targeted to provide further incentives for environment-friendly agriculture. However, the key challenge of IPM is still not addressed as it remains outside of the conditionality (statutory management requirements, short SMRs) and can therefore not be linked to CAP payments, but given its otherwise legally binding nature, financial support through eco-schemes continues to be unlikely. Thus, the current assessment of the CAP agreement is expected improve the coherence with the SUD in some respects, while the status of IPM as a major pillar of the SUD remains unchanged in the CAP.

Similarly, the coordination with EU legislation in the area of environmental protection is mainly limited to the aligned objectives but only creates limited complementary effects in practice. In this area, EU policies covering the conservation of wild birds; flora, fauna and habitats; as well as water resources are combined. Considering water protection, which is explicitly covered in Art. 11 of the SUD, the aim of adopting appropriate measures to protect the aquatic environment and drinking water are creating a basis for coordination between the SUD and the Water Framework Directive[260], which also obliges Member States to protect water resources. However, this formal coordinating link is hardly translated into practice.

Stakeholders from pesticide industry and EU institutions criticize the missing establishment of clear targets for water protection and possibilities to link water pollution to diffuse sources through use data. The case study on water protection provides further details on the interaction between the SUD and different pieces of EU legislation in the field of water protection. The detailed analysis in the case study further finds that interlinkages between pesticide legislation (including the SUD) and water legislation need to be made clearer and more precise, for example in terms of threshold levels. While the Water Framework Directive is referenced in Article 11 of the SUD, the concrete relationship is weakly defined, while thresholds for chemicals in drinking water from the Drinking Water Directive are not mentioned. The interlinkages also need to become more strongly reflected in the institutional frameworks that govern water protection and pesticide use, as this is found in the case study to be an important limitation to implementation and enforcement at Member State level.

A DG SANTE summary report[261] based on fact-finding missions and audits in Member States, arrives at more positive conclusions. A list of good practices of the implementation of water protection

[259] https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/new-cap-2023-27_en

[260] Directive 2000/60/EC. Directive establishing a framework for Community action in the field of water policy.

[261] European Commission (2017). Overview Report on the Implementation of Member States' Measures to Achieve the Sustainable Use of Pesticides under Directive 2009/128/EC

measures are identified, even though the effect on water quality cannot be measured. Individual audits[262] carried out by the Commission, also after the publication of the report in 2017 find a mixed picture on the effective implementation of water protection measures. In contrast to the stakeholders' views, they do find progress in many Member States with targets in several NAPs and additional monitoring systems for highly used pesticides. However, this is not the case for all Member States, as some have made little progress on protecting water resources from pesticides. The protection of species and habitats as part of biodiversity has also links to the reduced risk from pesticide use that the SUD aims at achieving. Thus, the objectives again align and allow for coordination and complementarity. However, in practice a link is not visible to many stakeholders concerned about environmental impacts (NGO, EU institution) and measures as introduced in NAPs are seen as too weak and not enforced to establish complementary action to other environmental protection policies. EU data monitoring projects and emerging scientific trends seek to provide comprehensive information to enable reinforced links with water and biodiversity policies, but building on these developments is not yet part of the legislative framework[263]

In the mentioned cases for coordination with environmental protection policies, the national implementation and governance prevents stronger links and complementarity. The implementation of the SUD and other policies is often not carried out by the same institution. Water monitoring under the WFD is often carried out by other agencies that investigate different substances than those observed under NAPs.

In addition, the EU has provided funding for sustainable plant health topics through the programmes Horizon 2020 and LIFE. These projects notably supported and support the development of low-risk alternatives in line with the IPM principles[264] and the development of indicators[265]. While these projects and the funding provided by the EU Commission are coherent with the SUD's objectives, the assessment of effectiveness conducted in Chapter 4.1 shows that the overall impacts are limited. This can be seen in the example of the HAIR project, which results did not translate into more accurate indicators than those currently used and based on sales data.

In conclusion so far, the objectives of the SUD are aligned with other policy instruments. The actions of the SUD in many cases also do allow for coordination and complementarity. However, in reality the implementation leads to varying levels of complementarity with other legislation in the Member States.

With regard to the coordinating and complementarity with development, food and agriculture actions in developing countries and third countries, it has to be noted that the SUD does not have extraterritorial legal applicability outside the EU and EEA area. There are effects of the EU pesticide legislation, but quantitative data on these are lacking and a causal relation with the SUD cannot be found. Many stakeholders refer to impacts of the accompanying pesticide legislation such as Regulations (EC) Nos 1107/2009 and 396/2005 for changes in pesticide availability and restrictions on imported food products. The direct impact of the SUD is less clearly pronounced. According to different stakeholders[266], the EU pesticide legislation, including the SUD, is taken internationally as an example for other countries to follow.

[262] See: https://ec.europa.eu/food/audits-analysis/audit_reports/index.cfm

[263] Brack, W., Aissa, S.A., Backhaus, T. *et al.* Effect-based methods are key. The European Collaborative Project SOLUTIONS recommends integrating effect-based methods for diagnosis and monitoring of water quality. *Environ Sci Eur* **31,** 10 (2019). https://doi.org/10.1186/s12302-019-0192-2; see also LUCAS Soil and IPCHEM databases

[264] E.g. SmartProtect, IPMWorks, or IPM-Decisions

[265] E.g. HAIR and SPRINT project

[266] Total of 6 interview responses: 2 pesticide users, 2 other industries affected by the SUD, 1 international organization, 1 NGO

More qualitatively, all steps of IPM operationalisation like the principles in Annex III of the SUD can improve the use of pesticide in third countries as well. This is confirmed by stakeholders from international organisations and European NGOs. At the same time, the challenges of reducing the risk associated with pesticide use exist in non-EU countries and in particular developing countries as well[267]. Low risk alternatives to the currently used pesticides are often missing and IPM requires further research and guidance for crops and conditions not farmed in the EU. To this point, the spill over of IPM practices and low risk alternatives has however been limited by the slow uptake in the EU and thus limited active knowledge sharing with third countries.

4.4.4 Influence of contextual policy factors on the implementation of the SUD [EQ 17]

Four different contextual policy factors have been assessed on their impacts on the implementation of the SUD as these may represent relevant coherence considerations. The four factors reflecting ongoing initiatives and political priorities of the EU Commission that have the potential to interact with the SUD are mentioned in the full EQ 17 presented in the box below.

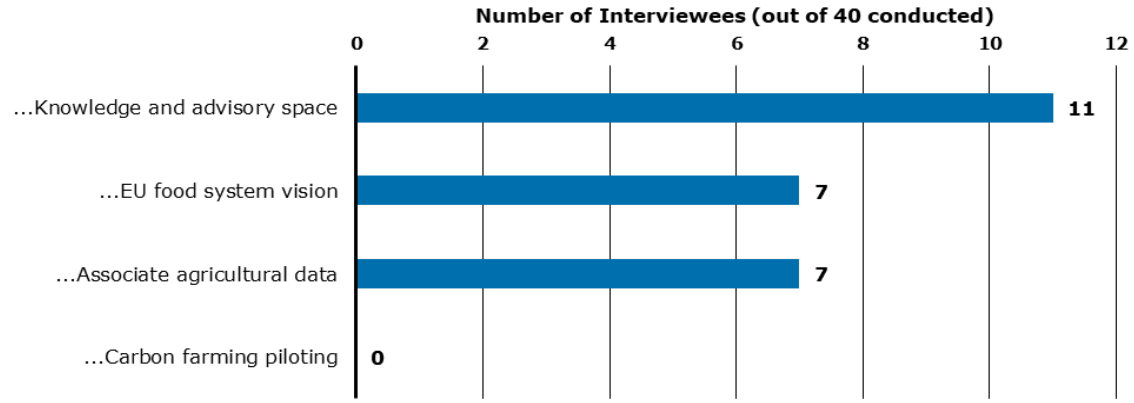
EQ 17: To what extent has the lack of an operational sustainable EU food system vision, associated EU agricultural data, knowledge and advisory space, and lack of carbon farming piloting hampered implementation of the SUD and successful achievement of its objectives?

The reduction of the risk related to pesticide use requires the uptake of low-risk alternatives and the application of IPM. For this, information about the possibilities of implementing IPM is important to provide to pesticide users. Farmers as important users of pesticide as the producers of food are however only one element of the food system that also includes processors, retailers, governments and consumers. Additionally, the importance of data on use and effects of pesticides has already been mentioned multiple times in this report. Carbon farming pilots may also have a role to play in the reduction of pesticide risks (e.g. by increased soil health and resilience)[268]. This section therefore analyses whether the factors mentioned in the question have hampered the achievement of the SUD's objectives. Figure 4.30 illustrates the salience of the four factors for interviewees.

[267] Technical and financial capacity building activities have been agreed in relation to international agreements such as the Stockholm Convention on persistent organic pollutants, or the Cotonou Agreement on the partnership of the EU with countries from the African, Caribbean and Pacific group of states. These are not specific to pesticide use and risks, however. The support targeted to pesticides was not possible to determine

[268] COWI, Ecologic Institute, and IEEP, "Technical Guidance Handbook Setting up and Implementing Result-Based Carbon Farming Mechanisms in the EU" (Kongens Lyngby: COWI, 2021), https://op.europa.eu/en/publication-detail/-/publication/10acfd66-a740-11eb-9585-01aa75ed71a1/language-en.

Figure 4.30 Salience of potentially hampering factors



As the figure above shows, out of the four points, knowledge and advisory space appears to be the most crucial to the achievement of the objectives. IPM techniques require an understanding of a wide range of possible solutions that are strongly dependent on the precise context of a farm and a field. Thorough knowledge of currently available options is necessary for finding the right approach. A lack of such knowledge is described in academic literature[269] and EU reports[270] as an important barrier to the uptake of IPM. Advisory services can help to close this knowledge gap and provide the information to farmers. However, the current system is described as a weakness and therefore as a hampering factor by stakeholders from several different categories. Two EU institution interviewees point to a lack of adequate capacities in Member States in terms of staff and in terms of the ability to present IPM and low risk alternatives to farmers in a way that helps them understand the options IPM offers.

The limits of financial and human capacity of advisory services are also confirmed in DG SANTE's 2017 overview report. The restricted ability to provide advice to farmers is seen as a key challenge by the EU level interviewees and also by stakeholders from industries and one NGO. Public advice is reported to be replaced by information provided by advisors closely connected to pesticide producers or distributors, who have an interest in advising to use their products. This makes the uptake of IPM more difficult for farmers, who lack the information of how to implement this in practice. In this way, the implementation of the SUD and the successful achievement of its objectives are hampered.

A lacking vision for the EU's food system is found to be the second hindering factor. A vision in essential in the communication of the desired state to be achieved and helps to provide predictability and consistency in the design of policy instruments. This is particularly true for a policy area as complex as the food system Interviewees from Member State authorities, industry, NGO and research are of the opinion that a clearer vision of the food system would contribute to a better achievement of its objectives. In particular, in the context of seemingly conflicting objectives of food safety, security, affordability together with biodiversity and resource protection and reduction of greenhouse gas emissions, stakeholders see benefits of a comprehensive vision in which the SUD

[269] Lamichhane et al. (2018) A call for stakeholders to boost integrated pest management in Europe: a vision based on the three-year European research area network project, International Journal of Pest Management, 64:4, 352-358, DOI: 10.1080/09670874.2018.1435924

[270] DG SANTE 2017-629. Overview Report on the Implementation of Member States' Measures to Achieve the Sustainable Use of Pesticides under Directive 2009/128/EC

represents one element for progress. As a wider scale strategy and vision were missing until the publication of the Farm-to-Fork strategy, the legislation on each aspect – in this case pesticides – has priorities between economic, environmental, social and health needs, whereas a common vision could help to balance these needs in a wider scope. The clarity and – ideally – increase acceptance this would create, can help in the implementation of the SUD and its provisions.

Thirdly, the importance of data for the achievement of the objectives of the SUD has been discussed in several instances in this report already. Here, the connection to other associate agricultural data is of relevance. In comparison to advisory services and a vision for a sustainable food system, other agricultural data received less attention from stakeholders. However, the benefit from combining all available data sources on agricultural production is described by one NGO stakeholder. Data collected for the SUD could according to this stakeholder be combined with data from the Farm Accountancy Data Network[271] and data on environmental indicators to create a more holistic picture of the effects and achievements of the SUD[272]. In this sense, the integration of available data sources could lead to better understanding of actions and thus improved achievement of objectives rather than currently representing an active barrier to the implementation.

Lastly, carbon farming piloting was announced as one action of the Farm-to-Fork strategy. It refers to land use activities that help capture and retain carbon from the atmosphere by binding it in plant biomass or soil[273]. The current lack of such pilots, however, does not impact the implementation of the SUD. It is not seen as a hampering factor by any stakeholder and no other links are apparent in literature or reports and can therefore not be considered a salient factor in preventing the SUD from being effective. Interlinkages are not directly apparent. Synergies could arise from improved soil quality with benefits for productivity and resilience of agriculture. However, the effects on pesticide use and risk are at most indirect and still largely uncertain.

4.4.5 *Considerations of special conditions for outermost regions and pesticides for minor uses [EQ 18]*

The following section analyses the consideration of special circumstances like those for outermost regions and pesticides for minor uses in the SUD. The full EQ 18 is presented in the box below.

EQ 18: To what extent has the SUD taken into consideration the specific climatic conditions of the EU outermost regions and their specific status as recognised in Article 349 TFEU and pesticides for minor uses?

Outermost regions are part of the EU territory but located outside of the European continent, mostly in islands in the Atlantic Ocean, the Indian Ocean and the Caribbean. Their specific status is recognized in Art. 349 Treaty on the Functioning of the EU (TFEU) which allows for special measures or derogations in line with their specific conditions. Because of their location, these regions have different climatic conditions and therefore different agricultural production than mainland EU: crops, pest and agricultural practices may differ from those on the European continent.

Pesticides for minor uses is a term used for plant protection needs of small dimension either because of specialty crops that are cultivated on only small areas, or because they address rare pests[274]. This includes conditions in the outermost regions but also crops and pests in continental Europe. The small market for such pesticides presents economic challenges to develop and market pesticides

[271] See: https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/farms-farming-and-innovation/structures-and-economics/economics/fadn_en

[272] See the Commission proposal for a Farm sustainability Data Network to repealing the FADN. Reference or weblink ?

[273] See also: https://ec.europa.eu/clima/policies/forests/carbon-farming_en

[274] See: https://www.oecd.org/env/ehs/pesticides-biocides/minoruses.htm

according to EU legislation. Both agriculture in outermost regions and pesticides for minor uses share the challenge of limited availability of active substances for the specificities of the crops and pests of a given geographical and climatic area.

The SUD does not mention outermost regions or minor use pesticides explicitly. However, the objective of reducing the risk of pesticide use through IPM is also applicable to those crops and conditions. The principles of the SUD are presented by the Commission as opportunities to find solutions to challenges linked to minor crops and minor uses[275], which is also brought forward by one NGO stakeholder in an interview.

It should be noted that the availability of PPPs for minor uses and conditions in outermost regions is considered a problem by industry stakeholders and Member State authorities. This challenge is also reflected in the Commission report[275]. Stakeholders in particular see challenges in the decreasing number of active substances approved for pesticide in minor uses, that creates risk of resistances and does not enable the substitution of high-risk pesticide with ones with lower risk. However, stakeholders representing Member States with outermost regions as well as the Commission report note that the bottleneck lies in the placing of such pesticides on the market and therefore is related to Regulation (EC) No 1107/2009 rather than effects of the SUD.

Still, the characteristics of agriculture in outermost regions and of pesticides for minor use can create additional challenges in the context of the SUD. Crop specific IPM guidelines and targeted advice on IPM techniques are less likely to be available as these often address major crops first and financial restrictions discussed in EQs 4 and 17 are likely to be even more pronounced for these smaller applications. However, interviewees from Member States, industry and EU level institutions do not mention such concerns.

Overall, the SUD is found not to create additional challenges to outermost regions and minor uses in comparison to the continental European area. Problems in plant protection in the two areas arise from the limited number of pesticides on the market. These problems can be mitigated by the SUD through promotion of IPM that can reduce the need for pesticide applications, if alternatives are available. Given the geographic proximity, the existence of such guidelines for outermost regions could be beneficial for IPM uptake in third countries, particularly developing countries, as well.

4.5 Complementarity

The criterion of complementarity assesses in more detail the consistency of the SUD with the regulatory framework for pesticides. This includes the regulations on the authorisation of plant protection products, maximum residue levels of pesticides as well as the statistics on pesticides.

