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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 MS on the impacts of use of plant protection products on human health and the environment

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Final report

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This report has been prepared by the FCEC at the request of European Commission. The views expressed are those of the Consultant.

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Food Chain Evaluation Consortium
Civic Consulting – Bureau van Dijk – Arcadia International – Agra CEAS

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Key messages from the study

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ACP	Advisory committee on pesticides (UK)
ADEME	Agence de l'environnement et la maîtrise de l'énergie (FR)
ADI	Acceptable daily intake
ANSES	Agence nationale de sécurité sanitaire (FR)
ARC	Awareness raising campaign
ARfDs	Acute reference dose
a.s.	Active substance
BLE	Office for agriculture and food (DE)
BMELV	Federal ministry of food, agriculture and consumer protection (DE)
BMGFJ	Ministry of health, family and youth (AT)
BVL	Federal Office of consumer protection and food safety (DE)
CA(s)	Competent authority(ies)
CC	Communication campaign
CAP	Common agricultural policy
CAPER	Concerted action pesticide environmental risk indicators
CELCAA	Comité européen de liaison des commerces agro-alimentaires
COCERAL	Comité du commerce des céréales, aliments du bétail, oléagineux, huile d'olive, huiles et graisses et agrofournitures
COM	European commission
COPA-COGECA	Comité des organisations professionnelles agricoles de l'union européenne - Confédération générale des coopératives agricoles de l'union
CPHR	Common plant health regime
CRD	Chemicals regulation directorate (UK)
CSREES	Cooperative state research, education, and extension service
DFR	Draft final report
DG	Directorate general
DG ESTAT	Eurostat
DG SANCO	Directorate general for health and consumer affairs
DPSIR	Drivers-Pressures-States-Impacts-Responses
DSS	Decision support system
DWD	Drinking water directive
HD	Hasse diagram
EAP	Environmental action plan
EC	European commission
ECPA	European crop protection association
EEA	European environmental authorities
EFSA	European food safety agency
EMAG	Environmental monitoring advisory group on pesticides
ENI	Effets non intentionnels – non-intentional impacts
ENVIR	DG environment
EP	European Parliament

EPA	Environmental protection agency
EPPO	European and Mediterranean plant protection organisation
ETR	Exposure toxicity ratio
EQS	Environmental quality standards
EU	European union
EVIRA	Finnish Food Safety Authority
EYP	Environmental yardstick
FA	Frequency of application
FASFC	Belgian federal agency for the safety of the food chain
FAO	Food and agriculture organization
FCEC	Food chain evaluation consortium
FEAP	5th environmental action programme
FSA	Food standards agency
FVO	Food and veterinary office
g	Gram
GIS	Geographical information system
GLOBALG.A.P	Global partnership for good agricultural practice
GM	Genetically modified
GMO	Genetically modified organism
ha	Hectare
HAIR	Harmonised environmental indicators for pesticide risk
HAPERITIF	Harmonised pesticide risk trend indicator for food
HBM	Human biomonitoring
HSE	Health and safety executive (UK)
IBMA	International bio-control manufacturers' association
ICP	International co-operative programme
INERIS	Institut national de l'environnement industriel et des risques
InVS	Institut de veille sanitaire (FR)
Ipest	Pesticide environmental impact indicator
IPM	Integrated pest management
IT	Information technology
KO	Kick off
NMI3	National milieu indicator (NL)
MRLs	Maximum residue levels
MS	Member states
NAP	National action plan
NCA	National communication association
NODU	Nombre de doses utiles – number of useful doses
NEPTUN	Network related to gathering of statistics on use of PPP (DE)
NRSP	National research support project
OJ	Official journal
OECD	Organisation for economic co-operation and development
ONCFS	Office national de la chasse et de la faune sauvage

OHP	Occupational health problems
OHS	Occupation and human safety
ONEMA	Office national des eaux et des milieux aquatiques
p-EMA	Environmental performance indicator of pesticides
PAHES	Pesticide adverse health effect surveillance system
PAN	Pesticide action network
PIAP	Pesticide incident appraisal panel
PERI	Pesticide environmental risk indicator
PLI	Pesticide load index
PPPs	Plant protection products
PRI	Pesticide risk indicator
PRIBEL	Pesticide risk indicator Belgium
RA	Risk assessment
RASFF	Rapid alert system for food and feed
RBD	River basin district
RBDU	River basin district sub unit
RDP	Rural development programme
RBMP	River basin management plan
REACH	Registration policy related to chemicals
RM	Risk management
RNV3P	French surveillance network in human health
RSBT	Réseau de surveillance biologique du territoire
SAGIR	Sanitary surveillance network for wildlife
SETAC	Society of environmental toxicology and chemistry
SUD	Sustainable use directive 2009/128/EC
SyPEP	System for predicting the environmental impact of pesticides
SYNOPS	Synoptisches Bewertungsmodell für Pflanzenschutzmittel (synoptic evaluation model for plant protection products)
SWOT	Strengths, weaknesses, opportunities, threats analysis
TC	Third countries
TEC	Treaty establishing the European community
TFI	Treatment frequency index
ToR	Terms of reference
WFD	Water framework directive
WG	Working group
WHO	World health organisation
WIIS	Wildlife incident investigation scheme

GLOSSARY

Active monitoring: Investigation aiming at analysing impacts of a specific product or active substance when use. Active monitoring are not experimental studies as they are conducted in large areas and not in replicated plots.

Awareness raising campaign: Awareness-raising campaign aims at attracting attention and generating public support – public awareness is always an important element whether seeking individual behaviour or policy change (or both).

Communication campaign: Communication campaigns are campaigns that use the media, messaging, and an organized set of communication activities to generate specific outcomes in a large number of individuals and in a specified period of time.

Ecological monitoring studies: Long-term species specific monitoring studies that are not usually designed to examine pesticide effects but rather to study the ecology of individual species. However pesticides effects may be detected when there are, for example, variations in regard to pesticide use or any obvious hints of causal effects.

Experimental studies: an experiment analysing the impact of a specific product or active substance applied under controlled conditions in the field. Such studies are performed in the natural environment within an agricultural context. Experimental studies are usually conducted with untreated controls and sometimes with reference treatments in replicated plots.

Incident investigation scheme: *see re-active monitoring.*

Monitoring - monitoring study: means conducting a planned sequence of observations or measurements with a view to obtaining an overview of the state of compliance with feed or food law, animal health and animal welfare rules. It can also been defined as an investigation into the overall impact of pesticide use on a specific ecosystem through surveying or monitoring that consists of characterisation of exposure (chemical monitoring, exposure modelling) and observations of effects (biological monitoring) occurring as a consequence of use and/or misuse of pesticides.

Pesticides: understood as plant protection products (PPP) in the sense of Regulation 1107/2009 in the context of this study. The study doesn't concern biocides.

Re-active monitoring (also called passive monitoring): A re-active monitoring scheme (or passive monitoring or incident investigation scheme) is defined as one that considers whether a deleterious event (e.g. death of a bird or mammal) results from the use of pesticide and, when evidence is gathered, whether it is attributable to the correct use, misuse, or abuse of a compound.

Risk indicator: means the result of a method of calculation that is used to evaluate risks of use of pesticides on human health and/or the environment (Definition from Directive 2009/128 – Article 3). In the context of this study, risk indicators concern only the PPP post approval phase.

Surveillance: means a careful observation of one or more agri-feed or agri-food businesses, feed or food business operators or their activities". It could reflect a more punctual "impact source" hence the control of specific consequences of a use of an individual PPP.

Key messages from the study

Monitoring activities	Programmes for monitoring the impacts of use of plant protection products are currently focused mainly on residues in the food chain and in water. Further studies are carried out by few Member States. Methodology and objectives of such studies vary between Member States. Monitoring is performed on a voluntary basis and is not harmonised which makes data comparison difficult. There is few exchange regarding information and data.
Analyses of cost-effectiveness of on-going activities	Few Member States have been able to detail the cost of the individual monitoring programmes carried out as these tend to be part of broader programmes (e.g. water monitoring) and, as such, costs are not generally calculated separately. At this stage, in the absence of a common metric or units of measurement, it is difficult to assess the cost-effectiveness of different programmes. Additionally a large number of projects have only been started recently, which means that so far in a majority of cases data on their efficacy and efficiency are not available.
Coordination among all involved actors	Due to the wide spectrum of activities, a number of different Competent Authorities may be involved in monitoring programmes in each Member State. Most Member States have at least three different authorities in charge of monitoring the impacts of use of plant protection products, hence the relevance of coordination, sharing of data and follow up. Audits are currently very limited with respect to efficiency of the monitoring programmes in place. Some Member States do not intend to include all monitoring and surveillance programmes addressing the impacts of pesticides use under their National Action Plan.
Risk Indicators	Regarding the development and use of risk/impact indicators two basic approaches have been identified: a) descriptive indicators aiming also at measuring progress in the achievement of the objectives of the Sustainable Use Directive and b) indicators based on theoretical models for the prediction of specific risks/impacts. Some Member States are currently making an inventory and a comparison of all the available indicators. The resulting data could be used as a basis for the upcoming European discussions.
Communication and awareness raising campaigns	Communication and awareness raising campaigns aiming at the reduction of the impacts of use of plant protection products use exist or are planned for the near future in most Member States. In the majority of cases, these are based on the creation and maintenance of an institutional website. In none of the communication plans that have been listed, target group segmentation is applied.

Executive Summary

This document represents the final report of the 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 (MS) on the impacts of use of plant protection products on human health and the environment*". The study aimed at identifying and collecting information on the systems that MS have developed and put in place with the objective to reduce the impact of use of pesticides on human health and the environment.

These systems relate to:

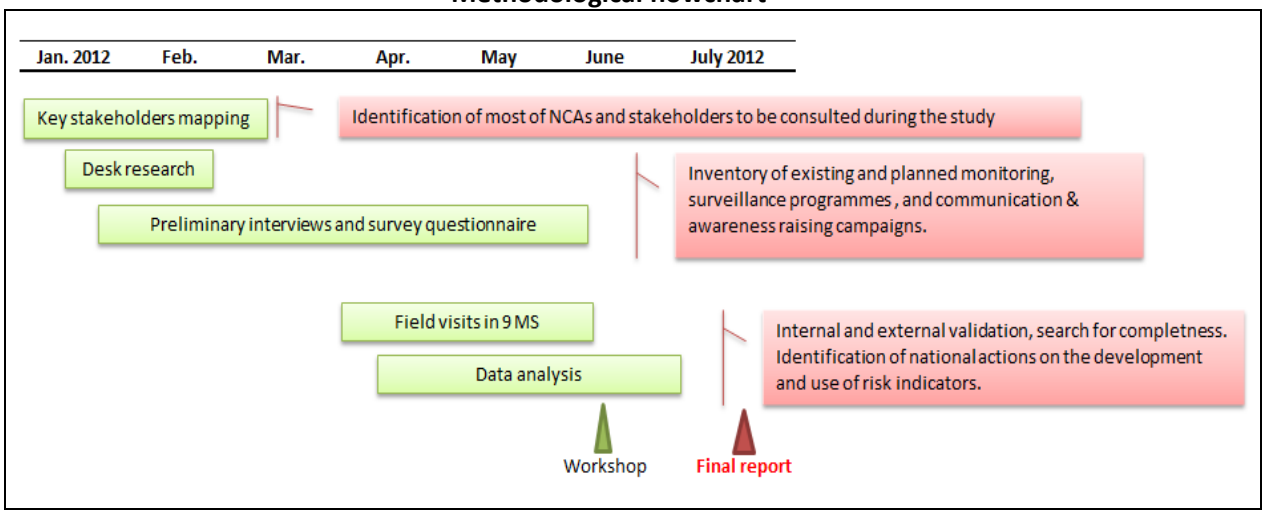
1. Programmes of surveillance and monitoring of impacts of use of Plant Protection Products (PPP) in the EU 27 MS;
2. Development of risk/impact indicators of use of PPP on human health and on the environment;
3. Communication of information on the results of monitoring actions to the general public and awareness raising programmes aiming at the reduction of the impact of use of PPPs.

The study was launched by the Directorate General for Health and Consumers in December 2011 in the context of the on-going implementation of obligations covered under the Framework Directive 2009/128/EC on the sustainable use of pesticides[1] and in preparation to the drafting of the strategic guidance document on monitoring and surveying of impacts of pesticide use on human health and the environment[2].

Methodology

The six months study started in January 2012.

Methodological flowchart



[1] Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides.

[2] Article 7(3) mentions that "*To enhance the comparability of information, the Commission, in cooperation with the Member States, shall develop by 14 December* (date has been modified to 26 November by corrigendum to Directive 2009/128/EC of 24 November 2009 published in the OJ L 161, 29.6.2010) a *strategic guidance document on monitoring and surveying of impacts of use on human health and on the environment*".

The project involved a combination of research tools and included several phases, as follows.

- **Key stakeholders mapping**: identification of relevant national competent authorities (NCAs) via a preliminary questionnaire ;
- **Desk research** to outline the current situation and to develop a detailed schedule of the issues to be explored during the study ;
- A large data gathering exercise from identified NCAs and main EU stakeholders through **preliminary interviews** and a **detailed survey questionnaire** that provided evidence to support the analysis ;
- A second consultation exercise consisting of in-depth interviews during **field visits carried out in 9 MS** ;
- **Data analysis** ;
- **Presentation of the draft results during an EU workshop** held in Brussels on 18 June 2012 that gave the opportunity for NCAs and main EU stakeholders to comment on the findings and to complete the data sets.

Limitations of the methodology

Due to the wide scope of the study and the complexity of the subject matter, the data collection process has been rather slow and difficult. Eventually, 18 out of 27 MS adequately replied to the survey. Inventories of programmes and activities that are presented in this report should not be considered as fully complete but they offer a robust baseline and a good overview of the current MS efforts. The financial data provided was not sufficiently detailed to perform a cost-effectiveness analysis.

Monitoring and surveillance activities

PPPs are subject to a thorough risk assessment prior to their approval for use and marketing. Such assessment results in the authorisation for use of PPPs which do not have any immediate or delayed harmful effect on human and animal health and any unacceptable effect on the environment.

After the assessment and authorisation phase, the impacts deriving from use should be monitored to verify that the actual circumstances of use do respect the terms assumed in the pre-authorisation phase and consequently confirm absence of any harmful or unacceptable effects.

The potential risks and impacts of use of PPPs are of different natures and can be grouped in two categories: impacts on human health and impacts on the environment. The impact of use of PPPs on human health can concern different population sub-groups which can be differentiated in terms of exposure and hazard sensitivity. With regards to risks and impacts on the environment, several protection goals and various organisms have to be considered (i.e. air, soil, water, birds, biodiversity, etc…).

In order to allow for a correct characterisation of the different national programmes the results of the study are presented on the basis of comparable groups as follows:

I. Monitoring and surveillance programmes addressing **environmental issues**:
   - Monitoring impact of use of pesticides in water ;
   - Monitoring impact of use of pesticides in air ;
   - Monitoring impact of use of pesticides in soil ;
   - Monitoring impact of use of pesticides on bees, birds, and mammals and other organisms ;
   - Monitoring impact of use of pesticides on biodiversity;

II. Monitoring and surveillance programmes addressing **human health issues**:
- Monitoring food and feed residues ;
- Gathering of information on pesticides acute poisoning and chronic poisoning ;
- Surveillance on operators and workers ;

III. **Other programmes**:
- Monitoring of derogation of aerial spraying ;
- Implementation of obligations of Article 67(2) of Regulation (EC) No 1107/2009 ;

  Activities related to the obligations of Article 68 of Regulation (EC) No 1107/2009 (monitoring and official controls including control of proper application of risk mitigation measures and possible monitoring activities deriving from conditions of approval on specific active substances.

I. Monitoring and surveillance programmes addressing **environmental issues**

Water: With regards to water quality, the main EU legal instruments are the Water Framework Directive (WFD) 2000/60/EC and the Drinking Water Directive (DWD) 98/83/EC which prescribe the implementation of monitoring programmes for the assessment of the status of surface water and groundwater in order to establish an overview of water quality within each river basin district. The Commission has published two reports in 2007 and 2009 that highlight that the large majority of the monitoring activities carried out under the River Basin Management Plan (RBMP) has as objectives to check whether the concentrations in the water environment are meeting the defined environmental quality standards (EQS). These programmes are related to the taking of samples and the analysis of their concentration of priority substances in water. The 2009 Commission's report concludes that "*in general terms, there is a good monitoring effort across the EU*". In addition to the EU mandatory RBMP, 6 MS have reported additional complementary actions in the form of checking concentration of additional PPP substances in water, ranging from a few to more than 140 additional substances.

Air: None of the MS that have answered to the general survey questionnaire has reported monitoring activities related to assessment of impact of use of PPP in air. Literature review shows that France appears to be the only Member State where actions have been taken to monitor air quality with respect to pesticides. The French risk assessment agency ANSES has recently published a scientific report on the general population exposure to pesticides residues in France which highlights the complexity of the issue especially when it relates to air pollution[3]. A large number of local studies have been conducted in France since 1980s for confined air and four studies have been carried out for atmospheric air. Protocols for sampling and measurements of pesticides in the air are very complex and may explain why MS have not engaged any monitoring activities in this field. No MS has indicated the intention to include air monitoring in its National Action Plan (NAP).

Soil: Soil contamination by several substances, of which pesticides, has been recognised as one of the main threats for EU soils[4]. In 2003, the EEA[5] made an inventory of national surveillance programmes for soils that highlighted that only 17 projects out of a total of 57 were considering organo-chemicals and pesticide substances. Priorities have not been put on PPP leading to the fact that the actual European Soil Portal does not integrate data on soil contamination by pesticides. The Joint Research Center is reporting actions related to the development of protocols and methodologies addressing soil threat issues but it appears that pesticides are not considered in these programmes. No

[3] ANSES, 2010, Exposition de la population générale aux résidus de pesticides en France. Available at: **http://www.observatoire-pesticides.gouv.fr/upload/bibliotheque/171959218396043870616875052847/ exposition_population_generale_pesticides_2010_vdef.pdf**
[4] (DG ENVIR communications, 2002).
[5] European Environment Agency

monitoring programmes targeting soil pollution by pesticides has been reported by MS during the study. Similarly to air, no MS has indicated its intention to include soil monitoring as a target in its NAP.

Honeybees: With regards to impacts of use of pesticides on honeybees, EFSA funded a study in 2009 of the assessment of bees mortality monitoring programmes in Europe that concluded that "*most of the results produced by the different programmes are difficult to use at a European level due to their lack of representativeness and an absence of uniform indicators and protocols to measure these indicators*". Recommendations were made to reinforce and harmonise national programmes and the indicators they generate, to use a common foundation for conducting analytical epidemiological studies over various countries and to appoint a specific scientific and technical team for supervision on the European level. These recommendations led to the creation of an EURL for bees and in the granting of an EU funding to support national monitoring studies and initiatives in order to identify real origins and impacts of diseases on colony losses. Very few MS have indicated an activity in this field via the general survey. Therefore, information that is presented hereafter is based on literature review and individual interviews with experts during the field visits. Three types of monitoring approaches have been reported. Re-active monitoring programmes in 7 MS in response to the EU obligations set up in 2010, voluntary monitoring programmes on seed treatment PPP in 4 MS and industry stewardship initiatives required by e.g. UK Chemicals regulation directorate (CRD).

Birds and mammals: In public scientific literature, many authors have highlighted that the organisation of monitoring activities in Europe seems to be limited with respect to birds and mammals. Only 2 MS (FR and the UK) have reported the existence of a specific monitoring programme dedicated to monitor the impact of use of pesticides on birds. Other programmes exist but the monitoring addresses several other biodiversity criteria and are mainly dedicated to survey dynamics of the population and the general health of birds rather than pesticides effects.

Terrestrial invertebrates: With respect to monitoring studies in post-authorisation phase on terrestrial invertebrates other than honeybees, there is a very limited activity. MS have not reported any re-active or active monitoring system for other terrestrial organisms.

Biodiversity: Not all monitoring activities aiming at reducing impacts of PPP on the environment fall under the categorisation presented above. The French authorities have decided to target biodiversity as a whole under their NAP called Plan Ecophyto 2018. A national active monitoring programme has been launched with the aim of monitoring four main biodiversity criteria (i.e. wild birds, earthworms, flora in the vicinity of cultivated fields and coleopteran) in farmers' fields. This programme is certainly the largest voluntary monitoring programme that has been set-up to date in the EU. First results will be published in late 2012 – early 2013. The number of biodiversity criteria to be monitored is expected to grow in the coming years if first results show value.

II. Monitoring and surveillance programmes addressing **human health issues**:

Pesticides residues in food and feed: The main monitoring and surveillance programmes addressing human health issues are those related to the monitoring of pesticides residues in food and feed. In order to meet the requirements of Articles 29, 30 and 31 of Regulation (EC) No 396/2005, each European reporting country[6] is conducting two annual monitoring control programmes: a national control/monitoring programme (designed by each country) and a coordinated European programme defined by the European Commission which gives clear guidance on specific control activities that have to be performed by each country. National programmes vary considerably between Member States as they are drawn up according to Member States' priorities. All data generated under the

[6] (EU 27 MS and EEA countries)

national and EU monitoring programmes are transmitted to the European Food safety Authority (EFSA) which draws up an Annual report on pesticides residues with very detailed trends analyses, including the exposure assessment of European consumers to pesticide residues via food. Three MS have also reported complementary voluntary initiatives as, to their opinion, detection frequency and number of Maximum Residues Level (MRL) exceedances can lead to unnecessary concern among consumers. In these programmes a balanced report is sought by considering the exposure to pesticides residues by matching results of the pesticides monitoring programmes with food consumption statistics.

Poisoning: MS have the obligation to 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 pesticides application areas[7]. The information collected during the study highlights the large differences and variability of schemes that actually exist in the EU as well as the complexity of these systems. MS that have answered the questionnaire can be grouped in 3 different categories:

a) MS that have in place an information platform to communicate on the risks of chemicals (including pesticides) and to inform on the symptoms, but that are not recording incidents ;
b) MS that have in place a help desk that could be contacted by phone or via a website but that have also implemented a system to record incidents via a poisoning reporting centre;
c) MS that have a help desk and an incident reporting system via the poisoning centre and that are trying to understand the origin of these incidents, therefore going further than just collecting statistics on incidents that are reported to the centre. These approaches range from simple investigations by phone to research studies performed by clinical experts.

Protection of users: With regards to health surveillance activities in the context of obligations from Directive 2004/37/EC and Directive 98/24/EC, only six specific programmes addressing protection of users of PPP have been reported by MS. Authorities from 8 MS have mentioned that no specific Occupational Health and Safety (OHS) under aspects of implementation of the SUD Directive is currently performed. Objectives of these programmes, targets and budgets are specific. They range from projects providing information to farmers about the PPP risks to measures to be taken for workers protection with a focus on the most hazardous operations to complete programmes including investigations, surveys and research studies to understand ill-health possibly caused by pesticides exposure.

III. **Other programmes**

Aerial spraying: No past, on-going or planned monitoring actions aiming at identifying adverse effects of impacts of use of PPP on health and the environment via aerial spraying has been reported during the study. In 2005, the French InVS (Institut de Veille Sanitaire) made an inventory of epidemiological studies on sanitary impacts of aerial spraying indicating that the large majority of them have been conducted outside the EU.

Post-authorisation monitoring requirements: Activities related to provisions of Article 67(2) and Article 68 of Regulation (EC) No 1107/2009 addressing post-authorisation monitoring requirement by the competent authority (CA) to authorisation holders and mitigation measures respectively are not

[7] Article 7(2) of Directive 2009/128/EC

new as they were already foreseen in the approval process under Directive 91/414/EEC. The number of specific requests sent to authorisation holders is rather low. France and Germany appear to be the only countries in which a significant number of requests have been asked (i.e. about 10% of the registered PPP in France).

Table 1: Level of harmonisation of monitoring and surveillance programmes measuring impacts of use PPP on environment and human health

Risk area	Compartments /sub-groups	EU DB	Harmonisation level (1= no harmonisation – 5 = Totally harmonised)				
			1	2	3	4	5
Environment	Water					■	
	Air		■				
	Soil		■				
	Bees, birds and mammals and other organisms			■	■		
Human health	Food and feed residues	*					■
	Acute and chronic poisoning				■		
	Operators and workers				■		
Others	Aerial spraying		■				
	Post-authorisation monitoring					■	

Source: Compiled by the FCEC

A general cross-cutting key challenge for Member States was identified as regards the question on how to use information on the presence of pesticides in different compartments which are:

a) Generated by diverse institutions and under the authority of different Ministries and authorities;

b) Generated with another focus and protection goal than the use of pesticides (such as water quality, food safety, etc.), and the focus is other than the sustainable use of pesticides

for the purpose of getting information for the status of sustainable use, possible priorities, and measurement of progress.

The particular tasks for Member States can be distinguished as follows:

a) Develop a strategic perspective / setting smart targets (define which data can be used as input for sustainable use and how they will be used);

b) Ensure that the existing relevant data can be accessed (i.e. installing suitable co-operation and data exchange infrastructure, checking of possible data protection problems);

c) Process the information in line with the strategic perspective (i.e. actually using data to generate findings for the purpose of sustainable use).

From the analysis of the replies to the survey and the field visits, it can be concluded that the approach of tackling these challenges is quite diverse in the Member States. In the consultant's view, the elaboration, review and further development of a National Action Plan, as established by the Sustainable Use Directive, will provide a useful tool not only for developing a strategic perspective, but also for establishing suitable communication channels across sectors and across MS.

The Third Countries analysis has not led to the identification of significant good practices that could be used in the EU context. The three countries (Australia, Canada, and the USA) are facing some similar challenges with respect to monitoring and surveillance of impacts of use of PPP, particularly that a number of different authorities from different policy fields are involved in monitoring and surveillance activities on the presence of pesticides in different areas; and that most of existing activities have specific protection goals, and the focus is another than the sustainable use of pesticides (e.g. water quality or food safety). It is not always obvious how such projects can

contribute to the knowledge about impacts of use of pesticides, or sustainable use in general. It should be emphasized that the efforts of those countries were not assessed with a view on obligations similar to those of the SUD Directive, since no such obligation exists at this stage. A number of major monitoring activities is actually done at the level of federated states or provinces and a national co-ordination body is not in place in any of the three countries – let alone an institution which is in charge of using the data for assessing the progress of sustainable use.

Risk/impact indicators: Problem definition and emerging results

The SUD Directive provides for harmonised pesticide risk indicators to be developed. These indicators should be able to measure and demonstrate progress in achieving the sustainable use of pesticides. However, even when EU harmonised risk indicators are defined, MS may continue to use their existing national indicators or adopt others in addition to the harmonised ones.

The large majority of interviewees met during the field visits recognised the need for common and harmonised EU indicators. However, they have all indicated challenges in developing risk indicators that can be applied throughout the EU 27 MS and which will actually indicate and describe the progress achieved regarding reduction of risks of pesticides. These main considerations led to the current situation in which two approaches coexist:

a) A few Member States are currently using several "**descriptive (national) indicators**" that are said to be able to measure progress towards the objectives of the SUD Directive, including risk and impact reduction during the use phase of PPP. The UK has already implemented this approach but measuring several single indicators for several years for different subject areas (environmental, health, social and economic).

b) The second approach considers the use of indicators that predict the potential risks of PPP which are based on **mathematical models**. These indicators are designed to calculate theoretical risks which are often linked to product properties. Less than 10 MS have been/are engaged in the development of such type of indicators. The HAIR research project which has been financed under the EU's 6th Framework Programme for Research and Development (R&D) led to the development of several risk indicators elaborated through specific IT tools to run the calculations. Eight MS, plus Norway and Switzerland, participated to the HAIR project.

The adoption of harmonised EU risk indicators at EU level will be subject to delegated acts rules (comitology). Interviewees have indicated that selection of these indicators should be advanced quickly and several MS have mentioned to be in a waiting position until harmonised indicators are adopted. They do not want to develop something that may overlap with the harmonised ones.

Both French and Danish authorities are currently making (or have recently finalised respectively) an inventory and a comparison of all available indicators. The results and outcomes of these studies should be used as a basis of the European discussions to come.

Communication and awareness-raising campaigns to the general public

As regards communication and awareness-raising campaigns to the general public, several Member States have or will soon establish web portal(s) to communicate on their actions regarding the reduction of impacts of pesticides.