The following box provides a summary of the findings under the complementarity criterion.

Box 5. Summary of findings under the criterion of complementarity

The evaluation findings show that the SUD is complementary to other pieces of EU legislation in the regulatory framework for pesticides, by regulating the use phase of pesticides. *However, the complementarities have not been fully realised, for example the dependency of the SUD on Regulation (EC) No 1185/2009 to provide relevant statistics to the assessment of progress towards the objectives of the SUD. The lack of consistent use data per active substance to feed relevant indicators, still to be developed, has made it difficult to adopt relevant measures and monitor progress at the EU level and few Member States make full use of national available use data (outside of the scope of EU legislation). Even though formally*

[275] European Commission (2014). Report on the establishment of a European fund for minor uses in the field of plant protection products. COM(2014) 82 final.

complementary, the pesticide legislation taken together has not been able to generate sufficient incentives to stimulate a better knowledge base or the development of a significant number of low-risk alternatives to hazardous pesticides.

The box below presents the full question under EQ 19.

EQ 19: To what extent has the SUD proved complementary to other EU legislation on pesticides, in particular the legislative acts mentioned under question 15 points 1, 2, 3?

4.5.1 Complementarity with EU legislation on pesticides [EQ 19]

As presented before (see EQ 15 and the background to the Directive in 0), the SUD is part of a package governing pesticides in the EU which includes three further policy instruments, namely the Regulations (EC) Nos 1107/2009, 1185/2009 and 396/2005. Each of these instruments addresses a different stage of the pesticide life cycle. As described in the thematic strategy from 2006[276], the SUD aims at closing the existing gap of a legal framework for the use phase of pesticides after they have been placed on the market and before they may appear as residues in food. These instruments are accompanied by statistical data to understand developments in pesticide use. This question assesses how well the SUD acts in complementarity to the other pieces of pesticides legislation in addition to the assessment of coherence provided under EQ 15 above.

In the interplay with the other instruments, the SUD clearly focuses on the use of pesticides in a relevant manner, as the assessment of relevance has found above (see Section 4.3). Regulating the life cycle of pesticides in multiple instruments is criticised by interviewees from two Member States and two industry representatives as creating a complex and difficult to navigate system of legal obligations with unclear priorities. However, the SUD is not seen as resulting in challenges of complementarity as its nature of a Directive with framework provisions on actions to be taken by Member States leaves room to adapt measures flexibly in response to national circumstances.

By contrast, other instruments of the policy package are seen as not being totally complementary to the objectives of the SUD. First, Regulation (EC) No 1107/2009 also refers to IPM and is therefore seen as legally supportive of the SUD. However, the availability of low-risk active substances is still limited (26 as of April 2021) and has not been achieved through the adapted requirements for such substances in the Regulation. Interviewees from one Member State and two industry stakeholders stress this lacking support from the Regulation to the risk reduction objective. Thus, even though formally complementary, the pesticide legislation has not been able to generate sufficient incentives for low-risk alternatives to be introduced to the market as options that could replace chemical pesticides with higher risks[277].

Similar to Regulation (EC) No 1107/2009, the regulation on pesticide statistics (Regulation (EC) No 1185/2009) does also not meet its full potential in complementarity with the SUD. The dependency of the SUD from Regulation 1185/2009 has already been discussed and the overall challenges in providing relevant data to the assessment of progress towards the objectives of the SUD. The lack of consistent use data per active substance made it difficult to adopt relevant measures and monitor progress (see further information and stakeholder insights under section 4.1.2.1). Thus, the importance of an EU action for ensuring such data is collected at national level is essential. Similarly, it is also important for the SUD to define the HRIs so that they can measure progress. To support

[276] European Commission (2006). COM (2006) 372 final. A Thematic Strategy on the Sustainable Use of Pesticides

[277] Ecorys (2018). Study supporting the REFIT Evaluation of the EU legislation on plant protection products and pesticides residues (Regulation (EC) No 1107/2009 and Regulation (EC) No 396/2005).

this, there is a need for accurate and reliable use and sales data, so that the HRIs can be reported on accurately and help to inform future decision making[278]. In the current HRI1 this was done using pesticide sales data, because pesticide use data collected under Regulation (EC) No 1185/2009 was not usable due to lack of harmonisation and comparability (time and crop coverage not harmonised) and data collection being too sparse (every 5 years). The complementarity between the SUD and the pesticide statistics regulation therefore needs improvement to be able to measure the progress on the objectives of the SUD. The Commission has made a proposal for a Regulation of the European Parliament and of the Council on statistics on agricultural input and output and repealing Regulations (EC) No 1165/2008, (EC) No 543/2009, (EC) No 1185/2009 and Council Directive 96/16/EC (known also as Proposal for SAIO Regulation). When adopted by the legislators, this will repeal Regulation (EC) No 1185/2009. The Commission proposal includes a provision of pesticide sales and agricultural use statistics annually.

Interviewees from EU level institutions explain the clear division between Regulation (EC) No 1107/2009 and the SUD in leaving Member States to regulate how active substances that have been approved may be used in their country through authorised PPPs. This flexibility is considered useful by almost all Member State interviewees. Such statements lead to considerations to why use data are needed at the EU level as the policy on pesticide use is of the responsibility of Member States. Under the current subsidiarity principles, one could consider that Member States are responsible for measuring progress in the reduction of risks associated to pesticide use, and not the EC.

Overlaps do however exist between the two pieces of legislation, in which the SUD is found to be the weaker element. An authorisation for placing PPPs on the market is considered by many a "green light for safe use"[279] for which a further limitation of use is causing misunderstandings for users. This is echoed from a second Member State interviewee, who points out that labels are meant to inform about the appropriate use of approved pesticides and further regulation is difficult to justify. This relationship merits clarification and strengthening the position of the objectives of the SUD to be seen as equal and complementary rather than subordinate to the information on the label.

4.6 EU added value

An assessment of EU added value principally looks at the value resulting from EU intervention that is additional to the value that would have resulted from interventions initiated at other levels of governance (i.e., national level) and from the private sector.

The following box provides a summary of the findings under the EU-added value criterion.

Box 6. Summary of findings under the criterion of EU-added value

The evaluation has shown that while previous measures existed at the Member State level, they were varied and not harmonised across the EU. *Some Member States only had none or only one measure comparable to the SUD's requirements in place and no Member State had all measures contained in the SUD in place at the time of its adoption. Hence, the objectives*

[278] It should be noted that Regulation 1185/2009 (at the time of reporting) is in the process of being repealed and the Commission has put forward a proposal for a Regulation of the European Parliament and of the Council on statistics on agricultural input and output, repealing Regulations (EC) No 1165/2008, (EC) No 543/2009, (EC) No 1185/2009 and Council Directive 96/16/EC (known also as Proposal for SAIO Regulation). It is anticipated that when adopted, this will repeal Regulation (EC) No 1185/2009. The Commission proposal includes provision of annual pesticide sales and use in agriculture statistics.

[279] Stated by one Member State authority representative

and concept of the SUD have provided added value by creating a common, harmonised framework for the sustainable use of pesticides and raising awareness. The implementation of these elements, however, needs to further progress in order to provide added value comprehensively across the EU. The balance struck by the SUD is positive to the extent that national and regional particularities can be reflected in the implementation by Member States.

4.6.1 Sustainable pesticide use measures prior to the SUD [EQ 20]

The added value of the SUD needs to be compared to the instruments that Member States had already in place before the adoption of the SUD. This EQ, together with the appendix on the status quo at the time of the original impact assessment, provide the needed context. The box below presents the full EQ 20.

EQ 20: Which measures, if any, did EU Member States have in place to promote a sustainable use of pesticides before the adoption of the SUD?

Many Member States had measures in place that formulated requirements to pesticide use that are similar to those contained in the SUD. The status quo at the time of impact assessment (Appendix 5) summarises the previously existing measures for each of the SUD's provisions.

The previously existing measures however varied between the Member States and were not harmonised or uniform across the EU. While some Member States applied many instruments already and, in a few cases, had established national plans for pesticide management, other Member States had only none or only one measure comparable to the SUD's requirements in place. No Member State had all measures contained in the SUD in place at the time of its adoption.

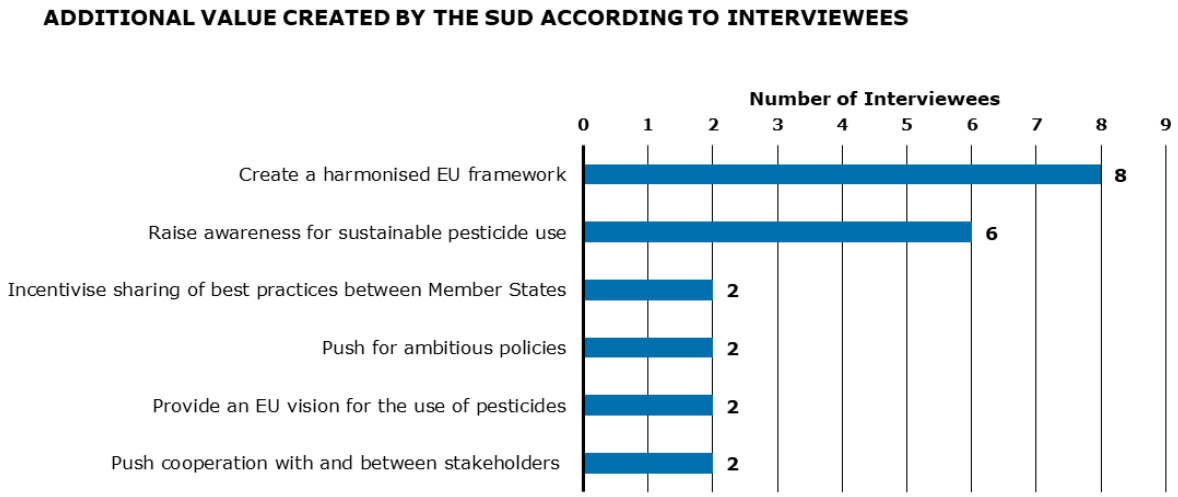
4.6.2 Additional value of the SUD compared to possible national or regional initiatives

The following section assesses the added value of the SUD as an EU intervention in comparison to the achievements that could have been possible at national or regional level. The box below presents the full EQ 21.

EQ 21: To what extent has the SUD produced additional value (e.g. providing strategic priorities for action, a common framework for action, etc.) compared to what could have been produced at national or regional level (through public and private initiatives) in its absence?

The available evidence shows an additional value of the SUD as an EU directive in comparison to national or regional initiatives. The main points of added value as expressed by stakeholders are summarised in Figure 4.31.

Figure 4.31 In-depth Interviews: *Added value from the SUD as an EU intervention*. (n=16)



The figure above shows that two main elements are seen as the added value of the SUD as an EU intervention:

- The creation of a harmonised EU framework for the sustainable use of pesticides; and
- The raised awareness for the topic.

The first point reflects the change compared to the situation before the adoption of the SUD as described in EQ 20 and Appendix 5. Competition between producers of different Member States in the single market is a strong concern to many stakeholders from industries using pesticides and others that are impacted by the SUD. This point is supported by stakeholders from all groups. In a shared economic system such as the single market, the harmonised framework established by the SUD has the added value of creating comparable minimum requirements for pesticide users that help avoiding unbalanced competition. In order to protect national producers, Member States would likely not introduce restricting policies or ones with costs for pesticide users, unless there is an EU framework for this.

The implementation of the SUD shows that ambitious measures are not in the interest of many of the Member States (this is also reflected in the fact that only two interviewees see the push for ambitious policies as a benefit of the SUD), which indicates the level of risk management that can be expected in the absence of the SUD. Therefore, the SUD is seen as essential to harmonising the national approaches to create a sustainable use of pesticides.

Secondly, the SUD is found to have raised awareness for the need to use pesticides sustainably. Stakeholders, mainly from NGOs and other industries impacted by the SUD[280] consider this element the key added value of the SUD. However, also one Member State authority interviewee mentions the impact that the legal framework has had on farmers by promoting EU-wide principles of sustainable use. Such awareness across the EU cannot be expected in the absence of an EU initiative on a topic like pesticide use. This point is particularly supported by the results of the public consultation. More than 80% of respondents, of which the majority are pesticide users, reply that trainings according to the SUD's provisions have improved their knowledge on the safe use, storage and disposal as well as protection of aquatic environments and minimizing human exposure.

Three more elements are mentioned as added value of the SUD, by a smaller number of stakeholders each:

[280] Food chain industry, agricultural input industry

- Three stakeholders[281] express that sharing experiences and learning from other Member States has been an additional value to improve the sustainable use of pesticides. 30 respondents to the public consultation see the exchange among peers (e.g. farmers, advisors, organisations) as a main source of information. However, the formulation of the questions does not allow to draw a causal link to the SUD in this respect.
- Two stakeholders[282] see the added value in the creation of a shared vision or strategy for the use of pesticides that has been established with the SUD. Indicating the expected developments for the sustainable use of pesticides is important to guiding national action in the right direction according to these stakeholders.
- Two interviewees from Member State authorities consider the increased collaboration with stakeholders and other authorities as value added in comparison to the situation before the adoption of the SUD. Working with industry, civil society in the creation of NAPs and guidelines is seen to have improved since 2009.

However, these points are not confirmed by broader consensus among stakeholders in the interviews. In fact, the findings for previous evaluation criteria contradict some elements of these three points when looking at the implementation in the Member States. Therefore, the two main points are found to be the main added value of the SUD.

In summary, the objectives and concept of the SUD have provided added value by creating a common, harmonised framework for the sustainable use of pesticides and raising awareness. The implementation of these elements, however, needs to further progress in order to materialise this value comprehensively across the EU.

4.6.3 Balance between action at EU and national level

The following section considers if the actions of the SUD strike the right balance between activities on EU level and national level. The full EQ 22 is presented in the box below.

EQ 22: To which extent did the SUD strike the right balance between action at EU level and national action? Is it a proportionate response to the problem?

The balance between action at EU level and national level is strongly linked to the discussion on the form of the legal instrument between a directive and a regulation. This discussion is part of the evaluation of effectiveness in Section 4.1.4.

The SUD follows the subsidiarity principle[283] in setting a framework for Member States to set national targets, determine and adjust the level of ambition as well as formulate the implementation in their Member State. For this purpose, the development of NAPs was required in the Directive[284]. As the use of pesticides depends on a range of conditions such as climate, crops, farm structure or existing policy instruments, a strong role for Member States was chosen in the process of adoption of the SUD.

In response to this question, it is again found that stakeholders views differ but lean to call for a stronger role for the European level. Member State authorities consider the flexibility for national and local context and governance settings an advantage of the SUD, which reflects the subsidiarity considerations. However, several Member States also point out that the effectiveness of such an approach depends on the national transposition and implementation, which can differ substantially

[281] Two Member State authority interviewees and one EU institution representative

[282] One NGO and one pesticide user

[283] Article 5 TEU

[284] See recitals 19 and 22 as well as Article 4 of the SUD

between Member States. This variation means that the potential for harmonisation of rules is not fully reaped, which means that issues of competitiveness in the single market continue to exist.

Additionally, the potential for effects of economies of scale are reduced by the differing mechanisms. The case study on National Action Plans highlights the differences in the number, range and specificity of objectives of NAPs as well as of their implementation. In particular, quantifiable targets, concrete timetables and objectives on worker protection are missing from several NAPs in the sample of analysed plans.

The described position is based on the combination of effectiveness assessment and responses from Member State authorities. Other stakeholders from different groups, but particularly NGOs/academia[285] explicitly state that a stronger role of the EU level is necessary to take measures for ensuring that provisions of the SUD are effectively implemented in all Member States that ensure an even level of risk reduction and level playing field in the EU. Pesticide users, however, support the position of many Member States that the decentralised formulation of a more detailed provision is more adequate to centralised EU measures. As mentioned before, stakeholders from all categories agree with some few exceptions that the measures provided in the Directive have been of added value but require stronger implementation. Supporting, monitoring and enforcing the implementation of the SUD could be a way for the EU to improve the added value even more.

In summary, the balance struck by the SUD is good to the extent that national and regional particularities can be reflected in the implementation by Member States. Stronger oversight by the EU Commission is however necessary to ensure that an effective and overall harmonised level of implementation is achieved. This is needed to reach a sustainable use of pesticides across the EU and create comparable measures for all stakeholders in the EU's single market.

[285] Including 3 NGOs or academia, 1 Member States, 1 consumer and workers organisation, 2 other industries affected by the SUD

5. Conclusions

In the previous sections the evaluation has sought to answer the evaluation questions put forward in the terms of reference, based on the information collected and available evidence. In this section, the evaluation findings are discussed from a transversal perspective across the different evaluation criteria and questions, to grasp complexities and reflect on issues and problems identified in the evaluation work, with the intention to provide potential lessons learned of relevance to future policy initiatives.

Based on the evidence available and information collected for the purposes of the evaluation, it can be stated that the SUD has likely contributed to reducing the risk of using pesticides to human health and the environment as suggested by the evolution of the HRI1, the main indicator being used to monitor progresses, that has decreased by about 20% over the last decade. This reduction of HRI1 is caused by a shift in sales from more hazardous to less hazardous pesticides as overall sales figures have remained relatively stable in the same time period, indicating that the dependency on pesticide use has not decreased. However, HRI1 does not allow to distinguish between impacts of the active substances renewal programs as foreseen under Regulation (EC) No 1107/2009 and the mitigation measures included in the SUD.

Member States have made efforts to implement the provisions of the Directive, and the implementation has been progressing. National Action Plans (NAPs) have been developed/adopted, with most NAPs currently in their second version, however only a few Member States have set clear and meaningful quantitative risk reduction targets as required by the SUD and the quality and level of ambition of NAPs varies. Provisions that are directly related to pesticide use and their conditions of use, such as training of operators, inspections of pesticide application equipment and certification schemes for professional pesticide users, as foreseen under articles 5, 6 and 8 have been put in place and have contributed to establishing a level playing field. However, there is little control and enforcement of IPM, which is further exacerbated by the principle-based nature of IPM and absence of clear definitions and criteria which makes it difficult to gauge the actual level of implementation.

While implementation differs between Member States, the SUD has clearly had an EU added value through establishing a level playing field and ensuring that all Member States have a policy framework in place for pesticide risk reduction. The evaluation finds that the objectives of the SUD was and still is highly relevant to address the risk posed by pesticide use to the environment and human health, although relevance is hampered by the uneven implementation and limited effectiveness.

The lack of reliable indicators does not allow to correctly assess progress made. The adoption of harmonised indicators as foreseen in the Directive under Article 15 took eight years to establish for reasons which are disputed between the Commission and the Member States. The current main indicator (HRI1) is often criticised by stakeholders as it is considered as a hazard indicator rather than a risk indicator that would consider all environment compartments and risks to human health.

The evaluation has found that there are few incentives in place to support a change in agricultural practices at a broader scale. The Common Agricultural Policy (CAP) has not been specifically used to support a transition towards IPM and although some Member States have invested in demonstration farms showing promising results, this has not translated into a systemic change in pest control practices.

To achieve the objectives of the SUD, crop protection practices need to change, meaning that pesticides users change how and when they apply pesticides to control pests, using chemical pesticides only as a last resort in line with IPM principles. To some extent, the SUD builds on the

assumption that too much pesticides are being applied by professional users (or are being incorrectly applied) and that there is room for reducing the dependency on pesticides. It also builds on the assumption that effective alternative methods exist to prevent and control pests, with a similar performance and cost as pesticides (the impact assessment of the thematic strategy even assumed that the main economic benefit for farmers would be a reduction in costs for pesticides). The evaluation can conclude that there is little consensus regarding these assumptions and the stakeholder landscape is strongly polarised and opinions often starkly opposed.

Professional users, along with other pesticide industry representatives state that active substances approved for use in the EU are safe under the conditions of use, as Regulation (EC) No 1107/2009 only approve safe active substances for placing on market. They also argue that few (cost-effective) alternatives exist to control pests. Use of pesticides is perceived as necessary to ensure a viable and competitive agri-food sector and food security in the EU.

Environmental organisations and researchers studying the effects of pesticides on the environment and human health contest the safety of pesticides and call for stronger action to reduce their use, citing concerns regarding pollinator and biodiversity decline and prevalence of potential health effects from exposure to pesticides (including unknown "cocktail" and long-term effects). Reducing use of pesticide would in turn avoid costs to society in terms of illnesses and environmental degradation. While there is evidence to support both sides of the argument, it is not conclusive and tends to be debated, further cementing polarisation. The lack of comprehensive data on actual use and effects of pesticides (i.e., air, water and soil quality; and human health) further hampers the possibility to take decisions based on facts. Sales data is collected, but confidentiality requirements mean it cannot be fully made available for policy making at the EU level. As described earlier in this report, it was expected that the SUD would establish a stronger evidence base, however this has not been achieved. Hence, the assumptions underlying the rationale of the Directive are still being debated and there is little common ground among stakeholders.

Another aspect assessed to strongly influence the implementation of the Directive is governance. Starting at the level of the European Commission, the Directive is coordinated by DG SANTE. The SUD has a strong and direct link to environmental and agricultural policy and coordination is taking place ad-hoc between the DGs that are mainly involved (AGRI, ENV, ESTAT, GROW, JRC) as well as other relevant DGs (CLIMA, EMPL). There is general alignment between policies, however there are few signs of active support in the implementation of the SUD from the related policy areas. The evaluation has found a similar situation at Member State level in terms of governance, e.g., there is generally a lead ministry (often ministry of agriculture and food) coordinating the implementation, but the level of coordination and collaboration differs across Member States. This challenge was illustrated by the difficulty in getting complete responses to the Member State survey, with responsibilities for different provisions (for example water, acute and chronic poisoning) distributed between different ministries and governance levels (central, regional and local levels). The broad and transversal scope of the Directive makes it challenging to coordinate and information flows are generally not optimized, making it difficult to gauge the actual progress on implementation.

The research also shows segmentation between Member States and the European Commission. The majority of Member States consider that substantial progress has been achieved whereas the European Commission and the European Court of Auditors consider that implementation is weak. There are clearly different views between the EU and national regulators. National authorities of Member States and other stakeholders, except NGOs, are generally of the opinion that the SUD objectives are highly relevant and coherent with other policy areas and that there is no need to modify the SUD.

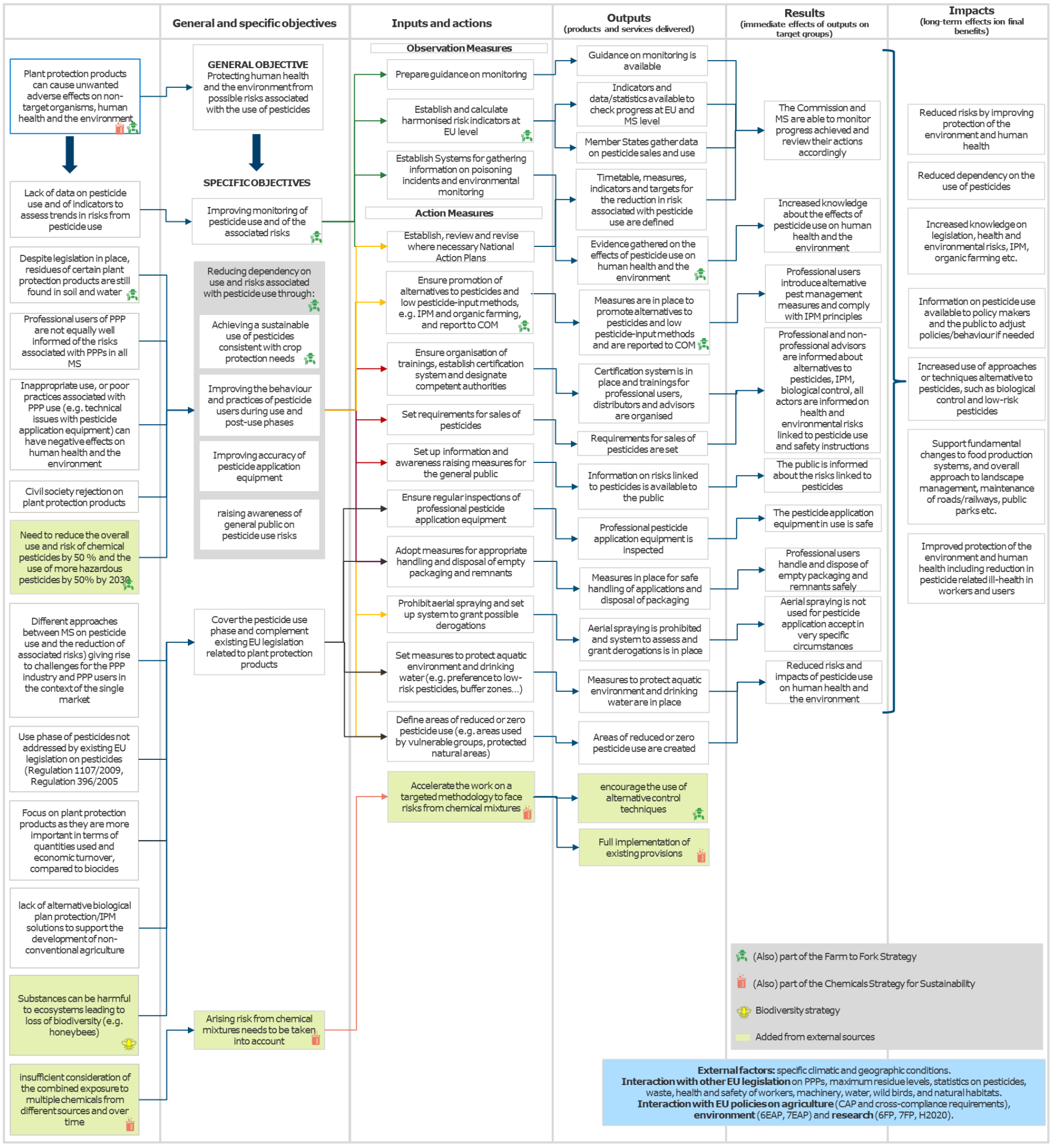
Appendix 1: INTERVENTION LOGIC

INTERVENTION LOGIC

The intervention logic was developed on the basis of the illustration provided in the Terms of Reference for this Study and shows the objectives and actions of the SUD, linked to the expected results and impacts. The figure was extended to include relevant objectives of recent developed EU policies, namely the Farm to Fork Strategy, the Chemicals Strategy for Sustainability and the Biodiversity Strategy.

The boxes with challenges, objectives, actions and outputs that were included from these policies are coloured in green and marked with a symbol referring to the relevant policy. Challenges, objectives, actions and outputs that are both part of the SUD and of the named policies are also marked with the relevant symbol(s), but not coloured. Since the actual results of the included policies will turn out in the future, no new entries were made in the columns "Results" and "Impacts".

Figure 5.1 Intervention logic for Directive 2009/128/EC on the sustainable use of pesticides



Appendix 2: EVALUATION QUESTIONS MATRIX

EVALUATION QUESTIONS MATRIX

The matrix outlines our interpretation of the evaluation questions by introducing refined questions and indicators based on the SUD's intervention logic presented in Appendix 1. By doing so, the evaluation matrix ensures that the Directive is evaluated according to the outputs, results and impacts which it is intended to reach, and that the evaluation design is rigorous and transparent. The evaluation matrix ensures that there is a clear link between the evaluation questions addressed, the indicators and the methodology proposed. It also makes clear references to the sources of information.

The table below presents the refined set of evaluation questions provided in the Terms of Reference, including operationalised questions, indicators of a contextual, quantitative and qualitative nature, judgement criteria as well as the interlinkages with the data collection activities. The indicators have been derived from a combination of existing secondary sources, and from the operationalised evaluation questions.

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews: National level	Interviews: EU/international level	Targeted surveys closed questions: National competent authorities	Targeted surveys closed questions: Distributors and sellers	Targeted surveys closed questions: Agricultural users	Targeted surveys closed questions: Other non-agricultural pesticide users	Targeted surveys closed questions: NGOs	Targeted surveys closed questions: Consumer organisations	Targeted surveys closed questions: Focus groups	Targeted surveys closed questions: Workshops	Literature review: Legal documents	Literature review: Scientific articles	Literature review: EU reports	Literature review: MS reports	Literature review: Other literature / grey literature	Literature review: Statistical data	Case studies	Conclusions from other EQs and subquestions
Effectiveness																								
EQ 1. To what extent have the actions envisaged by the SUD contributed to achieving the following objectives?	1.1	Reducing dependency on pesticide use and reducing the risks and impacts of pesticide use on human health and the environment	1.1.1	Number of MSs which have set a quantitative target on the reduction of use	All NAPs define useful targets (as per Directive)														X					
			1.1.2	Number of MSs which have set a quantitative target on the reduction of risk of pesticide use	All NAPs define useful targets (as per Directive)														X					
			1.1.3	Long-term increase/decrease trends of sales of pesticides (2011 – 2018)	Trend analysis shows decreasing trends																	X		
			1.1.4	Total amount and yearly increase/decrease rate of trends of sales of pesticides (2011 – 2018) compared to overall volume of agricultural production	Trend analysis shows decreasing trends																	X		
			1.1.5	Statistics on agricultural use of pesticides in the European Union (2010 – 2014)	Trend analysis shows decreasing trends														X			X		
			1.1.6	Trends in Harmonised Risk Indicators established under Commission Directive (EU) 2019/782	Trend analysis shows decreasing trends														X			X		
			1.1.7	Trends in national risk indicators	Trend analysis shows decreasing trends														X			X		
			1.1.8	Maximum residue level (MRL) exceedance rates for samples with origin in EU/EFTA countries based on EFSA reporting (2007 – 2018)	Trend analysis shows decreasing trends														X			X		
			1.1.9	Compliance rates for the chemical parameters (incl. pesticides) in drinking water (2011 – 2013)	Trend analysis shows decreasing trends														X			X		
			1.1.10	Area of groundwater polluted by pesticides (data from 1st and 2nd RBMP assessments)	Trend analysis shows decreasing trends														X			X		
			1.1.11	[EQS data on pesticides in GWB and SWB] [TBC]	Trend analysis shows decreasing trends														X			X		
			1.1.12	Stakeholders' views on the degree to which the Directive has contributed to reducing dependency on pesticide use and reducing the risks and impacts of pesticide use on human health and the environment	At least 75% of survey respondents confirm that the SUD has contributed to this objective (Descriptive statistical analysis) Different types of interviewees confirm that the SUD has contributed to this objective Descriptive			X	X	X	X	X	X	X											

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
			1.1.13	Evidence that the Directive has contributed to this objective	Evidence found in different types of documents that the SUD contributed to this objective Descriptive													X	X	X	X			
	1.2	Achieving a sustainable use of pesticides consistent with crop protection needs, including promoting the use of IPM, land management practices and alternative approaches or techniques such as non-chemical alternatives to pesticides	1.2.1	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: IPM promotion	Descriptive														X					
			1.2.2	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: IPM enforcement	Descriptive														X					
			1.2.3	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Aerial Spraying	Descriptive														X					
			1.2.4	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Water protection	Descriptive														X					
			1.2.5	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: PPP use in specific areas	Descriptive														X					
			1.2.6	Trends in area under organic farming (potentially also labour force in organic farming)	Trend analysis shows increasing trends																	X		
			1.2.7	Stakeholders' views on the degree to which the Directive has contributed to achieving a sustainable use of pesticides consistent with crop protection needs, including promoting the use of IPM, land management practices and alternative approaches or techniques such as non-chemical alternatives to pesticides	At least 75% of survey respondents confirm that the SUD has contributed to this objective (Descriptive statistical analysis) Different types of interviewees confirm that the SUD has contributed to this objective Descriptive	X		X	X	X	X	X	X	X											
			1.2.8	Evidence that the Directive has contributed to this objective	Evidence found in different types of documents that the SUD contributed to this objective Descriptive													X	X	X	X		CS1	
	1.3	Complementing existing EU legislation and addressing the	1.3.1	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Application equipment	Descriptive														X					

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
		use phase of pesticides	1.3.2	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Handling and storage	Descriptive														X					
			1.3.3	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Water protection	Descriptive														X					
			1.3.4	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: PPP use in specific areas	Descriptive														X					
			1.3.5	Findings from EQ19	Descriptive																			EQ19
			1.3.6	Stakeholders' views on the degree to which the Directive has complemented existing EU legislation and addresses the use phase of pesticides	At least 75% of survey respondents confirm that the SUD has contributed to this objective (Descriptive statistical analysis) Different types of interviewees confirm that the SUD has contributed to this objective Descriptive			X	X	X	X	X	X	X											
			1.3.7	Evidence that the Directive has contributed to this objective	Evidence found in different types of documents that the SUD contributed to this objective Descriptive													X	X	X	X				
	1.4	Improving the behaviour and practices of pesticide users	1.4.1	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Requirements on sales of PPPs	Descriptive														X					
			1.4.2	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Training	Descriptive														X					
			1.4.3	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Handling and storage	Descriptive														X					
			1.4.4	Stakeholders' views on the degree to which the Directive has contributed to improving the behaviour and practices of pesticide users	At least 75% of survey respondents confirm that the SUD has contributed to this objective (Descriptive statistical analysis) Different types of interviewees confirm that the SUD has contributed to this objective Descriptive	X		X	X	X	X	X	X	X											