Communications programmes that have been listed during the course of this study are generally including all actions (and not only monitoring ones) carried out by MS in promoting safe and sustainable use of pesticides. Reporting of results of monitoring and surveillance programmes are included in these general communication programmes.

The large majority of MS has mentioned that very little communication took place to date, but that strategies are currently under development for implementation by end of 2012 when the NAP is made public.

SWOT analysis

Strengths, weaknesses, opportunities and threats (SWOT) analysis[8] is a useful tool to complete the summary presented above as it helps developing a full awareness of the current situation for strategic decision-making.

[8] Strengths: internal features of the overall EU monitoring scheme(s) that have proved effective in addressing reduction of impacts of use of PPP (e.g. project components, methods and techniques for implementation, evaluation techniques, project staff and management, communication);
Weaknesses: internal features of the overall EU monitoring scheme(s) that have not proved effective in addressing negative impact of use of PPP;
Opportunities: external factors that may assist in overcoming the weaknesses and building on the strengths; and
Threats: external constraints that restrict the range of opportunities for change.

Table 2: SWOT analysis of the existing monitoring and surveillance activities assessing impacts of use of PPP in the EU 27 MS

Strengths	Weaknesses
• **Elements of harmonisation:** Good efforts by MS where monitoring efforts are mandatory (presence of PPP in water / food and feed residues); Harmonisation due to EU legislation and consequent comparability of results for this type of monitoring and surveillance activities; Regular annual review and planning topic per topic for EU mandatory actions (water quality and residues in food and feed). • **Bottom-up approach**: Programmes for EU mandatory actions are designed at MS/local level, therefore ensuring a bottom up approach in identifying and addressing priorities. • **Long term national strategies** – no abrupt changes in government priorities make that national programmes are stable for both EU mandatory and voluntary actions. • **Good stakeholders' commitment** to support monitoring, surveillance and communication programmes. • **Examples of good involvement of stakeholders**: National programmes design and adoption provides direct contact with stakeholders, therefore opportunity for insight of stakeholders' needs and interests to ensure active stakeholder involvements. • **Coordination framework**: The coordination framework that exists at EU level (technical WG) does include all stakeholders.	• **Elements of fragmentation:** Fragmented and non-harmonised monitoring actions in cases of monitoring activities carried out on national voluntary basis (all cases of monitoring of impacts of PPP and impacts of use of PPP, except for those of the presence of PPP in water / food and feed residues); variety and divergence of interest amongst MS; lack of common approaches, guidelines and protocols for key targets; current voluntary approaches hardly allow a robust statement on impact of use of PPPs; lack of communication across MS hampers sharing of knowledge, experience and practices among MS and therefore do not provide valuable assistance to MS that are still in the process of strengthening their monitoring and communication programmes; lack of indicators in routine systems to monitor effectiveness of the programmes – lack of QC in regional performance; lack of incentives to report all poisoning incidents in re-active monitoring programmes; existence of limited active monitoring programmes to complement re-active monitoring schemes; no clear functional coordination mechanisms aiming at assessing overall impacts of use of PPP at MS and at EU level. • **Lack of financial resources** for initiating new programmes. • **Low priority**: No consensus among all European CAs that monitoring and surveillance programmes of impacts of use of PPP are currently high priorities. • **Lack of incentives** for further harmonisation in the field of monitoring and surveillance. • **Low comparability:** Costs of monitoring programmes not known (not calculated) by MS leading to the difficulty of assessing cost-effectiveness of the programmes. • **Lack of transparency / communication to the general public**: Regular dissemination of information through mainly annual reports or web sites only (limited audience). The information provided is still very scattered and citizens sometimes lack guidance in their search; it is difficult to distinguish the quality of information provided.

Opportunities	Threats
• **Improvement of commitment / priorisation to be expected:** Commitment to reduce impacts of use of PPP by the large majority of actors; **Further commitment to be expected due to further ac**tivities in the framework of implementation of the SUD obligations, and related COM actions (e.g. development of risk indicators, implementation of rules on poisoning incident reporting, or monitoring of impacts of aerial spraying); Development of the NAP provides the opportunity for the development and of additional monitoring and surveillance actions; High political interest and awareness to be used to set up and finance new projects/actions. • **Improve harmonisation:** Further alignment to international standards when exist to foster harmonisation. • **Coordination to be improved**: Better coordination with other EU mandatory monitoring obligations (plant health, GMOs, bees' diseases, seed). • **Possible role models existing:** Several concepts tested in other sectors could provide model for development in monitoring impacts of use of pesticides. • **Expertise and stakeholder involvement to be strengthened**: The Commission could further strengthen the valuable role of the technical WG to ensure communication across MS and ensure visibility to stakeholders and policy makers; Better co-operation with scientific academic world; Create/strengthen networks of expertise in the different monitoring compartments by relying on existing expertise; Increase (technical and financial) stakeholder involvement in among others surveillance, risk management. • **Focusing on regional approach**: Explore regional approach could provide economies whilst improving effectiveness, especially. • **Opportunities for improving communication:** The internet – as a channel for information and communication is well suited to fulfil consumer and citizen expectations. It is inexpensive, easy to use, provides a diversity of information, and introduces its users to a global network of people with common interests.	• **Lack of a clear COM roadmap: this** creates misunderstandings. The technical WG is the platform to discuss these issues • **Heterogeneity of activities:** Harmonisation of monitoring and surveillance activities difficult to achieve without making them mandatory; at present, MS commitments for further harmonisation are not to be expected • **High funding dependency**: budgetary constraints and current financial austerity context continue to affect the availability of resources/staff to implement new monitoring actions/programmes. Monitoring is expensive and requires significant resources, both at MS and at EU level, for programme design, implementation and management • **Diversity of problems and interest between MS:** Strong MS focus on national priorities and interest undermines EU wide perspective • **Continuing threat of low priority for monitoring / surveillance:** Current focus is on the development of the NAP and implementation of the SUD and not on monitoring and surveillance activities • **Evaluation of performance lacking**: Results and impacts of the programmes needs to be assessed in the medium-long term to evaluate the full performance of the programmes (drawing conclusions by camping results on a short term basis can be misleading as results in the field of impacts of use of pesticides can only be demonstrated over a certain period of time) • **Cost dimension**: Long-term data collection on chronic impact of use of PPP is very costly and will be under pressure from budget constraints as it does not "directly solve" any problem.

1 Introduction

1.1 Background to the study

The present document is the final version of the final report for the assignment relating the 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 MS on the impacts of use of plant protection products on human health and the environment*".

This study was launched by the Directorate General for Health and Consumers of European Commission in December 2011 in the context of the on-going implementation of obligations covered under the Framework Directive 2009/128/EC on the sustainable use of pesticides[9] and in preparation to the drafting of a strategic guidance document that the Commission services has to develop by 26 November 2012 on monitoring and surveying of impacts of pesticide use on human health and the environment[10].

The study is undertaken by the Food Chain Evaluation Consortium (FCEC) under the leadership of Arcadia International.

The structure of this report has been discussed with the Commission service and has been defined based on the list of deliverables as described in the ToR of the study. It is further presented in Section 1.6. Beforehand, we present the objectives and scope of the study as well as the methodology implemented and the possible factors underlying the limitations of the study.

1.2 Objectives of the study

The Directive 2009/128/EC of the European Parliament and of the Council establishes a framework for Community action to achieve the sustainable use of pesticides (called SUD Directive). In its Article 7(3), it provides for the Commission, in cooperation with the Member States, to develop a strategic guidance document on monitoring and surveillance of impacts of pesticides use on human health and environment to be finalised by 26 November 2012.

The main objectives of the strategic guidance document are to provide guidance to MS in order to enhance comparability of information on monitoring and surveying of impacts deriving from the use of plant protection products and to ensure accurate and balanced information to be communicated to the general public.

At national level, several activities concerning monitoring and surveillance on impacts of pesticide use are carried out, also in partnership with the private sector, and in few areas coordination at European level is on-going such as for residues in food and for water quality.

For this purpose, **DG SANCO has commissioned a study with a view to provide:**

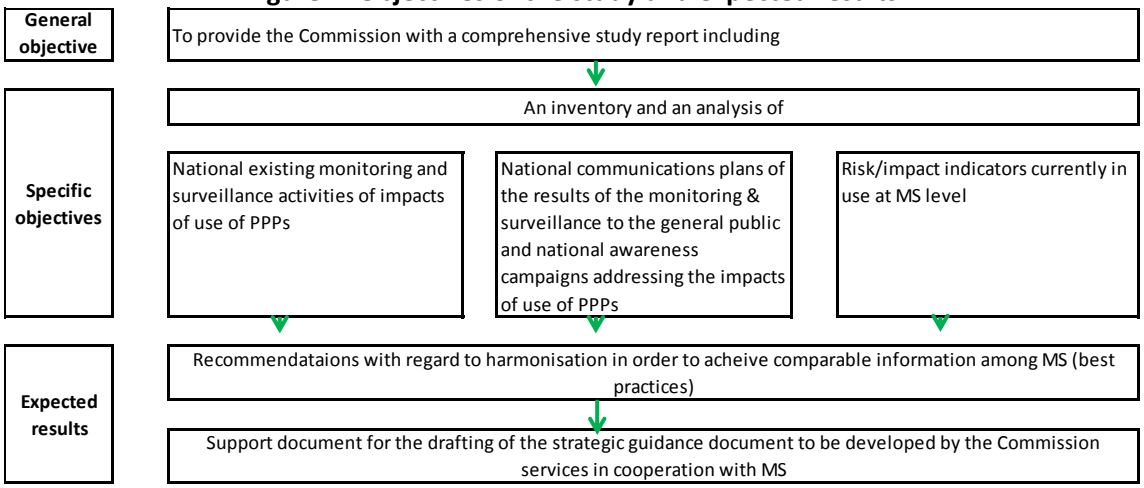
1) **Collection of information on activities on surveillance and monitoring of impacts of use of PPP in the EU**;
2) **Collection of information on risk/impact indicators of use of PPP on human health and on the environment**;

[9] 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.

[10] Article 7(3) mentions that "*To enhance the comparability of information, the Commission, in cooperation with the Member States, shall develop by 14 December* (date has been modified to 26 November by corrigendum to Directive 2009/128/EC of 24 November 2009 published in the OJ L 161, 29.6.2010) a *strategic guidance document on monitoring and surveying of impacts of use on human health and on the environment*".

3) **Collection of information concerning communication of information and awareness raising programmes.** The study should aim at identifying the systems that MS have developed and put in place for communication to the public of the results from the monitoring and surveillance activities as well as any awareness raising programmes aiming at the reduction of the impact from the use of PPPs.

Figure 1: Objectives of the study and expected results



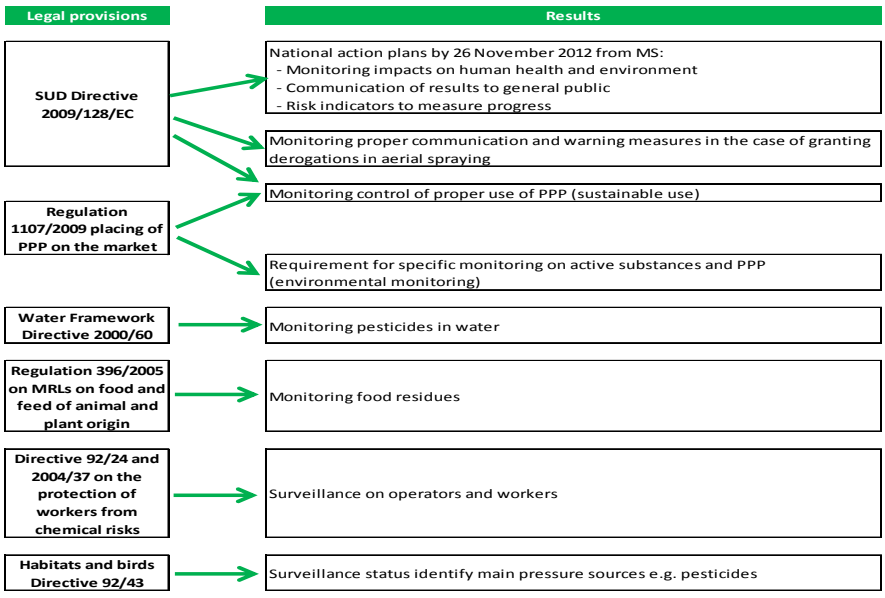
Source: Compiled by the FCEC based on the ToR of the study

The study addresses existing activities that are currently in place at MS and where appropriate planned developments.

In addition, the ToR of the study requires that additional monitoring activities and surveillance activities in the context of other possible impacts on the agro-system should be identified to determine possible overlapping activities, building of synergies between different areas, to identify lack of surveillance, or to indicate need for developments.

The following figure provides an overview on monitoring and surveillance on impacts of use of pesticides on human health and on the environment currently ruled by EU provisions and covered by the study.

Figure 2: Overview on monitoring surveillance on impacts of use of pesticides on human health and on the environment currently ruled by EU provisions and covered by the study



Source: ToR of the study

The detailed description of the obligations presented on the basis of the classification of impacts of use of PPP and the relationship between the different EU provisions are presented in Chapter 3.

Furthermore, EU obligations addressing the assessment and measuring the impacts of use of PPPs may be complemented by national rules. The study aims at capturing activities developed at national level too.

1.3 Methodological approach

This chapter describes the approach and method for the study in brief.

The project started at the beginning of 2012 with a kick-off meeting on 19 January 2012.

This study involved a combination of evaluation tools and included several phases:

- Identification of relevant national competent authorities (NCA) via a preliminary questionnaire;
- A phase of desk research to outline the current situation and to develop a detailed schedule of the issues to be explored during the study;
- A large data gathering exercise from identified NCAs, and main EU stakeholders across the EU through preliminary interviews and a detailed survey questionnaire that provided evidence to support the analysis;
- A second consultation exercise consisting of in-depth interviews during field visits carried out in 9 MS;
- Data analysis in order to support the drafting of the strategic guidance document.

The overall project workflow is presented in Annex 2.

1.3.1 Identification of all relevant national actors to be contacted during the study

The objectives of this task were to:

- Introduce the objectives of the study to the MS;
- Present the project team and the applied methodology for data collection;
- Identify initial sources of information;
- Identify main stakeholders including national policy officers fully or partly involved in the implementation of the obligations of the Framework Directive 2009/128/EC and other related EU obligations, technical and research institutes that are concerned by the impacts of PPPs on human health and on environment and that needed to be contacted during the study;
- Finalise the list of exploratory interviews.

This task has been completed by sending a preliminary questionnaire aiming at identifying all national actors to the EU 27 policy officials in charge of the SUD Directive. The complete list of NCAs is presented in Annex 3.

1.3.2 Desk research and analysis

This task involved the identification and review of available scientific literature and other material, including EU legislation and other official documents.

The desk research revealed that there is limited scientific literature with the subject of implementation of the NAP at MS level.

In contrary, the amount of grey literature[11] is enormous leading to the difficulty to fully understand the situation at MS level without any national guidance. For example, when we consider the river basin management programmes related to water quality, there is a total of more than 100 programmes in the EU as programmes are defined per river basin (107 in total). Most of them are documented on the web, but individually. This leads to possible confusions as no national summaries are proposed.

For MS that are engaged in programmes leading to the reduction of impacts of use of PPP for several years (BE, DK, SE, DE, FI, FR, NL, and the UK), information is often available but not really structured in a way that could be directly useful for the study. For most of other MS, it is difficult to find information on the implementation of the SUD or on monitoring activities.

The questions related to the protection of workers are approached from the chemical side and, very often, few references are mentioning pesticides or PPP as they are included in the overall approach on chemicals. No specific distinction to pesticides or PPP is made.

Little literature exists when it concerns the impacts of use of PPP on the protection of the habitats and of the birds as only few MS have initiated monitoring programmes addressing these issues (DE and the UK, FR in 2012 – more information in Chapter 4).

These preliminary remarks highlight the importance of having national contacts in order to guide the study team in identifying literature of interest.

1.3.3 Stakeholders' consultation

The study attempts to consult all relevant authorities and main EU stakeholders. The stakeholders' consultation started immediately after the launch of the study and it involved:

- Exploratory interviews at EU level with officials from several DGs and relevant EU stakeholders. These interviews have been helpful to understand the wide scope and the complexity of the study. However it has not been easy to get attention from all relevant authorities and stakeholders we wanted to meet. Most of stakeholders have mentioned their interest for the study but have indicated that they were not able to contribute a lot to the data collection;
- A detailed survey questionnaire was launched at the end of February 2012 with a deadline for completion of 23 March. The list of targets and the survey questionnaire can be found in Annex 3 and Annex 4 respectively. The survey questionnaire was sent to more than 100 official representatives in charge of the implementation of the different EU acts covered by the study (6 in total). Responses have been received from 18 MS of which 9 MS have been visited during the field visits (see below). MS that have not provided any information at all are CY, EL, HU, LU, LV, MT, PT and SI.

[11] Grey literature (or gray literature) is a library and information science term that refers to written material such as reports that is difficult to find via conventional channels such as published journals and monographs because it is not published commercially or is generally inaccessible. Examples of grey literature include technical reports from government agencies or scientific research groups, working papers from research groups or committees, white papers, and preprints. Information presented on national websites can, also, be considered as grey literature.

- In-depth interviews by conducting field visits in 9 MS (DE, DK, ES, FR, IT, NL, PL, SE and the UK). These field visits have been an opportunity to close data gaps, as well as for the purpose of clarification and analysis of specific responses and observations at greater depth to obtain an enhanced understanding of national strategies and view of various national programmes. Collaboration during these visits has been good even if some difficulties in organising them have been faced. When the research team proposed a visit of two days to cover all dimensions of the subject, a large majority of MS indicated their wish for a shorter visit (only one day). In agreement with the Commission, the study team has then limited the visit to one day and has completed the data gathering exercise by additional phone calls and email exchanges whenever necessary.
- Additional phone calls and email exchanges to help filling data gaps for MS not visited.
- A Third Countries analysis has also been performed by means of a desk research and phone interviews to gather information to understand how major non EU PPP consuming countries have approached monitoring and surveillance issues, with a view to the impact of use of PPP. Key contacts of relevant authorities (EPA-USA, Health Canada, and APVMA-Australia) were approached to discuss important monitoring and surveillance activities, as well as to get a clearer picture of the approach of these Third Countries.

1.4 Limiting factors affecting the development of the study

The study team has been facing several challenges in collecting and gathering the required data. While the evidences and facts that are presented in this report are robust, it has to be highlighted that the data collection has been rather slow and that several delays occurred.

These delays can mainly be explained by:

- **The majority of MS is currently in the process of elaborating or updating of their national action plan (NAP)** that have to be communicated to the Commission by 26 November 2012 in compliance with the Directive on sustainable use of pesticides. For many MS this is a completely new action and the directive itself is still in its initial implementation;
- The **wide scope of the study required to contact several different authorities in each MS,** and the problem arose as some were hesitant on which information to provide, plus, there was a **need for intense internal coordination at MS level**;
- There is **no common understanding in terms of scope and objective of Article 7(3) of Directive 2009/128/EC** and, consequently, on the scope and character of the strategic guidance document addressed in this provision.

  Particularly, two issues have been raised:

  - First, it has been argued by several MS representatives that have been met during the field visits that they believe the scope of Article 7(3) is restricted to monitoring and surveillance measures in the framework of Article 7(2), i.e. regarding gathering information on pesticide acute poisoning incidents, as well as chronic poisoning developments (where available), in the context outlined there.

    However, from the wording of Article 7(3), it follows that impacts of pesticides use on human health and the environment should be subject to the strategic guidance document.
  - Further, the idea of enhancing comparability of information, as expressed by Article 7(3), was sometimes questioned by interviewees.

However, even if not sharing the understanding of MS representatives, it has to be expressed that at this stage, the impact of Article 7(3) is not fully understood and remains confusing for several official representatives; against the background that the survey clearly makes reference to the strategic

guidance document, this has to be considered when recognising a considerable thematic variety within MS' responses.

Finally, several MS have emphasized that monitoring activities are important and necessary for measuring the level of PPP related risk but do not decrease such a risk. Therefore MS current priorities are to implement obligations that have a direct positive impact on use of PPP (e.g. trainings, awareness raising campaigns, development of decision support systems-DSS). Several MS consider that studying monitoring activities should come after the implementation of the SUD obligations and not before.

All these limitations have led to a data collection process that has been slow and delays in answers to the questionnaire have been observed. The in-depth interviews that have been performed in the context of the field visits have been an opportunity to partly close the survey questionnaire data gaps.

Additional substantial efforts based on additional literature review and individual phone calls to national experts have been necessary to better understand the complexity of several sectors (e.g. health).

The research team is of the opinion that the different data sets and inventories that are presented in this report are not fully complete. Additionally, it would have appreciated to have more time for the data collection process.

1.5 Structure of the final report

The structure of this report has been aligned to the overall aim and specific objectives of the study which are to move forwards a baseline analysis and a compendium of best practices in support to all MS to fine-tune their strategy and objectives when drafting their NAP.

The final report is structured as follows:

- Executive summary;
- Chapter 1: Introduction including the context, the objectives, and the expected outcome of the study as well as the presentation of the methodology applied and the limitation factors affecting the development of the study;
- Chapter 2: Classification and typology of impacts of use of PPPs;
- Chapter 3: Matrix analysis of national plans and actions;
- Chapter 4: Analysis of risk/impacts indicators of the use of PPP;
- Chapter 5: Matrix analysis of communication of information & awareness raising programmes.

2 Classification and typology of impacts of use of PPPs

The potential risks and impacts of use of PPPs are of different natures. For sake of clarity they can be grouped in two different classes related to the impacts on human health in one hand and on the environment in the other hand, including impacts on various organisms.

The impact of use of PPPs on human health can concern different population sub-groups which can be differentiated in terms of exposure and hazard sensitivity. When it relates to risk and impact on the environment, several protection goals and various organisms have to be considered (i.e. air, soil, water, birds, etc…).

Biodiversity could also be considered in this classification. However due to the complexity and the lack of common understanding of what biodiversity covers across the EU 27 MS, the research team has decided not to create a specific class for biodiversity. Additionally, several MS have highlighted that, due to the difficulty of assessing impacts of PPP on biodiversity, the large majority of monitoring efforts in this field is addressing the assessment of agricultural practices, as a whole, on biodiversity rather than the assessment of use of PPP alone.

In order to allow a correct characterisation of the diverse programmes/plans in place at MS level and to allow their comprehension, the following classification of impacts domains is proposed.

Table 3: Classification of impacts of use of PPP

Strategy	Use	risk area	compartments/sub-groups	Organisms & exposure situation
Reduction of impacts	Use of PPP on agricultural areas	Environmental	Terrrestrial	Soil macro organisms
				Terrestrial plants
				Soil micro organisms
				Other terrestrial organisms (including birds and mammals)
				Concentration in soil
			Aquatic (freshwater, marine water, surface and groundwater)	Fish
				Aquatic invertebrates
				Algae and aquatic plants
				Sediment organisms
				Aquatic micro-organisms
				Other aquatic organisms
				Long term concentration in water
			Air	Concentration
			Non-compartment specific	Bees and other non target arthropods
		Human Health	Workers	Operators
				Re-entry workers
				Greenhouse workers
			Consumers/General public	Bystanders
				Residents
				Consumers
	Use of PPP on non-agricultural areas	All	Professional users	
			Non-professional users (gardeners)	
Reduction of use (volumes)	General use of PPP	All		

Source: Compiled by the FCEC based on various existing classifications.

3 Matrix analysis of national monitoring and surveillance activities

This chapter is structured in five complementary parts.

In the first three parts, it proposes an inventory of the different monitoring and surveillance activities actually in place at MS level based on the classification of impacts as described under Chapter 2 (see Table 1).

Monitoring and surveillance programmes can address several impacts and therefore could fall under several categories of the proposed classification. We will not repeat each programme several times to address this aspect: programmes are sorted and classified based on their main objective. This presentation of the different programmes allows drawing conclusions summarising risks currently on the radar-screen of MS. This inventory is broken-down per MS and respects the typology of impacts of use of PPPs as presented in Chapter 2.

The fourth section presents how these actions are correlated with the objectives of the finalised NAPs by checking whether or not all national monitoring and surveillance activities have been integrated in the NAP and analyses the articulation of these monitoring activities within the NAPs.

Finally, the last section presents the structure of the national governance(s) by mapping interactions (i.e. exchange of information, data consolidation) between these different authorities and by listing tools in support to this coordination.

3.1 Monitoring and surveillance programmes addressing environmental issues

3.1.1 Monitoring impact of use of pesticides in water

In the context of water quality, the main EU legal instrument is the Water Framework Directive (WFD) 2000/60/EC[12] which prescribes that management and monitoring activities should aim to achieve the goals of the directive within geographical areas or river basin districts (RBDs). These are largely based on surface water catchments, together with the boundaries of associated groundwater and coastal water bodies. For each river basin district, a river basin planning process must be set up. The first milestone of this planning process (analysis, monitoring, objective-setting and consideration of measures to maintain or improve water status) is the initial river basin management plan (RBMP).

In accordance with Article 8(1) of the WFD MS have to establish by 22 December 2012 monitoring programmes for the assessment of the status of surface water and groundwater in order to establish an overview of water status within each river basin district. This monitoring obligation is linked to obligations of the Drinking Water Directive (DWD)[13] which 1) aim at setting quality standards for drinking water quality at the tap (microbiological, chemical – including pesticides - and organoleptic parameters) and 2) oblige Member States to regular monitoring of drinking water quality and to provide to consumers adequate and up-to-date information on their drinking water quality as drinking water. Therefore and for pesticides, monitoring requirements of the WFD cover the ones of the DWD which are integrated in the same monitoring programmes.

[12] 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
[13] Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption

The Commission has published two reports (2007 and 2009) in which it has carried out an analysis of the information reported by MS with the help of a number of compliance indicators.

The 2009 report concludes that "*in general terms, there is a good monitoring effort across the EU*". More than 107,000 monitoring stations were reported for monitoring on surface water and groundwater. One of the key elements of the WFD is that it sets a framework to take into consideration all pressure and impacts in the aquatic environment and integrates the requirements of other key existing EU water legislations as minimum basic measures. This may involve *ad-hoc* monitoring programmes to be developed every 6 years but in many cases these requirements have not been clearly incorporated into the WFD monitoring programmes yet.

As for residues in food, **the large majority of the monitoring activities has as objectives to check whether the concentration in the water environment are meeting the defined environmental quality standards (EQS) and are related to the taking of samples and the analysis of their concentration of priority substances in water**. Monitoring programmes should be designed to establish a coherent and comprehensive overview of the water status within each river basin district. River basin districts (RBDs) (110 in total in the EU 27 MS of which 40 are based on more than a single MS leading to a total of 170 national or national parts of international river basin districts) and/or their sub-units (RBDUs) are the main units for the management of river basins and have been delineated by MS under Article 3 and updated by reporting to Article 13 of the WFD.

As regards pesticides in surface waters, they should cover those included in Annex X of the WFD (priority substances as listed in Directive 2008/105/EC[14] and being alachlor, atrazine, chlorfenvinphos, chlorpyrifos, cyclodiene pesticides, DDT total, para-para DDT, diuron, endosulfan, hexachloro-cyclohexane, isoproturon, simazine, and trifluralin) and those identified at MS level as additional specific substances of concern.

Regarding pesticides in groundwater, total pesticides should be monitored (Annex I to the Groundwater Directive 2006/118/EC[15]) as well as threshold values established at national level by MS, if any. The WFD sets out provisions for the purposes of assessing groundwater chemical status. The quality standard for active substances in pesticides, including their relevant metabolites, degradation and reaction products has been established at 0.1 µg/l for one substance and the total maximum concentration of all pesticides substances shall not exceed 0.5 µg/l.

Results of the RBMP programmes are not presented in this document as EU reporting is already organised. Therefore only the complementary activities/programmes that have been launched nationally are described below.

In addition to the 13 priority substances as listed in Annex X of the WFD, respondents to the general survey have listed the monitoring of additional substances as follows:

Table 4: Additional PPP substances monitored in national water quality programmes (surface water)

MS	Additional PPP substances monitored
DK	Large additional list which is reviewed based on results. When PPP substances are not found during monitoring, then the list of substances is updated by removing the non-found ones.
EE	About 40 additional ones

[14] Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council.

[15] Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration

MS	Additional PPP substances monitored
FI	> 150 substances
FR	5 additional national ones: chlortoluron, 2,4 D, linuron, 2,4 MCPA, oxadiazon
NL	All substances that exceed the EQS or are a threat of concern to the functioning of the water system are measured.
UK	clothianadin, imidacloprid, thiamethoxam, fipronil. Additionally when it concerns surface and groundwater used for drinking water supply – any pesticide where trends in raw water are rising such that extra treatment may, or is being required in order to meet Drinking Water Directive pesticide standards at the tap. UK water companies carry out risk assessments to identify pesticides of concern, and monitor for these in raw water intakes. Pesticides most frequently causing concern are metaldehyde and a small number of herbicides used on cereals, oil seed rape and grassland.

Source: Compiled by the FCEC based on results from the survey questionnaire

In all cases, these additional programmes concern the analysis of concentration of additional a.s. in surface water and/or water ground. More specifically, a large majority of them are dedicated to check concentration of herbicides as it seems that the main risks are coming from this group of PPP.

Monitoring of water quality together with the monitoring of residues in food and feed (see Section 3.2.1) are the two most expensive monitoring programmes that are in place at MS level. The following budget figures give an estimation of the total costs of these programmes (EU mandatory monitoring and additional ones when occur). Unfortunately, most of MS have indicated that monitoring of PPP in water is part of the general programmes where all substances are included and therefore it is not possible to estimate the exact costs of monitoring of pesticides only.

Not all MS have communicated the annual budgets of these programmes. From the ones that have provide budget figures, surface water and groundwater monitoring programmes costs are ranging from marginal costs: 60 K Euros in EE (only pesticides) to about 33,000 K Euros in DK (all substances included). Finland is spending about 100 K Euros for the programmes and for pesticides substances when France is spending 11,000 K Euros and Spain 1,500 K Euros for all substances included. The UK has indicated that data are not disclosed.

The French authorities have explained that the unit cost for sampling and analysis are largely variable from one basin to the others (11 different basins in France). Additionally individual laboratory testing costs are also variable as they are correlated to the complexity of the different protocols used. A large percentage of samples is being analysed by public laboratories for which the unit price of analysing a sample is not calculated. The Dutch authorities that have been met during the field visits consider also that the sampling protocols are highly variable across MS and that a cost comparison across MS may lead to biased conclusions.

3.1.2 Monitoring impact of use of pesticides in air

Article 2 of the SUD Directive mentions that the provisions of the directive shall apply without prejudice to any other relevant Community legislation. Recital 3 of the directive doesn't mention any EU legal act in the field of protection of air. However, considering all possible domains for impacts of pesticides use, monitoring of impacts of use of PPP to air was considered as an important one to be considered in the study.

None of the MS that have answered to the general survey questionnaire has reported monitoring activities in this field. Literature review shows that France appears to be the only Member State where actions have been taken to monitor air quality with respect to pesticides. ANSES has recently

published a scientific report on the general population exposure to pesticides residues in France which highlights the complexity of the issue especially when it relates to air pollution[16]. A large number of local studies have been conducted in France since 1980s for confined air and only four studies have been carried out for atmospheric air. This report presents results regarding the presence of pesticides in the air. Out of more than 100 000 measures that have been taken from 2001 to 2010, about 12% of these measures have detected the presence of a minimum of one pesticide. High concentrations have been mainly observed during the spraying periods. Several national working groups coordinated by INERIS and by ADEME have been established as well as a think-thank (Phyt'air) which has been created in 2001 to analyse the current situation and to propose actions.

Protocols for sampling and measurements of pesticides in the air are very complex and can hardly be presented in details in this report. They are specific to many criteria and in particular to the target population. They have been developed by INERIS and have been tested prior to any measurement programme during the 2001 campaign (pilot campaign of the observatory on air quality). The INERIS protocols have been updated based on the outcomes of this pilot study and then applied in the different studies that have carried out after 2001. The costs for the implementation of these protocols have not been communicated.

The following programmes have been reported by INERIS:

Table 5: French monitoring programmes carried out by INERIS on impacts of use of PPP on air

Project	Objective	Design	Timeframe	Measured impact	IT Tools	Budget	Follow-up
Pilot campaign	Testing of protocols regarding impacts of pesticides in confined environments based on protocols developed by Mandin (1999)	90 houses and 3 schools in 3 different regions	2001	Concentration of pesticides in the air and in dust on the soil. Analysis on 31 substances. 16 of them have been detected in the air and 5 in dust.	Not reported		See follow-up programmes
EXPOPE	Evaluation of human exposure to pesticides	First study: 41 adults (mainly gardeners, veterinarian) and individuals non exposed during work Second study: 130 children (6 to 7 years old)	2002-2005	Concentration of pesticides in the air on 34 substances in 1st study (14 detected) and 28 substances in 2nd study (20 detected).			Statistics analyses per substance have been carried out to better understand the concentrations that have been measured.
Habit'air	Collect	60 houses	2004-2005	Concentration			Enrich data set

[16] ANSES, 2010, Exposition de la population générale aux résidus de pesticides en France. Available at: **http://www.observatoire-pesticides.gouv.fr/upload/bibliotheque/1719592183960438706168750528 47/ exposition_ population_generale_pesticides_2010_vdef.pdf**

Project	Objective	Design	Timeframe	Measured impact	IT Tools	Budget	Follow-up
project (in region)	additional data on human exposure to chemicals. Protocols of the "logement" programme have been used	(only 8 houses for pesticides)		of pesticides in the air on 32 substances in 8 houses (13 detected)			of the "Logement" national programme
Atmosf'Air (in region)	Exploratory study to estimate human exposure to PPP for population living close to crop fields	12 locations monitored during growing season (April to August).	67 PPP monitored	Concentration in air. 17 substances have been detected in confined environments. 11 substances detected in the atmosphere.		Budgets coming from several sources: region, ADEME	The conclusions of this study have highlighted that the sample was not large enough and not enough representative

Source: ANSES report 2010 - ***http://www.observatoire-pesticides.gouv.fr/upload/bibliotheque/1719592183960438706168750528 47/exposition_population_generale_pesticides_2010_vdef.pdf***

In summary to these 4 studies, 84 substances have been monitored and 38 substances have been detected at least once. Five substances have been detected in all programmes (chlorpyriphos, alpha-endosulfan, fenthion, lindane, and propoxur). Two substances (ethyl-parathion and metholachlor have never been detected and four additional substances have been detected in 3 monitoring programmes out of 4 (diazinon, dichlorvos, beta-endosulfan and dieldrin).

This approach highlights the importance of running a pilot test to validate the approach before engaging large efforts in monitoring programmes. Reports do not indicate whether or not a database has been created to capture data.

In response to the general survey questionnaire, no MS has specified that protection of the air would be an objective of the NAP. The French Ministry of Agriculture authority has mentioned that they are currently under discussion with other ministries to include protection of the air as an objective of the Ecophyto 2018 Plan.

It is worth reporting here the existence of an international cooperative platform for monitoring and evaluation of the long-range transmissions of air pollutants in Europe (EMEP). This platform aims at regularly provide governments and subsidiary bodies under the Long-Range Transboundary Air Pollution (LRTAP) Convention[17] with qualified scientific information to support the development and further evaluation of the international monitoring protocols on emission reductions negotiated within the convention. The UN-ECE Convention on LRTAP include some pesticides in the protocol on POPs.

[17] The Convention on Long-range Transboundary Air Pollution (LRTAP), signed in 1979, is one of the central means for protection of our environment. It establishes a broad framework for co-operative action on reducing the impact of air pollution and sets up a process for negotiating concrete measures to control emissions of air pollutants through legally binding protocols.

3.1.3 Monitoring impact of use of pesticides in soil

The question related to the pollution of soils by PPP is similar to the one on the pollution of air. There is no EU legal text linked to the SUD Directive. However, soil contamination by several substances, of which pesticides, has been recognised as one of the main threats for EU soils (DG ENVIR communications, 2002). Main data allowing discussing persistence of PPP substances in the soil mainly come from the PPP authorisation dossier.

At EU level, two monitoring programmes which are included in the International Co-operative evaluation Programmes (ICP) and surveillance of impacts of atmospheric pollution on forests (ICP Integrated Monitoring) exist.

In 2003, the European Environment Agency (EEA) made an inventory of national surveillance programmes for soils. All these programmes have different objectives and only 17 out of the 57 programmes are considering organo-chemicals and pesticides (PPP and biocides). This explains why the actual European Soil Portal[18] does not currently integrate data on soil contamination by pesticides.

Table 6: Inventory of national monitoring and surveillance programmes of soils in the EU

MS	Date of last inventory	Total number of programmes	Of which national programmes	Of which regional programmes
AT	2003	20	8	12
BE	1997	1		1
BG	2003	2	2	
DE	2003	4	3	1
DK	1997	3	3	
ES	1997	1	1	
FI	2003	2	2	
FR	2003	7	7	
HU	2003	1	1	
IT	2003	2		2
LU	2003	1	1	
NL	1997	2	2	
SE	1997	4	4	
UK	1997	4	1	3

Source: EEA, 2003

Literature contains very few detailed information describing these monitoring programmes on pesticides. Huber (2003) reports that the sampling frequency of these 17 monitoring programmes ranges from 3 years to 10 years (median of 6 years) and presents a range of number of sites from 1 to 700.

The most documented cases of pollution by pesticides found in literature are contaminations due to organochlorines, atrazine and chronic pollutions by mineral substances (e.g. copper based pesticides used for decades in vine production as fungicide).

The research team is of the opinion that based on the results that have been collected during the study, the lack of data does not allow highlighting good practices in this field. All questions related to soil quality are extremely complex as they are largely dependent of numerous various criteria (e.g. the nature of the soil and its composition). A large number of factors are influencing impacts of a pollutant (being PPP or not) leading to difficulties to identify the real impacts of a given substance.

[18] **www.eursoils.jrc.ec.europa.eu**

Costs for running such type of monitoring studies seem to be rather high even if no evidences supporting this statement have been reported during the study.

Similarly to the previous section, no MS has reported any programme on protection of the soil as part of the NAP.

Finally, the Joint Research Center is reporting actions related to the development of protocols and methodologies addressing soil threat issues but it appears that pesticides are not considered in these programmes[19].

3.1.4 Monitoring impact of use of pesticides on bees, birds, and mammals and other organisms

The objective of the Habitats Directive 92/42/EEC[20], which is the implementing agreements of the Bern Convention, is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. It requires the maintenance and restoration of these species and habitats at favourable conservation status, laying down rules for their protection, management and exploitation, and protects them through a suite of designated sites known as Natura 2000 sites and a strict system of species protection. There is also a requirement for the implications of any proposed developments, plans or projects on or near to Natura 2000 sites to be assessed to ensure no likely significant harm is done to any protected features– known as a Habitats Regulations Assessment.

The European Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds) is a framework for the protection and conservation of wild birds in Europe, also implementing the Bern Convention. It places great emphasis on the protection of habitats for endangered and migratory species and bans activities that threaten birds.

Moreover as already explained in Chapter 2 under the PPP legislation, post-authorisation monitoring of possible impact on non-target organisms due to the use of a plant protection product, whenever considered necessary, can be required to the authorisation holder or carried out by the national competent authorities.

For clarity this chapter presents the existing national monitoring schemes in three sub-groups:

- Honeybees;
- Birds and mammals;
- Other organisms.

Honeybees

Decline of managed honeybee colonies and also wild bee species is of a high concern in the EU 27 MS for the last two decades. Therefore large monitoring efforts have been initiated and are currently on-going to analyse the main reasons and origins of this decline. Multi-factorial studies are the most dedicated approaches as they are designated to quantify the contribution of several factors that may affect honeybee health. Pesticides are considered as one of the factor that could cause honeybee colony losses.

EFSA funded a study in 2009 of the assessment of bee mortality monitoring programmes in Europe, including a compilation of the data generated by the programmes and a literature review. This

[19] More information on **www.eursoils.jrc.ec.europa.eu**
[20] Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna

study was coordinated by ANSES, in conjunction with seven European partners. Twenty-five monitoring programmes were analysed. **Conclusions of the study highlight that most of the results produced by the different programmes are difficult to use at a European level due to their lack of representativeness and an absence of uniform indicators and protocols to measure these indicators**. Recommendations were made to reinforce and harmonise national programmes and the indicators they generate, to use a common foundation for conducting analytical epidemiological studies over various countries and to appoint a specific scientific and technical team for supervision on the European level.

In 2010 the Commission published a Communication on bee health addressing all policy areas concerning bee health and anticipating several actions to be taken in this respect. An EU Reference laboratory for bees' health has been designated and bee health training for Member States officers provided. At the end of 2011 an EU contribution of 3,750 K Euros was granted for the implementation of surveillance activities on honeybee colony losses actions during the period starting in January 2012 till end of June 2013. The primary focus of the study will be on following main honeybee diseases and/or pathogens. In addition as regards pesticides the 2012 work programme will focus on developing and validating assays for measuring organochlorines, organophosphorus and synthetic pyrethroid residues in bees and in pollen. Seventeen national projects have been selected and the EU contribution for a maximum of 70% is limited to costs relating to carry out laboratory tests and pay dedicated staff monitoring the health status of apiaries and bee colonies.

With respect to pesticides, in 2011 the Commission asked EFSA to review the pesticide risk assessment scheme for bees in relation also to the on-going review of the pesticide data requirements. In 2012, EFSA was asked to carry out a full review of all insecticides belonging to the class of neonicotinoids.

Several national programmes have been initiated when it relates to specific impact of pesticides on bees mortality as pesticides are listed by many authors as a contributing factor to death of honeybees. This chapter presents these monitoring programmes that could be grouped in two different types: active monitoring and re-active (or incident reporting) monitoring schemes.

The general survey has not been helpful in collection information on these monitoring programmes. Very few MS have indicated an activity in this field. Therefore, information that is presented hereafter is based on literature review and individual interviews with experts during the field visits. Additional phone interviews have allowed completing the dataset as presented below.

The three type of monitoring approaches that are reported in the previous table (re-active, active monitoring and stewardship programmes) are complementary. Re-active monitoring activities can be a helpful tool to identify new problems in the field but are lacking from the fact that, being based on a voluntary approach, only a limited number of samples are collected. Active monitoring are more research activities and it requires several years before robust conclusions can be drawn. Finally, the third type is based on stewardship programmes for individual product or group of products for testing validity of active monitoring plans as well as the effectiveness of the implemented stewardship measures.

Table 7: Matrix analysis of monitoring actions studying effects of PPP on honeybees

MS	Type of monitoring	Objectives	Active substances concerned	Approach	Timing	Actors	IT tools	Measured impacts and follow-up activities & results	Budget
DE	Re-active	In response to EU obligation	All	Mandatory reporting as COM required monitoring for bees to be carried out by MS in 2010 on clothiandin, thiametoxam, imidacloprid, fipronil	Permanent programme	Observations done by beekeepers and transmitted to veterinary agents	MS have not reported any specific data collection and data analysis tool for this purpose.	Lab analysis for further investigation for free	Marginal
DK	Re-active							Lab analysis for further investigation	
FI	Re-active								
FR	Re-active								
IT	Re-active								
NL	Re-active								
UK	Re-active							Lab analysis for further investigation for free	
AT	Active	MELISSA project	Neonicotinoid (seed treatment)	Voluntary in 2009. Mandatory since 2010	2009-2010 (extended till 2012)	BMLFUW Ministry for agriculture, environment and water mgt	MS have not reported any specific data collection and data analysis tool for this purpose.	Need for further results	High
BE	Active		Imidacloprid	Voluntary	2009	Research (Nguyen et al.)		Results indicated a significant correlation between number of colonies per apiary and mortality rate in the respective apiary.	Not available

MS	Type of monitoring	Objectives	Active substances concerned	Approach	Timing	Actors	IT tools	Measured impacts and follow-up activities & results	Budget
DE	Active	DEBIMO: Study to understand the complex causes of winter losses.	All PPP	Since 2004 bout 150 beekeepers volunteered and 1,500 colonies were checked with respect to their development, diseases, residues and effects of plant protection products, climate,	Since 2004	The project is co-ordinated by the German Federal Ministry of Food Agriculture and Consumer Protection and mainly conducted by the German bee institutes		Traces of pesticide substances in bee bread reflecting agricultural use but no impact of uses of PPPs in accordance with good agricultural practice. *Varroa* being significantly the most harmful agent for colonies.	High
DE	Active	Study of impact on bees population	Neonicotinoid (seed treatment)	Voluntary	2008-2009	Research (University of Hohenheim)		No adverse effects observed	High
DE	Active		Thiamethoxam, clothianidin	Voluntary	2010	German bees Institutes		No adverse effect observed	High
FR	Active	Study of impact on non-wild bees population	Thiamethoxam (seed treatment)	Mandatory (results required to validate registration or not)	2007-2010	Surveillance by authorities		No product related impact over a period of 3 years in 3 to 6 regions	High
IT	Active		Neonicotinoid (seed treatment)	Voluntary	2008-2009	ApeNet monitoring (CRA-API)		Some cases of acute poisoning by pesticides reported	High
UK	Industry stewardship scheme		Neonicotinoids	Mandatory Based on CRD request to author. holder	On going	PPP industry			Not available

Note: Exact budget figures have not been reported. Therefore a qualitative estimation of the budgets based is proposed by the research team.

Birds and mammals

Many authors have highlighted that in Europe the organisation of monitoring activities with respect to birds and mammals seems to be quite limited (De Snoo et al. 1999, Gandolfi et al. 2010). A survey conducted by De Snoo in 1999 (covering the 1990-1994 period) mentioned that only 7 EU MS (BE, DE, DK, FR, EL, NL, and the UK) were conducting in a systematic way incident registration system on birds, mammals and other non-target arthropods. This publication highlights that compared with the other countries, relatively high numbers of incidents were registered in France, the Netherlands and the United Kingdom. Over 1,000 incidents were investigated to establish their causes: approved use, misuse or deliberate abuse, and to identify the compounds, species and mode of application involved. It was found that most registered incidents are due to deliberate abuse. Approved use is responsible for only a minor fraction of the incidents, and these are due to particular practices such as use of treated seed, bait or wood preservatives and the spraying of grassland. Hardly any incidents were due to crop-spraying. De Snoo wonders why so few incidents are registered for normal crop-spraying: are they occurring or are they not reported and therefore not registered ? It is doubtful whether incident registration is a reliable instrument for obtaining a proper understanding of the occurrence of the side-effects of agricultural pesticide use.

In the frame of our study, only 2 MS have reported the existence of a specific monitoring programme dedicated to monitor the impact of use of pesticides on birds. Other programmes exist but the monitoring addresses several other biodiversity criteria and are mainly dedicated to survey the population dynamics and the general health of the birds rather than pesticides effects.

In the UK, the WIIS (Wildlife Incident Investigation Scheme) investigates since 1993 the deaths of wildlife (i.e., birds, mammals, and beneficial insects), pets and some livestock throughout the UK, where there is evidence that pesticide poisoning may be involved. The programme is run by the Chemical Regulation Directorate. WIIS mainly relies on reports from the public of incidents involving wildlife casualties. Further investigations normally involve post mortem analysis of carcases, chemical analysis of tissues for pesticide residues and on-site investigations to determine, if possible, the circumstances of the incident. Mortality is attributed to a pesticide if a residue is found that is above a level considered to represent lethal exposure. The results of WIIS are presented to the Environmental Panel of the Advisory Committee on Pesticides and published in an annual report. From the analysis of all 756 WIIIS incidents reported during the 1993-2003 period, 492 (44.0%) were cases of abuse, where vertebrate control agents were used in deliberate attempts to harm wildlife and companion animals. This abuse often takes the form of poisoned meat baits, put out mainly for rooks, crows, magpies and foxes for the protection of game birds.

Another successful scheme, established in France, is operated by a national network (SAGIR, a sanitary surveillance network for wildlife) and aims at assessing wildlife health rather than just pesticide poisonings. Created in 1986 by the Office national de la chasse (ONCFS), the SAGIR network is a national system of surveillance of wildlife diseases. During its set-up, SAGIR has permitted to highlight new diseases, to collect numerous data on wildlife pathology and to monitor several important die-offs. Initially, it focused mainly on game but it is now extended to other species. For a few years, SAGIR has been more and more often associated to programmes dealing with the sanitary relationship between wildlife and livestock.

In term of active monitoring scheme, it is wise mentioning that France is currently launching a programme aiming at measuring the impacts of agricultural practices, of which pesticides, on wild birds. Protocols have been defined by researchers and observations in the field have just started (see description under 3.1.5).

Table 8: Matrix analysis of reported monitoring actions studying effects of PPP on birds and mammals

MS	Name of the program	Responsiblity	Type of monitoring	Species	Measured impacts	Budget	Timing	IT Tools	Follow-up
FR	SAGIR	ONCFS	Re-active monitoring	Game birds, other wildlife	Lethality Health	Not known. Paid in a majority by the hunting associations	Existing since 1986 Permanent yearly programme	Database (managed by ANSES)	Analysis of the cause of death by running laboratory tests. Trend analysis of the incident reports
FR	Axis 5 Ecophyto (Non intentional impacts)	Ministry of Ag.	Active monitoring performed by stakeholders in 22 regions. Protocol (STOC-EPS) developed based on existing biodiversity network (Vigie-nature) and adapted to agriculture	Wild birds	Lethality	1.3 Mio Euros (for 4 surveillance programmes). Financed by the Ecophyto 2018 plan.	Existing since 2012 Permanent yearly programme till 2018	Epiphyt database: for collection of raw data only.	An annual report will be published in winter 2012-2013 summarising the outcomes of the first year. Then follow-up measures will be discussed and proposed.
UK	WIIS	HSE - CRD	Re-active monitoring	Wildlife (birds, mammals, pets, livestock)	Lethality	500 K Euros (80% paid by PPP industry)	Existing since 1993 Permanent yearly programme	Internal database	Analysis of the cause of death by running laboratory tests. Trend analysis of the incidents

Other organisms

With respect to monitoring studies in post-authorisation phase on terrestrial invertebrates other than honeybees, there is a very limited activity. MS have not reported any system like the UK WIIS re-active monitoring plan (see above) for other organisms. However in case of monitoring of soil invertebrates it is currently facilitated by the standardisation of sampling methods by the International Organisation for Standardisation (e.g. earthworms)[21].

It should be highlighted here the French initiative that has been initiated earlier this year under the Ecophyto 2018 programme. Within the French NAP, a specific action aims at measuring impacts of use of pesticides on earthworms by monitoring populations in farmers' fields. These monitoring activities are not research activities. The protocols have been drafted by researchers (Museum National d'Histoire Naturelle) but the observations in the field are done by advisory services staff and by farmers and not by researchers. The programme intends to measure impacts of agricultural practices on population of earthworms and therefore do not only estimate impact of use of pesticides. Protocols have proven usefulness in the context of other monitoring programmes addressing biodiversity as a whole. Results will be analysed and reported on a yearly basis by a national committee (CSBT). This approach is expected to lead to a larger consideration of biodiversity issues by the farmers. The protocol on monitoring of earthworms population is associated to 3 other protocols on biodiversity (of which the wild birds surveillance programme as described under 3.1.4). The total fund of this action is 1.3 Mio Euros for 2012 (all protocols included).

The number of monitoring studies that are surveying the dynamic of populations is larger than the ones related to monitoring of impacts of use of pesticides. They are not reported here as they are not measuring impacts of pesticides. As ecological studies, it can be mentioned "the Game Conservancy Trust" in the UK or the "Vigie Nature" project in France (which is also surveying wild birds and the flora*)*, and for experimental studies, the Boxworth project and the SCARAB long term effect project, both being carried out in the UK in the 1990s.

3.1.5 Monitoring impact of use of pesticides on other biodiversity criteria

Not all national programmes related to the environmental impacts of use of PPP that have been reported by MS fall under the classification presented in Table 1 and in particular the French initiative to implement active monitoring programmes in the field of impacts of agricultural practices (of which impacts of use of pesticides) on biodiversity (Axis 5 of Ecophyto 2018 programme).

This programme has been launched in March 2012 and intends to monitor biodiversity at large by implementing surveillance activities on:

- Wild birds (see Chapter 3.1.4)
- Earthworms (see Chapter 3.1.4)
- Flora in the vicinity of cultivated fields; and
- Coleoptera (beetles).

These monitoring activities have been associated to additional monitoring activities on pesticide resistances (monitored at the level of 23 pest/active substance combinations) and have been integrated in the epidemiological pest surveillance network (réseau de surveillance biologique du territoire - RSBT).

[21] Matthias Liess et al., 2003, effects of pesticides in the field, EU&SETAC Europe Workshop

This RSBT network was created in 2009 to monitor pest pressure in the field (in order to answer to objectives of the "Grenelle de l'Environnement" and to obligations of Article 14 of the SUD Directive). In 2012, it has been extended to monitoring activities on biodiversity (ENI network – non-intentional effect network). The RSBT network involves the main actors in plant protection and plant health: farmers and growers, technical institutes, cooperatives, wholesalers and chambers of agriculture and regional plant health federations. It is at regional level that decisions are taken on the crops to be monitored, based on their agronomic importance locally. The biological monitoring committee for the local region lays down guidelines to focus efforts across the area concerned and fosters harmonisation of monitoring protocols, along with the information feedback.

When it relates to monitoring of impacts of use of PPP (i.e. ENI network), the programme has a global annual fund of 1.3 Million Euros for 2012 (the total fund of the RSBT programmes is about 10 Million Euros in 2012) and concerned about 600 plots distributed on the complete territory. The first results on this monitoring programme of non-intentional impacts of use of pesticides will be presented by end of the year.

Table 9: Description of the French ENI Network (monitoring actions on impact of PPP on biodiversity)

	Name of the programme	Type of monitoring	Design	Actors	Targets*	Crops on which monitoring will be performed	Protocol	Measured impacts	Timing	IT tools	Budget	Follow-up
FR	ENI Network Monitoring on non-intentional effects of Pesticides	Active	600 plots in 22 regions	Authorities, research and agricultural stakeholders (Chamber of agriculture, producers organisation, extension services, plant health associations Monitoring is performed by non-scientific experts	Wild birds (see Chapter 3.1.4) Earthworms (see Chapter 3.1.4) Flora in the vicinity of cultivated fields; and Coleoptera (beetles)	Maize, winter wheat, salads and wine	Vigie nature protocols (monitoring biodiversity) that have been adapted to agriculture and tested in 2010 on 100 farms and in 2011 on 300 farms	Population dynamics	2012-2018	Data collection tool Epiphyt Data sharing principles to be defined	1.3 Mio Euros for 2012.	To be defined

Source: Compiled by the FCEC mainly based on the following report: **http://agriculture.gouv.fr/IMG/pdf/Annexe_6_Rapport_MNHN.pdf**
**: Targets have been proposed via a recommendation to the Ecophyto 2018 governance body by a national Committee called Comité de Surveillance Biologique du Territoire (CSBT) including representatives from authorities, research and stakeholders*.

3.2 Monitoring and surveillance programmes addressing human health issues

3.2.1 Monitoring food and feed residues

According to Regulation (EC) No 1107/2009, the residues of the plant protection products, consequent on application consistent with good plant protection practice and having regard to realistic conditions of use, shall not have any harmful effects on human health, including that of vulnerable groups, or animal health.

Regulation (EC) No 396/2005[22] on pesticide residues establishes the MRLs of pesticides permitted in products of plant or animal origin intended for human or animal consumption and completes the harmonisation and simplification of pesticide MRLs. MRLs undergo a common EU assessment to make sure that all classes of consumers, including the vulnerable ones, like babies and children, are sufficiently protected.

Typically, in each European reporting country (EU 27 MS and EEA countries) two monitoring control programmes are in place: a national control/monitoring programme (designed by each country) and a coordinated European programme for which clear guidance is given on which specific control activities have to be performed by the Member States.

National programmes vary considerably between Member States as they are drawn up according to Member States' priorities. They can be more or less targeted towards specific problems, which could lead to significant differences in term of the results obtained between Member States.

Aggregating and reporting results from these different programmes are of the responsibility of EFSA since 2007, previously the FVO was responsible for this task. Key results of these monitoring programmes are summarised in the following table.