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
			1.4.5	Evidence that the Directive has contributed to this objective	Evidence found in different types of documents that the SUD contributed to this objective Descriptive													X	X	X	X			
	1.5	Improving the accuracy of pesticide application equipment	1.5.1	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Application equipment	Descriptive														X					
			1.5.2	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Handling and storage	Descriptive														X					
			1.5.3	Stakeholders' views on the degree to which the Directive has contributed to improving the accuracy of pesticide application equipment	At least 75% of survey respondents confirm that the SUD has contributed to this objective (Descriptive statistical analysis) Different types of interviewees confirm that the SUD has contributed to this objective Descriptive	X		X	X	X	X	X	X	X					X					
			1.5.4	Evidence that the Directive has contributed to this objective	Evidence found in different types of documents that the SUD contributed to this objective Descriptive													X	X	X	X			
	1.6	Improving monitoring of pesticide use and of the associated risks (focus is on "monitoring of the associated risks" (i.e. Art 7(2) and 7(3) of the SUD) and not on "pesticide use" since all MS submit use data under the statistics regulation; also not on the harmonised risk indicators	1.6.1	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: National action plan	Descriptive														X					
			1.6.2	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Evolution of the number of studies aiming at monitoring the impacts of use in pesticides in various environmental compartments (Soil, air, water)	Descriptive														X					
			1.6.3	Status (2019) and trend (2017 – 2019) of DG SANTE compliance-monitoring index indicators: Evolution of the number of studies aiming at monitoring the impacts of use in pesticides on human health (residues in pesticides, worker exposure, etc)	Descriptive														X					

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews: National level	Interviews: EU/international level	Targeted surveys closed questions: National competent authorities	Targeted surveys closed questions: Distributors and sellers	Targeted surveys closed questions: Agricultural users	Targeted surveys closed questions: Other non-agricultural pesticide users	Targeted surveys closed questions: NGOs	Targeted surveys closed questions: Consumer organisations	Focus groups	Workshops	Literature review: Legal documents	Literature review: Scientific articles	Literature review: EU reports	Literature review: MS reports	Literature review: Other literature / grey literature	Literature review: Statistical data	Case studies	Conclusions from other EQs and subquestions
		since they are covered under EQ2)	1.6.4	Extent to which MS have risk monitoring systems in place (i.e. Art 7(2) and 7(3) of the SUD))	All MS have a risk monitoring system in place				X															
			1.6.5	Stakeholders' views on the degree to which the Directive has contributed to improving monitoring of pesticide use and of the associated risks	At least 75% of survey respondents confirm that the SUD has contributed to this objective (Descriptive statistical analysis) Different types of interviewees confirm that the SUD has contributed to this objective Descriptive			X	X	X	X	X	X	X											
			1.6.7	Evidence that the Directive has contributed to this objective	Evidence found in different types of documents that the SUD contributed to this objective Descriptive												X	X	X	X				
EQ 2. Are the currently available pesticide statistics, in addition to those proposed in the planned review of agricultural statistics under the Strategy for agricultural statistics for 2020 and beyond, sufficient to monitor effectively the progress on the sustainable use of pesticides? Which indicators and elements, if any, are missing for an effective monitoring of pesticides use and associated risks to human health and the environment?	2.1	Are the currently available pesticide statistics sufficient to monitor effectively the progress on the sustainable use of pesticides?	2.1.1	Stakeholders' views on the degree to which the currently available pesticide statistics are sufficient to monitor effectively the progress on the sustainable use of pesticides	At least 75% of survey respondents confirm that the statistics are sufficient Different types of interviewees confirm that the statistics are sufficient Descriptive			X	X	X	X	X	X	X											
			2.1.2	Stakeholders' views on the degree to which the currently available pesticide statistics are sufficient to process the national risk indicators (e.g. TFI, PLI, etc).	At least 75% of survey respondents confirm that the statistics are sufficient				X	X	X	X	X	X											
				Stakeholders' views on the degree to which the currently available pesticide statistics are sufficient to process the two harmonised risk indicators	At least 75% of survey respondents confirm that the statistics are sufficient				X	X	X	X	X	X											
			2.1.3	Extent to which the currently available statistics allow to measure progress in reduction of risk and/or use per PPP type? Per group of crops?	Evidence found that the statistics allow to measure this progress												X		X			X		
			2.1.4	Extent to which MS have modified the national indicators used for assessing progress when the EU HRIs have been implemented	Descriptive				X															

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
	2.2	Are the pesticide statistics proposed in the planned review of agricultural statistics under the "Strategy for agricultural statistics for 2020 and beyond" relevant for more effectively monitoring the progress on the sustainable use of pesticides?	2.2.1	Stakeholders' views on the degree to which the statistics proposed in the planned review of agricultural statistics under the "Strategy for agricultural statistics for 2020 and beyond" are relevant for more effectively monitoring the progress on the sustainable use of pesticides	At least 75% of survey respondents confirm that the statistics are sufficient Different types of interviewees confirm that the statistics are sufficient Descriptive			X	X	X	X	X	X	X										
			2.2.2	Stakeholders' views on the degree to which the proposed statistics will provide sufficient input for running the current national and harmonised risk indicators	Different types of stakeholders confirm that the statistics are sufficient Descriptive			X	X																
	2.3	Which indicators and elements, if any, are missing for an effective monitoring of pesticides use and associated risks to human health and the environment?	2.3.1	Stakeholders' qualitative assessment of which indicators and elements, if any, are missing for an effective monitoring of pesticides use and associated risks to human health and the environment.	Stakeholders provide concrete examples of missing indicators Descriptive			X																
			2.3.2	Evidence on which data, other than statistics, indicators and elements, if any, are missing for an effective monitoring of pesticides use and associated risks to human health and the environment.	Evidence found in different types of documents that elements are missing Descriptive													X	X		X	X		
EQ 3. How do the achieved results and impacts compare with the expected ones (cf. impact assessment of the thematic strategy and intervention logic)?	3.1	Findings EQ1	3.1.1	What are the achieved results?	N/A																			EQ1
	3.2	How do the achieved results compare to the expected ones?	3.2.1	Correspondence between 2006 IA expected results versus realised/established results (EQ1)	The observed results (quantitative, qualitative) matched the expected ones														X					EQ1
	3.3	How do the achieved impacts compare to the expected ones?	3.3.1	Correspondence between 2006 IA expected impacts versus realised/established impacts (EQ1)	The observed impacts (quantitative, qualitative) matched the expected ones														X					EQ1
EQ 4. Which were the key contributing and	4.1	Which were the key contributing	4.1.1	Stakeholders' views on the key contributing factors in achieving the intended objectives	Interviewees provide concrete examples of key contributing factors										FG1									

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions							Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
hindering factors in achieving the intended objectives, in particular to what extent has the form of a Directive been a contributing or hindering factor in achieving the intended objectives, to what extent has the SUD been transposed by Member States in a way that allows the effective implementation of the SUD, which are the factors hampering the implementation, to what extent are these factors influenced by regional and national conditions and to what extent has the lack of a definition of 'sustainable use' hampered the effectiveness of the SUD?		factors in achieving the intended objectives?	4.1.2	Evidence on the key contributing factors in achieving the intended objectives	Evidence found in different types of documents about key contributing factors Descriptive												X	X	X	X			
	4.2	Which were the key hindering factors in achieving the intended objectives?	4.2.1	Stakeholders' views on the key hindering factors in achieving the intended objectives	Stakeholders provide concrete examples of key hindering factors										FG1								
			4.2.2	Evidence on the key hindering factors in achieving the intended objectives	Evidence found in different types of documents about key hindering factors Descriptive													X	X	X	X			
			4.2.3	Extent to which derogations to the ban of aerial spraying are used by MS	Evidence found in different types of documents about the way derogations are used in MS (emergency, structurally)													X	X	X	X			
	4.3	To what extent has the form of a Directive been a contributing or hindering factor in achieving the intended objectives?	4.3.1	Stakeholders' views on the extent to which the form of a Directive has been a contributing or hindering factor in achieving the intended objectives	At least 75% of survey respondents confirm that the Directive has been a contributing factor Different types of interviewees confirm that the statistics are sufficient Descriptive			X	X	X	X	X	X	X										
			4.3.2	Evidence on the extent to which the form of a Directive has been a contributing or hindering factor in achieving the intended objectives	Evidence found in different types of documents about key contributing factors Descriptive													X	X	X	X			
	4.4	To what extent has the SUD been transposed by Member States in a way that allows the effective implementation of the SUD?	4.4.1	Number of national measures (transposition) per MS	Number of national measures is comparable to that of other comparable framework legislation (e.g. WFD, nitrates Directive, IED)																	X		
			4.4.2	Stakeholders' views on the extent to which the SUD been transposed by Member States in a way that allows the effective implementation of the SUD	Interviewees provide concrete examples how the transposition hindered or supported effectiveness			X							FG1								
			4.4.3	Evidence on the extent to which the SUD been transposed by Member States in a way that allows the effective implementation of the SUD	Evidence found in different types of documents about how the transposition hindered or supported effectiveness Descriptive													X	X	X	X			
	4.5	Which are the factors hampering the implementation of the SUD?	4.5.1	Stakeholders' views on the factors hampering the implementation of the SUD	At least 75% of survey respondents confirm different factors which hamper the implementation of the SUD Different types of stakeholders confirm different factors which hamper the implementation of			X	X	X	X	X	X	X	FG1								

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews: National level	Interviews: EU/international level	Targeted surveys closed questions: National competent authorities	Targeted surveys closed questions: Distributors and sellers	Targeted surveys closed questions: Agricultural users	Targeted surveys closed questions: Other non-agricultural pesticide users	Targeted surveys closed questions: NGOs	Targeted surveys closed questions: Consumer organisations	Focus groups	Workshops	Literature review: Legal documents	Literature review: Scientific articles	Literature review: EU reports	Literature review: MS reports	Literature review: Other literature / grey literature	Literature review: Statistical data	Case studies	Conclusions from other EQs and subquestions
					the SUD Descriptive																			
			4.5.2	Evidence on the factors hampering the implementation of the SUD	Evidence found in different types of documents about key contributing factors Descriptive													X	X	X	X			
	4.6	To what extent are these factors which hamper the implementation of the SUD influenced by regional and national conditions?	4.6.1	Stakeholders' views on the extent to which the factors which hamper the implementation of the SUD are influenced by regional and national conditions	Different types of stakeholders confirm that factors which hamper the implementation of the SUD are influenced by regional and national conditions Descriptive			X							FG1									
			4.6.2	Evidence on the extent to which the factors which hamper the implementation of the SUD are influenced by regional and national conditions	Evidence found in different types of documents that factors which hamper the implementation of the SUD are influenced by regional and national conditions													X	X	X	X			
	4.7	To what extent has the lack of a definition of 'sustainable use' hampered the effectiveness of the SUD?	4.7.1	Stakeholders' views on the extent to which the lack of a definition of 'sustainable use' hampered the effectiveness of the SUD	Different types of stakeholders confirm that the lack of a definition of 'sustainable use' hampered the effectiveness of the SUD			X																
			4.7.2	Evidence on the extent to which the lack of a definition of 'sustainable use' hampered the effectiveness of the SUD	Evidence found in different types of documents confirms that the lack of a definition of 'sustainable use' hampered the effectiveness of the SUD													X	X	X	X			
Efficiency																								
EQ 5. What have been the main costs (e.g. implementation costs, staff time in preparing, revising and implementing Member States' national action plans, training and certification for advisers, distributors and users of pesticides etc.) to implement the SUD for the	5.1	What have been the main costs (e.g. implementation costs, staff time in preparing, revising and implementing Member States' national action plans, training and certification for advisers, distributors and users of pesticides etc.)	5.1.1	Main cost per stakeholders	Descriptive				X	X	X	X	X	X				X	X	X	X			EQ5.1.2
			5.1.2	Stakeholders' qualitative assessment of the categories of main costs	Stakeholders provide concrete examples of main costs			X	X	X	X	X	X	X										

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
different actors concerned (e.g. Commission, Member States, farmers, professional users etc.)? What were the factors driving these costs?		to implement the SUD for the different actors concerned (e.g. Commission, Member States, farmers, professional users etc.)?																						
	5.2	What were the factors driving these costs?	5.2.1	Stakeholders' qualitative assessment of the factors driving costs	Stakeholders provide concrete examples of factors driving costs			X																
			5.2.2	Evidence of the factors driving costs	Evidence found in different types of documents about factors driving costs												X	X	X	X				
EQ 6. What social, environmental and economic benefits has the SUD achieved and what is the corresponding monetised value, where possible and relevant to estimate?	6.1	What social, environmental and economic benefits has the SUD achieved?	6.1.1	Stakeholders' views on the extent to which the Directive has led to social, environmental, and economic benefits	At least 75% of survey respondents confirm that the Directive has led to social, environmental, and economic benefits				X	X	X	X	X	X										
			6.1.2	Stakeholders' qualitative assessment of social, environmental, and economic benefits	Stakeholders provide concrete examples of social, environmental, and economic benefits			X																
			6.1.3	Findings from EQ1 on achieved results and benefits	Descriptive																			EQ1
			6.1.3	Evidence of extent to which social, environmental and economic benefits have been achieved through the SUD	Evidence found in different types of documents that potential social, environmental and economic benefits have been achieved through the SUD Descriptive												X	X	X	X				
	6.2	What is the corresponding monetised value of the benefits, where possible and relevant to estimate?	6.2.1	Monetised value of the benefits, where possible and relevant to estimate	Monetised value of the benefits, where possible and relevant to estimate																			
EQ 7. To what extent were the SUD's costs proportionate to its benefits (i.e. positive outcomes)?	n/a	n/a	7.1.1	Extent to which the SUD's costs were proportionate to its benefits; based on the assumption that benefits have been achieved	Descriptive																			EQ5, EQ6
			7.1.2	Stakeholders' views on the extent to which the SUD's costs were proportionate to its	At least 75% of survey respondents confirm that the				X	X	X	X	X	X										

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
				benefits; based on the assumption that benefits have been achieved	costs were proportionate to the benefits																			
EQ 8. What have been the costs of partially meeting or not meeting some of the objectives and requirements of the SUD?	8.1	What were the expected benefits of fully meeting all objectives and requirements of the SUD?	8.1.1	Information provided in the original Impact Assessment on expected benefits	Descriptive														X					
	8.2	What have been the costs of partially meeting or not meeting some of the objectives and requirements of the SUD?	8.2.1	Comparison of expected benefits with actual benefits	Monetised value of the benefits, where possible and relevant to estimate																			
			8.2.2	Stakeholders' views on the costs of partially meeting or not meeting some of the objectives and requirements of the SUD.	Stakeholders provide concrete examples of factors driving costs			X																
EQ 9. Which elements of the SUD pose an administrative burden or are overly complex? What are the administrative costs for the different actors?	9.1	Which elements of the SUD pose an administrative burden?	9.1.1	Evidence collected under EQ 5.1	Descriptive																			EQ5.1
			9.1.2	Stakeholders' views on the extent to which certain elements of the SUD pose an administrative burden	Stakeholders provide concrete examples of elements posing an administrative burden			X																
			9.1.3	Evidence on the extent to which certain elements of the SUD pose an administrative burden	Evidence found in different types of documents about elements posing an administrative burden													X	X	X	X			
	9.2	Which elements of the SUD administrative burden are overly complex?	9.2.1	Stakeholders' views on the extent to which certain elements of the SUD's administrative burden are overly complex	At least 75% of survey respondents confirm that certain elements of the SUD administrative burden are overly complex Different types of interviewees confirm that certain elements of the SUD administrative burden are overly complex Descriptive			X	X	X	X	X	X	X										
			9.2.2	Evidence on the extent to which certain elements of the SUD's administrative burden are overly complex	Evidence found in different types of documents that certain elements of the SUD administrative burden are overly complex Descriptive													X	X	X	X			
Relevance																								
EQ 10. To what extent has the SUD responded to the needs and problems	10.1	What were the needs and problems concerning the use of	10.1.1	Needs and problems concerning the use of pesticides identified at the time of the impact assessment	Descriptive														X					

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions							Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
concerning the use of pesticides identified at the time of the impact assessment?		pesticides identified at the time of the impact assessment?																					
	10.2	To what extent has the SUD responded to those needs and problems?	10.2.1	Stakeholders' views on the extent to which the SUD responded to those needs and problems	At least 75% of survey respondents confirm that the SUD responded to the identified needs and problems Different types of interviewees confirm that the SUD responded to the identified needs and problems Descriptive			X	X	X	X	X	X	X										EQ10.1.1
			10.2.2	Extent to which the SUD addresses the needs identified in the impact assessment	Final text of the SUD addresses the needs identified in the impact assessment												X		X					
EQ 11. How have the needs and problems identified at the time of preparation of the SUD evolved since then? What are the current needs and problems related to the use of pesticides and how will they evolve (e.g. health risks to children and the most vulnerable, key environmental aspects such as soil health, biodiversity etc.)?	11.1	How have the needs and problems identified at the time of preparation of the SUD evolved since the time of the impact assessment?	11.1.1	Stakeholders' views on the extent to which the needs and problems identified at the time of preparation of the SUD evolved since the time of the impact assessment	At least 75% of survey respondents confirm that the needs and problems identified at the time of preparation of the SUD evolved since the time of the impact assessment Different types of interviewees confirm that the needs and problems identified at the time of preparation of the SUD evolved since the time of the impact assessment Descriptive			X	X	X	X	X	X	X										
			11.1.2	Evidence on the extent to which the needs and problems identified at the time of preparation of the SUD evolved since the time of the impact assessment	Evidence found in different types of documents that the needs and problems identified at the time of preparation of the SUD evolved since the time of the impact assessment												X	X	X	X	X			
	11.2	What are the current needs and problems related to the use of pesticides?	11.2.1	Stakeholders' qualitative assessment of the current needs and problems	Different types of interviewees confirm current needs and problems Descriptive			X																EQ11.1
			11.2.2	Evidence on the extent to which the current needs and problems	Evidence found in different types of documents about current needs and problems												X	X	X	X	X			EQ11.1
	11.3	What is the likely evolution of the needs and problems related to the use of pesticides (e.g. health risks to	11.3.1	Stakeholders' views on extent to which the needs and problems related to the use of pesticides will evolve	Different types of interviewees confirm current needs and problems Descriptive			X																
			11.3.3	Evidence on the extent to which the needs and problems related to the use of pesticides will evolve	Evidence found in different types of documents about current needs and problems																			

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews		Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
							National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
		children and the most vulnerable, key environmental aspects such as soil health, biodiversity etc.)?																						
EQ 12. To what extent are the SUD's objectives and required actions relevant today to address the current needs and problems and expected developments related to the use of pesticides in the EU?	12.1	To what extent are the SUD's objectives and required actions relevant today to address the current needs and problems?	12.1.1	Stakeholders' views on the extent to which the the SUD's objectives and required actions are relevant today to address the current needs and problems	At least 75% of survey respondents confirm that the Directive has led to social, environmental, and economic benefits				X	X	X	X	X	X										
			12.1.3	Stakeholders' qualitative assessment of which of the SUD's objectives and required actions are relevant (or not) today to address the current needs and problems	Stakeholders provide concrete examples			X																	
	12.2	To what extent will the SUD's objectives and required actions stay relevant regarding the expected developments related to the use of pesticides in the EU?	12.2.1	Stakeholders' views on the extent to which the the SUD's objectives and required actions are relevant regarding the expected developments related to the use of pesticides in the EU	At least 75% of survey respondents confirm that the Directive has led to social, environmental, and economic benefits				X	X	X	X	X	X										
			12.2.2	Stakeholders' qualitative assessment of which of the SUD's objectives and required actions are relevant (or not) regarding the expected developments related to the use of pesticides in the EU	Stakeholders provide concrete examples			X																	
			12.2.3	Evidence on the extent to which the current provisions are (and will) fully take into account new technologies and alternative techniques	Descriptive																		CS7	
EQ 13. Based on the identified current needs and problems and expected developments, are the objectives of the SUD relevant to address the three main dimensions of	13.1	Based on the identified current needs and problems, are the objectives of the SUD relevant to address the three main dimensions of sustainability,	13.1.1	Stakeholders' views on the extent to which the objectives of the Directive are relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental	At least 75% of survey respondents confirm that the Directive has led to social, environmental, and economic benefits				X	X	X	X	X	X										
			13.1.2	Stakeholders' qualitative assessment of which of the objectives of the Directive are relevant to address the three main dimensions of	Stakeholders provide concrete examples			X																	

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
sustainability, i.e. social, economic and environmental?		i.e. social, economic and environmental?		sustainability, i.e. social, economic and environmental																				
			13.1.3	Evidence on the extent to which the objectives of the Directive are relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental	Evidence found in different types of documents that the objectives of the Directive are relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental Descriptive													X	X		X			
	13.2	Based on the expected developments of needs and problems, are the objectives of the SUD expected to stay relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental?	13.2.1	Stakeholders' views on the extent to which the objectives of the Directive are expected to stay relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental	At least 75% of survey respondents confirm that the objectives of the Directive are expected to stay relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental				X	X	X	X	X	X										
			13.2.2	Stakeholders' qualitative assessment of which of the objectives of the Directive are expected to stay relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental	Stakeholders provide concrete examples			X																	
			13.2.3	Evidence on the extent to which the objectives of the Directive are expected to stay relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental	Evidence found in different types of documents that the objectives of the Directive are expected to stay relevant to address the three main dimensions of sustainability, i.e. social, economic and environmental Descriptive													X	X		X			
Coherence																								
EQ 14. To what extent has the SUD been coherent internally (i.e. coherence between the required actions)?	n/a	n/a	14.1.1	Stakeholders' views on the degree to which inconsistencies (i.e. overlaps, contradictions, gaps) exist across the Directive's activities	Different types of interviewees confirm that inconsistencies (i.e. overlaps, contradictions, gaps) exist across the Directive's activities Descriptive			X																	
			14.1.2	Evidence on the degree to which inconsistencies (i.e. overlaps, contradictions, gaps) exist across the Directive's activities	Evidence found in different types of documents that inconsistencies (i.e. overlaps, contradictions, gaps) exist across the Directive's activities Descriptive													X	X	X					

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
EQ 15. The SUD has strong links with other EU legislation[7] and depends on these links for its implementation and achieving its objectives. To what extent has the SUD created an effective and coherent link with other EU legislation and policies related to the use of pesticides? To which extent is the SUD dependent on implementation of the linked legislation in achieving its objectives? In particular, the link with the following legislation and policies should be explored:	15.1	Regulation (EC) No 1185/2009 (statistics on pesticides)	15.1.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2									
			15.1.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2									
			15.1.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
	15.2	Regulation (EC) No 1107/2009 (placing on the market of plant protection products)	15.2.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2									
			15.2.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for			X	X	X	X	X	X	X	FG2									

Evaluation question	Sub-questions		Indicators		Judgement criteria																		Case studies	Conclusions from other EQs and subquestions
							Interviews		Targeted surveys closed questions									Literature review							
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
					achieving its objectives Descriptive																			
			15.2.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
	15.3	Regulation (EC) No 396/2005 (maximum residue levels)	15.3.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2									
			15.3.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2									
			15.3.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
	15.4	Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective	15.4.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the			X	X	X	X	X	X	X	FG2									

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews: National level	Interviews: EU/international level	Targeted surveys closed questions: National competent authorities	Targeted surveys closed questions: Distributors and sellers	Targeted surveys closed questions: Agricultural users	Targeted surveys closed questions: Other non-agricultural pesticide users	Targeted surveys closed questions: NGOs	Targeted surveys closed questions: Consumer organisations	Focus groups	Workshops	Literature review: Legal documents	Literature review: Scientific articles	Literature review: EU reports	Literature review: MS reports	Literature review: Other literature / grey literature	Literature review: Statistical data	Case studies	Conclusions from other EQs and subquestions
		measures against pests of plants			Directive and this legislation Descriptive																			
			15.4.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2										
			15.4.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
	15.5	Regulation (EC) No 528/2012 (biocidal products), in particular Articles 17(5) and 18	15.4.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2										
			15.4.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2										
			15.4.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or												X	X	X	X	X			

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
					contradictions between the SUD and this legislation																			
	15.6	Regulation (EC) No 882/2004 (official controls) replaced by Regulation (EC) No 2017/625 as of December 2019	15.5.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2									
			15.5.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2									
			15.5.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
	15.7	Directives on health and safety of workers (Directive 98/24/EC, Directive 89/391/EEC, Directive 2004/37/EC, Directive 2009/104/EC, Directive 89/656/EEC, Directive 94/33/EC, Directive 92/85/EEC)	15.6.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2									
			15.6.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is			X	X	X	X	X	X	X	FG2									

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews: National level	Interviews: EU/international level	Targeted surveys closed questions: National competent authorities	Targeted surveys closed questions: Distributors and sellers	Targeted surveys closed questions: Agricultural users	Targeted surveys closed questions: Other non-agricultural pesticide users	Targeted surveys closed questions: NGOs	Targeted surveys closed questions: Consumer organisations	Targeted surveys closed questions: Focus groups	Targeted surveys closed questions: Workshops	Literature review: Legal documents	Literature review: Scientific articles	Literature review: EU reports	Literature review: MS reports	Literature review: Other literature / grey literature	Literature review: Statistical data	Case studies	Conclusions from other EQs and subquestions
					dependent on implementation of this linked legislation for achieving its objectives Descriptive																			
			15.6.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
	15.8	Directives on environmental protection (on water: Directive 2000/60/EC Directive 1008/105/EC, 2006/118/EC, Directive 98/83/EC, Directive 91/271/EEC, on wild birds: Directive 79/409/EEC, on natural habitats: Directive 92/43/EEC)	15.7.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2									
			15.7.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2									
			15.7.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
	15.9	Regulation (EC) 834/2007 repealed by Regulation (EU) 2018/848 (organic production)	15.8.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the			X	X	X	X	X	X	X	FG2									

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews: National level	Interviews: EU/international level	Targeted surveys closed questions: National competent authorities	Targeted surveys closed questions: Distributors and sellers	Targeted surveys closed questions: Agricultural users	Targeted surveys closed questions: Other non-agricultural pesticide users	Targeted surveys closed questions: NGOs	Targeted surveys closed questions: Consumer organisations	Focus groups	Workshops	Literature review: Legal documents	Literature review: Scientific articles	Literature review: EU reports	Literature review: MS reports	Literature review: Other literature / grey literature	Literature review: Statistical data	Case studies	Conclusions from other EQs and subquestions
					Directive and this legislation Descriptive																			
			15.8.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2										
			15.8.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
	15.10	Relevant aspects of the Common Agricultural Policy (e.g. cross-compliance requirements, Regulations (EU) Nos 1306/2013, 1307/2013, 1308/2013)	15.9.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2										
			15.9.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2										
			15.9.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or												X	X	X	X	X			

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews: National level	Interviews: EU/international level	Targeted surveys closed questions: National competent authorities	Targeted surveys closed questions: Distributors and sellers	Targeted surveys closed questions: Agricultural users	Targeted surveys closed questions: Other non-agricultural pesticide users	Targeted surveys closed questions: NGOs	Targeted surveys closed questions: Consumer organisations	Focus groups	Workshops	Literature review: Legal documents	Literature review: Scientific articles	Literature review: EU reports	Literature review: MS reports	Literature review: Other literature / grey literature	Literature review: Statistical data	Case studies	Conclusions from other EQs and subquestions
					contradictions between the SUD and this legislation																			
	15.11	Directive 2006/42/EC (machinery) with respect to pesticide application equipment	15.10.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2										
			15.10.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2										
			15.10.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X				
	15.12	Directive 2006/12/EC (waste) and Directive 91/689/EEC (hazardous waste)	15.11.1	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2										
			15.11.2	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is			X	X	X	X	X	X	X	FG2										

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews: National level	Interviews: EU/international level	Targeted surveys closed questions: National competent authorities	Targeted surveys closed questions: Distributors and sellers	Targeted surveys closed questions: Agricultural users	Targeted surveys closed questions: Other non-agricultural pesticide users	Targeted surveys closed questions: NGOs	Targeted surveys closed questions: Consumer organisations	Targeted surveys closed questions: Focus groups	Targeted surveys closed questions: Workshops	Literature review: Legal documents	Literature review: Scientific articles	Literature review: EU reports	Literature review: MS reports	Literature review: Other literature / grey literature	Literature review: Statistical data	Case studies	Conclusions from other EQs and subquestions
					dependent on implementation of this linked legislation for achieving its objectives Descriptive																			
			15.11.3	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
	15.13	EU policies on climate change	15.12	Stakeholders' views on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	At least 75% of survey respondents confirm that there are there are synergies, overlaps, and/or contradictions between the Directive and this legislation Different types of interviewees confirm that there are synergies or overlaps between the Directive and this legislation Descriptive			X	X	X	X	X	X	X	FG2									
			15.13	Stakeholders' views on the degree to which the SUD is dependent on implementation of this linked legislation for achieving its objectives	At least 75% of survey respondents confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Different types of interviewees confirm that the SUD is dependent on implementation of this linked legislation for achieving its objectives Descriptive			X	X	X	X	X	X	X	FG2									
			15.14	Evidence on the degree to which there are synergies, overlaps, and/or contradictions between the SUD and this legislation	Evidence found in different types of documents (including the legislative texts) that there are synergies, overlaps, and/or contradictions between the SUD and this legislation												X	X	X	X	X			
EQ 16. To what extent has the SUD allowed for coordination and complementarity with other EU actions and	n/a	n/a	16.1.1	Stakeholders' views on extent to which the SUD allowed for coordination and complementarity with other EU actions and policies within the EU institutions	Different types of interviewees confirm that the SUD allowed for coordination and complementarity with other EU actions and policies			X																

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
policies on water, climate change, conservation of wild birds, natural habitats, wild fauna and flora, Common Agricultural Policy, protection of the environment and health including workers' health and safety, plant protection products and pesticide residues, promoting development, food and nutrition security in developing countries including sanitary and phytosanitary support (SPS) to the agri-food sector in third countries?			16.1.2	Evidence on the extent to which the SUD allowed for coordination and complementarity with other EU actions and policies within the EU institutions	Evidence found in different types of documents (including the legislative texts) that the SUD allowed for coordination and complementarity with other EU actions and policies													X		X				EQ15
EQ 17. To what extent has the lack of an operational sustainable EU food system vision, associated EU agricultural data, knowledge and advisory space, and lack of carbon farming piloting	n/a	n/a	17.1.1	Stakeholders' views on extent to which the lack of an operational sustainable EU food system vision hampered implementation of the SUD and successful achievement of its objectives	Different types of interviewees confirm that the lack of those elements hampered the achievement of the SUDs objectives Descriptive			X																	
			17.1.2	Evidence on the extent to which the lack of an operational sustainable EU food system vision hampered implementation of the SUD and successful achievement of its objectives	Evidence found in different types of documents that the lack of those elements hampered the achievement of the SUDs objectives Descriptive													X	X		X				