Table 10: Monitoring of residues in food and feed: consolidated results of the EU-coordinated and national programmes (2007, 2008, 2009)

		2007	2008	2009
EU-coordinated programmes	No of samples	17 575	11 610	10 553
	No of pesticides tested	71	78	138
	No of commodities tested	9	9	10
	% Compliant samples	97.7 %	97.8 %	98.8 %
National programmes	No of samples	74 305	70 143	67 978
	Annual increase of No of samples	+ 12.9 %	- 5.9 %	- 3.1 %
	No of pesticides tested	870	862	834
	% Compliant samples	96.1 %	96.5 %	97.4 %
	% Compliant EU samples / Third countries samples	97.69% / 93.16%	97.6% / 92.4%	
	% Compliant Baby Food samples	99.4 %	99.8 %	99.2 %
	% Compliant Organic Food samples	98.7%	99.1 %	99.6 %
	No of commodities tested	350	200	300

Source: Compiled by the FCEC based on EFSA annual reports 2007, 2008, 2009.

Remark: the large increase of numbers of samples in 2007 (+12.9 %) results from the entry of Bulgaria and Romania in the EU.

[22] 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.

Several interviewees have highlighted that the monitoring of pesticide residues in food is the only monitoring programme where all the results generated at EU level are compiled in a single database. This data collection also allows for analysing trends over time and for very detailed analysis, including the exposure assessment of European consumers to pesticide residues via food. Thus, the EU wide data collection provides unique assets that should be considered in a cost/benefit analysis.

These mandatory programmes to meet the requirements of Articles 29, 30 and 31 of Regulation 396/2005 are the main activity of EU MS when it relates to monitoring activities in food and feed. Resources engaged in this programme are important. The cost for sample collection and analysis is high (e.g. in the UK, HSE in charge of carrying out the programmes reports an annual cost of about 2.5 Mio Euros). Authorities from other MS that have been met during the field visits have mentioned that the overall budget figure is not available as not calculated. For example for France, the national programme is defined by the Ministry of Agriculture but then the sampling is carried out by administrative staff in each of the 22 regions and this task is performed among others related to official controls on PPP. In total, there are 60 FTEs dedicated to official controls in the field of pesticides (all obligations included). When it comes to laboratory analyses a large part of them are done by public laboratories that are not invoicing the Ministry of Agriculture for this task as it is part of their annual budget. Therefore unit costs of laboratory analyses are not known.

When it relates to assessing the cost-efficiency of the national programmes, the same authorities have highlighted that the comparison of ratio e.g. total cost/no of samples analysed or total cost/number of a.s. searched for would lead to biased results. Other indicators should be defined to compare programmes, if required.

From a total of 15 MS that have answered to the survey questionnaire, 12 MS have not reported any specific voluntary activity in addition to the annual running of the EU coordinated programme and the national programme in conformity with the EU obligations. Several of these MS have highlighted the challenges they are facing in producing data in the format required by EFSA which represents a major on-going administrative and IT effort as regular investment to increase technical capacity is required to ensure that the methodology remains up to date, and specifically to meet the increased analytical specifications for the EU co-ordinated programme. However it should be stated that once the format for reporting the results to EFSA has been implemented at national level, no additional administrative costs are required. The implementation was an investment which is expected to reduce the administrative costs in the future.

BE, FI and the UK have reported voluntary initiatives as, to their opinion, detection frequency and number of exceedances can lead to unnecessary concern among consumers. A more balanced report should be obtained by considering the exposure to pesticide residues by matching results of the pesticides monitoring programmes with food consumption statistics. The description of each of these programmes is presented in the following table.

Table 11: Voluntary initiatives on monitoring impacts of residues of PPP on food and feed reported by MS

MS	Objective	Design	Actors	Targets	Measured impacts	Timing	IT tools	Budget	Follow-up
BE	To measure exposure of Belgian consumers to pesticide residues through consumption of fruit and vegetables	Matching of data collected in the Belgian food consumption survey performed by the Institute of Public Health (ISP 2006) and data of the 2008 pesticide monitoring programme of the FASFC	Authorities (FASC)	Belgian consumers of fruit and vegetables	Calculations demonstrated that the chronic exposure of the Belgian adult population (15 years and older) is generally under control, even at high or frequent consumption of fruit and vegetables	2008	N/A	Not reported	Programmes that were initially planned have not been established
FI	To estimate exposure in acute setting and also among sensitive groups, such as young children	cumulative risk assessment study	Authority (EVIRA)	Sensitive groups (e.g. young children)	Dietary exposure to residues of plant protection products is characterised by a low chronic exposure level, on which higher acute exposure occasionally takes place	2010	N/A	Not reported	The report concluded that monitoring of sensitive subpopulations should be continued.
UK	to sensitize the food supply actors (retailers) on the risks of residues in food and over time the reduction of incidences in residues of health concern for consumers and increase compliance with MRLs.	Tests of all positive samples are not included as a matter of routine, but only where a cost/benefit analysis indicates this would be worthwhile.	Health and Safety Executive-	All food samples in which PPP residues have been found (at detection level)	Every positive detection is checked against at least one of the following indicator (MRLs, ARfDs, ADIs). If estimated intakes from residues found are a health concerns, and residues are above the MRL, HSE sends a draft notification to the Food Standards Agency, for their onward transmission via the RASFF.				Additional follow-up action is performed on a case by case basis.

EFSA is also currently deepening the possibilities to extend the current approach to assess cumulative and synergistic risks from pesticides to human health. Based on the monitoring data provided by MS, EFSA performs dietary exposure assessments regarding pesticide residues via food.

These EFSA model developments may justify the weak involvement of MS to spend resources on additional national initiatives as they may consider that it will come via the EU channel. EFSA work has started in 2009 and is currently on going.

As a conclusion, it should be noted that these different voluntary initiatives are following the same approach.

3.2.2 Gathering of information on pesticides acute poisoning and chronic poisoning

Article 7(2) of SUD sets the obligation for MS to *"[…] 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 pesticides application areas"*. This obligation applies as of 26 November 2011 (Article 23 of the SUD Directive).

This chapter aims at understanding how MS have already implemented this obligation or are going to implement it.

Sixteen (16) MS have provided an answer to the question included in the survey questionnaire related to the enforcement of this obligation. From these answers, the following analytical grid has been developed.

Table 12: Analytical grid of implementation of Article 7(2) regarding the implementation a systems for gathering information on pesticides acute poisoning incidents, and chronic poisoning developments

	Name of the program	Objectives	Design	Governance and actors	Target groups	Substances covered	Expected results	Status	Measured impacts and observed results	Means of communication
BE	**National** Toxico-vigilance	**Incident reporting system** Monitoring of poisoning incidents via an incident reporting system (Poison centre) and a follow-up of activities get a better view on the effects of the exposure. **(acute poisoning)**	Follow up by telephone was made in 2006 and 2011. These calls involved only plant protection products and biocides	FPS Health, Food Chain Safety and Environment within the frame of the Federal Reduction programme for PPP and biocides.	All exposed persons + pets	PPP and biocides	Reduction of poisoning incidents	Permanent 5 yearly programme	From 2003 until 2006 included the Poison Centre received annually 2744 calls (2433-2914) for exposures to ag. Products. Noteworthy is the proportion of animal victims (30%). Regarding the calls for children (27%) 2/3 of the cases are about children within the age of 1 to 4. The products with the most exposures to are pest control products (product-type 18 of the biocides), rodenticides, herbicides and insecticides .	FPS Health, Food Chain Safety and Environment web-site (http://www.prpb.be)
CZ	**National** register of hospitalised persons	**Incident reporting system** Providing statistical data on all the persons hospitalised from the reason of poisoning caused by pesticides. A central source of information on healthy status of human population of the Czech Republic. Statistical data on all the in-patients in the Czech hospitals. **(acute poisoning)**	Statistical Classification of Diseases and Related Health Problems, (WHO 2004)	Institute of Health Information and Statistics of the Czech Republic under governance of the Ministry of Health	All the hospitalised persons from the reason of poisoning caused by pesticides	All main groups of pesticides	Updated data on persons suffering from poisons caused by pesticides and subjected to hospitalisation	Permanent yearly programme Since 1960 Data are summarised yearly since 1992	Number of hospitalised persons caused by poisons by pesticides as well as duration of the hospitalisation was decreasing by third in the last years in comparison with the 1990s.	Internal e-database of Ministry of Health
DE	**National** Register for cases of poisoning reported by physicians	**Incident reporting system by physicians and additional information by German Poison Centres** Data related to acute poisoning from all chemical products and substances including pesticides.	Annual report (German and English)	Federal Institute for Risk Assessment and German Poison Centres	All exposed persons	All chemicals including pesticides	Reduction of poisoning incidents	Permanent yearly programme since 1990	Very few serious cases of pesticide poisoning every year.	Federal Institute for Risk assessment web-site
DK	**National** Danish register for acute cases	**Incident reporting system** Statistical data related to acute poisoning from all chemicals including PPP. This	Very few cases of PPP every year. Therefore the		All consumers	All chemicals including pesticides		Permanent yearly programme	Very few cases of pesticide poisoning every year.	Ministry of Health website

	Name of the program	Objectives	Design	Governance and actors	Target groups	Substances covered	Expected results	Status	Measured impacts and observed results	Means of communication
	of poisoning.	register covers all cases of **acute poisoning**, including poisoning caused by pesticides	system has not been modified to adjust to SUD.							
EE	**National** Poisoning information centre-hotline via the Poison Information Centre's Estonian Poisoning Information Centre's (EPIC)	**Incident reporting system** To provide relevant and updated information in the area of poisoning and to ensure that such information is available and can be used by medical staff and citizens. The most effective prevention programmes not only diminish poisoning risk but build competence and awareness about prevention/treatment measures **(acute poisoning)**	All calls answered in EPIC from the 1st of October 2008 to the 30th of September 2010 were analysed	Health board, Ministry of Social Affairs	Public and healthcare specialist and general public	All chemicals including pesticides	To reduce the incidence of illness, damage to health and death as a result of severe cases of poisoning.	Permanent yearly programme	Active & systematic poisons information education increases the awareness of the population to the poison information centre without an expensive media campaign and has a positive impact on the volume of poisoning calls handled by the centre. The educational programmes did not have an immediate effect on the call volume & structure but has a long term positive effect.	Through distributing brochures and making presentations at children and senior centres, health and safety fairs, in hospitals and ambulances.
FI	Planned. This project is under investigation and noted in the Finnish NAP.									
FR	**National** Poison centres	**Incident reporting system and research** Three (3) main initiatives grouped under the toxico vigilance project (included in the Ecophyto 2018 plan – Axe9): • Poison Centres is an incident reporting system based on 10 regional poison centres • Phyt'Attitude intends to better understand sanitary issues and undesired effects of pesticides • RNV3P analysed **chronic exposures** to pesticides	Statistical analyses of reported cases. Data of the 3 programmes aggregated and used by the InVS for qualitative analysis.	Institut de Veille Sanitaire (InVS)	General public and professional	Any substance or any pollution	To monitor incidents in order to set-up alert actions, as well as prevention and training activities for all public	Permanent yearly programme	200 000 dossiers in the DB (BNPC) – 3% of cases due to PPP	Various (web sites, regular reporting, etc…)
	National Phytattitude				Professional			Permanent yearly programme Since 1991 Voluntary	A total of 1909 cases reported during the 1997-2007 period of which 1554 considered as due to PPP.	
	National RNV3P:				Professional			Permanent yearly	Only 0.2% of reported cases (61 in total) are related to PPP poisoning according to	

	Name of the program	Objectives	Design	Governance and actors	Target groups	Substances covered	Expected results	Status	Measured impacts and observed results	Means of communication
	network of surveillance of professional diseases	by medical experts						programme since 2001	evaluation carried out under the RNV3P network.	
IE	**National** Poisons Information Centre	The core function of the National Poisons Information Centre (NPIC) is to provide information, rapidly, by telephone, to assist in the treatment of poisoning. **(acute poisoning)**	Not reported	National Poisons information Centre	All society.	All substances (PPP, BP, VMP, HMP, industrial etc..)	N/A	Ongoing.	In 2010 the NPIC answered 9,330 enquiries about human poisoning and followed-up 361 serious or unusual cases of poisoning to determine the origin of the incident.	Internet and emergency helpline and annual report
NL	**National** Intoxication Information Centre (NVIC)	**Incident reporting system.** The Intoxication Information Centre (part of the University Medical Center Utrecht) advises on poisoning. The centre specialises in conducting rapid risk assessment of health effects following exposure to xenobiotics. **(acute poisoning)**	Doctors must report intoxication accidents to this Centre. The Centre collects these data, publishes statistics and advises to doctors and government.	The University Medical Centre Utrecht institute acts as an information centre for all medical workers with regards to intoxications.	Medical workers and gov.	Alcohol, pesticides, toys, cosmetics, biocides		Permanent yearly programme since 2010	The number of acute poisoning by pesticides is very small in the Netherlands.	Advises to medical workers and government website. Accountability for implementing the statutory duties of the NVIC
RO	**National** programme for monitoring environmental determinants of living and working	**Incident reporting system** Protecting public health against the risk generated by the use of pesticides. Monitoring acute non-professional intoxication with pesticides Reducing the number of **acute poisoning** with non-professional pesticides, especially serious cases requiring hospitalization or	Standardized formulars (statement cards for acute non-professional intoxication with pesticides)	Health Ministry:- Institute of Public Health Bucharest - Country Public Health Directorates (c's – PHD).	General population	Specific classes of highly toxic pesticides only	Decrease the number of cases	Permanent yearly programme	Human mortality rate of non-professional users dropped Decrease of the number of reported incidents.	Fax, e-mail, post

	Name of the program	Objectives	Design	Governance and actors	Target groups	Substances covered	Expected results	Status	Measured impacts and observed results	Means of communication
		that lead to the death of intoxicated people.								
PL	Planned. Currently, there is no coordinated monitoring of poisoning incidents (in terms of poisoning cases in the scope of OHS authorities). The existing four regional centres for poisoning incidents (concerned with all types of poisonings, not only with respect to pesticides) in Poland currently are not obliged to communicate any information to the Ministry of Agriculture.									
SE	**National** Swedish Poisons Information Centre (GIC).	**Communication scheme** The GIC provides information about risks, symptoms and treatment of various types of **acute poisoning** via the phone (24/24)	no systematic review is undertaken in order to generate conclusions in terms of impacts of use	Swedish Poisons Information Centre and EPA.	General population	Any substances		Permanent yearly programme	GIC received about 80 000 calls per year, of which about 60 000 relates to acute intoxication or poisoning incidents in humans. A small proportion of calls are general inquiries about risks and prevention. About 50% of enquiries address chemicals as a whole.	Results frequently forwarded to EPA
SK	**National** Acute poisoning - information exchange scheme	**Communication scheme Acute poisoning** - information exchange and help		Ministry of Health/ National toxicological centre	Users of PPPs	All pesticides		Permanent yearly programme	Protection of human health, in case of acute poisoning fast information exchange	Web site
U K	**National** PIAP	**Assessment of reported incidents (acute and chronic poisoning)** The Panel examines investigations of ill-health possibly caused by pesticide exposure and assesses whether the incident was likely to have been caused by pesticide exposure based on data collected from two incident reporting schemes: the National Poisons information centre and Human Health Enquiry and Incident survey.	The Panel reflects on whether the data, when compared across a number of years, displays any relevant trends.	The HSE Agriculture &Food Sector, the HSE Medical Unit, the Department of Health, in liaison with the Advisory Committee on Pesticides, The National Health Service's General Practitioner Reporting Scheme, the Info Service.	All	Pesticides, plant protection products.	A downward trend of reporting of incidents from incident-survey-HHEIS-and-resistance-reporting-2010.	Permanent yearly programme (see PAHES WG under Chapter 3.2.3)	Further data on alleged ill-health from pesticide use is gathered from approval-holders, who are required to log all reports of alleged poisoning incidents from both professional and non-professional use, and supply these annually to Government.	

Note: no budget data have reported by MS

The information highlights the large differences and variability of schemes that actually exist in the EU as well as the complexity of the systems. MS that have answered to the survey questionnaire can be grouped in 3 different categories:

a) MS that have in place an information platform to communicate on the risks of chemicals (including pesticides) but that are not recording incidents. These platforms can be considered as help desk to inform persons that are looking for information on the risks and on the symptoms. These platforms can be contacted via phone or via a web site dedicated for that purpose.

b) MS that have in place a help desk that could be contacted by phone or via a website but that have also implemented a system to record incidents that are reported by persons calling the poisoning reporting centre. Under this approach all poisoning incident cases from any origin (contamination or pollution) are collected and centralised;

c) MS that have a help desk and an incident reporting system via the poisoning centre in place and that are trying to understand the origin of these incidents. Therefore going further than just collecting statistics on incidents that are reported to the centre.

   These approaches can be rather simple like in Belgium, country in which a follow-up is performed for all incidents that are reported by phoning individually the person that notifies the incident to further understand the reasons of the incident.

   A more sophisticated approach is the one followed in the UK, where a panel has been established to analyse incident reports that have been collected and to see how to improve the current general incident reporting systems to better understand impacts of use of PPP on humans.

   A third approach is to complement the UK approach by individual monitoring clinical actions conducted by doctors and hospital experts (e.g. toxico-vigilance programme in France) to study the origin of the poisoning when it has not been able to understand the origin of the problem by interviewing the person that has notified the incident. Several experts and officials have highlighted that costs for running such type of individual clinical research actions are high and therefore due to budget limitations the number of research studies to fully understand the origin of the poisoning is limited.

Only France has reported a network regarding the monitoring of chronic poisoning. This network called the National Occupational Illness Surveillance and Prevention Network (RNV3P) was established in 2002 as a network of experts from 32 university hospitals as well as occupational physicians records and monitors occupational health problems (OHPs) based on occupational health consultations in university hospitals in mainland France and in occupational medical health services (approximately 5,000 OHPs/year for patients seen in hospital consultations). The OHP data are collected systematically according to a standardised code which is attributed based on main variables of interest: disease and co-morbidity (CIM-10), an occupational code (ILO) and a code for the type and domain of professional activity (NAF-93). For certain recorded problems the clinician also reports a degree of impossibility for attributing the level of certainty for the problem's relationship to the main illness (weak, probable, strong). At present, 30,000 OHPs diagnosed and recorded in occupational illness consultation centres have been recorded in the information database and have been utilised for epidemiological surveillance. The surveillance activity of the network is carried out on two levels. First, a planned epidemiological health activity is programmed which focuses on estimating the incidence of illness – predefined problems. In a parallel fashion, research is developed to explore the tools which can be used to highlight emerging illness and develop methodologies to detect the relationships of unknown problems to the incidence of these illnesses – including those

that present a communicable nature (either temporarily or over the long term), in certain professions or sectors. The cost of this network has not been reported.

As summarised in the table above, the French approach is to strengthen the cooperation between the 3 programmes that have been described under Axis 9 of the Ecophyto 2018 plan that has been established in late 2011. The first initiatives under that axis is to centralised all data in a national database called CAP TV, to improve knowledge on exposure, and to help employers to replace CMR substances with lower toxic ones. The 2012 budget is about 330 K Euros and is expected to grow in the following years (forecasting to be done based on 2012 experience) of which 100 K euros is being paid by stakeholders.

3.2.3 Surveillance on operators and workers

Article 153 of the Treaty on the Functioning of the EU provides that the Union shall support and complement MS activities in the field of improvement of the working environment to protect workers' health and safety. This obligation is complied with by Directive 98/24/EC[23] which is focusing on employers' obligations mainly in term of setting-up prevention, training, and education actions towards employees.

Particularly, Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work[24] aims "*at the protection of workers against risks to their health and safety, including the prevention of such risks, arising or likely to arise from exposure to carcinogens or mutagens at work*". Under this Directive, main obligations are employers' obligations in term of assessing the risk when using carcinogen and mutagens substances and of establishing prevention measures (e.g. hygiene and individual protection, information and training of workers) at the place of work. As for Directive 98/24/EC, Article 14 of Directive 2004/37/EC provides for MS to carry out relevant health surveillance of workers for hazardous substances.

Finally, the Commission highlights in its 2007 strategy on health and safety at work (2007-2012)[25] that "*The Commission is encouraging the Member States and the business sector to implement systematic procedures to gather and analyse the data drawn from the health surveillance of workers in order to improve prevention while avoiding inflating the formal requirements to which companies are subject. The national health care systems should play a more active role by, for example, organising campaigns to raise doctors' awareness of their patients' medical history and working conditions".*

Health surveillance activities that are occurring in the context of Directives 98/24/EC and 2004/37/EC have been reported by 13 MS (CZ, DE, DK, EE, FR, FI, IE, NL, PL, RO, SE, SK, and the UK) out of the 18 that have answered to the survey questionnaire. Out of these 13 MS, 8 MS (CZ, DE, DK, FI, IE, NL, PL, and SE) have mentioned that currently no specific Occupational Health and Safety (OHS) programme related to implementation of the SUD Directive is performed (excepted the ones mentioned under Chapter 3.2.2.).

Only six specific programmes addressing protection of users of PPP have been reported as follows:

[23] Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC)

[24] Directive 2004/37/EC of the European Parliament and of the Council of 29 April 2004 on the protection of workers from the risks related to exposure to carcinogens or mutagens at work (Sixth individual Directive within the meaning of Article 16(1) of Council Directive 89/391/EEC)

[25] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 21 February 2007, entitled 'Improving quality and productivity at work: Community strategy 2007-2012 on health and safety at work' [COM(2007) 62 final - Not published in the Official Journal].

Table 13: Specific programmes addressing the impact of use of PPP on workers based on obligations of Directive 98/24/EC and Directive 2004/37/EC

MS	Name of the program	Objective	Governance and actors	Target groups	Substances covered	Timelines	Budget	Expected results	Measured impacts and observed results	Means of communication
DK	**National** Dangerous chemicals in DK	To follow the development of sales and use of dangerous chemical substances and impacts of these products on general working health	Work Environment Authority, Ministry of employment	Farmers and greenhouse gardeners employees	Most of dangerous chemical substances including pesticides	Every two years	Not reported		The Working Environment Authority carries out regular inspections of farmers and greenhouse gardeners regarding general working health. This includes working health regarding the use of any chemical substances including pesticides.	Publication of a report.
SE	**National** Säkert bondförnuft	To inform farmers about the risks, measures to be taken for workers protection with a focus on the most hazardous operations. To incentive farmers to better protect themselves	Work Env. Authority	Farmers and farming employees	Most of hazardous chemicals	2009-2013	500 K euros for the five years period (funded by the Board of Agriculture through the Rural Development Programme)	To reduce farm accident by 50% by 2013	Indicators on the efficacy of the project are regularly measured (evolution of the number of accidents, number of farmers that have been contacted). As of end of 2011, about 30,000 farmers people have participated in the activities	180 trainers have been trained to offer farmers with information, farm visits and courses to minimise risks.
SK	**National**	Recording of workers incidents (all work operations included) in a central database.	Public Health Authority	workers	All pesticides	Permanent yearly programme	Not reported	Reduction of incidents	Not reported	N/A
UK	**National** PIAP programme	The Panel examines investigations of ill-health possibly caused by pesticide exposure and assesses whether the incident was likely to have been caused by pesticide	HSE and associated authorities (see previous table (10))	All	Pesticides, plant protection products	Permanent yearly programme The UK's independent Advisory		Further data on alleged ill-health from pesticide use is gathered from approval-holders, who are required to log all reports of alleged poisoning incidents from	Permanent yearly programme (see PAHES WG under Chapter 3.2.3)	

MS	Name of the program	Objective	Governance and actors	Target groups	Substances covered	Timelines	Budget	Expected results	Measured impacts and observed results	Means of communication
		exposure based on data collected from two incident reporting schemes: the National Poisons information centre and Human Health Enquiry and Incident survey.				Committee on Pesticides is about to conduct a review of all human health monitoring efforts that could lead to revision of the programme		both professional and non- professional use, and supply these annually to Government.		
FR	**National** Axis 9 Ecophyto 2018 Toxico vigilance	See table 10 under Chapter 3.2.2								
FR	**National** Axis 2- Action 11 Programme Plan Santé Travail	Diminishing occupational risks related to chemicals Establishing the necessary measures for preventing accidents at work and occupational diseases Communication to general public	Ministry of Health	All	All chemicals	2010-2014	Not reported		Number of accidents at work and occupational diseases recorded. Number of official controls on site Evolution of number of cancers.	Communication via work inspectors only
RO	**National**	Diminishing occupational risks related to PPP activities and other chemical fertilisers Establishing the necessary measures for preventing accidents at work and occupational diseases	Ministry of Health	All	Pesticides, plant protection products	Permanent yearly programme since 2005	250 K Euros per year		Number of accidents at work and occupational diseases recorded in activities of handling, storage and domestic transportation of PPP substances and fertilisers have decreased by 2%.	

3.3 Other programmes

3.3.1 Monitoring of derogation of aerial spraying

Article 9 of SUD bans aerial spraying with provisions on possible derogation which may be allowed in special cases provided that several conditions are met as follows:

- No viable alternatives exist or there must be clear advantages of reduced impacts on human health and on the environment as compared with land-based application of pesticides;
- The pesticides must be explicitly approved for aerial spraying by the MS;
- The operator carrying out the aerial spraying must hold a certificate;
- The enterprise responsible for providing aerial spraying application shall also be certified by a CA;
- If the area to be sprayed is in close proximity to areas open to the public, specific risk management measures shall be included in the approval;
- As from 2013, the aircraft shall be equipped with accessories that constitute the best available technology to reduce spray drift.

In addition, MS shall designate authorities competent for establishing conditions for granting authorisation (Article 9(3)) and for making information available to the public. CAs shall, also, specify the measures necessary for warning residents and bystanders in due time and to protect the environment in the vicinity of the area sprayed.

Finally, Article 9(5) established that MS shall ensure the conditions referred to previous obligations (Article 9(2) and (3)) are met by conducting appropriate monitoring.

This section presents how the granting of derogation, the information to the general public and to residents and bystanders and the monitoring activity have been established by MS.

Aerial spraying has been used for various reasons mainly for economic advantages (faster treatments), for quicker reaction time and for crops where land applications were not possible (e.g. forests). Prior to the implementation of the ban, the situation regarding the economic importance of aerial spraying varied considerably between MS. Aerial spraying was widely used in a limited number of MS being France, Luxemburg (vineyards), Greece to protect olive trees, Germany, Spain and in central Europe for protection of forests. For example, in Poland the aerial spraying is conducted almost exclusively on forests. Forests in Poland are in over 80% the public property.

National legislations were quite different: going from a total ban in EE to no restriction at all in MT. In most MS aerial spraying of PPP was allowed but different restrictions had to be taken into considerations. BiPRO 2009's report for the DG ENVIR[26] presents an overview on the situation in place in MS prior to the entry into force of the SUD Directive and highlights the different approaches regarding restriction of aerial spraying.

Eighteen (18) MS have provided an answer to the survey questionnaire regarding the situation of aerial spraying in their country (Article 9 of Directive 2009/128). This information is presented in Annex 7.

[26] **http://ec.europa.eu/environment/archives/ppps/2nd_step_study.htm**

In several MS (e.g. FR, DE), the national authority in charge of the SUD has delegated the delivery of derogations, e.g. to the level of departments in case of FR. This approach should allow a better understanding of the request, a quicker response to the applicant, an optimal communication to the general public (as requested in Article 9(3) of the SUD) and a better control of the respect of the conditions under which the derogation was granted.

For the large majority of MS, the approach regarding the transposition of the obligation of communication to the general public has still to be developed. The MS that have already defined their communication approach (e.g. BE, CZ and FR) are mentioning that the communication will take place at regional level. In BE and CZ the national authority is/will be in charge of granting the derogation, and then it will notify the local administration that will be in charge of communicating to the general public. The communication channels for these 2 MS have not been reported. In FR, the derogation will be published on the website of the local administration. None of these three approaches are reporting a communication scheme that will bring the information to the residents; instead residents will have to consult websites to be informed of the aerial spraying. As an exception, in France all beekeepers' associations will receive the information via emails.

In PL, on behalf of the Polish State Treasury forests are managed by the State Forests National Forest Holding – an organization that protects, utilizes, and shapes Poland's forests. Every single action in that matter is preceded by the informative procedure in which several methods of giving information are used such as: posters, TV and radio broadcasts. Information also goes to local authorities and residents. Such messages contain information about the reason of spraying, used equipment and pesticides, period in which entry to the forest is forbidden. If there are any hives in the forest local foresters may provide safe transport to carry them away.