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
hampered implementation of the SUD and successful achievement of its objectives?			17.1.3	Stakeholders' views on extent to which the lack of EU agricultural data, and knowledge and advisory spaces, hampered implementation of the SUD and successful achievement of its objectives	Different types of interviewees confirm that the lack of those elements hampered the achievement of the SUDs objectives Descriptive			X																
			17.1.4	Evidence on the extent to which the lack of EU agricultural data, and knowledge and advisory spaces, hampered implementation of the SUD and successful achievement of its objectives	Evidence found in different types of documents that the lack of those elements hampered the achievement of the SUDs objectives Descriptive													X	X		X			
			17.1.5	Stakeholders' views on extent to which the lack of Carbon farming piloting hampered implementation of the SUD and successful achievement of its objectives	Different types of interviewees confirm that the lack of those elements hampered the achievement of the SUDs objectives Descriptive			X																
			17.1.6	Evidence on the extent to which the lack of Carbon farming piloting hampered implementation of the SUD and successful achievement of its objectives	Evidence found in different types of documents that the lack of those elements hampered the achievement of the SUDs objectives Descriptive													X	X		X			
EQ 18. To what extent has the SUD taken into consideration the specific climatic conditions of the EU outermost regions and their specific status as recognised in Article 349 TFEU and pesticides for minor uses?	n/a	n/a	18.1.1	Stakeholders' views on extent to which the SUD has taken into consideration the specific climatic conditions of the EU outermost regions and their specific status as recognised in Article 349 TFEU and pesticides for minor uses	Different types of interviewees confirm that the SUD has taken into consideration the specific climatic conditions of the EU outermost regions and their specific status as recognised in Article 349 TFEU and pesticides for minor uses Descriptive			X																
			18.1.2	Evidence on the extent to which the SUD has taken into consideration the specific climatic conditions of the EU outermost regions and their specific status as recognised in Article 349 TFEU and pesticides for minor uses	Evidence found in different types of documents that the SUD has taken into consideration the specific climatic conditions of the EU outermost regions and their specific status as recognised in Article 349 TFEU and pesticides for minor uses Descriptive													X	X	X	X	X			
Complementarity																								
EQ 19. To what extent has the SUD proved complementary	19.1	To what extent has the SUD proved complementary	19.1.1	Evidence on the extent to which the SUD proved complementary to other EU legislation on pesticides	Evidence found in different types of documents, and based on the assessment of EQ15, that the SUD proved												X							EQ15

Evaluation question	Sub-questions		Indicators		Judgement criteria	Online Public Consultation	Interviews		Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
							National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
to other EU legislation on pesticides, in particular the legislative acts mentioned under question 15 points 1, 2, 3? To which extent do those legislations together provide a consistent regulatory framework for pesticides?		to other EU legislation on pesticides, in particular the legislative acts mentioned under question 15 points a, b, c?			complementary to other EU legislation on pesticides Descriptive																			
	19.2	To which extent do those legislation together provide a consistent regulatory framework for pesticides?	19.2.1	Stakeholders' views on extent to which those legislation together provide a consistent regulatory framework for pesticides	Stakeholders provide concrete examples			X																
			19.2.2	Evidence on the extent to which those legislation together provide a consistent regulatory framework for pesticides	Evidence found in different types of documents, and based on the assessment of EQ15, that those legislation together provide a consistent regulatory framework for pesticides Descriptive												X	X		X			EQ15
EU Added Value																								
EQ 20. Which measures –if any– did EU Member States have in place to promote a sustainable use of pesticides before the adoption of the SUD?	n/a	n/a	20.1.1	Information available in original Impact Assessment	Descriptive																			
			20.1.2	Evidence of the measures –if any–EU Member States did have in place to promote a sustainable use of pesticides before the adoption of the SUD	Descriptive																		CS6	
EQ 21. To what extent has the SUD produced additional value (e.g. providing strategic priorities for action, a common framework for action, etc.) compared to what could have been produced at national or regional level (through public and private	n/a	n/a	21.1.1	Stakeholders' views on extent to which SUD produced additional value (e.g. providing strategic priorities for action, a common framework for action, etc.) compared to what could have been produced at national or regional level	Different types of interviewees confirm that the SUD produced additional value Descriptive			X																EQ1
			21.1.2	Evidence on the extent to which the SUD produced additional value (e.g. providing strategic priorities for action, a common framework for action, etc.) compared to what could have been produced at national or regional level	Evidence found in different types of documents the SUD produced additional value Descriptive												X	X	X	X			EQ1

Evaluation question	Sub-questions		Indicators		Judgement criteria	Interviews			Targeted surveys closed questions								Literature review						Case studies	Conclusions from other EQs and subquestions
						Online Public Consultation	National level	EU/international level	National competent authorities	Distributors and sellers	Agricultural users	Other non-agricultural pesticide users	NGOs	Consumer organisations	Focus groups	Workshops	Legal documents	Scientific articles	EU reports	MS reports	Other literature / grey literature	Statistical data		
initiatives) in its absence?																								
EQ 22. To which extent did the SUD strike the right balance between action at EU level and national action? Is it a proportionate response to the problem?	n/a	n/a	22.1.2	Stakeholders' views on extent to which the SUD did strike the right balance between action at EU level and national action? Is it a proportionate response to the problem	Different types of interviewees confirm that the SUD produced additional value Descriptive			X																EQ4.3
			22.1.3	Evidence on the extent to which the SUD did strike the right balance between action at EU level and national action? Is it a proportionate response to the problem	Evidence found in different types of documents the SUD produced additional value Descriptive													X	X	X	X			EQ4.3

Appendix 3: METHODOLOGY

METHODOLOGY OF THE STUDY

Research Framework

Back-to-back assessment

The Commission has well-established procedures and specific guidelines for carrying out evaluations and impact assessments, which establish the minimum standards and principles that those need comply with – laid down in the Better Regulation Guidelines and the Better Regulation Toolbox[286]. As required in the Terms of Reference for this study, the relevant activities within this contract have been developed fully in line with the Better Regulation Policy of the European Commission to ensure that results of this contract can be used as a solid based to enhance the legislative framework for the use of pesticides within the EU.

The Study therefore constitutes a part of back-to-back evaluation and impact assessment, to evaluate the Directive after nine years of implementation (considering that Member States were to comply with the SUD as of November 2011). Ideally, evaluations and impact assessments should be conducted sequentially so that the results of the evaluation can be fully used in the subsequent impact assessment. However, due to the imminent need of input to the ongoing policy process and work towards the revision of the SUD, the Study has carried out the evaluation and impact assessment in parallel (in a so-called "back-to-back" manner) as a single process combining the two assessments.

Ex-post evaluation

The evaluation part of this study consists of a theory-based evaluation. Theory-based evaluation is a systematic approach to the assessment of assumptions underlying the causal chain from inputs to outputs to results and impacts of an intervention. It relies on an explicit theoretical model (the intervention logic) which represents the background for the analysis. Theory-based evaluations aim to explain why and how results have occurred and to appraise the contribution of the intervention and of other factors.

In this Study, the evaluation work was based primarily on available evidence from earlier studies and reports exploring the implementation and effects of the Directive. The field work conducted served to validate the available findings and a specific focus was placed on developing a greater understanding of the how and why questions, e.g. how Member States, farmers, industry and other stakeholders implemented the Directive and why it worked/did not work as intended, e.g. the barriers and drivers, alternative explanations and explanatory factors for achievement/non-achievement of effects. This was more specifically undertaken through contribution analysis, applied in the case studies exploring specific provisions of the sustainable use Directive.

Impact Assessment

EU legislation is prepared and adjusted based on transparent, comprehensive and balanced evidence on the advantages and disadvantages of possible policy options by assessing their potential impacts. Impact Assessment is a tool to help structure reflection and conduct analyses informing policy design. It sheds light on the economic, social (including health) and environmental dimensions of policy proposals based on an analysis of the issue at stake through stakeholder engagement and research. The ultimate goal is to develop the most pertinent policy options. As

[286] See: https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox/better-regulation-toolbox_en

such, the Impact Assessment explains why, and which policy actions could be taken at the EU level and provides evidence to respond to concerns that are likely to arise in the decision-making process or the public reaction after the Commission adopts the initiative.

As mentioned earlier, with the Better Regulation Guidelines and the Better Regulation Toolbox the European Commission has well-established procedures and specific guidelines in place for carrying out evaluations and impact assessments. The approach adopted in this study for the impact assessment (as for the evaluation) thus closely follows the provisions from the Commission to ensure the application of best practice.

Assessment of impacts of policy options

Identification of economic, social and environmental impacts of the policy options and who will be affected constitutes one of the key steps of the Impact Assessment. Ultimately, the analysis aims to identify to what extent different policy options to revise the Regulation would meet the defined objectives, with what benefits, at what cost, with what implications for different stakeholders.

This step will follow the method laid out in the Toolbox[287] which provides an overview of potential key impacts which should be screened to identify potentially important impacts (considering both positive/negative, direct/indirect, intended/unintended as well as short/long-term effects).

The Study assesses the most significant effects for each policy option in more depth. To this end, the Guidelines[288] and Toolbox[289] provide a wide range of methodologies which are taken into account through the study and adapted for the assessment of impacts. This includes assessment of the most significant impacts qualitatively, quantitatively and in monetary terms whenever possible. Impacts are assessed from the point of view of society as a whole, although distributional effects and cumulative burdens on individual parties are proportionately assessed and considered.

It is also important that environmental and socio-economic impacts are simultaneously addressed in a balanced way to protect non-target organisms (biodiversity) and human health and to safeguard the competitiveness of European agriculture.

Overview of study tasks

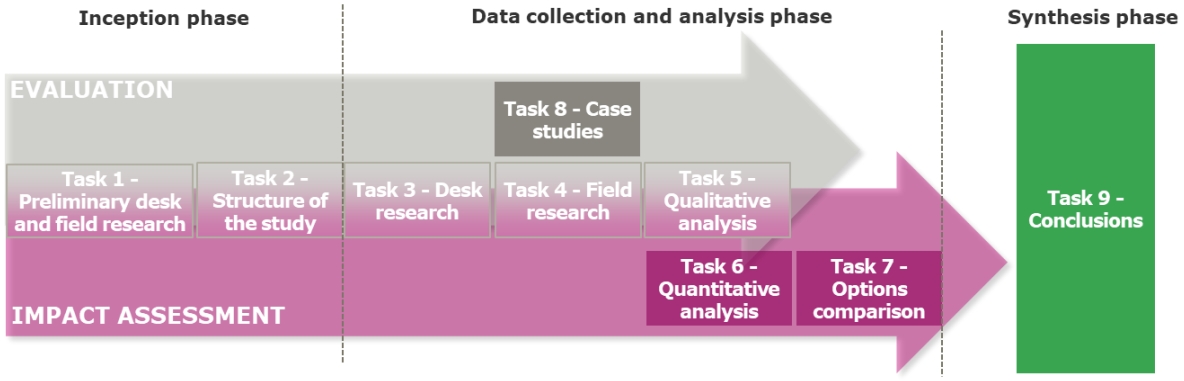
In our methodology and stakeholder consultation strategy, the challenging timeline of the project was considered by sequencing the data collection activities and targeting the questions to minimise duplication and consultation fatigue among stakeholders. The figure below illustrates the back-to-back process and the data collection activities in relation to both the evaluation and the impact assessment part.

[287] Predominantly "Tool #19. Identification/screening of impacts". See: https://ec.europa.eu/info/sites/info/files/file_import/better-regulation-toolbox-19_en_0.pdf

[288] Chapter 8. Methods, models and costs and benefits

[289] E.g. Tools #20 - #24, #26, #29, #57 - #62 and others

Figure 5.2. Design of the back-to-back evaluation and impact assessment study



Several consultation activities fed into both the evaluation and the impact assessment part of the study, while still adhering to the separate analytical steps to be undertaken.

A key challenge in the study was to take into account diverging opinions and views on the merits of the Directive between different stakeholder groups and between Member States. The methodology aimed to address this by combining solid quantitative and qualitative evidence to allow for a robust and fair assessment of the Directive.

In line with the challenging timelines for the Study, an effective process to identify and screen available sources and literature was carried out. This built upon a comprehensive list of potential literature that was identified by the Commission, and from this the study further classified and categorised the existing evidence of relevance to the SUD evaluation and impact assessment, including statistical sources. This work ensured that the data collection strategy was effective and efficient (in particular to make clear knowledge gaps, identify methodological challenges and proposed solutions).

Task 3 - Desk research

This task involved the consolidation of information sources provided under the Terms of Reference of the study, as well as publicly available literature that was identified as being reliable and containing relevant information on the sustainable use of pesticides to underpin the evaluation, impact assessment and case studies.

Tasks 5, 6 and 7 relate to the evaluation of sustainable use information be it qualitative, quantitative or semi-quantitative (e.g. scores or Low/Moderate/High changes). Types of information gathered ranged from conceptual understanding of pesticides use, methods and tools (such as, analytical methods, quantitative indicators of change) to underpinning technical data (such as, approaches to IPM, water quality status, food prices, etc) and published case studies. Evidence of reported health effects, national monitoring schemes, incidents and complaints were gathered in Task 4 from targeted stakeholder consultations.

Following the consolidation of sources, the literature was then coded and categorised based on a number of parameters (i.e. tags) to help organise and operationalise the information for its use in both the evaluation and impact assessment.

Task 4 - Field research (stakeholder consultation strategy)

The field work task ran throughout the Study, with one single stakeholder consultation strategy covering both the evaluation and impact assessment, including both backward and forward-looking

questions. The consultation was targeted to each specific stakeholder group, to ensure that questions asked are relevant to the position of each group.

The field research comprised of targeted interviews, surveys targeted to different stakeholder groups, focus group discussions as well as validation workshops for both the evaluation and the impact assessment component of the study. The table below indicates the different consultation strategies and their timings.

Table 5.1. Consultation activities

Consultation method	Stakeholder activities/ groups	Dates	No. of responses	Part of the Evaluation or Impact Assessment
Targeted interviews	• EU Commission services and agencies • Member State authorities • International organisations • Consumer organisations • Economic stakeholders - PPP producers and distributors • NGOs • Research and Academia • Other economic stakeholders impacted by SUD • Workers organisations	5th-31st March 2021	53 interviews with 82 persons	Both
Targeted surveys (3)	• Survey questionnaire to Member States, Iceland and Norway SUD competent public authorities and related authorities	18th June-23rd July 2021	53 responses from 29 countries	Both
	• Survey questionnaire to professional users of PPP and other industry stakeholders	19th July - 27th August 2021	147 completed and 47 partially completed responses	
	• Survey questionnaire to environmental NGOs, Consumer Organisations and civil society organisations		21 completed and 11 partially completed responses	
Focus groups (6)	• Identifying environmental and human health impacts of the policy options	6th July 2021	2 EU institution representatives, 1 academic and 1 environmental consultant	Impact Assessment
	• Identifying impacts of policy options on non-EU countries (trade flows, sustainable farming practices, development)	7th July 2021	3 international institutions, 1 international private sector initiative and 1 academic	
	• Identifying macroeconomic impacts of the policy options		2 EU institution representatives,	

Consultation method	Stakeholder activities/ groups	Dates	No. of responses	Part of the Evaluation or Impact Assessment
			1 public research institute and 2 think tank representatives	
	• Identifying (microeconomic) costs of the policy options	N/A	Replace with targeted interviews	
	• Increasing the uptake of IPM (including enforcement) and monitoring of progress	1st Sep 2021	2 academics, 4 research institutes	
	• Contribution of drones and precision farming to reduction of pesticide risk and use	1st Sep 2021	2 academics, 4 research institutes	
Workshops (4)	• SUD Study – Validation Workshop on the evaluation and future revision of the SUD.	4th May 2021	59 participants	Evaluation (with implications for the Impact Assessment)
	• 2nd remote stakeholder event on the evaluation of the sustainable use of pesticides Directive 2009/128/EC and impact assessment of its possible revision[290]	25th June 2021	250 participants	Impact Assessment
	• 3rd remote stakeholder event on the evaluation of the sustainable use of pesticides Directive 2009/128/EC and impact assessment of its possible revision[3]	5th October 2021	220 participants	Evaluation and Impact Assessment
	• SUD Study – Validation Workshop on the evaluation and impact assessment findings of the SUD.	6th October 2021	79 participants	Evaluation and Impact Assessment
Public Consultation	• Public Consultation (PC) on the evaluation and impact assessment of Directive 2009/128/EC establishing a framework for community action to achieve the sustainable use of pesticides.	18th January - 12th April 2021	1640 responses across all stakeholder groups	Both

The collected qualitative and quantitative data fed into answering the evaluation questions and assessing impacts of policy options. The analysis processes are described in the following tasks.

[290] https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/food_safety_and_quality/documents/event_sante_pesticides_sud_20210621_agenda.pdf

The following table provides a list of the stakeholders that were consulted, specifically as part of targeted interviews.