Finally, when it relates to monitoring actions on impacts of use of PPP on health and the environment via aerial spraying, interviewees met during the field visits have not reported any past, on-going or planned programme to assess the impacts of use of PPP via aerial spraying on health and on the environment.

Epidemiological studies on sanitary impacts of aerial spraying exist but the large majority of them have been conducted outside the EU. In 2005, the French InVS (Institut de Veille Sanitaire) made an inventory of the different studies present in literature and have reported the following programmes.

Table 14: Epidemiological studies on sanitary impacts of aerial spaying

Reference	Journal	Population	Study type	Exposure	Sanitary case	Results
Broody, 2004	Envir Health Perspective	Population USA Cape Cod	Study of 1165 females individuals	Use of PPP from spraying from the trees- not aerial spraying	Canker	Non-significant results
Saiyed, 2004	Envir Health Perspective	General population of India	Sample: 197 persons from 10 to 19 years old	Aerial spraying of endosulfan. Study in a neighbouring village to the sprayed field	Male reproductive system	Significant negative impacts of PPP
Gary, 2003	J. Toxicol Envir Health	operators - USA	Sample of 200 persons	Use of PPP per product and usage	Reproductive hormones	Significant negative impacts of PPP
Keifer, 1996	Occup Environ Med	Population Nicaragua	Sample of 100 persons	Study on persons leaving in the neighbouring area of a cotton field	Acute and toxic poisoning symptoms	More symptoms on population exposed to spraying than on non-exposed persons.
Thomas, 1992	Epidemiology	Population USA	Sample of 2000 persons	Study on persons leaving in the neighbouring area of sprayed field	Human growing development issues	No proven relation between human growing development issues and impact of PPP
Richards, 2001	Arch Environ Contam Toxicol	Farming population USA	8 locations	Aerial concentration of propanil in houses close to field sprayed by aerial means	NO	No increased concentration of PPP in houses
McClure, 2001	Arch Environ Contam Toxicol	Farming population USA	Sample of 56 adults and 52 children	Aerial spraying of propanil. Houses close to sprayed field (less than 2 kms)	Immunity system	No significant results

Source: InVS from literature 2005

The InVS report conclusion highlights the difficulties and the complexity in running epidemiological studies and monitoring studies in this field. They are expensive and in a majority of cases authors (as listed in the previous table) are mentioning that they do not lead to robust conclusions on the impact of use of pesticides applied via aerial spraying on population. This key conclusion certainly explained the reasons why this type of studies has not been initiated in the EU.

Additionally, first discussions related to the ban of aerial spraying started more than 10 years ago, and therefore MS have decided not to engage resources in research for an activity that was going to be banned.

3.3.2 Implementation of obligations of Article 67(2) of Regulation (EC) No 1107/2009

The provisions of Article 67 of Regulation (EC) No 1107/2009 applicable in all MS since 14 June 2011 provide for post-authorisation monitoring which may be required by the competent authority to the company by means of self-monitoring of the correct use of its products on the market (stewardship programmes).

A request for post-authorisation monitoring plan is not new as it was already foreseen in the approval process under Directive 91/414/EEC.

Fifteen (15) MS have provided an answer to this question via the survey questionnaire or via the interviews performed in the case of field visits.

Table 15: Status regarding request of post-authorisation monitoring programmes by MS to authorisation holders

MS	Already requested under previous legislation	No of requests to date	Motivation of the requests
BE	Yes (since implementation of Reg. 1107/2009 only)	About 20	• In application of Dir. 2010/21/EC[27], monitoring programmes have been requested for clothianidin, thiametoxam and imidacloprid (fipronil is not authorised for spraying in Belgium). • Request mainly addressing concentration of the a.s. in groundwater. When trace of the a.s. is found in groundwater; authorisation holder is required to perform post-monitoring to explain the substance presence in groundwater. • On 21/05/2012, monitoring data were requested for all active substances for which the approval of the active substance foresees the need (about 15 substances in total). For groundwater: clopyralid ; triclopyr ; captan ; chloridazone ; métazachlore ; trifloxystrobine ; isoxaflutol ; fluopicolide ; isoproturon ; terbuthylazine ; lenacil ; nicosulfuron. Surface water: fluopicolide ; isoproturon ; terbuthylazine ; quinoxyfen ; flufenacet. Long range transport : clofentezine, epoxiconazole, fluopicolide Soil : copper Bees : pyridaben ; Residus in fruits : dodine
BG	No	0	• No post-monitoring programmes requested to authorisation holders to date

[27] Commission Directive 2010/21/EU of 12 March 2010 amending Annex I to Council Directive 91/414/EEC as regards the specific provisions relating to clothianidin, thiamethoxam, fipronil and imidacloprid

MS	Already requested under previous legislation	No of requests to date	Motivation of the requests
			• Regular meetings and voluntary stewardships programmes with authorisation holders are considered sufficient to address obligations of Article 7(2)
DE	Yes (since 1998)	29 for ground Water 22 for other compartments (5 surface water, 5 soil, 1 air, Health 7, Bees 4)	• Already in place for several years in Germany (German Plant Protection Act of 1986: § 15 (5) Plant Protection Act 1986 and § 15a (2) Plant Protection Act 1998). • Post-registration monitoring studies are used to clarify special questions. In the past, a request for a post-registration monitoring study could be a result from the risk assessment within the review of active substances on EU level. Examples: o Surface water: behaviour of an active substance in potato processing (e.g. washing); monitoring in agricultural areas with a high density of surface water. o Soil: potential for accumulation in soil. o Health of users, bystanders or animals: Request on a report about health damages; wildlife incident monitoring data for hares. o Bee monitoring: Studies concerning guttation; monitoring of dust drift.
ES	Yes (since 2007)	Unknown	• Already implemented prior to entry into force of Reg. 1107/2009 (El artículo 67 se implementa en España a través de la Orden APA/326/2007, de 9 de febrero (BOE Nº 43, de 19 de febrero de 2007)
FI	No	0	• No post-monitoring programmes requested to authorisation holders to date
FR	Yes (since 1992)	About 10% of registered products	• Similar to Germany. • A post-authorisation monitoring plan has been requested for about 10% of registered products since 1992. Compartments covered are mainly water quality and impacts on bees • No need to modify the past approach.
IE	No	0	• Implementing legislation for the Regulation will be finally in place by 23rd May 2012. Under the current regulations we have not seen the need to require any such monitoring activities from the authorisation holders.
IT	No	0	• No post-monitoring programmes requested to authorisation holders to date
LT	No	0	• No post-monitoring programmes requested to authorisation holders to date • Regular meetings and voluntary stewardships programmes with authorisation holders are considered sufficient to address these issues
NL	Yes (since 2006)	Ground water: 5 Drinking water: about 10 times	• Entry into force of HTB 1.0 legislation in 2006 • Approach based on a decision tree for the evaluation of pesticides leaching from soils o Surface water: In the (quite rare) case that for a substance the exceeding can be (statistically) related to the specific land use that is applied for, an adequate assessment is asked from the applicant. This may be

MS	Already requested under previous legislation	No of requests to date	Motivation of the requests
			achieved by performing a specific monitoring action but authorities do not specifically require new monitoring data. A general remark is that there is already a wide monitoring programme in The Netherlands by the Water Boards. o Drinking water (groundwater): for any new substances on the Dutch market and in specific cases a post registration monitoring on drinking water abstraction points has been required.
PL	No	Very rare to non-existent	
RO	No	0	• Implementation of Article 7(2) not performed yet
SE	Yes	3-4 times before 2011	• No post-monitoring programmes requested to authorisation holders since entry into force of Reg. 1107/2009
SK	Yes (since 2011)	Not known	• Entry into force of the new phytosanitary act (No 405/2011 Coll.) in 2011
UK	No	0	• No request of post-monitoring monitoring plans to date although the UK authorities have agreed stewardship schemes for certain products

From the 15 MS that have answered to this question via the survey questionnaire and during the field visits, 8 of them (BG, FI, IE, IT, LT, PL, RO, and the UK) have indicated that no specific request addressing the set-up of a post-authorisation monitoring plan has been asked to authorisation holders to date.

The 7 other MS (BE, DE, ES, FR, NL, SE, and SK) have already implemented this obligation in the previous regulation for several years for the majority of them. The number of requests remains rather low. FR and DE are the only countries in which a significant number of requests have been asked (i.e. about 10% of the registered PPP in France).

Clear reporting deadlines are included in the official request sent to authorisation owner to perform these post-monitoring plans. Then officials' role is to secure that these deadlines are respected. Data provided by the authorisation holders are then forwarded to the risk assessment agency for evaluation. MS officials met during the field visits have not reported any other use of these data than the ones mentioned above.

3.3.3 Activities related to the obligations of Article 68 of Reg 1107/2009 (monitoring and official controls including control of proper application of risk mitigation measures and possible monitoring activities deriving from conditions of approval on specific active substances

Article 68 of Regulation (EC) No 1107/2009 specifies that "*Member States shall carry out official controls in order to enforce compliance with this Regulation. They shall finalise and transmit to the Commission a report on the scope and the results of these controls within six months of the end of the year to which the reports relate. Commission experts shall carry out general and specific audits in the Member States for purposes of verifying the official controls carried out by the Member States*".

Proper use of plant protection products is subject to enforcement and proper use shall also comply with the provisions of the SUD.

Moreover, as already in force under Directive 91/414/EEC and now indicated under Article 6 of Regulation (EC) No 1107/2009 conditions of approval of an active substance can include requirements for application of risk mitigation measures and monitoring after use. Hence, Member States could have initiated such monitoring activities required by specific EU approval decisions.

These monitoring measures and monitoring after use are considered by a large majority of interviewees as post-authorisation monitoring plans and are therefore included in the previous chapter. **None of the respondents to the general survey have reported any monitoring action on impact of use of PPP in this field**.

Enforcement of this regulation is audited by the FVO. Official controls on national enforcement systems in the field of use and placing on the market of PPP have been carried out on a regular basis by the FVO since implementation of the Directive 91/414/EEC in 1993[28]. FVO has planned a new multi-annual auditing programme that has started earlier this year..

3.4 Mapping of these monitoring and surveillance activities within the NAPs (only for MS that have published a finalised NAP).

Provisions to be included in the NAPs are listed from Article 5 to Article 15 of the SUD. Article 4(1) mentions that "*MS shall adopt their National Action Plans to […]. These targets may cover different areas of concern, for example worker protection, protection of the environment, residues, use of specific techniques or use of specific crops*".

Therefore, Member States are invited to go further than the measures that are described under Articles 5 to 15. In order to identify what are the risks currently on the radar-screen of MS and based on data collected via the general survey completed by discussions with policy officers, the positioning of the different national monitoring programmes in relation to the NAP is presented below.

This mapping is mainly carried out for MS that have published a NAP[29]. These MS are BE, DE, DK, FI, FR, NL, SE, and the UK. Before presenting individual MS approaches, it is important to position these activities considering the history and the strategy of each MS in actions and programmes to reduce impacts of use of PPP on the environment and on human health.

[28] An overview on the results of the first series of missions on this sector carried out from 1998 to 2003 is available on DG SANCO webpage. http://ec.europa.eu/food/fvo/specialreports/sr_rep_9507-2003_en.pdf.
[29] as described in Annex 5

Figure 3: Historical development of national plans aiming at reducing impacts and use of PPP on human health and the environment in the EU

MS	Name of the programme	1980	1985	1990	1995	2000	2005	2010	Objectives	Actions	Results
Denmark											
	Pesticide Action Plan PAP-I								50% **volume** reduction before 1997	Revision of Chemical Act taxation (in 1996, 54% tax on insecticides and 33% for other PPP)	- 2.67 >> TFI >> 2.45 - 50% volume reduction via low doses - 135 a.s. out of 213 authorised were banned
	BICHEL Committee								Committee including all concerned parties for defining new stratgey		
	Pesticide Action Plan PAP-II								Reduction of **use**:TFI to 2.00 in 2004	Decision support systems experienced groups	TFI already at 2.00 in 2000
	Pesticide Action Plan PAP-II								Reduction of **use**:TFI to 1.7 in 2009	Consultation at farm level subsidy on pesticide free	- TFI increased to 2.3 in 2006 - Questionning about TFI as an indicator
	Green Growth								Pesticide impact index to be reduced by 1.4 by end of 2013	Law on restructuring the pesticide tax system, new cropping systems, buffer zones, etc…	
The Netherlands											
	Multi year Crop Protection Plan								50% **volume reduction** and 50-90% **emission reduction** compared to 1984-1988	Restriction on soil disinfection phasing-out heavy pesticides (sold at dose rate of 200-300kg/ha)	- 49% volume reduction - 54-79% emission reduction
	Covenant Crop Protection								95% **impact reduction** compared to 1998	Buffer zones/better nozzles Introduction safe pesticides	86% impact reduction in 2006
The UK											
	UK pesticides strategy								Several qualitative economic, environmental and social objectives (7 in total). No single indicator used against a unique national	- 7 individual action plan to answer to each of the 7 strategic outcome	
France											
	Plan Interministériel Réduction des risques liées aux pesticides (PIRRP)								- **Reduce impact** of pesticides and - **50% Volume** reduction of most dangerous substances	- Improve registration system, assure tracebaility of PPP, reduce aerial spraying, strenghten control, etc…	
	Ecophyto 2018								- **50% reduction of pesticides use by 2018, if possible** translated in a 50% reduction of treatment frequency (TFI)	- 9 action plans (axis) implementing obligations of SUD Directive + pest monitoring network	

MS	Name of the programme	1980	1985	1990	1995	2000	2005	2010	Objectives	Actions	Results
Belgium											
	Programme de Réduction des Pesticides et des Biocides (PRPB)								- **Reduction of 25% of impacts of PPP** and - **Reduction of 50% of impacts of biocides** on human health and on the environment	Set-up of the governance (14 thematic groups led to the identification of 160 recommendations (actions))	
	First update in 2007									Proritisation of actions by ministries and implementation	
	Second update in 2009									Reinforcement of actions regarding biocides	
	Third update in 2011									Follow-up of tox vigilance survey, support development of PPP for organic products	
Germany											
	Plant Protection Product Reduction Programme								- **Risk reduction** w/o setting a clear quantitative objective.	- Complying with necessary minimum requirement when using PPP - Foster innovation, develop DSS	
	NAP on sustainable use of PPP								- Expectations of a risk potential that can be reduced by a further 25% by 2020 compared to 1996-2005 average.	- Development of IPM and non-chemical solutions - Improve plant protection equipment	
Sweden											
	1st NAP 1987-1990/96								Use reduction goal of 50 % (with respect to 1981-85 baseline); Update 1990, to total 75 %		49 % (until 1990) / 64 % (1990-1996) achieved
	2nd program 1997-2001								No use target, but risk reduction expressed by indicators		
	3rd program 2001-2006/2009								No use target, but risk reduction expressed by indicators		
	4th program 2010-2013								Reduced risk, measured by risk indicators, almost no residues in water, low residue levels in domestic vegetable crops. Expectations further risk reduction of 25% by 2020 (with respect to 1996-2005 baseline)	o Changeover to pesticides with less risk o Regulation of the handling of pesticides o Training and information in safer handling of pesticides o Control of pesticides residues in food and water o Pesticide taxes o Reduced use of pesticides	

The following table presents the positioning of the EU mandatory monitoring programmes in relation to the NAP (inside the NAP or outside) and then lists the additional monitoring and surveillance programmes that are considered under the NAP. Data collection regarding volumes of annual sales data of PPP and use data in regard to obligations of the PPP statistics Regulation[30] are not included in this analysis as they are not considered as being monitoring actions on the impact of use of PPP.

Table 16: Positioning of the MRLs and WFD mandatory programmes and other monitoring programmes in regard to the NAPs

MS	EU Mandatory monitoring programmes		Main national monitoring and surveillance existing initiatives reported as being part of the NAP
	MRLs	WFD	
MS that have finalised a National Action Plan			
BE	🔴	🔴	- Toxico vigilance
DE	🔴	🔴	- Passive monitoring of poisoning incidents
DK	🔴	🔴	- Passive monitoring of poisoning incidents
FI	🟢	🟢	
FR	🔴	🔴	- Toxicovigilance - Monitoring on non-intentional effects (resistances and biodiversity)
NL	🔴	🔴	-Toxicology information center
SE	🔴	🟢	
UK	🟢	🔴	- PIAP Programmes - WIIS Scheme
Other MS			
CZ	🟢	🔴	-Toxicology information center
PL	🟢	🟢	

🟢 : Included in the NAP
🔴 : NOT included in the NAP

This table clearly highlights the different strategies taken by MS. In the majority of them (BE, DE, DK, FR, NL) the MRLs and WFD monitoring programmes which are EU mandatory actions are not considered as being part of the NAP[31]. They have been in place for several years already and therefore they are considered as independent activities. In a few other MS (FI and PL) the strategy has been to include them in the NAP as there are directly related to the impact of use of PPP. Poland has indicated that this programme is one of the major pillars of the future NAP. In the CZ, SE, and the UK, the approach has been to include only one of the 2 mandatory programmes in the NAP (MRLs monitoring programme in CZ and the UK and WFD monitoring programme in SE).

[30] Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides.
[31] This analysis is based on data collected via the general survey only as this is the latest available information. It should be highlighted that e.g. the German NAP drafted in 2008 indicates that monitoring of MRLs and reducing PPP residues in food is included in the NAP (Chapter 4.5 of the NAP document published by the Federal Ministry of Food, Agriculture and Consumer protection in 2008).

This analysis is limited to 10 MS at this stage. All NAPs shall be communicated to the Commission by 26 November 2012.

3.5 Coordination tools and governance of the different actions at national level

Article 4 of SUD provides for the development of NAP which shall aim among others at "*setting quantitative objectives, targets, measures, timelines and indicators to reduce risks and impacts of pesticide use on human health and the environment*". Therefore, the NAP has a central role in terms of defining the overall national objectives to reduce impact of use of pesticides and in term of measuring progress. To be able to measure progress, all information from the different programmes and actions (being monitoring programmes or not) (being in the NAP or not) has to be consolidated at the NAP level.

The SUD do not include any clear provision related to the consolidation of this information but in its Recital 5, it invites MS to coordinate actions of the NAP with other implementation plans as follows: "*National Action Plans should be coordinated with implementation plans under other relevant Community legislation and could be used by grouping together objectives to be achieved under other Community legislation related to pesticides".*

Finally, "*the exchange of information on the objectives and actions MS lay down in their NAP is a very important element for achieving the objectives of this Directive. Therefore, it is appropriate to request MS to report regularly to the Commission and to the other MS, in particular on the implementation and results of their NAP and on their experience* "(Recital 7 of SUD).

All these points highlight the importance of coordinating the different information packages from the different national programmes in order to support the achievement of the above mentioned objectives.

In order to analyse how MS are currently organised and identify the level of coordination between the different programmes, we have first asked each MS, via a preliminary questionnaire to the official in charge of the SUD, to identify all authorities in charge of the various actions covered by this study (see Figure 2). From the 23 answers that have been received, 18 MS have described the split of responsibilities and have provided information on which body is in charge of what. The other 5 MS have not described the role and responsibility of the different authorities but have just identified themselves as the central contact point.

From these 18 answers, only the UK has mentioned that a single authority was in charge of all obligations covered by this study (i.e. HSE), the distribution of responsibilities for other MS is as follows:

Table 17: Frequency of distribution of responsibilities for obligations covered by the study

	Number of different authorities in charge of enforcing monitoring and surveillance provisions for obligations covered by this study (see Figure 2)							
	1	2	3	4	5	6	7	8
No of MS (frequency)	1 (UK)	3	5	5	2		1	1

This table highlights that, with the exception of the UK, a minimum of two authorities is in charge of monitoring and surveillance activities in the field of impacts of PPP. Results are ranging from 2 different authorities for 3 MS (AT, IT, FR) to 7 for RO and 8 for EE.

MS officials that have been met during the field visits have highlighted that several coordination committees are in place in order to centralise and analyse information from several sources and several projects.

For example, the UK mentioned the existence of the HSE's Pesticide Incidents Appraisal Panel that considers all incidents where there is any allegation on use of a pesticide to cause ill health, of the Pesticides Adverse Health Effect Surveillance Scheme Working Group (PAHES WG) which was set up in 2010 to define the strengths and weaknesses of existing systems for reporting of adverse health effects related to pesticides exposure and to assess the feasibility of developing an integrated system for reporting, investigating and evaluating exposure to pesticides in relation to human health, and of the Pesticide Forum. The Pesticide Forum created in 1996 is a multi-stakeholders platform that brings together all actors (NGOs, Producers, authorities, consumers, and the pesticide industry) to coordinate and monitor actions that are part of the UK strategy on sustainable use of pesticides. This forum also advices government as well as the scientific Advisory Committee on pesticides (ACP) does.

In FR, the CNOS (National Ecophyto 2018 Committee) is in charge of coordinating all actions included in the Ecophyto Plan and therefore do not coordinate the actions related to the monitoring of residues in food and the water quality monitoring as these monitoring programmes are not included in the Ecophyto 2018 Plan. However the results of these monitoring programmes are used as data input for the calculation of indicators for the NAP. Additionally, the pesticide residue observatory (ORP) collects and exploits information on pesticides in the environment. It is implemented as part of the two actions undertaken for the National Health and Environment Plan (PNSE) 2004-2008 (action 36 "*organise the exploitation of existing data in order to assess the exposure of the population to pesticides*" and action 40 "*run a health-environment surveillance network to support preventive and precautionary policies*". When it relates to other monitoring actions that are outside these scopes, the ministerial inter-service approach applies.

The Belgian PRPB plan has been developed based on a participative approach of all stakeholders, from producers to consumers. According to Belgian authorities, it is intended to organise a national forum of stakeholders in the coming months to advise the national action plan.

The well-known Bichel Committee in DK was established when launching the second national plan aiming at reducing impact of PPP. This committee composed of all actors of the agricultural and food supply chain that were participating on a voluntary basis was very active and engaged in coordinating all actions of the plan and in measuring its efficiency.

In the NL, the "polder model" refers to the Dutch know-how in coordinating a diversity of stakeholders around large initiatives. The 2003 National Agreement signalled a new collaboration between stakeholders (Barzman and Dachbrodt-Saaydeh, 2011).

In DE, the elaboration, review and further development of the NAP is accompanied by a close consultation of the "Forum to the NAP for the sustainable use of PPP", in which representatives of different groups of stakeholders (stemming inter alia from the area of consumer protection, water management, agriculture, trade, environmental/ nature protection NGO, as well as different concerned public authorities) are present under coordination of Federal level. The Forum has working groups on water, biodiversity, and indicators. Further, the Ministry organises regular co-ordination meetings to selected issues of relevance for the NAP (e.g. on inspections, illegal trade, etc. ...), where the competent authorities both horizontally (other Federal ministries) and vertically (ministries of Länder) are present.

These different examples show that a similar approach has been taken by MS. It is based on a large voluntary multi-stakeholders presence to review progress made with the national action plan and to make recommendations to the government for its on-going enhancement.

These forums are active in collecting, analysing, and reporting information but none of the MS have been reported the development of a unique IT tool to consolidate data and information. When IT tools exist, they are supporting information management of a given action. Most of the interviewees met during the field visits consider that if there is a need to consolidate information, it seems unrealistic to create a unique IT Tool that would have no added value for the entire system. **Information flow can be optimised without the support of IT tools.**

The question of assessing efficiency of the different programmes has been reported in the previous chapters and for each type of programmes. In summary it can be concluded that individual assessments are performed on specific actions but not on a regular basis. These assessments are mainly qualitative and are performed by the actors of the actions themselves. When it concerns assessing the governance of the programmes, only France and the NL have reported an evaluation in that field during the field visits.

In the NL, an external evaluation of the Dutch Plant Protection policy (including the NAP) is performed on a regular basis. The first evaluation, carried out by an independent organisation, has been completed in 2010 and the next two ones are planned for 2017 and 2022. Its main objective was to measure in which extent the policy targets have been reached in the main areas being water quality, protection of workers, residues in food, and the development of IPM techniques.

In France, authorities have planned a mid-term evaluation of the complete Ecophyto 2018 plan in 2013. This strategic evaluation will aim at assessing efficacy and efficiency of the different actions (104 in total). In preparation to this global approach, authorities have decided to launch several *in itinere* evaluations of individual actions or group of actions. The first one which assessed the operational efficiency of the epidemiological monitoring network (Axis 5) has been completed in early 2012 and the second one (Axis 2: development of farms networks to promote the use of IPM techniques) is planned for the end of 2012.

4 Analysis of risk/impacts indicators of the use of PPP

The purpose of this paragraph is to list and compare risks and impact indicators that are currently used by MS to assess impact of use of pesticides and to report MS positioning regarding a possible selection of harmonised risk indicators as required by the SUD Directive.

Article 4(2) of SUD imposes that "*NAPs shall include indicators to monitor the use of PPP containing active substances of particular concern, especially if alternatives are available. […] On the basis of such indicators and taking into account where applicable the risk or use reduction targets achieved already prior to the application of this Directive, timelines and targets for the reduction of use shall also be established, in particular if reduction of use constitutes an appropriate means to achieve risk reduction with regard to priority items identified under Article 15(2)(c)*".

Article 15(1) of the Directive indicates that harmonised risk indicators shall be established (by the Commission) but, also, precise that MS may continue to use existing national indicators or adopt appropriate indicators in addition to the harmonised ones.

This section starts by presenting history in term of development of indicators; present briefly results of the first EU research project aiming at comparing the different existing indicators (CAPER) and then presents the actual indicators.

The question related to the selection of harmonised indicators is controversial and show two opposed approaches. The first approach is to use elaborated indicators based on mathematical models that calculate the risk/impact trends for each active substance, and the second one relies on the selection of descriptive quantitative and qualitative indicators which are measuring the impacts of all actions in place in order to achieve the reduction of impacts of use of PPP.

Riha et al. (1996) already distinguished these two categories for environmental impacts of PPP as follows:

- Methods with use models to predict environmental fate and potential risk for the environment. Models identify the relative importance of various dissipation pathways, and allow estimation of flux densities, concentrations, residence times and exposure;
- Categorical indices of impacts. Generally, this methodology consists of a generic indexing system in which biologically or ecologically-significant threshold levels for an environmental variable are used to define categories of impact, hazard or risk.

Therefore the first approach is to use indicators based on mathematical models that predict the risk trend, and the second one relies on the selection of several categorical indices/descriptive indicators which are measuring the real impacts of the actions in place in order to achieve the reduction of impacts of use of PPP.

These two approaches are presented separately below and a comparison of the advantages and disadvantages is reported. Additionally a presentation of the objectives and outcomes of the FP6-HAIR project which was launched by the Commission to set harmonised risk indicators is made as it is a key component in the current approach to the selection and implementation of EU harmonised risk indicators. The OECD Pesticide Programme has carried out a project to develop indicators that mainly took place in between 1997 and 2005. OECD joined the HAIR project in 2004. Therefore we do not present the OECD results as it can be considered that these results have been integrated in the research carried out under HAIR.

4.1 Indicators based on theoretical modelling

4.1.1 Description

Levitan (1997), Hart (1997) and Falconer (1998) are the first authors that are presenting an overview of pest risk indicators known from the literature[32]. They give a short description of each indicator, including a summary of the methodology behind each and the way they are used in practice.

The Concerted Action on Pesticides Environmental Risk indicators (CAPER)(1999) builds on these initial research and add several steps. The purpose of this project was to evaluate and compare the pesticide indicators which have been developed throughout the European Union. Organisations from thirteen EU Member States were involved in CAPER.

The following eight indicators were evaluated:

1. Environmental Yardstick (EYP) - The Netherlands
2. Hasse Diagram (HD) - Denmark
3. SYNOPS_2 - Germany
4. Environmental performance indicator of pesticides (p-EMA) - United Kingdom
5. Pesticide environmental impact indicator (Ipest) - France
6. Environmental Potential Risk Indicator for Pesticides (EPRIP) - Italy
7. System for Predicting the Environmental Impact of Pesticides (SyPEP) - Belgium
8. Pesticide Environmental Risk Indicator (PERI) - Sweden

The analytical comparison of these indicators as presented in the research report is as follows:

Table 18: Purpose, scale and stage of development of the indicator (described in CAPER)

	EYP	HD	SYNOPS	p-EMA	Ipest	EPRIP	SyPEP	PERI
Purpose								
Advice to farmers	*			*	*	*		*
Advice to extension services	*		(*)	*	*	*	(*)	*
Advice to policy makers	(*)	*	*			(*)	*	
Scale								
Pesticide level	*	*		(*)	*	*		(*)
Crop level	*	*	(*)	*	*	*		*
Farm level	*	*	(*)	*	*	(*)	(*)	*
National level	(*)		*				*	
EU level	(*)		*				*	
Stage of development (situation in 2000)								
Under development						*		*
Pilot/testing		*			*	*	*	
Used in practice	*		*	*				

Source: CAPER final report
(*) indicates that the indicator is not developed for this purpose and scale, but in practice it is used in that respect

[32] CAPER final report, 2000

Table 19: Compartments and effects taken into account (described in CAPER)

	EYP	HD	SYNOPS	p-EMA	Ipest	EPRIP	SyPEP	PERI
Compartments								
Groundwater	*	*		*	*	*	*	*
Surface water	*	*	*	*	*	*	*	
Soil	*	*	*	(*)		*		*
Air			(*)	(*)	*	*		*
Effects								
Human health	(*)			*	*	*	(*)	
Aquatic organisms	*	*	*	*	*	*	*	*[1]
Soil organisms	*	*	*			*		*[1]
Bioaccumulation				*				*[1]
Bees				*				*[1]

Source: CAPER final report
(*) means that compartment/effect is partly or rudimentarily taken into account

The CAPER report recommends the development of a harmonised scientific framework for a EU pesticide indicator. With such a framework the monitoring and evaluation of pesticide policies could be harmonised and farmers' decision tools could be based on the same principles. It is also recommended that the different stakeholders (farmers' organisations, pesticide industry, environmental community) should be involved in the development of this framework.

The FP6-HAIR project has been established based on the CAPER conclusions. This project aimed at supporting EU policies by providing a harmonised European approach for indicators of the overall risk of pesticides. The main deliverable of the project is a set of harmonised environmental and human health risk indicators, implemented in a software package. The proposed tool includes methods to predict environmental fate and exposure, and the resulting acute and chronic risks for aquatic and terrestrial organisms, for groundwater, for public health (including pregnant women) and for applicators of the pesticides[33]. The Commission organised a workshop in January 2012 and the follow up of this project is currently to be decided.

In parallel to this project, several MS have developed additional indicators. All MS have been invited to present their research work in the development and implementation of indicators via their response to the survey questionnaire that was launched during the course of this study.

Nine MS (DE, DK, FI, FR, NL, PL, SE, SK, and the UK) have reported currently working on the selection and/or development of risk indicators. Belgium has indicated to be in a waiting position till harmonised indicators are selected. It doesn't want to develop something that may overlap with the harmonised ones.

The survey results and the review of literature led us to the evaluation of 10 risk/impacts indicators:

1. Treatment Frequency Index (TFI) – Denmark and France[34]
2. Pesticide Load Index - Denmark
3. SYNOPS - Germany
4. PRIBEL – Belgium
5. PRI Nation - Sweden
6. PRI Farm - Sweden

[33] HAIR final report. Available at **http://cordis.europa.eu/documents/documentlibrary/124722961EN6.pdf**
[34] The TFI is not a risk indicator but rather an indicator of intensity if use. However, due to the historical development of risk/impact indicators in the EU, the research team considers important to mention it in this context.

7. NMI3 – The Netherlands
8. POCER-1 and POCER-2 – Belgium
9. PRI - Finland

Before briefly presenting and comparing these indicators, it is interesting to mention that only SYNOPS remains in the list of reported indicators by MS. All others indicators that were presented in the CAPER project seem to have been abandoned or their development stopped.

The treatment frequency index (DK[35] & FR[36]) and the pesticide load index (DK)

The term Treatment Frequency Index (TFI) was introduced in 1986 by Denmark. The TFI is a theoretical number of pesticide treatments per ha, based on a standard dose rates of active substances and the amount of pesticides sold yearly. A TFI of 1 is equivalent to one full dosage treatment applied to agricultural land.

In Denmark, the index (known as Frequency of Application – FA) had initially been developed to supervise the success of the politically suggested incentive for pesticides reduction in grain cultivation. In contrast to most other risk indicators for pesticides application, the used algorithm does not contain a factor for toxicity for single active substances. The indicator integrates the information about pesticides application and effectiveness on target organisms about the standard dose which is looked as a biologically active application dose. This indicator is calculated with relatively few dates. It can be calculated with sales figures as well as with data on users.

Denmark will complement the TFI with the PLI (Pesticide Load Index) indicator for clarification on the question whether divergences of the toxic dose can be explained by changes of the sales figures or by diverging toxicity of the used plant protection products. The reason behind the introduction of complementary elements to TFI is that TFI primarily reflects the consumption of plant protection products and is not considered as valid in order to be able to state the trend in environmental impact or side effects. This is not considered as being sufficient, as the strategy has moved from an objective of reduction of volumes to an objective of reduction of impacts.

Until an indicator for the harmful effects of PPP is developed – which is subject to research activities – TFI and PLI approaches are combined.

To calculate the TFI a broad range of data is necessary, and these input data are not available on a yearly basis in France, therefore the NODU specific indicator was built. The NODU has now been implemented in France that has a strategy of reducing volumes of PPP by 50% in 10 years, if possible (Ecophyto 2018 action plan). Because sales figures were available for active ingredients only and not for commercial products, the Danish TFI has been reshaped by the French to estimate treatment frequencies per crop. The reference year of the French programme is 2008.

PRIBEL (BE)

The goal of the first PRPB programme was to achieve by 2010 (compared to reference year 2001) an impact reduction of 25% in agriculture and 50% for biocides and non-agricultural products. In order to assess the improvements being made, a specific tool complying with the situation was needed to measure the significance of the improvement and how they are contributing to the sustainable use of PPP in agriculture. To that end, the Gent University developed the so-called PRIBEL (Pesticide Risk Indicator for BELgium) indicator.

[35] Danish authorities themselves do not consider their TFI / PLI concept as real "risk indicators" (as a risk indicator has to be used to "evaluate risks" which they deem the TFI / PLI does not).

[36] TFI is completed by the NODU indicator in France: to measure progress toward use reduction, the NODU – *Nombre de Doses Unitaires* – an indicator related to the Treatment Frequency Index was adopted. The NODU is based on nationally aggregated sales of active ingredient and an agreed-upon unit dose for each active ingredient.

The PRIBEL indicator is a multi-impact indicator based on the POCER II indicator which is an extension of the POCER I indicator also developed at the Gent University. It assesses at the level of Belgium both the human risk from occupational exposure to pesticides and the risk to the environment from the use of agricultural pesticides. The indicator consists of seven modules: applicator, consumer, surface water, ground water, earthworms, birds and bees. As the goal of an indicator is to synthetize as much information as possible into a few geographical representations, an aggregation procedure involving several steps (spatial aggregation and aggregation of the active substances over the pesticide groups and the crops groups) is applied.

This approach has the benefit that all the information can be concentrated in global PRIBEL value per compartment for Belgium, but intermediate results are still available for more refined comparisons, e.g. assessment of the impact of a specific pesticide on a single compartment.

The risk indices are calculating taking into account the (eco)toxicological data of the active substance and the application dose per ha, whilst the frequency considers the number of application cases of one a.s. per hectare, the national sales per crop and the national area per crop.

SYNOPS (DE)

SYNOPS (*Synoptisches Bewertungsmodell für Pflanzenschutzmittel* (synoptic evaluation model for plant protection products) is a Computer-aided model aiming to allow the identification of relative changes in PPP-related risks to aquatic and terrestrial ecosystems.

SYNOPS calculates how different representative organisms can get exposed to PPP, and relates this exposure to the toxicity for these very organisms evaluated under laboratory standard. The result is a proportionality factor for every measure and for representative organism (SYNOPS-risk index). The bigger the ratio is, the higher is the probability of undesirable events in the environment, or, in other terms, the risk.

Within the National Action Plan SYNOPS is applied on different levels of spatial aggregation. On the one hand SYNOPS is applied on national level to assure the tracking of the risk trends and risk development in Germany. In this case SYNOPS is used on yearly basis with annual sales data of pesticides assuming realistic worst case scenarios for the environmental conditions. This application will be referred as SYNOPS-Trend. On the other hand SYNOPS-GIS is used for regional risk analysis and the detection of hot spots. This implementation of SYNOPS requires more detailed input datasets like field based surveys on pesticide use and extended GIS based datasets on land use, slope, soil types and climate.

Both versions of SYNOPS are based on the same functionalities and procedures to assess the environmental risk on field level. SYNOPS calculates the predicted environmental concentration on daily basis for soil, surface waters and non-target plants. It considers the interception on the crop and the exposure pathways spray drift, surface run-off and drainage and temperature dependent degradation in water and soil. From the daily environmental concentrations the short-term and long-term exposure are derived and the risk potentials are calculated as the ratio of exposure to toxicity (ETR) for three reference species (daphnia, fish and algae) in aquatic systems and two species (earthworm and bee) for terrestrial systems.

SYNOPS-Trend is being used annually since 2005 to track the trend of risk potential of pesticides used in agriculture and horticulture in Germany.

SYNOPS-GIS was used for detail risk analysis of pesticides applied in orchard regions in Germany. Recently it is being used in frame of a pilot hot spot analysis of the risk for small surface water bodies caused by pesticide applications in arable crops in Bundesland Nordrhein-Westfalen.

Treatment Index (BI) (DE)

The BI demonstrates the number of plant protection product applications on an operational area, with regard to a specific crop or a specific company. It takes account of reduced application rates and site-specific applications. In case of tank mixes each plant protection product is counted separately.

The data for this indicator stem from the crop-specific company panels for the implementation of the regulation concerning statistics on pesticides, EC no. 1185/2009 (previously NEPTUN-surveys), and the network reference farms.

PRI Nation & PRI Farm (SE)

The Swedish Chemicals Inspectorate has developed two systems intended to track risk trends over time by calculating pesticide risk indicators. Pesticide Risk Indicators at National level (PRI-Nation) and Pesticide Risk Indicators at Farm level (PRI-Farm).

The first system, PRI Nation, was initiated in 1996 with the main objective to monitor impact of pesticide policies established in the national risk reduction programme. It has been in use since 1997 with annual updating and reporting on the national progress.

The second system, PRI Farm, was developed during 2003 and 2004 with the main purpose to follow up pesticide risk trends at individual farms and to compare pesticide risks on different production systems. The aim with PRI-Farm is to use a more realistic approach by defining local exposure conditions. One important aspect is that by using these tools, farmers can check their own progress in relation to risk reduction, which may increase their awareness, interest and participation in the national risk reduction programmes. The work on the PRI-Farm model has been performed in co-operation with representatives of different interest groups such as farmers, industry, authorities and research institutions. Initial tests have been carried out on a number of so called Pilot Farms with the aim to gather experience on practical farm use.

Both models are based on the same approach, where data on hazard and exposure is scored and combined with data on use intensity. The weighting procedure included is based on field data (where available), expert judgements or policy assessments.

The result is aggregated to a single score for each substance or treatment with the intention to indicate environmental and operator health risks respectively. However, the indicator score or sum does not quantify actual pesticide risks. Instead, the purpose is to indicate trends in potential risks at national level and farm level.

While PRI-Nation is expressed as the nation-wide sum of environment or operator health risk indicators for all substances each year, PRI-Farm provide a risk indicator for each treatment expressed as the indicator sum of a crop or a field on a particular farm.

NMI3 (NL)

The NMI 3 focusses on the emissions to surface water and the related risk to the aquatic ecosystem. The use of pesticides may also lead to contamination and risk to other parts of the environment, such as groundwater, soil organisms and the terrestrial ecosystem. Although the Dutch policy document contains no additional operational targets for these environmental compartments, the risks are considered in the evaluation as well and therefore the NMI 3 also contains modules for calculating these risk indicators.

The NMI 3 includes modules for calculating emission to surface water resulting from atmospheric deposition, spray drift, drainage flow, point sources, and discharge from greenhouses with soilless cultivation and from greenhouses with soil bound cultivation. The model is comprised of a number of simple models, combining a wide range of information about pesticide usage, emission factors, the geographical distribution of crops, surface water, soil and climate properties, and substance

properties. Each application in the NMI database is linked to a combination of object treated and application method which determines the emission pathways calculated.

The primary goal of the NMI 3 is to produce a trend line connecting two points of the annual environmental risk at national scale level, at the starting and end year of the policy period 1998-2010. Each point represents the risk indicator outcomes in the years corresponding with farm based surveys conducted by Statistics Netherlands (CBS). The results can also be used for ranking, for comparing applications of similar type and for visualisation of spatial patterns in calculated emission indicators and risk indicators.

POCER-1 and POCER-2 (BE)

The POCER indicator (Pesticide Occupational and Environmental Risk indicator) has been developed at Ghent University for agricultural situations, as a tool for applicators and decision-makers, by calculating the impact of pesticide treatments on the applicator, the worker, the bystander, groundwater, surface water, bees, earthworms, birds, useful arthropods and persistence in soil. A few adaptations in the POCER calculation method can make the indicator useful for non-agricultural conditions. The impact of plant protection products on human health and environment in public services and households can be calculated and the scores can be compared with each other, resulting in an improved pesticide programme.

POCER-2 has been developed to assess the risks of pesticide use in 14 areas (compartments) related to humans, the economy and the environment. Compared to POCER-1 (only 8 compartments), the tool has been improved by adding approaches in the translation of relative risk values into absolute values defined according the subjective ranking of the importance of the various compartments. The selection of the compartments was made in order to obtain risk information for the sustainability of PPP use. This concept was based on three pillars: human health, natural resources and agricultural interest. For each specific compartment a pesticide risk indicator was selected. A software was developed to allow an assessment of the risk at various aggregation levels: no aggregation, multiple active substances, multiple times, multiple locations, and multiple compartments.

4.1.2 Comparison of risk indicators based on models

This description of the main indicators based on theoretical models highlights the variability of indicators that have been developed to date. Many indicators exist; there is no consensus on the methodologies that could be used. Some indicators cover a rather large number of compartments, while others are more dedicated to one or a few compartments. A number of indicators include modules or are specially developed for consumers and/or applicators.

The following table highlights the general profile of the indicators that have been described in this report and are compared to HAIR.

Finally, it should be reported here that two MS have initiated a comparison of existing risk indicators. The French Ministry of Agriculture has asked ANSES to make an inventory of all risk indicators developed to date and to compare them based on the French requirements. The final report of this study should be available soon.

A similar study has been recently finalised (available in Danish language only so far) in Denmark. The study looked at a total of thirty indicators currently in use and concludes "*that the literature is overwhelmingly dominated by indicators of pressure or risk, which are characterised by outputs calculated on the basis of more well described risk-parameters. The literature review resulted in only one indicator, SPEAR (species at risk), which can be regarded an indicator of real pesticide-damage*."

Compiling results of these two studies may be of interest as background material for the comitology discussions that will take place in the context of the selection of the harmonised EU risk indicators.

Table 20: Purpose, scale and stage of development of the indicator

	TFI	PLI	SYNOPS	PRIBEL	PRI Nation	PRI Farm	NMI3	POCER 2	PRI (FI)	HAIR
Objective	Measure spraying frequency use	Predict potential risk								
Purpose										
Advice to farmers	*			*		*	*	*	*	
Advice to extension services	*	*		*		*	*	*	*	
Advice to policy makers	*	*		*	*	*	*	*	*	*
Scale										
Pesticide level	*	*		*	*	*	*	*	*	*
Crop level	*	*	*	*		*	*	*	*	*
Farm level	*	*	*	*		*		*	*	
National level	*	*	*	*	*	*	*(1)	*	*	*(1)
EU level										*
Stage of development										
Under development		*								
Pilot/testing				*						
Used in practice	*		*		*	*	*(2)	*	*	*(2)

Source: Compiled by the FCEC team based on MS experts input

1: The purpose of the risk indicators available in NMI 3 and HAIR is to produce a trend over multiple years at national scale. This can be extended to regional scale depending on the usage data available. The farm scale is beyond scope.
2: NMI 3 has been used in practice (i.e. for its purpose as specified in your Table 13). HAIR is "ready for use" (i.e. not in a pilot/testing stage) but so far only been used in specific projects (for research and/or demonstration purposes).

Table 21: Compartments and effects taken into account

	TFI	PLI	SYNOPS	PRIBEL	PRI Nation	PRI Farm	NMI3	POCER 2	PRI (FI)	HAIR
Environmental compartments										
Groundwater				*	*	*	*	*	*	
Surface water			*	*	*	*	*	*	*	*
Soil			*	*	*	*	*	*	*	
Air			*				*			
Health compartments										
Operators				*	*	*		*		*
Re-entry workers				*	*	*		*		*
Greenhouse workers					*	*				*
Bystanders				*	*	*		*		*
Residents					*	*				*
Consumers				*	*	*		*		*
Effects										
Human health		*		*	*	*		*	*	*
Aquatic organisms		*	*	*	*	*	*	*		*
Soil organisms		*	*	*	*	*		*	*	*
Bioaccumulation		*	*		*	*		*	*	
Bees			*	*				*	*	*(3)

Source: Compiled by the FCEC team based on MS experts input

3: a hazard quotient for bees, contrary to the other indicators in HAIR

4.2 Descriptive indicators

As mentioned under the introduction of this chapter, two approaches oppose. The first one based on theoretical models has been presented in the previous section, the second approach which is based on the combination of descriptive indicators is presented under this chapter.

Not all countries are engaged in a research work to develop indicators as they have not completed the draft of their NAP yet. However, they are considering several data sets as possible indicators that could contribute as complementary tools to the theoretical models.

In the following table, we have compiled a list of such indicators that have been developed and that have been partly implemented by several MS (e.g. PL, and the UK).

MS and stakeholders that are in favour of using such type of indicators rather than models have indicated that the measurement of such indicators has to be performed on a regular basis in order to assess the trends and the progresses made.

Table 22: Descriptive indicators

Environment and Health Indicators
Presence of PPP residues in food of animal origin
Presence of PPP residues in feed
Presence of PPP in ground water
Presence of PPP in surface water
Presence of PPP in drinking water
Use of spray drift reduction nozzles (e.g. in % area covered)
Installation of bio beds or other appropriate cleaning places
Integrated Pest Management/Integrated Crop Management implementation rate: – Agricultural area covered by the application of the general IPM principles (comprising those applying ICM, IF) (in %total crop area) – Implementation of voluntary crop-specific IPM guidelines (in % area covered compared to total crop production area(s))
Modern machinery in use (such as with cleaning tanks, induction bowl) (e.g. in % of area covered compared to total cropped agricultural area)
Spraying equipment passing the inspection (in % compared to spraying equipment in use)
National register of sprayer operators – number of members and % sprayed area
Number of cross compliance complaints linked to the use of PPPs
Compliance with EQS on EU priority substances linked to Water Framework Directive
MRLs exceedances (%)
Data about law infringement incidences connected with use of PPP, information about inspected PPP application equipment and trained PPP users
Human PPP poisoning incidences
Number of substantiated category 1 & 2 pollution incidents for land, air or water, involving agricultural and non-agricultural pesticides
Population of wild birds and other species (biodiversity)
Information about bee poisoning incidences

Social Indicators [37]
Continuous professional development – Numbers of farmers/distributors/advisors holding plant protection training certificates (in % compared to total number of farmers)
Number of professional users in the non-agricultural area applying the relevant IPM general principles
Container management systems – recovery/collection rate
Continuous rinsing or equivalent techniques of empty containers (rinsing rates (%))
Rapid alert (RASFF) notifications (with regard to MRLs exceedances), which actually lead to produce being either withdrawn from the market or being blocked from entering the market (in % of total alerts) (home grown produce only). Relation (comparison) of above to other food/feed contaminants leading to produce withdrawals in light of RASFF
Economic Indicators
Agricultural production area covered by trained, certificate holders (% compared to crop production area)
Number of farms/holding using remnant purification systems (in % total farms)
Number of viable and registered solutions available for specific pest/disease problems
Registered active compounds per key pest/disease problems
Number of active compounds per key pest/disease problems
Number of economic viable alternative non-chemical solutions available for pest/disease problems
Pest pressures over growing season
Potential harvest losses due to pest pressure
Statistic data about use of PPP
Statistic data about sales of PPP
Pesticide average inputs per crop

Source: ECPA and interviews with MS officials

When using these indictors, the approach is to combine several of them and to measure them at a regular frequency. The trend analysis of this set of indicators show the progress that is made in term of reducing impact of use of PPP.

[37] An alternative to this list could be the use of indicators developed under the DPSIR (Drivers-Pressures-States-Impacts-Responses) framework that was developed by the EEA to help identifying sustainability indicators. It provides a systems approach for identifying, structuring and representing complex issues in terms of interactions between the system drivers, pressures, states, and responses. Drivers are the environmental and socioeconomic forces of change in the system.

4.3 Comparative analysis between indicators based on models and descriptive indicators

In support to the forthcoming comitology discussions for the selection of harmonised risk indicators, we are presenting in this chapter a comparison between model indicators and descriptive indicators based on inputs collected during the field visits.

Table 23: Comparison of model vs. descriptive indicators

Type	Advantages	Disadvantages
Model indicators	• Predict a risk (anticipation) • May consider diverse compartments (environment and human health) • Assess the impact of a single application of PPP • Rank alternative pesticide application options • Allow for developing several scenarios (sensitivity analysis) • Most of indicators consider active substances	• Require significant efforts for implementation (expertise and resources) • Require large data input sets • Statistics on use on PPP available every 5 years only • Perceived as being a “black-box” • Difficult to understand the rationale of the approach for policy makers and general public • Limitations of modelling in general • Easy possibility of misunderstandings, particularly in case of dissimilar model used • List of pesticide usages differs across MS leading to difficulties to compare risk predictions from one MS to another.
Descriptive indicators	• Easy to implement • Easy to understand for the general public (communication) • Easy to understand for actors – good appropriation	• Most of the indicators do not take into consideration that PPP may differ considerably in their toxicity to non-target organisms, their rate of degradation and their mobility in the environment • Considered more as impact/hazard indicators than risk indicators • May be costly to measure via sampling and monitoring

5 Matrix analysis of communication of information and awareness raising programmes

This chapter presents a summary of communication and awareness raising campaigns that have been put in place to date at MS in response to Article 7(1) of SUD which mentions that "*MS 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, non-target organisms, and the environment arising from their use, and the use of non-chemical alternatives*".

The ToR of the study mention that the contractor is required to identify and make an inventory of the systems that MS have developed and put in place for communication to the publics on the results from the monitoring and surveillance activities. Several interviewees have indicated that the results of monitoring actions are often included in the general communication campaigns. Therefore we present in this chapter communication plans and programmes that MS have reported in their answer to the general survey questionnaire in which results of monitoring and surveillance programmes on impacts of use of PPP on human health and the environment are included.

It should be mentioned that in MS that have introduced a strategy to reduce impacts of PPP, actors affected by the strategy (e.g. farmer associations, PPP producers, plant protection equipment manufacturers, food processing industry and the retail trade) have been asked to participate in the implementation of the strategy by entering in mandatory financial or voluntary commitments. In order to incentive these different stakeholders, they have been allowed to promote associated measures in the course of their own public relations work[38].

This situation has translated in the development of numerous actions that could be categorised as follows:

- Stewardship programmes developed by PPP industry which are most of time product and country specific. They may include information regarding potential impact of the products, but the large majority of them are presenting information which is dedicated to promote proper use of PPP and safe application of products. Most of these actions are targeting the professional and non-professional users of PPPs;
- Producers organisations and farmers' union initiatives that are promoting the safe use of PPPs to the farming and producers communities. The main well known initiative in this field is certainly the UK Voluntary Initiative that has been created in 2001. It aims at proposing and delivering focussed environmental approaches to reduce impacts of use of PPP based on several complementary actions that are reviewed every year. All projects listed are resourced from the industry but some have a contribution from the UK Government;
- Websites, developed by national PPP industry associations, dedicated to inform the general public on potential impacts of pesticides on human health and on the environment. These websites, also, promote the benefits of PPP for agriculture. Such websites exist in several countries such as FR (www.infopesticides.org), BE, DE, etc.).

These national initiatives have not been reported in the survey questionnaire as the aim of the inventory is to list communication and awareness raising schemes developed by public authorities.

[38] Such is the case in DE according to German NAP, 2008

Additionally, most of the private initiatives are targeting the users of PPP rather than the general public. These programmes answer more to obligations of Article 6(3) of the SUD than to obligations of Article 7(1).

The matrix analysis of communication and awareness raising programmes that have been reported via the general survey questionnaire is presented in the following two analytical grids. The first one describes the programme and the second one presents tools and methodology used to assess efficiency of the programmes and obstacles faced during their implementation.