Table 5.2. Consulted stakeholders as part of the targeted interviews

Stakeholder Category	Name
EU institutions, services and agencies	DG AGRI – Unit Greening, cross-compliance and POSEI (exploratory interview) DG ENV - Unit B2, Sustainable Chemicals (interview) DG SANTE - Unit E4, Pesticides and biocides and Unit G1, Plant health (interview) DG SANTE – Unit F3, Plants and organics (exploratory interview) EEA - Biodiversity and Nature (interview) EU-OSHA (interview) European Parliament - AGRI Committee secretariat (interview) Eurostat - Unit E1 Agriculture and fisheries (exploratory interview) JRC – Joint Research Centre (exploratory interview)
Member State Authorities	AT - Federal Ministry for Agriculture, Regions and Tourism (written communication) BE - Federal Public Service Public Health, Food Chain Safety and Environment - DG Plants, Animals and Food, Service Plant Protection Products & Fertilizers (interview) DE - Federal Ministry for Food and Agriculture (interview) DK - Ministry of Environment (interview) ES - Ministry of Agriculture, Fisheries and Food, Sub-directorate General for Plant and Forest Health and Hygiene (interview) and Ministry of Health, Consumer Affairs and Social Welfare (interview) IT - Ministry of Agricultural, Food and Forestry Policies (interview) NL - Ministry of Agriculture, Nature and Food Quality (interview) SE - Swedish Board of Agriculture (interview) LV - Plant Protection Department (interview) PL - Ministry of Agriculture and Rural Development (interview) HU - Ministry of Agriculture (interview) HR – Ministry of Agriculture (interview) FR – Ministry of Food and Agriculture (interview)
International organisations	FAO (interview)
Pesticide users	CEETTAR - European Organisation of Agricultural, Rural and Forestry Contractors (exploratory interview) CEJA - European council of young farmers (interview) CIBE - International Confederation of European Beet Growers (interview) COLEACP- Europe-Africa-Caribbean-Pacific Liaison Committee (interview)

Stakeholder Category	Name
	COPA-COGECA (exploratory interview)
	EIM - European Rail Infrastructure Managers (written communication)
	ELO - European Landowners' Organisation (interview)
	IFOAM - International Federation of Organic Agriculture Movements (interview)
Pesticide producers and distributers	CropLife Europe (interview and exploratory interview)
	ECCA- European Crop Care Association (interview)
Other industries impacted by the SUD	Bee Life - Bee Life European Beekeeping Coordination (interview)
	CEMA - European Agricultural Machinery Association (exploratory interview)
	COCERAL - European Association of cereals, rice, feedstuffs, oilseeds, olive oil, oils and fats and agro supply trade (interview)
	EurEau - European Federation of National Associations of Water Services (interview and exploratory interview)
	Europatat - European Potato Trade Association (interview)
	Euroseeds (interview)
	FRESHFEL - European Fresh Produce Association (interview)
	IBMA - International Biocontrol Manufacturers' Association (Exploratory interview)
	PROFEL - European Association of Fruit and Vegetable Processors (interview)
NGOs, research and academia	BirdLife (interview)
	EEB - European Environment Bureau (interview)
	Farm Europe (interview)
	PAN Europe - Pesticide Action Network Europe (interview and exploratory interview)
Consumer and worker organisations	BEUC - European Consumer Organisation (interview)
	EFFAT - European Federation of Food, Agriculture and Tourism Trade Unions (interview)

Task 5 - Qualitative analysis

The purpose of the Qualitative Data Analysis was to ensure that data collected through the different study activities (i.e. from the desk and field research, case studies, as well as from the results of the calculations and projections under Task 6 "Quantitative analysis") were analysed to provide robust answers to the study questions.

For the ex-post evaluation, the analysis focused on assessing data on the implementation of the provisions of the Directive and the desired and actual outputs, results and impacts – and the causality between them. For the impact assessment, the focus was placed on describing the intended changes and the expected impacts. As in all evaluations, the assessment was to some extent steered by data availability. Thus, the analysis, in parts, relies on available indicators, proxies and other approximations. In those cases, an assessment was undertaken if the analysis of the available data allows for drawing conclusions and what the limitations are.

To provide for a sound basis for answering the evaluation questions and in order to validate the findings from different sources, structured triangulation of the qualitative data sources was undertaken. Through the triangulation, a conscious effort was made to state clearly to what degree findings are based on opinions and/or objective facts and to what extent different sources of information support or contradict the findings.

Importantly, the only findings that were included are those supported by a minimum of two different stakeholder types and a minimum of two respondents within each group, or alternatively two types of data sources. Furthermore, this was tested by cross-checking with findings derived from the other analytical tools, to compare, contrast and identify trends. Findings were also supported by the use of descriptive statistical analysis such as frequency, tendency and bivariate relations where appropriate.

Task 6 - Quantitative analysis

The purpose of Task 6 was to use indicators and metrics – primarily based on product use and risks - to compare policy options for pesticide reduction targets announced in the Farm to Fork and Biodiversity strategies that could be implemented and monitored in an updated SUD.

The starting point for Task 6 was the conceptualisation of the chains of impacts (or logic chains) describing potential policy options mapped in Task 5 to underpin this quantitative analysis task. Information gathered in Tasks 1-4 were used to identify material changes and value in qualitative (Task 5), semi-quantitative or fully quantitative (Task 6) impacts and benefits. Indicators for the measurement of costs, benefits and trade-offs were identified following Task 4. Due to data constraints, **semi-quantitative assessment** was often utilised by which impacts across the range of indicators defined for each sustainability dimension (economic, environmental and social, including human health) were estimated in terms of their anticipated percentage change relative to their baseline.

Full quantification of impacts would involve significant data gathering, processing and analysis to a level that exceeds the time and resources that could be reasonably allocated to this task based on the proportionality principle, and therefore modelling was considered to be beyond the scope of this Impact Assessment (although the published outputs from existing models[291] were taken into account).

Task 7 - Options comparison

Once the impacts of each of the relevant policy options and sub-options were identified and analysed, the next step involved a comparison of those based on their relative strengths and weaknesses. The aim of the comparison is to see if one or more policy options stand out above the others. The study principally used multi-criteria analysis (MCA) as the main tool to compare policy options.

MCA is a technique for making a comparative assessment of alternative projects, options or heterogeneous measures. With this technique, several criteria can be taken into account simultaneously in a complex situation. Essentially, it applies cost-benefit thinking to cases where there is a need to present impacts that are a mixture of qualitative, quantitative and monetary data, and where there are varying degrees of certainty, as well as difficulties with the quantification of some effects. The approach that was applied ensures that the option comparison is transparent, auditable and objective.

[291] The outputs from environment, health economic or climate models, where these relate to pesticide use, may be used to illustrate potential future indicators or case studies, for example.

The option comparison comprises the following steps:

1. Define the comparison criteria that present the relative strengths and weaknesses of each policy option (see Table 5.3 below)
2. Select the type of MCA be based on the type of data which needs to be compared (quantitative, qualitative or mixed) and on the approach that will be taken towards compensability
3. Define the scoring system and weights to ensure objectivity and comparability across different policy options
4. Perform a sensitivity analysis on key variables in order to determine whether they are critical or not
5. Develop an appraisal summary table to analyse and interpret the results.

Table 5.3. Overview of criteria for comparison and their data sources

Criterion	Definition
Effectiveness	The extent to which different options would achieve the general and specific objectives of the SUD. This also takes into account targets and timeframes defined in the objectives as well as the effectiveness in contributing to achieving the pesticide reduction targets identified in the Farm to Fork and Biodiversity strategies.
Efficiency[292]	An analysis of the net benefits of the impacts, i.e. comparing the benefits and the costs
Coherence	The coherence of each option with the overarching objectives of EU policies
Trade-offs and synergies	Identifying the trade-offs and synergies (e.g. among various stakeholder groups)
Proportionality	Assessing the proportionality of different options
Subsidiarity	Assessing the compliance with the subsidiarity principle of the different options

Task 8 - Case studies

The Study Team designed and conducted seven case studies of specific topics or themes, with a focus on implementation, application, and enforcement. Through the focus on SUD provisions the case studies have a strong evaluative perspective by analysing in selected Member States how the provisions have been implemented, the established effects of actions and potential barriers and drivers, contextual factors etc.

Case study design

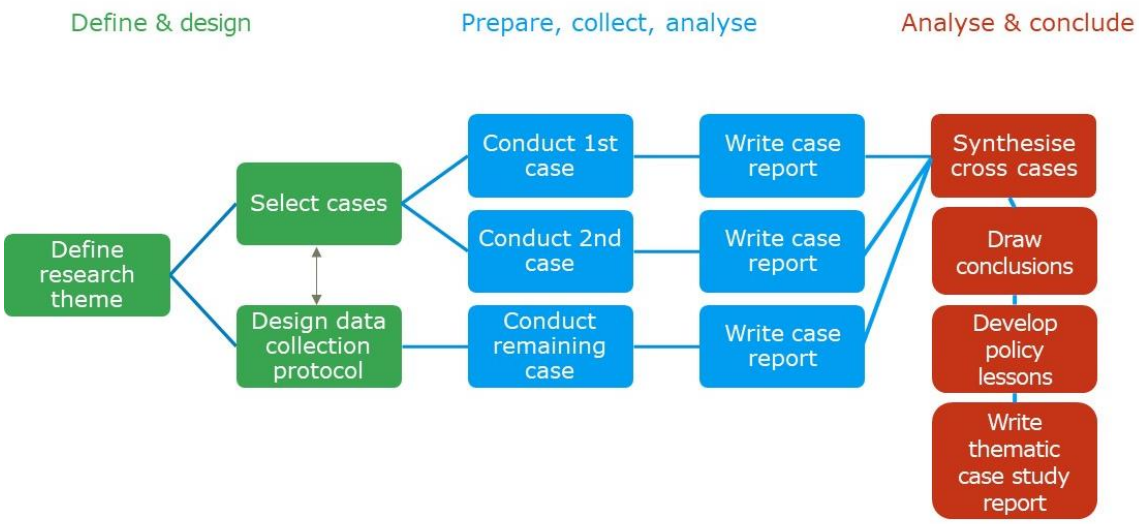
In terms of design, the Study Team undertook a multiple unit case study design, e.g. the case studies are either topical or thematic, and each case study entails several units of observation. This approach is illustrated in the following figure below.

The selection of Member States used to illustrate a case study depends upon the topic of the case study and heterogeneity aspects related the following complementary sets of criteria:

- A balanced geographical representation across the EU 27 Member States;
- A balanced split between old Member States and new Member States (the ones that accessed the EU post-2004);
- The importance of crop production associated to volumes of sales of PPPs;
- Holding typology;
- The level of implementation of the SUD; and,
- The themes of case studies.

[292] Alternatively, in case benefits cannot be monetised in a satisfactory way, the extent to which objectives can be achieved for a given cost (cost effectiveness)

Figure 5.3: Case study process



Source: Yin, 2009

Based on the desk research performed during the inception stage, the selection of the case studies per Member State are presented in the table below.

Table 5.4 Selection of Member States covered by case studies

Selection criteria	Member State selection for case studies
General criteria	
Importance of crop production	High (FR, DE, ES), Average (BG), Low (AT, BE, IE)
Volumes of sales of PPPs	High (FR, DE, ES), Average (AT, PL), Low (DK, IE)
Evolution of sales of PPPs	Increase (FR, BG, AT), Stable (IE, DE, ES), Decrease (DK)
Holding typology	Majority large farms (FR, DE, BE, NL, DK), Average (ES, PT), Majority small farms (BG, PL)
Level of implementation of the SUD	High (BE, DE, DK, NL), Average (FR, PL, AT), Low (ES, BG, IE)
Case study theme and selection	
NAPs	AT, BE, BG, IE, PL
IPM	FR, DE, DK, BE, NL
Pesticide application equipment	NL, ES, BG, PL, FR
Water protection	ES, BE, BG, PL, NL
Governance	BG, DK, FI, IT
Additional measures	DK, SE, FR, NO, EL, HU, CH
New technologies and alternative techniques	FR, DE, ES, NL, PL
Use of statistics	DK, FR, PT

This selection takes into consideration the heterogeneity for each selected criterion in order to be as representative of all EU situations but consider also the need to have a rational approach due to the time restrictions of the Study.

Deliverables of Task 8

As mentioned above, a total of seven case studies were undertaken to inform the evaluation on specific SUD provisions and identify additional measures and good practices. Following data

collection and field research (Tasks 3 and 4) and analysis, the case studies are reported in seven case study reports and a combined summary report.

Task 9 – Conclusions

Under this task the aim was to produce conclusions for the reporting in the Study. Following all of the results from the evaluation and impact assessment being triangulated and analysed (see task 5), and answers to the evaluation and impact assessment questions being produced, the Study Team formulated conclusions at the level of the evaluation criteria of relevance, coherence, implementation, effectiveness, efficiency, EU added value and sustainability of the SUD.

Appendix 4: BACKGROUND TO THE SUSTAINABLE USE DIRECTIVE, ITS INTERVENTION AND OBJECTIVES

BACKGROUND TO THE SUSTAINABLE USE DIRECTIVE, ITS INTERVENTION AND OBJECTIVES

Pests (insect pests, diseases, weeds, and others) can reduce crop yields and crop quality; therefore, crop protection measures are often necessary to prevent economic losses and ensure food security. Currently, crop protection in the European Union (EU) relies heavily on the use of plant protection products (PPPs). About 360,000 tonnes of active substances contained in PPPs, of which the major parts are of chemical nature, are being used in the EU every year. Since 2011, the total volume of sales of PPPs has remained stable despite political efforts to reduce their use, but volumes of low-risk active substances have increased[293]. In addition, land use for agricultural production has remained stable with an increasing trend for organic farming (an increase of 46% between 2012 and 2019)[294].

Since PPPs (pesticides as regards this project, unless otherwise specified) may have harmful effects on the environment and human health, they are strictly regulated at EU level. The 'EU pesticide package' includes three main pieces of legislation covering the complete lifecycle of a PPP, starting from the approval of the active substance contained in pesticides, the placing on the market through Regulation (EC) No 1107/2009[295], moving to the framework Directive for Community action to achieve the sustainable use of pesticides (Directive 2009/128/EC)[296], and ending with the Maximum Residues Limits (MRLs) Regulation (EC) No 396/2005[297]. Figure 5.4 illustrates this process.

Figure 5.4 The regulatory lifecycle of a Plant Protection Product

Source: DG SANTE, 2018

The **placing on the EU market of pesticides** (authorisation and production phase) has been regulated for 40 years, and currently takes place under the Plant Protection Products Regulation (Regulation (EC) 1107/2009[298]). Directive 91/414/EEC introduced the principle of risk assessment for approval of pesticide active substances. This principle was modified by the introduction of Regulation (EC) 1107/2009, which applies hazard, the intrinsic toxicity of the active substance, rather than risk, the potential for hazard to occur, as approval criterion.

[293] No detailed statistics available as regards the volumes of low-risk active substances used.

[294] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Organic_farming_statistics#Total_organic_area

[295] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC

[296] Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides

[297] Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC.

298 Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC.

The main legal act governing the consumption phase is Regulation (EC) 396/2005[299] which establishes the rules for the setting and the review of **maximum residue levels (MRLs)** for pesticides to be found in food and feed products at European level.

A regulatory framework for **pesticide use** (use phase) as lifecycle stage between authorisation and residue in products for consumption was established with the Directive 2009/128/EC (Sustainable Use Directive, short SUD), which is the subject of this study.

The 'pesticides package' from 2009 is completed by two more legal acts:

- Regulation (EC) 1185/2009[300] concerning **statistics on pesticides**. This regulation aims at collecting statistics on pesticide use and pesticide sales in order to calculate the harmonised risk indicators which are necessary to measure progress in meeting the main objective of the Directive. The data to be used for the calculations shall be statistical data collected in accordance with Regulation (EC) No 1185/2009, and other relevant data; and,
- Directive 2009/127/EC[301] with regard to machinery for pesticide application. Under the Machinery Directive, manufacturers of machinery must fulfil certain essential requirements for the protection of the health and safety of persons and, where appropriate, domestic animals and property. These provisions add essential environmental protection requirements for the design and construction of new machinery for pesticide application, leading to an optimal use of pesticides and therefore aiming at contributing to reduction of pesticide use and risks.

Despite very strict legislation, the high pesticide use has led to increasing concerns about the related impact on the environment and human health. Pesticide use has also become a topic of the societal debate across the EU and is one of the main causes of controversy between farmers and the civil society, who perceives pesticides as a severe risk to public health[302].

The use of pesticides has received considerable attention in the EU over the last 20 years, first within the framework of the Thematic Strategy (2006) setting the ground for the sustainable use of pesticides. It was the culmination of a long period of development and consultation set in motion in 2002 by the Sixth Environmental Action Programme (6th EAP)[303] and operates alongside the 2009 Plant Protection Product Regulation.[304] The goal of the strategy was to fill the gaps regarding 'the use-phase of pesticides at EU level through setting minimum rules for the use of pesticides in the Community'.[305]

The problem underlying the establishment of the SUD therefore can be summarised as the risk for the environment and human health that arises from the use of pesticides by using these products for protecting the health of crops[306]. Harmful effects from pesticides

[299] Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC.

[300] Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides.

[301] Directive 2009/127/EC of the European Parliament and of the Council of 21 October 2009 amending Directive 2006/42/EC with regard to machinery for pesticide application

[302] Eurobarometer 2019, EFSA

303 European Parliament and Council Decision No 1600/2002/EC laying down the Sixth Community Environmental Action Programme [2002] OJ L242/1. Prior to this launch, the Commission had been collaborating on a project to develop a 'Framework for the Sustainable Use of Plant Protection Products' since 1992 <http://ec.europa.eu/environment/archives/ppps/history.htm>.

[304] Confirmed by the Seventh Environment Action Programme (7th EAP) sets, in 2013, the objective, that by 2020 the use of plant protection products should not have any harmful effects on human health or unacceptable influence on the environment, and that such products should be used sustainably

[305] Expert Group on the Thematic Strategy on the Sustainable Use of Pesticides, mandate, 2009, p.1.

[306] European Commission (2006). COM(2006) 372 final. A Thematic Strategy on the Sustainable Use of Pesticides

that do not reach their target organism but instead are introduced to water, soil or food and feed products were aimed to be prevented by reducing the risk of such spread.

In order to address this problem, the SUD contains aims at achieving two main objectives:

- **Achieving a sustainable use of pesticides** in the European Union (EU) by reducing the risks and impacts of pesticide use on human health and the environment, and
- **Promoting the use of Integrated Pest Management (IPM)** and of alternative approaches or techniques such as non-chemical alternatives to pesticides.

While not explicitly elaborated in the Directive itself and while the term 'sustainable use' is not defined by the Directive, the provisions of the SUD together with the underlying thematic strategy describe further specific objectives to guide the regulatory framework on the use of pesticides:

- Achieving a sustainable use of pesticides consistent with crop protection needs, including promoting the use of integrated pest management (IPM) aiming at reducing dependency on pesticide use, crop management practices and alternative approaches or techniques such as non-chemical alternatives to pesticides;
- Complementing existing EU pesticide legislation by addressing the use phase;
- Improving the behaviour and practices of pesticide users;
- Improving the accuracy of pesticide application equipment; and
- Improving monitoring of pesticide use and of the associated risks.

These objectives are reflected in the intervention logic in Appendix 1, as starting point for the actions foreseen by the Directive. In order to achieve these objectives, the SUD foresees two main sets of measures as described below.

Observation measures that support the collection and systematic analysis of information on pesticide sales and use in Member States and on the EU level to monitor progress and be able to review actions. This stream of actions aims to enable an effective design of specific instruments in the second stream, the action measures.

Action measures comprise a larger set of instruments that Member States are required to establish in order to reduce the environmental and human health risks associated with pesticide use and achieve the specific objectives. Depending on existing national instruments and characteristics of the pesticide use in a Member State, the Directive gives the flexibility to implement the actions in the most effective and efficient way. The plan for national implementation of the actions is presented by each Member State in a National Action Plan (NAP) that establishes timetables, measures, targets, and indicators to achieve the objectives. In this way, the NAPs create a link from the action measures to the observation measures. The mechanisms established at the national level then apply to pesticide users who benefit from, for example, training, certification, inspections of equipment and information on alternative solutions to be able to apply pesticides more sustainably with reduced risk and positive effects on the environment and human health compared to the status quo situation. Further action measures to achieve a sustainable use of pesticides are illustrated in the intervention logic.

The visualization presented in Appendix 1 represents the current logic of intervention with additional elements originating from EU strategies published as a result of the Green Deal. These have not been within the scope of the SUD so far and therefore do not form part of the evaluation. Instead, they guide the assessment of impacts of potential future policy options.

Appendix 5: STATUS QUO AT THE TIME OF IMPACT ASSESSMENT

STATUS QUO AT THE TIME OF IMPACT ASSESSMENT

This section assesses what actions the implementation of the SUD triggered across the EU. This was done in a comparative analysis of the status quo before the implementation of the Directive[307] and the provisions in the final text of the SUD. The analysis results in an overview of legislative changes (or actions) that Member States (or sub-sets of Member States) had to implement.

This overview is crucial for contextualising the results of the evaluation.

Art 4: National action plans

Before the SUD several Member States had already established national plans to manage hazards and risks associated with the use of pesticides for many years and some others, on the basis of the Communication 'Towards a Thematic Strategy on the Sustainable Use of Pesticides'[308] have had more recently developed or launched the development of NAPs. The IA of the Thematic strategy on the sustainable use of pesticides[309] highlights the Member States DK, SE, NL as already having a NAP in place and the Member States BE, DE, FR as discussing it based on the Communication on the Thematic Strategy.

The SUD introduced the requirement for all Member States to produce NAPs and also defined minimum requirements in terms of content.

Thus, the SUD prompted the following additional legislative measures to be taken across the EU:

- All Member States need to prepare NAPs including minimum requirements in terms of content, including:
  - Information on implementation of other Articles of the SUD (Art5 – Art15)
  - Timetables and targets for the reduction of use, in particular if the reduction of use constitutes an appropriate means to achieve risk reduction with regard to priority items. These priority items are identified by Member States and include e.g. active substances, crops, regions or practices, that require particular attention.
  - Member States may include in their NAPs provisions on informing persons who could be exposed to the spray drift (Art10).

Art5 and Art6: Training and certification for advisers, distributors and users of pesticides as well as sales of pesticides

Before the SUD was implemented, most EU25 Member States already had training and certification schemes in place; in 17 Member States this included compulsory schemes and in 6 Member States voluntary schemes. In countries with compulsory schemes, usually all groups like retailers, distributors, farmers and other users were concerned. The schemes varied widely in terms of repeating frequency, spanning from every 2 years (in CY) to one-off schemes in which no renewal of training and certification was required.[310]

[307] Based on information provided in the BiPRO (2004) Final Report; Assessing economic impacts of the specific measures to be part of the Thematic Strategy on the Sustainable Use of Pesticides. And the European Commission (2006) Impact Assessment of the Thematic strategy on the sustainable use of pesticides.

[308] European Commission (2006). Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - A thematic strategy on the sustainable use of pesticides COM (2006) 372

[309] European Commission (2006). Directive of The European Parliament and of The Council establishing a framework for Community action to achieve a sustainable use of pesticides. COM(2006) 373 final

[310] BiPRO (2004). Final Report; Assessing economic impacts of the specific measures to be part of the Thematic Strategy on the Sustainable Use of Pesticides, Figures 9-1 and 9-2.

As per SUD (Art5; enforcement date 2013) all Member States need to ensure that all professional users, distributors and advisors have access to appropriate training by bodies designated by the competent authorities and that certification systems are in place for those user groups; that trainings (and certification) are renewed; and defines minimum standards for the content of trainings (i.e. subjects listed in Annex I of the SUD). In addition, Art6 (enforcement date 2015) of the SUD prescribes that distributors have sufficient certified staff in their employment and that professional users can only purchase pesticides if they are certified as per Art5.

Thus, the SUD prompted the following additional legislative measures to be taken across the EU:

- Mandatory schemes are established in all Member States for all user groups in those that did not already have them in place.
- The need for renewal of training and certifications need renewal which was not the case in all Member States before. However, it should be caveated that the SUD does not prescribe specific or minimum intervals for renewals.
- The establishment of minimum criteria for training content. It should be noted, however, that no information is available on the content of trainings/certification before the implementation of the SUD.

Art7: Awareness raising

In 2005, a Eurobarometer survey[311] found that pesticides were the second most important factor to cause worry in EU citizens in relation to food. However, even at second most worrying, only 14% of respondents mentioned this factor. No information is available on existing legislation in the Member States regarding this point. The SUD introduced (Art7) the following provisions additional legislative measures to be taken across the EU:

- Provision of information to the general public on the risks and the potential effects of pesticides on human health, non-target organisms and the environment, and on the use of non-chemical alternatives.
- Member States must also put in place systems for gathering information on pesticide acute and chronic poisoning incidents.

Art8: Inspection of spraying equipment

Before the SUD, only ten Member States of the EU25 had established a compulsory control system for pesticide application equipment and seven have introduced inspection schemes on a voluntary basis.[312]

The SUD, Art8, mandates that pesticide application equipment in professional use must be inspected at regular intervals (every 5 years before 2020, after that every three years). It also defines minimum requirements (Annex II of the SUD) to be verified by inspections. In addition, it requires Member States to establish certificate systems designed to allow the verification of inspections and recognise the certificates granted in other Member States.

Thus, the SUD prompted the following additional legislative measures to be taken across the EU:

- Eight Member States had to establish a new control/certification system.
- Member States with existing control/certification systems had to adapt their existing systems to meet the requirements of the SUD, including intervals and minimum requirements. No

[311] European Commission (2005). Special Eurobarometer 238. Risk Issues on Food Safety. Available at: https://www.efsa.europa.eu/en/corporate/pub/eurobarometer05

[312] BiPRO (2004). Final Report; Assessing economic impacts of the specific measures to be part of the Thematic Strategy on the Sustainable Use of Pesticides. Figures 10-1 and 10-2.

information is available on the intervals in which testing had to be conducted and the minimum requirements prior to the SUD.

- Member States had to establish certificate systems designed to allow the verification of inspections and recognise the certificates granted in other Member States. No information is available on existing certification systems and standards prior to the SUD.

Art9: Aerial spraying

Before the SUD was implemented, there existed no harmonised European wide regulation for aerial spraying. The situation in the EU 25 Member States varied between a total ban (in EE and SI) and no restriction at all in Malta. Some Member States had a ban with exceptions in place (6 Member States) but the majority of Member States regulated spraying through a range of measures including compulsory prior authorisation, training of pilots, restrictions to crop types and/or guidelines for best practice.[313]

The SUD thus was the first EU-wide legislation on aerial spraying. It banned aerial spraying as of 2009 (Art9); derogations are possible in special cases and the Member States are in charge of defining their own conditions of what those special cases are. However, in order for a derogation to be granted a number of minimum requirements need to be met, incl. that it requires prior authorisation, that pilots have received training and are certified, that there are no viable alternatives, or that (as of 2013) the aircraft needs to be equipped with the best available technology to reduce spray drift. Member States are not legally obliged to inform the Commission on derogations.

Thus, the SUD prompted the following additional legislative measures to be taken across the EU:

- It imposed a ban (with exceptions) in MT where prior to the SUD no regulative measures existed.
- It introduced harmonised minimum requirements for derogations across the EU which, among others, led to:
  - 10 additional Member States requiring a prior authorisation
  - 11 additional Member States requiring training and certification of pilots
- It introduced additional minimum requirements across the EU, including that it needs to be ensured that there are no viable alternatives and that the aircraft needs to be equipped with the best available technology to reduce spray drift. It should be noted, however, that no information is available on the extent to which those requirements might already have been in place in certain Member States prior to the SUD.

EE and SI have maintained their total ban on aerial spraying.

Art11: Protection of water

Before the SUD, several Member States of the EU25 have already had specific risk reduction measures in the form of existing legislation for the protection of water from impacts of pesticides in place. As part of the 2004 IA support study, the status of only 17 Member States was assessed. However, the assessment showed that of those 17 Member States a total of 14 had such legislation in place. Of those 14, ten had established buffer stripes besides surface water, seven have established other risk mitigation measures besides surface water (e.g. hedges) and six Member States referred to the use of special equipment with reduced diffuse emissions. Financial support programmes for farmers who implement measures for water protection were established in about half of the eleven Member States that provided information with respect to this question.

[313] BiPRO (2004). Final Report; Assessing economic impacts of the specific measures to be part of the Thematic Strategy on the Sustainable Use of Pesticides. Figures 6-1 and 6-2.

Under the SUD, Member States have to take specific measures to protect the aquatic environment and drinking water (Art11). These have to include giving preferences to pesticides that are not classified as dangerous for the aquatic environment and to the most efficient application techniques (low-drift equipment), especially in vertical crops like orchards. Also, the use of mitigation measures which minimise the risk of off-site pollution like establishment of buffer zones should be taken

Thus, the SUD prompted the following additional legislative measures to be taken across the EU:

- Several Member States had to amend legislation to include the protection of water from impacts of plant protection products

Art12: Reduction of pesticide use or risks in specific areas

The SUD states (Art12) that Member States need to ensure that the use of pesticides is minimised or prohibited in certain specific areas. This includes public parks, sports, school, and recreation grounds. It also includes protected areas under the Water Framework Directive[314] 2000/60/EC or other areas identified for the purposes of establishing the necessary conservation measures in accordance with the provisions of the Birds[315] and Habitats[316] Directives. Low-risk plant protection products and biological measures must be considered as a first choice.

When the SUD was introduced, most Member States had already defined zones with restrictions or a ban for the use of pesticides, with the exception of CY, IE, and MT.

Thus, the SUD prompted the following additional legislative measures to be taken across the EU:

- Three Member States (CY, IE and MT) introduced provisions on reducing use of pesticides is minimised or prohibited in certain specific areas.
- It introduced provisions on reduction or prohibition of pesticides in areas such as public parks, sports, school, and recreation grounds. It should be noted, however, that no information is available on the extent to which those requirements might already have been in place in certain Member States prior to the SUD

Art13: Handling and storage of pesticides and treatment of their packaging and remnants

The IA of the Thematic strategy on the sustainable use of pesticides[317] highlights that before the SUD it was standard practice across most Member States to either introduce empty pesticides packaging and unused products into the classical waste stream, or even to abandon them in the field or to burn them. It, however, also mentions that in some Member States different systems for collecting used packages and obsolete pesticides were introduced in some Member States at that point in time.

The SUD prompted (Art13) the following additional legislative measures to be taken across the EU:

- Member States have to adopt measures to ensure that handling of pesticides by professional users and where applicable by distributors do not endanger human health or the environment
- Member States have to ensure that storage areas for pesticides for professional use are constructed in such a way as to prevent unwanted releases.

[314] European Commission (2000). Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

[315] European Commission (2009). Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

[316] European Commission (1992). Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

[317] European Commission (2006). Directive of The European Parliament and of The Council establishing a framework for Community action to achieve a sustainable use of pesticides. COM(2006) 373 final

Art14: Integrated pest management

The SUD mandated that Member States must take all necessary measures to promote low-pesticide input pest management (Art14), giving priority to non-chemical methods. This includes IPM as well as organic farming. They should establish or support the establishment of necessary conditions for the implementation of IPM, in particular they shall ensure that professional users have at their disposal information and tools for pest monitoring and decision making, as well as advisory services on integrated pest management. This implementation was supposed to be reported to the Commission by 30 June 2013. The eight general principles of IPM, as described under Annex III of the SUD, had to be implemented by all professional users by 1 January 2014.

The assessment of a before/after situation is challenged by the fact that no common understanding of IPM existed before the SUD. It is thus unclear to what extent IPM, its implementation and support were covered at Member States level before the implementation of SUD. The SUD, while not providing a legally binding definition, introduced a set of eight general principles of IPM, as described under Annex III of the SUD, which had to be implemented by all professional users by 2014.

Thus, the SUD prompted the following additional legislative measures to be taken across the EU:

- Member States must take all necessary measures to promote low-pesticide input pest management, giving priority to non-chemical methods.
- Member States should establish or support the establishment of necessary conditions for the implementation of IPM, in particular they shall ensure that professional users have at their disposal information and tools for pest monitoring and decision making, as well as advisory services on integrated pest management. Introduction of a common understanding of what constitutes IPM (the eight general principles)

Art15: National harmonised risk indicators

The SUD introduced (Art15) the following provisions additional legislative measures to be taken across the EU:

- Member States have to calculate harmonised risk indicators by using statistical data collected in accordance with the Community legislation concerning statistics on plant protection products together with other relevant data. However, neither the active substances nor the indicators are specified, leaving it open for the Member States to decide.
- Member States have to identify trends in the use of certain active substances.
- The EC has to calculate risk indicators at Community level by using statistical data collected in accordance with the Community legislation concerning statistics on plant protection products and other relevant data, in order to estimate trends in risks from pesticide use. Those harmonised risk indicators have been introduced in 2019 through a separate Directive.[318]

[318] European Commission (2019). Commission Directive (EU) 2019/782 of 15 May 2019 amending Directive 2009/128/EC of the European Parliament and of the Council as regards the establishment of harmonised risk indicators

Appendix 6: BIBLIOGRAPHY

BIBLIOGRAPHY

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