Table 24: Description of past and existing national communication and awareness raising campaigns

MS	Name of the programme	Type (*)	Outsourced (Yes/No)	Governance	Main target audience	Main objective	Expected and observed results	Timing	Communication tools	Budget (in K euros)
AT	PPP Law of Burgenland (**regional**)	ARC	NO	Regional government **Voluntary**	General public	Communication about risks of use of PPP	Decreasing of PPP application at wrong time	Annual programme since 2012	Internet and national media	20 per year
BE	Uninvited guests in your home or garden (**national**)	ARC	NO	Federal government (SPF)	General public (users of PPP in gardens)	Communication about risks of use of PPP	Education for better and safer use of PPP for agricultural and non-agricultural purposes	2007	Brochure	50 per year for all actions
BE	Read labels **(national)**	ARC	NO	Federal government (SPF) and stakeholders	Any user of PPP	Improve understanding of the labels for a safer use of PPP		Annual programme	Internet Brochure Logo	
BE	Vigilance (**national**)	CC	NO	Regional authorities	General public	General information to the public		Annual programme	Brochure "One week w/o PPP" yearly initiative	
DE	Ministry portal (**national**)	CC	NO	Federal government (BMELV)	General public including consumers, scientists, politicians, journalists.	The new website provides a general overview on the NAP, including its legal foundations, history and goals. Knowledge and expertise have been processed and are presented. In addition new analytical and monitoring results are supplemented and modified periodically.	Education/information platform for the public on the following issues: Plant Protection- sustainable use of plant protection products	Annual programme	Website in German. An English version should be released soon.	
DK	Residues report **(National)**	CC	NO	Danish Veterinary and Food Administration and The Technical University of Denmark	Consumers, politicians, NGOs, the press.	Publication of results of the residues monitoring programmes in food.	Number of exceedances of MRL. Time trends. Difference between samples of domestic and foreign origin.	Annual programme		

MS	Name of the programme	Type (*)	Outsourced (Yes/No)	Governance	Main target audience	Main objective	Expected and observed results	Timing	Communication tools	Budget (in K euros)
FI	Obsolete pesticides **(national)**	CC	NO	government (TUKES)	Consumers, politicians, NGOs, the press.	Publication of results of the residues monitoring programmes in food.	Number of exceedances of MRL. Time trends. Difference between samples of domestic and foreign origin.	Annual programme	Website	
FI	Residues report **(national)**	CC	NO	government (TUKES)	farmers, households, shops, stores	Information campaign for the proper disposal of obsolete pesticides. To spread the information what to do with the pesticides which are not registered any more.	Less obsolete pesticides can be found in storages.	Annual programme since 2007	internet, farmer fairs, leaflets	
FR	Ecophyto 2018 communication plan **(national)**	ARC	YES	government (DGAL) and stakeholders involved in the Plan	All	General communication on the ECOPHYTO 2018 plan.	Increased knowledge of the Plan	Since 2010 (3 years programme)	Internet, brochures, leaflets, brochure, fairs, radio and TV spots	About 1.000 per year
IE	**National** surface and ground water monitoring programme	CC	NO	Environ. Protection Agency	General public	General communication on the results of the EU mandatory monitoring programmes	Contamination from pesticides remains at an extremely low incidence and the trend seems to reflect further reductions.	Annual programme	Annual publication	No information
IE	**National** drinking water monitoring programme	CC	NO	Environ. Protection Agency & local municipal authorities				Annual programme	Annual publication	No information
NL	**National** information towards residents & users about risks & residues	CC	NO	Governmen t(water boards)	Users of PPP and residents	General communication on the results of the EU mandatory monitoring programmes and on the risks of residues in food	The communication of monitoring results , producers and retailers are more active in keeping the residue limits under control (below MRLs)	On going	Website publication	No information
SE	**National**	CC	NO	EPA with	General	Transparency of authorities' activities and	Communication of	On going	EPA web site	No

MS	Name of the programme	Type (*)	Outsourced (Yes/No)	Governance	Main target audience	Main objective	Expected and observed results	Timing	Communication tools	Budget (in K euros)
	programme (no specific name)			Board of Agriculture, Water department	public	information to the general public.	pesticides monitoring data (mainly residues) via the internet sites of EPA, including a geographic and substance targeted search.			information
SK	**National** report on pesticides	CC	NO	Ministry of Agriculture in cooperation with Ministry of environment and Ministry of Health	General public	Communication on the general overview of: 1. Registered active substances and PPPs 2. Controls on placing on the market, sale, storage, use and disposal of waste, 3. Chemical control of PPPs, 4. Pesticides residues control, 5. Monitoring of pesticides relevant for water quality	Compliance with the relevant legislation	Annual programme	Website	

**: Communication campaign = CC; Awareness raising campaign= ARC*

Table 25: Description of methodologies used by MS to assess efficiency of past & existing national communication and awareness raising campaigns

MS	Name of the programme	Evaluation timing	Evaluation approach	Evaluation Indicators	Budget	Measured/observed results	Problems and obstacles in implementation and running of the programmes
AT	PPP Law of Burgenland (**regional**)	Not applicable as 2012 is the first year of implementation. Assessment method has not been defined yet.					Lack of financial and staff resources
BE	Uninvited guests in your home or garden (**national**)	Distribution of a yearly brochure : No of brochures distributed. Budget: 250 K Euros from 2005 until 2011					No problem observed
BE	Read labels **(national)**						
BE	Vigilance (**regional**)	Not defined					Limited financial resources available for the campaigns.
DE	Ministry portal (**national**)	At regular frequency, statistics review of number of accesses & no of hits on the web site					No problem observed
DK	Residues report (**National)**	Not defined					
FI	Obsolete pesticides **(national)**	The results can be observed from the annually prepared control reports from the statistics of professional users. After the most active period (2007-2010) the competent Authority has maintained and updated the brochure of obsolete pesticide which can be found on TUKES website.					
FR	Ecophyto 2018 communication plan	External survey done by the communication agency in charge of the communication campaign. Analysis of the survey results reported back to the governance body of the Plan.					No problem observed
IE	**National** surface and ground water and drinking water monitoring programme	Impacts of the communication via the publication is not measured					Size and extent of the programmes and available financial resources
NL	**National** information towards residents and users about risks	Not defined					
SE	**National** programme	At regular frequency, statistics review of number of accesses & no of hits on the web site					
SK	**National** report on pesticides	Not defined					

Several MS have indicated that additional communication or awareness raising campaigns exist. However they are not included in the two previous grids as they are not directly targeting the general public but the producers and as they are not directly related to the communication of risks of use of PPP. For information they are listed hereafter:

- In AT, two regions (Vorarlberg and Wien) are mentioning a network to monitor pest pressure in cultivated field by the Chamber of Agriculture. Producers are informed on the optimal timing for spraying against harmful organisms via internet, email, fax and phone;
- In CZ, authorities are currently developing of a "Plant Health IT Portal" that should be online on the State Phytosanitary Administration in the coming weeks. Under phase 1 (2012 to 2014), crop-specific guidelines implementing Integrated Pest Management (IPM) for the most economically important crops will be developed and promoted via the website. During Phase 2, additional actions are planned such as the development of crop-specific guidelines for other crops, of monitoring pest and early warning systems etc.); and the development of a national register of pesticides. Plans are also to connect the portal to similar technical databases of the universities, research institutes etc. to offer a unique entry point to all questions related to PPP;
- IT is planning a large communication campaign by end of 2012 that will target all public and professional users of PPP. It will be coordinated by the Ministry of Agriculture which is currently developing the different actions of the programme. These actions may be funded by the Regional Rural Development Programmes. The Italian Ministry considers that about 10% of the total Fund (Nearly 200 Million Euros in 2012) may be used for financing this plan;
- In LT, there was no monitoring and surveillance activities communicated to the public in the past. For the future it is planned to implement communication to the public actions but no details have been reported;
- The Polish authorities (Ministry of Agriculture) are developing a website to address obligation of Article 7(2), as a part of official Ministry of Agriculture website. On the website crop specific IPM guidelines will be available, as well as information about good plant protection practices, DSS, results of monitoring concerning plant protection products. Some information is already available on the web site, however it is still under construction.

This inventory highlights that very few communication and awareness communication schemes have been initiated to date. The majority of the actions are based on legal obligations (e.g. residues in food) and quite often communication is achieved via the official website of the national authority in charge of the programme. Several MS have indicated that a national communication plan is under development and that these plans should be implemented by end of 2012.

Annex 1: Objectives of the Study from the Terms of Reference (ToR)

The main objective of the project was to provide the Commission with a comprehensive study on:

1) Collection of information on activities of surveillance and monitoring of impacts of use of PPP in the European Union

The contractor was requested to identify and describe the monitoring and surveillance activities on impacts of use of PPP on human health and environment in the European Union., including:

- Identification and description of monitoring and surveillance activities on impacts of pesticides use on human health and environment in MS grouped in comparable domains or goals;

- Description of general strategy and objectives of the activities, design of the monitoring/surveillance plans with parameters to be measured, applied methodology including where appropriate reference to techniques of sampling and analytical methods used, statistical design;

- Identification of the problems and obstacles faced by MS with the existing systems;

- Where appropriate planned developments;

- Identification of any stewardship/partnership programmes on-going or planned;

- Identification of IT Tools available for collating, pooling and elaborating the data.

In addition, monitoring and surveillance activities in the context of other possible impacts on the agro-ecosystem should have also been identified to determine possible overlapping activities, building of synergies between different areas, identify lack of surveillance, or indicate need for developments.

The activities described were suggested to be regrouped by category and MS in order to establish the possibility of a matrix analysis.

2) Collection of information on risk/impact indicators in the European Union of use of plant protection products on human health and environment

The contractor was requested to identify and describe, within the objective of each specific monitoring and surveillance activity, which "risk/impact indicators" and data elaborations are used at MS level to measure impacts on human health and environment.

The contractor was requested to make an analysis of these systems and their effectiveness in achieving the quantification of the impacts. The analysis should promote the use of the same metrics for indicator measurements throughout the exercise.

3) Collection of information concerning communication of information and awareness raising programmes

The contractor was requested to identify the systems that MS have developed and put in place for communication to the public of the results from the monitoring and surveillance activities as mentioned above as well as any awareness raising programmes aiming at the reduction of the impact from the use of PPPs.

Annex 2: Overall Project Workflow

Tasks	*Description*	*Methodological tools*	*Deliverables*
Main task 1: Structuring phase (inception)			
1.1	Kick-off meeting (19 January)	KO presentation Presentation and discussion of the methodology	PowerPoint presentation and minutes of the meeting
1.2	Introduction to the study and sending of a first questionnaire to CAs to identify all relevant stakeholders and experts (27 January)	Introductory email & preliminary survey	Database of all concerned parties and mapping of the actors
1.3	Preliminary desk research and literature review, data mapping (on going)		Inception Report
1.4	Exploratory interviews with SANCO, other DGs and stakeholders at EU level (on going)	Mainly face-to-face meetings	
1.5	Development of a draft survey questionnaire and interview questionnaire and testing of these tools (beginning of February)		
1.6	Mapping of the actors (ongoing)		
1.7	*Inception report: Outcome and conclusions on elements 1.1 to 1.6*		
Main task 2: Observing phase (data collection)(on going)			
2.1	Initial phone interviews with national officials	Phone interviews	*Interim note*
2.2	Primary analysis of survey responses		
2.3	Secondary data collection and case studies	Phone interviews & field visits	
2.4	Third Country analysis on best practices	Phone interviews	
2.5	Validate data collected		
2.6	*Interim note: update on progress of elements 2.1 to 2.5*		
Main task 3: Synthesis			
3.1	Final data analysis		*Draft final report*
3.2	Delivery of the draft final report		
3.3	One-day workshop	Workshop	Minutes of the workshop
3.4	Finalise report on the basis of quality assessment and discussion with the Commission		*Final report*

Annex 3: List of NCAs targeted by the survey questionnaire

List of targeted national CAs.xls

Annex 4: The survey questionnaire

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 MS on the impacts of use of PPP on human health and the environment

GENERAL SURVEY by the FCEC (Food Chain Evaluation Consortium)

INTRODUCTION

This general survey takes place in the framework of the 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 MS on the impacts of use of PPP on human health and the environment, which is undertaken for the European Commission, Directorate General for Health and Consumers (DG SANCO). The research is carried out by the FCEC and it is managed by Arcadia International.

The Directive 2009/128/EC of the European Parliament and of the Council establishes a framework for Community action to achieve the sustainable use of pesticides. In its Article 7(3), it provides for the Commission, in cooperation with the Member States, to develop a strategic guidance document on monitoring and surveying of impacts of pesticides use on human health and environment to be finalised by 26 November 2012.

The main objectives of the guidance are to enhance comparability of information on the impacts deriving from the use of plant protection products and to ensure accurate and balanced information to be communicated to the general public.

The study aims at collecting data in preparation to the drafting of the guidance document by the European Commission.

The aim of this general survey is <u>to collect information</u> on:

- **<u>Activities of monitoring and surveillance of impacts of use of PPP (past and current);</u>**
- **<u>Risk/impact indicators</u> that have been developed/are currently developed** and are in use at MS level;
- **<u>Communication activities/plans</u> developed and put in place for communication to the public** of the results from the monitoring and surveillance activities as well as any **<u>awareness raising programmes</u> aiming at the reduction of the impact from the use of PPPs.**

Information to be collected covers programs that have been initiated in support to the implementation of the Framework Directive 2009/128/EC; but also general information on other national activities/plans addressing impact of use of PPPs based on provisions of other EU directives, as follows:

- Regulation (EC) No 1107/2009 – placing of PPP on the market: Article 55 related to the use of PPPs, Article 67 related to the undertaking of post-marketing monitoring by the producers, and Article 68 regarding monitoring and officials controls;
- Regulation (EC) No 396/2005 on MRLs on food and feed of animal and plant origin (consumer exposure);
- Water Framework Directive 2000/60/EC (water quality);
- Directive 98/24/EEC and 2004/37/EC on the protection of workers from chemical risks (operator exposure);
- Habitats Directive 92/43/EEC and Wild Birds Directive 2009/147/EC (Biodiversity).

The survey is part of an overall data collection process that also includes analysis of literature and extensive interviews to be carried out via field visits that are planned in 9 MS (DE, DK, ES, FR, IT, NL, PL, SE, UK) in May 2012.

The information you provide will be treated on a strictly confidential basis. The confidentiality of your responses and statements is guaranteed in the sense that your organisation will be identified as having responded to the survey but none of your statements included in the evaluation report will be related to its author.

Please return it by e-mail to the FCEC (daniel.traon@arcadia-international.net and Ferdinand.zotz@bipro.de) by **latest March 23.** If you have any questions, do not hesitate to contact any of these two persons.

INSTRUCTIONS FOR FILLING IN THE QUESTIONNAIRE

Not all sections and questions may be relevant to your organisation: when filling in the questionnaire, please focus on the relevant sections and leave level of details or sections that are not relevant for you open.

All questions include a box for comments, and it is important in most cases to detail your answer in the box.

The questionnaire should preferably be completed in English. Replying in French or German is also possible.

The survey questionnaire is structured as follows:

A - Implementation of Directive 2009/128/EC

- Activities directly related to monitoring and surveillance on impacts of pesticides use included in the programmes required under Article 4 of Dir 2009/128 (National Action plans);
- Activities related to implementation of Article 7 of Dir 2009/128 (Information and awareness-raising);
- Activities related to implementation of Article 9 of Dir 2009/128 (monitoring derogation aerial spraying);
- Activities related to the obligations of Article 15 of Dir 2009/128(Risk Indicators).

B – Enforcement of Regulation (EC) No 1107/2009

- Activities related to the provisions of Article 67 of Reg 1107/2009 (post-authorisation monitoring);
- Activities related to the obligations of Article 68 of Reg 1107/2009 (monitoring and official controls including control of proper application of risk mitigation measures and monitoring activities deriving from conditions of approval on specific active substances and consequent authorisation of PPPs).

C - Legislative acts of interest from other EU policy fields

D - Additional information

DEFINITIONS

The following terms are taken into account for the purpose of this project:

- **'Pesticides'** are understood as plant protection products (PPP) in the sense of Regulation 1107/2009. The study doesn't concern biocides.
- '**Monitoring**' means conducting a planned sequence of observations or measurements with a view to obtaining an overview of the state of compliance with feed or food law, animal health and animal welfare rules. It can also been defined as an investigation into the overall impact of pesticide use on a specific ecosystem through surveying or monitoring that consists of characterisation of exposure (chemical monitoring, exposure modelling) and observations of effects (biological monitoring) occurring as a consequence of use and/or misuse of pesticides.
- **'Surveillance'** means a careful observation of one or more agri-feed or agri-food businesses, feed or food business operators or their activities". It could reflect a more punctual "impact source" hence the control of specific consequences of a use of an individual PPP.
- '**Risk indicator'** means the result of a method of calculation that is used to evaluate risks of use of pesticides on human health and/or the environment (Definition from Directive 2009/128 – Article 3). *Please note that as the study refers to impact of use of PPPs only, the risk indicators calculated in phase of pre-authorisation of PPPs have NOT to be considered in this questionnaire.*

IDENTIFICATION DATA

- Country:
- Name of the organisation:
- Name of the person completing the questionnaire:
- Position in terms of role and responsibility with respect to the area of competences below identified:
- Phone number:
- E-mail:

Please indicate your area of responsibility and competences for which you are providing information for:

Legal provisions	**Yes/No**
Sustainable Use Directive 2009/128/EC	
Regulation (EC) No 1107/2009 – placing of PPP on the market	
Regulation 396/2005 on MRLs on food and feed of animal and plant origin	
Water Framework Directive 2000/60	
Directive 98/24/EEC and 2004/37/EC on the protection of workers from chemical risks	
Habitats Directive 92/43/EEC / Wild Birds Directive 2009/147	
Other(s): *Please specify*	

SECTION A - IMPLEMENTATION OF DIRECTIVE 2009/128/EC

Activities directly related to monitoring and surveillance on impacts of pesticides use included in the programmes required under Article 4 of Dir 2009/128/EC (National Action plans)

Reminder: Only actions that are directly related to the monitoring and surveillance on impacts of use of PPPs and risks communications programs have to be reported in this section.

1. **Please describe monitoring and surveillance activities** which: 1) have been completed during the last 10 years, 2) are currently in place, 3) are planned for implementation in the near future on impacts of pesticides use on human health and on the environment, in the framework of implementation of Article 4 of Directive 2009/128/EC.

Fill ONE table per individual program/project (duplicate the table as appropriate). Please also provide any additional document, website link that could help further understanding the program.

Name of the program	
Focus	Monitoring or Surveillance or Both
Status	Completed or Ongoing or Planned
Implementation phases/timeframe/ periodicity	
General description	
Strategy & main objectives	
Statistical design	
Governance and actors (designed competent authorities, tasks and coordination role)	
Reference laboratories if appropriate	
Substances covered	
Affected social group	
Budget (in K EUR) *Please specify per year or for per total running time.*	
List of indicators used	
No of time each indicator has been measured/will be measured	
Assessment of the quality of the indicators:	
Limits in the measurement of the indicator	
IT tools used for collating, pooling and elaborating programmes	

Expected results	
Measured impacts and observed results	
Problems and obstacles in implementation and running of the programs	
Online presence of program	
Remarks / additional information	

Activities related to implementation of Article 7 of Dir 2009/128/EC (Information and awareness-raising)

2 - Are results from monitoring and surveillance activities communicated to the public? Please describe the information which is communicated, means of communication and – if applicable – evaluation tools by describing the past, current and planned communication programmes:

Fill ONE table per individual program/project (duplicate the table as appropriate). Please also provide any additional document, website link that could help further understanding the program.

Name of the program	
Status	Completed or Ongoing or Planned
Implementation phases/timeframe/ periodicity	
General description	
Strategy & main objectives	
Target groups	
Means of communication	
Expected results	
Governance and actors (designed competent authorities, tasks and coordination role)	
Budget (in K EUR) Please specify per year or for per total running time.	
Observed results	
Problems and obstacles in implementation and running of the programs	
Remarks / additional information	

3 - Are awareness raising programmes in place aiming at the reduction of the impacts from the use of PPPs? Please describe information communicated, target group, means of communication and – if applicable – evaluation tools by describing the past, current and planned awareness raising programmes:

Fill ONE table per individual program/project (duplicate the table as appropriate). Please also provide any additional document, website link that could help further understanding the program.

Obligations related to article 6(3) should, also, be reported in this section.

Name of the program	
Status	Completed or Ongoing or Planned
Implementation phases/timeframe/ periodicity	
General description	
Strategy & main objectives	
Target groups	
Means of communication	
Expected results	
Governance and actors (designed competent authorities, tasks and coordination role)	
Budget (in K EUR) Please specify per year or for per total running time.	
Observed results	
Problems and obstacles in implementation and running of the programs	
Remarks / additional information	

4 - Are systems to gather information on pesticides acute poisoning and chronic poisoning put in place?

Fill ONE table per individual program/project (duplicate the table as appropriate). Please also provide any additional document, website link that could help further understanding the program.

Name of the program	
Status	Ongoing or Planned
Implementation phases/timeframe/ periodicity	
General description	
Strategy & main objectives	
Target groups	
Methodology for objectives assessment	
Statistical design	
Substances covered	
Affected social groups	
Expected results	
Governance and actors (designed competent authorities, tasks and coordination role)	
Reference laboratories if appropriate	
Budget (in K EUR) *Please specify per year or for per total running time.*	
Measured impacts and observed results	
Means of communication	
Problems and obstacles in implementation and running of the programs	
Evaluation tools	
Remarks / additional information	

Activities related to enforcement of Article 9 of Dir 2009/128/EC (Aerial spraying)

5 - Is monitoring on aerial spraying derogations put in place or planned? Any results from surveillance activities already carried out in the past?

Fill ONE table per individual program/project (duplicate the table as appropriate). Please also provide any additional document, website link that could help further understanding the program.

Name of the program	
Focus	
Status	Ongoing or Planned
Implementation phases/timeframe/ periodicity	
General description	
Strategy & main objectives	
Expected results	
Governance and actors (designed competent authorities, tasks and coordination role)	
Budget (in K EUR) *Please specify per year or for per total running time*.	
Observed results	
Online presence of program	
Problems and obstacles in implementation and running of the programs	
Remarks / additional information	

Activities related to the obligations of Article 15 of Dir 2009/128/EC (Risk Indicators)

6 - Have you engaged activities leading to the definition, testing and use of risk indicators

Yes ☐ No ☐

If yes, please briefly describe the program(s):

7 - Please provide the list of existing national risk indicators

8 - Please provide the list, description and objectives of indicators that are currently under development

SECTION B – IMPLEMENTATION OF REGULATION (EC) 1107/2009

Activities related to the obligations of Article 67 of Reg 1107/2009 (post-authorisation monitoring)

9 - Please briefly describe if and how you have already implemented the provision of Article 67 indicating that "*Producers of PPP shall undertake post-authorisation monitoring on the request of the competent authorities*"?

10 - How many times before the complete applicability of Regulation 1107/2009, have you already requested such type of monitoring plans to be implemented by the producer?

Activities related to the obligations of Article 68 of Reg 1107/2009 (monitoring and official controls including control of proper application of risk mitigation measures and possible monitoring activities deriving from conditions of approval on specific active substances

11 - Please describe how official controls in respect to Article 68 (type of control, responsibility, frequency, and budget related to the official controls) are being carried out in our country?

LEGISLATIVE ACTS OF INTEREST FROM OTHER EU POLICY FIELDS

12 - Please describe monitoring and surveillance activities in the framework of implementation of other related policy fields which are used in the context of pesticides.

Fill ONE table per individual program/project (duplicate the table as appropriate). Please also provide any additional document, website link that could help further understanding the program.

a) For Regulation 396/2005 on MRLs on food and feed of animal and plant origin:

Have you engaged additional activities that are NOT yet reported in the EFSA Report on the 2009 and earlier EU Pesticide Residue monitoring in food leading to the definition, testing and use of risk indicators?

Yes ☐ No ☐

If yes, please fill the following table:

Name of the program	
Focus	Monitoring or Surveillance or Both
Implementation phases/timeframe/periodicity	
General description	
Strategy & main objectives	
Expected results	
Governance and actors (designed CAs, tasks and coordination roles)	
Substances covered	
Affected social group	
Budget (in K EUR) *Please specify per year or for per total running time.*	
List of indicators used	
Limits in the measurement of the indicator	
Measured impacts and observed results	
Communication means	
Problems and obstacles in implementation and running of the programs	
Remarks / additional information	

b) For Water Framework Directive 2000/60/EC

We understand that you will report here the description of the River Basin Management Plans (RBMP). We have therefore pre-filled the table with information already available and we would appreciate very much your review on our input and completion of the table.

Thanks, also, to attach any additional report describing this program if already exists.

Name of the program	Monitoring programmes under Article 8 of the Water Framework Directive
Focus	Monitoring
Implementation phases/timeframe/periodicity	Started December 2007, on-going. Frequency of sampling is variable. There are some minimum frequencies in WFD Annex V section 1.3.4 for surface waters.
General description	Monitoring programmes should be designed to establish a coherent and comprehensive overview of water status within each river basin district. As regards pesticides in surface waters they should cover those included in Annex X to the WFD (priority substances, see Directive 2008/105/EC) and those identified at Member State level as specific substances of concern. As regards groundwater, total pesticides should be monitored (Annex I to the Groundwater Directive 2006/118/EC) as well as threshold values established nationally by Member States, if any (see implementation report here)
Strategy & main objectives	Detailed objectives of the monitoring are included in WFD Annex V section 1.3 for surface waters and in section 2.4 for groundwater
Expected results	Specifically about pesticides, the objective is to check whether the concentrations in the water environment are meeting the set standards (see below)
Governance and actors (designed CAs, tasks and coordination roles)	Competent authorities are available in the annex 4 to the Commission WFD implementation report of 2007, see here.
Substances covered	Surface waters: Priority substances and other pollutants as per Annex I to Directive 2008/105/EC; river basin specific pollutants. Groundwater: total pesticides and individual pesticides as per Annex I to Directive 2006/118/EC; national groundwater pollutants (see summary in the implementation report, link above)

Affected social group	
Budget (in K EUR) *Please specify per year or for per total running time.*	
List of indicators used	The indicators are - for surface waters, the Environmental Quality Standards (EQS) for priority substances as per Annex I to Directive 2008/105/EC; the national EQS for river basin specific pollutants - for groundwater, the Quality Standards in Annex I to the Groundwater directive 2006/118/EC; the threshold values as per the implementation report (link given above)
Limits in the measurement of the indicator	
Measured impacts and observed results	According to the WFD, if the standards are exceeded, measures should be taken to reduce concentrations below the standards. Certain priority substances are currently exceeding the standards, but they do not have to be met until 2015.
Communication means	The outcomes of the monitoring programmes are reported in the river basin management plans drawn up in accordance with Article 13 of the WFD (the first plan was due in December 2009, updates expected in 2015 and 2021)
Problems and obstacles in implementation and running of the programs	
Remarks / additional information	The preparation of the WFD river basin management plans includes a pressures and impacts analysis of the river basins that should involve the screening of potential pollutants that are of concern in the basin. This may involve ad-hoc monitoring programmes in some cases, to be developed every 6 years.

In cases you have specific additional programs addressing specific PPP substances, we would appreciate that you fill additional tables.

Name of the program	

Focus	Monitoring or Surveillance or Both
Implementation phases/timeframe/periodicity	
General description	
Strategy & main objectives	
Expected results	
Governance and actors (designed CAs, tasks and coordination roles)	
Substances covered	
Affected social group	
Budget (in K EUR) *Please specify per year or for per total running time.*	
List of indicators used	
Limits in the measurement of the indicator	
Measured impacts and observed results	
Communication means	
Problems and obstacles in implementation and running of the programs	
Remarks / additional information	

c) For Directives 98/24/EEC and 2004/37/EC on the protection of workers from chemical risks

Name of the program	
Focus	Monitoring or Surveillance or Both

Implementation phases/timeframe/periodicity	
General description	
Strategy & main objectives	
Expected results	
Governance and actors (designed CAs, tasks and coordination roles)	
Substances covered	
Affected social group	
Budget (in K EUR) *Please specify per year or for per total running time.*	
List of indicators used	
Limits in the measurement of the indicator	
Measured impacts and observed results	
Communication means	
Problems and obstacles in implementation and running of the programs	
Remarks / additional information	

d) Habitats Directive 92/43/EEC / Wild Birds Directive 2009/147/EC

Name of the program	
Focus	Monitoring or Surveillance or Both

Implementation phases/timeframe/periodicity	
General description	
Strategy & main objectives	
Expected results	
Governance and actors (designed CAs, tasks and coordination roles)	
Substances covered	
Affected social group	
Budget (in K EUR) *Please specify per year or for per total running time.*	
List of indicators used	
Limits in the measurement of the indicator	
Measured impacts and observed results	
Communication means	
Problems and obstacles in implementation and running of the programs	
Remarks / additional information	

SECTION D - Additional information

Please provide information of any other projects/plans which are NOT EU mandatory and which are currently in place in your country

Thank you !

Annex 5: Description of the existing National Action Plan (NAP)

General description of the national action plans in key MS

On the basis of the literature review, on the answers to the survey questionnaire, and on conclusions of discussions in MS, we present here a general description of the national actions plan and strategies regarding monitoring and surveillance of impacts of use of PPP. This analysis included all MS in which a field visit has been conducted to the exception of Poland, Spain and Italy that have reported that no action related to the implementation of the SUD Directive has been taken yet and that the description of the NAP was not yet available. Belgium is not included in the list of MS to be visited, but is a leading country in this field. Therefore we have developed a short description of the Belgian federal plan (PRPB).

Belgium

History

During the last fifteen years, several efforts were done in Belgium to better manage the risk and control the use of pesticides and biocides. Belgium has adopted in 2005 the Program for Reduction of Pesticides and Biocides (PRPB). The objective is to reduce by 2010 the risks from pesticide and biocide uses to 50% of the value calculated for 2001. For agricultural use, the objective was lowered up to 25% because of the efforts already realised by the sector in the decade preceding the PRPB.

Establishment of the PRPB in the continuity of the actions started in the 1990s

Before the adoption of the PRPB, federal and national competent authorities initiated many of these efforts. At federal level, restrictions of authorisation of pesticides involved protection measures of water bodies in order to introduce appropriate buffer zones. Some pesticide application dosages were also limited and the aerial spraying of pesticides was severely controlled. Professional applicators of toxic or very toxic pesticides are obliged to dispose of a certificate of knowledge. The website “Phytoweb” was developed in order to provide all useful information and legislation for both professional and amateurs. In 2006, the EU Directive 2003/4/EC and Directive 2003/35/EC related to the public access to environmental programmes and information were transposed into Belgian legislation. Eventually, compulsory controls were organised since 1995 for the application machinery, and controls are also carried out for the pesticide storage area and the residues in food. Monitoring of pesticide use is realised since 1998.

Responsibilities are shared between the federal and the regional levels. Regions also defined their policy regarding pesticides. This mainly concerns the support to low-input farming methods or systems by the way of financing research studies centres or supporting advisory services and private initiatives for labelling and certification systems. Regions also restricted the use of pesticide in sensitive areas such as public areas (*Zonder is Gezonder*) and water

catchments areas. Information for professional (good plant protection practices guidelines, training, demonstrations, etc.) and awareness raising programmes for both professional and amateurs were organised. Regions also implemented the monitoring of ground- and surface-water quality (Flanders; Wallonia) in line with EU obligations of developing river basin management plans.

Initiated by an eco-taxation system and awareness of pesticide industry, a system to recover the pesticide packaging (similar approach to the ADIVALOR initiative in France) was implemented by the industry under the control of regions since 1997.

Implementation and governance of the PRPB

The PRPB was implemented in 2005 on the basis of a very intensive participation of stakeholders. It is updated every 2 years. Information, consultation and dialogue initiatives were taken in order to define and to rank by order of priority the actions to comply with the objectives. Stakeholders are informed by the way of seminars focussed on conclusions of studies, development of research programmes and consultations related to the PRPB. A national forum for exchange of information has been established. Information is also ensured by the way of several reports of the PRPB activities. The PRPB organises several committees to collect information and opinions about the pesticide or biocide risk management, as follows:

- The Advisory Council of the PRPB composed of stakeholders (Authorities, Water suppliers, Farmers, Environmental associations, Consumers, Scientists, PPP industry);
- The Advisory group for impacts on bees problematic;
- The Thematic groups for risk reduction proposals in several fields of expertise (15 groups, 270 participants);
- The Advisory group for biocide indicators development with stakeholders.

Opinion about the PRPB is also gathered in 4 federal councils every two years when the programme is updated. These councils are: Consumption Council; Federal Council for Sustainable Development; Superior Health Council; Central Economy Council.

Dialogue structures were implemented by the PRPB in order to define priorities, budgets and programmes. The most important is the Belgian dialogue committee with federal; regional and communities' authorities devoted to draft and agree on conventions in order to implement the PRPB measures where multi-level competencies are concerned. The National Action Plan (NAP) has been discussed and adopted at this level.

Programmes and budget of the PRPB

The first PRPB program was developed in 2005, the second in 2012 and it has been adapted in 2009-2010 to include obligations of the SUD Directive. On average, the annual budget for this plan is of half million euros, of which in between 50 to 70 K Euros are devoted for communication purposes. Financing of pesticide registration activities and PRPB was updated recently with a new contribution from industry based on the hazard of the products (risk phrases) and the quantity sold.

The main actions that are developed under the plan are:

- Monitoring the pesticide and biocide exposure:
  - Sales and market structure for type 18 biocides (rodenticides, insecticides, … for domestic use)
  - Use of pesticides for several crops (continuation of a monitoring program running since 1998).
- Consumer exposure:
  - Development of a pesticide use monitoring system in agriculture in order to obtain a sufficient representative data set as to assess the risk for Belgium every two years.
- Toxico-vigilance: monitoring of poisoning of humans and pets with pesticides and biocides.

Development of risk and impact indicators

A lot of actions of the PRPB are devoted to develop the risk indicators. Belgium is certainly a leading country in that respect. An inventory of the pesticides and biocides impact on health and environment was realised in order to have a hazard description focused on the Belgian case. The federal government decided, in 2004 to work with several indicators types, namely: risk, mass and frequency indicators. The main one is the "*multi-compartmental risk indicator PRIBEL (see description in Chapter 4.3) (Pesticide Risks Indicator for Belgium)*" which is in used since 2001. The main difficulty of using this indicator is the collection of raw data (volumes sold, what is exactly applied on crops? when?) to run this indicator.

It should also be highlighted the development of a bi-compartmental (human health and environment) risk indicator for biocides.

Communication and awareness raising campaigns

A web site devoted to the PRPB has been developed in order to provide information and to promote the communication campaigns. Conventions with the industry have also been signed with the PPP industry in order to reduce the confidentiality of the sales data to a minimum.

The first major communication campaign took place in 2007 with the publication of the leaflet "*Biocides et pesticides: pas sans risques*" that was developed in relation with the major consumer association (Test-Achat). In 2009, the PRPB financed a TV program called "*Jardins et loisirs*" in which information on the danger of PPP were presented.

Additional leaflets and posters are available at federal level on request. Eventually, participation to sociological analysis of the dialogue between stakeholders and authorities in a crisis situation: example of the impacts of pesticides on bees.

As mentioned above, the average annual budget for communication campaign is rather limited (from 50 to 70 K euros yearly).

Germany

(To note that replies to the questionnaires for Germany will be provided in calendar week 15. This section will be amended as appropriate after receipt of the replies)

History

Following a prior broad political dialogue on plant protection policy in Germany, the "Plant Protection Product Reduction Programme" was elaborated in 2004, a dynamic program under permanent development discussing impacts of chemical plant protection and measures to achieve a sound factual basis and a sustainable development in the use of PPP.

The current National Action Plan (NAP) was drawn up taking into account the experiences made with this program. It has been formally approved at the Conference of Agricultural Ministers meeting in April 2008.

The NAP contains the overall aim to reduce the potential risk of plant protection substances for humans, animals and the environment by 25 % by the year 2020. It seeks:

- To maintain the necessary balance in the use of PPP. Farmers should use these substances in such a way that their crop cultivation remains economically viable;
- To develop non-chemical plant protection processes, strengthen research on resistance properties, and promote IPM and organic farming;
- To improve plant protection consulting for users and to set up a plant protection Internet portal;
- To comply with existing plant protection regulations;
- To reduce the levels of pesticide residues in food.

Although it already considers a number of elements which are relevant under the SUD Directive, the NAP is further be developed, in compliance with all requirements for National Action Plans under the SUD Directive, particularly in the areas of decreasing the occurrence of exceeding MRL, biodiversity and water protection. The revision process will be accompanied by a close consultation of the "Forum to the NAP for the sustainable use of PPP", in which 36 representatives of different groups of stakeholders (stemming inter alia from the area of consumer protection, environmental/ nature protection NGO, agriculture, trade, as well as different concerned public authorities) are present under coordination of Federal level. The Forum has working groups on water, biodiversity, and indicators.

The elaboration and further development of the NAP is supervised by the Federal Ministry of Food, Agriculture and Consumer Protection (*BMELV*); it is supported by the National Office for Agriculture and Food (*BLE*), the Federal Office of Consumer Protection and Food Safety (*BVL*) and the Federal Crop Research Institute (*Julius-Kühn-Institut*). The implementation of the NAP measures is to some extent left, or at least to be co-ordinated, with public authorities at *Länder* level that are competent for enforcement of PPP legislation.

Programmes

The NAP features chapters on measures (Complying with the necessary minimum, Research and promotion of innovation, Improved knowledge and information), Indicators, as well as on reporting and supporting measures. The main actions that are developed under the plan are:

- Research and promotion of innovation towards integrated plant protection, including IPM, Hot Spot management, and computer modelling of predictions;
- Improved knowledge for users of PPP and retail sector, including improved advice and online information;
- Emphasising compliance with PPP law and reducing residues

Interesting features of the NAP in terms of the scope of this project are particularly the various programs used in the context of indicators, which are discussed below.

Development of risk and impact indicators

- Systematic **statistical collection and evaluation** about the actual application of PPP as the essential basis for all development of indicators is emphasized by the NAP.

  Currently, statistical investigation is done via the established NEPTUN network (*Netzwerk zur Ermittlung der Pflanzenschutzmittelanwendung in unterschiedlichen, landwirtschaftlich relevanten Naturräumen*) which serves at collecting of crop and regional-specific data on the use of PPP. NEPTUN analyses relate to a representative number of farms for various crop groups in different regions which are selected by means of random sampling. The surveys are carried out by professional associations when the *JKI* checks and evaluates the anonymised data. The *Länder* participate in plausibility assessments.

  The following parameters are investigated, regional and crop-specific, on the use of PPP in agricultural practice:

  - Date of the application
  - Area of application / indication (optionally)
  - Full name of PPP
  - Amount of used PPP
  - Unit for expenses amount treated surface.

  In addition to the *NEPTUN* analyses, a network of reference farms (*Netz Vergleichsbetriebe*) for different crop-growing, horticulture, fruit-growing, winegrowing, hops and other production sectors has been established. Due to the high number of random samples, the *NEPTUN* statistics allow identification of the average quantity of used PPP, the frequency of use and the corridor of average use in specific regions. In contrast, the reference farms do not provide statistically representative treatment index averages per region. Rather, they serve as examples

within the total number of farms in a region and provide annual data. The data generated under this project is used to calculate the treatment index.

Information gathered through the NEPTUN elevation are used to calculate the "treatment index", a representative index listing the number of times a PPP is used on a given piece of land, crop or farm, taking account of any reductions in the amounts used and whether only partial areas of land are treated. The treatment index serves as a documentation of the various intensities in the use of plant protection products on crops, fields, farms and in given regions and years. Multiyear data are used to identify trends.

The *NEPTUN* system will be replaced by *PAPA* approach (Panel PSM-Anwendung). Within *PAPA*, nine crop-specific networks (Panel) shall be construed in application of Statistics Regulation (EC) 1185/2009, which members provide anonymised data on an annual basis on a voluntary basis.

- To add the dimension of identifying risks arising from the use of PPP to the information on appearance and intensity of PPP use, the SYNOPS indicator uses as main tool.

- SYNOPS (*Synoptisches Bewertungsmodell für Pflanzenschutzmittel* (synoptic evaluation model for plant protection products) is a Computer-aided model aiming to allow the identification of relative changes in PPP-related risks to aquatic and terrestrial ecosystems see further description in the chapter on indicators below). SYNOPS is further explained below in Chapter 4.3.

- Independent of the validation of predictions by SYNOPS, and specific targeted monitoring activities in the context of registration procedures, general monitoring activities which can become relevant for decision direct in this frame are partially carried out on special problems. These activities are characterized that usually no direct connection is made between the appropriate use of a substance and identified occurrences. Those general monitoring measures are namely performed for:

    - The concentration of PPP in ground water has been monitored for over twenty years. Results of this ground water investigation serve to identify PPP which show an enhanced danger potential ground water, on account of the frequency of detection; on which measures may be based against the holder of the authorization. Frequent reports on the general state of ground water, on the basis of monitoring results of groundwater of approximately 13,000 measuring points, are published by Federal Environmental Agency, in collaboration with a working group of *Länder* representatives. The report of 2008 shows that the number of the measuring points in which the relevant limit value of the Federal Drinking Water Ordinance of 0.1 µ g/l is exceeded, have clearly decreased in the period from 1990 to 2008;

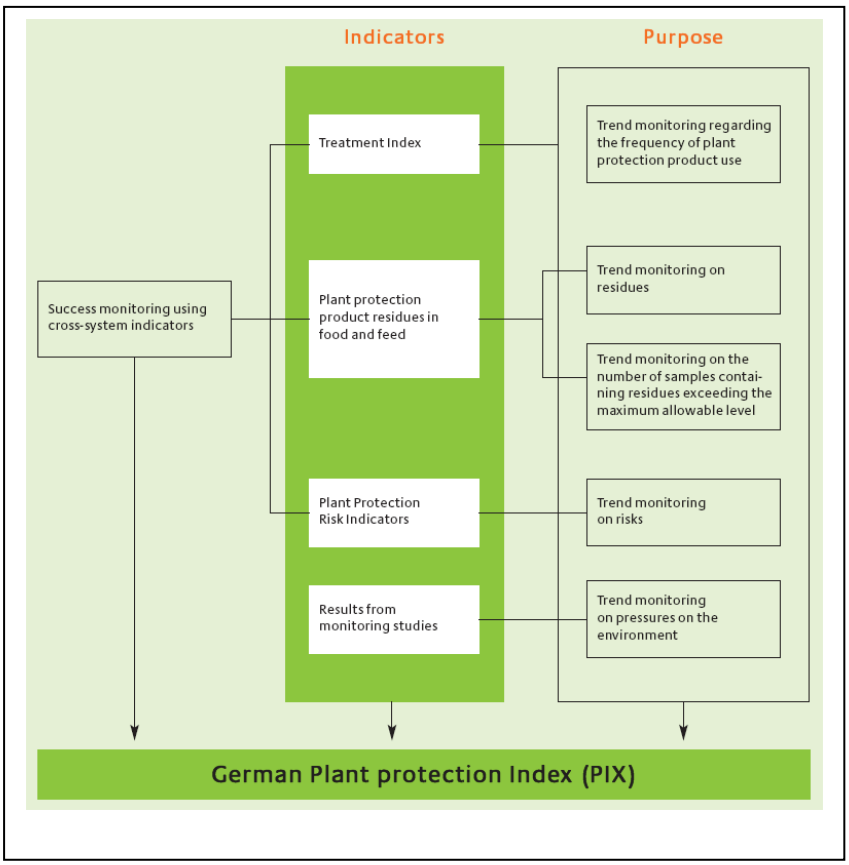
    - Monitoring of surface water is conducted (by *Länder* authorities) in compliance with the requirements of Water Framework Directive. The results

of the monitoring can be used for the assessment of the exposure of surface waters to PPP in basins > 10 km2;

- An example of a specific project is the monitoring of PPP in bee bread (*Deutsches Bienenmonitoring*) which is regularly executed since 2002.

The findings of treatment index, risk indicators, residue surveillance and (general) monitoring is foreseen to be used as cross-system indicators used for review of the progresses in terms of sustainable use, and the NAP, within the **German Plant protection Index (PIX)**. Input and purpose of PIX is depicted in the figure below, taken from the NAP:

The German plant protection index (PIX)



Source: Federal Ministry of Food, Agriculture and Consumer Protection, National Action Plan on Sustainable Use of Plant Protection Products (2008)

Communication and awareness raising campaigns

Information on sustainable use of pesticides in Germany is channeled through web site **http://nap.jki.bund.de/**, run by Julius-Kühn-Institut. The site presents elements of the 2008 National Action Plan, including regularly updated reports, and informs about further developments of the NAP and the respective working groups. Interactive tools for the different elements used as risk indicators are presented as well.

Denmark

History

In Denmark, the elaboration of coordinated plans on the risks of pesticides is a common tool, starting with the First Pesticide Action Plan that covered the period 1987 to 1996. In this period, the essential aims were to reduce clearly the amount of PPP used, to avoid unnecessary PPP measures, and to identify and eliminate the most problematic uses. The aim was to decrease the quantity of consumption of PPP (active substances and treatment index) by 50%, in relation to the period from 1981 to 1986.

Whereas, mainly due to promotion of new PPP with lower need of active substance per ha, the total quantity of active substances was significantly reduced, the average treatment index only decreased by 8 %.

Considering discussions and findings of the Bichel Committee (1998-1999), revised Pesticide Action Plans were adopted for the period of 2000-2003. This plan aimed to reduce pesticide use to attain a treatment frequency index (TFI, see below) from 2.45 to 1.7. After an Action Plan covering the period of 2004 to 2009, in spring of 2009, the government's Green Growth Plan was presented, covering the period from 2010 to 2015.

Programmes and budget

The Green Growth Agreement is a concerted Action Plan incorporating Danish nature, environmental and climate initiatives. It was signed in 2009 by the Government and the Danish People's Party. Around 1.8 billion EUR have been allocated for the period of 2010 to 2015.

Main aims of the plan are:

- Reduction in the pesticide impact
- Environment and health burdens from use of pesticides in horticultural and fruit growing sectors must be reduced maximally
- Pesticide residues in Danish-produced food must be reduced to a minimum.
- Approved pesticides must not leach into the groundwater at levels above the maximum limit value.

For this period, the indicator TFI is slightly changed and now also includes organic cultivated land. The new target is a modified treatment index of 1.4 by 2013. Research initiatives and training is emphasized, a new pesticide tax is introduced, aiming to that the PPP most harmful to health and the environment are subject to the highest taxes.

The plan obliges farmers to establish ten meters of non-cropped buffer zones around all lakes over 100 m^2, and water courses. These zones can only produce pluri-annual energy

crops and grass, but no pesticides and fertilizer may be applied. Farmers will be compensated for lost output through rural development funding.

Development of risk and impact indicators

The indicator "Frequency of Application" (FA) was initially developed to supervise the success the politically suggested incentive for pesticides reduction in grain cultivation. Whereas it primarily rather reflects the consumption of PPP than to deliver valid results of the trend in environmental impact or side effects, the Danish Plant Directorate has, in collaboration with the Environmental Protection Agency, initiated an investigation into ways of developing indicators for the harmful effects of plant protection products. Until such an indicator is developed, the FA is combined with the PLI (Pesticide Load Index). See in detail below in chapter 4.3.

Communication and awareness raising campaigns

Exhaustive information on the impact of the Green Growth plan and connected activities is provided for the general public (accessible also in English via **http://www.mst.dk/English/Pesticides/**). Over the period of the plan, a series of information campaigns shall inform the general public about the subject of PPP and proper handling. EPA is supposed to conduct two major campaigns aimed at garden owners.

France

History

France is the largest consumer of PPP in the EU (about 75.000 tons of active substances in 2009) and the 3rd largest at the world level. In order to reduce the impacts of use of PPP, the ministers in France in charge of health, agriculture, ecology, competition and consumer protection and the repression of fraud have decided to implement a new interministerial plan for reducing the risks linked to pesticides. This aims to reduce their use and the risks that they create in health terms for the users of the products and the consumers of foodstuffs, as well as their potential effects on the different compartments of the environment (water, air and soil) and biodiversity.

This plan is called "*Plan Ecophyto 2018*" and it major objective to reduce by 50%, between now and 2018, the volumes of PPP sold, if possible. It complies with the commitments initiated by the French government in the national health and environment plan published in June 2004; the "Agriculture" action plan of French strategy for biodiversity published in November 2005 and is aligned to the conclusions of the "*Grenelle de l'environnement*" forum that took place in 2007. The "*Grenelle de l'environment*" is a result of a national consultation that involved all stakeholders. This objective was translated into a 50% reduction in treatment frequency as sales figures were only available for active substances and not for commercial products. A more complex calculation than the Danish treatment frequency index (TFI) indicator has been developed in order to develop treatment frequencies per crop.

Objectives of the Plan Ecophyto 2018

The Plan Ecophyto 2018 is keeping with the pursuance of the inter-ministerial plan (French abbreviation PIRRP), launched in 2006 by the ministers in charge of agriculture and the environment through the work of regional groups for combating pollution by pest control products and by reinforcing the actions already undertaken in this respect, as well as by the profession itself, and is based on the following five goals:

- Acting on the products by improving the conditions under which they are released on the market.
- Acting on practices and minimising recourse to pesticides.
- Reinforcing the training of professionals, the protection of users of pesticides and providing them with better information.
- Enhancing knowledge and transparency in terms of the impact of pesticides on health and the environment.
- Evaluating the progress made.

Implementation and governance of the Plan Ecophyto 2018

In addition to the withdrawal from the market of plant protection products containing the active substances of most concern, the core purpose of the Ecophyto 2018 action plan is to disseminate the best low-pesticide agricultural practice (Focus 2) and to drive innovation based on research directed at new systems of production enabling further reductions and which are viable and lend themselves to dissemination (Focus 3).

Alongside actions for reduced use, the plan's success must involve training and safe pesticide use, these being necessary conditions to be met if these programmes are to win the widest possible acceptance (Focus 4).

The plan provides for the strengthening of networks for surveillance of harmful organisms, to ensure that treatments are properly targeted, along with the undesirable effects of pesticide use on crops and the environment (Focus 5).

And lastly, due to the specific situations of French overseas departments with regard to the risks associated with plant protection products, one of the plan's core focuses is dedicated entirely to them (Focus 6).

Since the relevance of reducing the use of plant protection products goes beyond the confines of the agricultural world, one strategic focus of the plan is specifically devoted to the issues surrounding reduced, safe use of pesticides in non-agricultural areas (Focus 7).

A system for quantitative monitoring of progress on the reduction of pesticide use (Focus 1) has been made an integral part of the plan.

The Plan is managed by the Ministry of Agriculture and was developed by representatives from the government, research, farming, training and extension services, PPP industry and input suppliers as well as NGOs. These stakeholders are now formally included in a national

committee that meet regularly in order to assess progresses and propose modifications and adjustments.

Additionally it has to be highlighted that the large majority of stakeholders are present in the plan and they bring their expertise to the different actions (105 actions in total) of the plan.

Financing of the plan (about 40 million euros yearly) comes from the government and from a tax paid by the farmers on each active substance. Participants are also bringing financing in kind when they are engaged in the different actions of the plan.

The programme continues to evolve and new activities are yearly being added to each focus point. For the first year in 2018, specific surveillance programs will be monitor impact of PPP on biodiversity and especially on birds (100 surveillance spots and a budget of 1.2 million euros).

Development of risk and impact indicators

In the first instance, the main objective of the Ecophyto 2018 action plan is to decrease the volumes of used pesticides by 50% in ten years if possible. Therefore it is an important similar to the one DK end NL took in the 1980s. Therefore, the French authorities have decided to take benefits from the Danish indicator which is the frequency treatment index (TFI) and to adapt it to the French approach. A second major indicator has been established: the NODU which is proportional to the number of dosage units represented by sales of active protection substances. The two ones have been developed to be complementary and to assess the progress made in the reduction of volumes. A national database has been created to gather information on volumes sold. This information is required to calculate both TFI and NODU indicators which are calculated on a yearly basis.

The French RA agency has been mandated to adapt these indictors in order to have a better focus on the reduction of impacts rather than on the reduction of volumes. The first set of new indicators should be ready in the second semester 2012.

Communication and awareness raising campaigns

Communication and awareness raising campaigns are defined within the Ecophyto 2018 action plan. There are based on several approaches as follows:

- Communication in real time on the implementation of the plan via the official Ecophyto 2018 website managed by the permanent secretariat;
- Execution of a survey of farmers' attitudes in the autumn of 2008 in order to define the most effective arrangements for communication and the arguments to be used to achieve the objectives of communication targeting the professional audience;
- Initiation in early 2009 of a communication campaign targeting professionals in the agricultural industry (prescribers, farmers, cooperatives, agri-food companies, distributors and others) in order to raise their awareness of the issues involved and to encourage acceptance of the Ecophyto plan with a view to modifying behaviour with regard to practices and production methods. This campaign has been based on the results of the attitude survey conducted in 2008;

- Communication in 2009 and 2010 targeting the managers of public spaces and amateur gardeners, working through partnerships, especially with specialist distributor networks (e.g. garden centres).
- Communication targeting the general public in 2010 in order to highlight the benefits of reduced pesticide use in agricultural and non-agricultural areas, along with the commitment of the farming industry to shouldering its environmental responsibilities, while at the same time generating forward impetus in the farming community.

Finland

Finland has produced a document presenting its NAP in 2011. This document is structured based on the obligations of the SUD Directive. Therefore, we refer to the Finnish document that could be found at:
http://www.mmm.fi/attachments/mmm/julkaisut/tyoryhmamuistiot/newfolder_25/647YNG83G/Trm2011_4_en.pdf .

The Netherlands

History

Already in the 1980s the NL initiated a national action plan regarding the reduction of impact of use of pesticides as it had the highest pesticide per area in the EU. The first approach which was the Multiyear Crop Protection Plan included a target of 50% overall volume reduction by 2000 relative to the 1984-1988 reference period. The target was quickly reached without adversely affecting yields and crop quality, in large part resulting from a 85% volume reduction in nématicides soil disinfectants. Here, one obvious criticism of volume reduction targets is that they do not take into account the replacement of lower-dose pesticides with newer and more potent active ingredient.

In executing its 3rd NAP (2001-2010), the Netherlands switched to an impact reduction target and towards reduction of environmental impacts.

Implementation and governance of the 3rd NAP

The Netherlands NAP consists of national legislation (authorisation, leaching, worker protection, residues, IPM) and additional impact reducing measures (to improve knowledge; to encourage and educate growers to produce their crops in a sustainable way, by using IPM; to keep enough PPP available, enforcement, encouraging sustainable consumption and production). These additional measures have been agreed upon within a multiple stakeholder working structure.

In 2003, the national agreement on crop protection set objectives at 95% reduction in the environment impact as measured by the ratio of predicted exposure concentration on water organisms to the no-effect concentration. In details, the Netherlands approach is based on

reducing risks, not use/emission/dependency and has set quantitative targets to be achieved by 2010:

1. Reduction of 95% of impacts of PPP's on surface water (-75% in 2005; reference year 1998);

2. Reduction of 95% of problems in surface water used for drinking water (-75%; 1998);

3. Reduction of 50% exceedances of MRLs (reference year 2003).

Programmes and NAP

In 2003 the Dutch Government launched initiative aimed at promoting the implementation of Integrated Crop Management across the agricultural sector. It is important to underline that the Dutch government developed a working structure where all stakeholders' parties from all sides assume common and individual responsibilities and tasks to work on the goals set. This structure is considered by the Dutch authorities to be an essential platform for moving ahead in achieving the NAP goals.

The well-known "polder model" refers to the Dutch know-how in coordinating a diversity of stakeholders around large initiatives. The 2003 national agreement was a next step forward in building collaboration between stakeholders and policy makers. The signatories of the agreement included the ministries of agriculture and of the environment, farmers organisations, the PPP industry, distributors, water board and water companies, input suppliers and NGOs.

As part of the 2001-2010 plan, a programme (called "*Telen met Toekomst*") including 35 regional networks was set up. These networks grouping farmers, researchers, advisors, input suppliers and water board representatives form new governances and new working methods. The technologies and strategies that are supported by these networks are then disseminated to the entire agricultural sector.

The project worked to develop 'Best Practice' protocols in Integrated Crop Management for all major crops; including field vegetables, bulbs, ornamentals, arable crops, trees, glasshouse vegetables and fruits. These standards go well beyond 'Good Agricultural Practice' and have the potential to reduce pesticide emissions and environmental damage. The chemical control of weeds and pests is seen as a last resort with the plant protection hierarchy. In 2005 the Dutch supermarket 'Laurus' endorsed the adoption of Best Practice ICM protocols by offering farmers a premium for produce grown according to the scheme. Initially selling Best Practice apples, pears, strawberries, parsley, cabbage, and lettuces, the supermarket has since expanded its operation to include other fruits and vegetables as well as glasshouse produce such as tomatoes, cucumbers and peppers.

Development of risk and impact indicators

The crop protection policy of the Dutch Government is oriented to environmental risks and more particularly on risks on the aquatic system. A set of risk indicators (program NMI2)

have been developed by the Netherlands Environmental Plan Bureau in the 2000s, as follows:

- Calculated concentration/norm. Only drift and yard leaching have yet been measured/monitored & calculated;
- Presence of 1 (allowed) active substance exceeding 0.1 ug/l in 1 year at one measuring point;
- Number of MRL exceedances/number of samples.

The new model version NMI 3 was developed in the period 2009 - 2011 to overcome limitations of the NM12 that have been highlighted by an evaluation carried out in 2006. It is presented in more detailed in the following chapter.

Sweden

History

In 1986 the first programme to reduce the risks connected with the use of pesticides was introduced in Sweden. The subject of the program was to reduce the risks to human health and the environment from the use of pesticides in agriculture and horticulture. Twenty years later this work is still going on. The first program has been revised four times.

Objectives and governance of the programme

The government has established 16 national objectives regarding the environmental quality that should be reached by 2020. The most important objective, when it comes to pesticides, is “A non-toxic environment”. Others important objectives are for example flourishing lakes and stream and good-quality groundwater.

The objective ”A non-toxic environment” states that the environment must be free from man-made or extracted compounds and metals that represent a threat to human health or biological diversity. It consists of six interim targets. One of them states that health and environmental risks associated with the manufacture and use of chemical substances will be reduced continuously, as measured by indicators and ratios that have been established by the competent authorities.

This gives a connection to the objectives of the action programme, which is part of the efforts to reach the National environmental quality objectives. The overall objective for the program is that national pesticide risk indicators shall continue to show a decreasing trend. In the programme there are also objectives concerning characteristics of plant protection products, residues in water and food and also risks with residues in water and food.

In regard to governance, the Swedish Environmental Protection Agency and The Occupational Safety and Health Administration, have issued regulations and guidelines aimed at reducing the health and environmental risks connected with the handling of pesticides. The Swedish Environmental Protection Agency also answers for monitoring of pesticide residues in surface - and ground water when the Swedish National Food Administration is responsible for the control of pesticide residues in food and drinking water.

The Federation of Swedish Farmers financially supports the programme. Their support in this issue has very much facilitated the realisation of the programme.

Measures of the programme

The programme comprises the following measures:

- Changeover to pesticides with less risk.
- Regulation of the handling of pesticides.
- Training and information in safer handling of pesticides.
- Control of pesticides residues in food and water.
- Pesticide taxes.
- Reduced use of pesticides.

Development of risk and impact indicators

There are two pesticide risk indicator systems used in Sweden, PRI-Nation and PRI-Farm.

PRI-Nation is intended to monitor impact of pesticide risk reduction policies on a national scale, whereas the purpose with PRI-Farm is to follow up pesticide risk trends at individual farms.

Both models are based on the same approach, where data on hazard and exposure is scored and combined with data on use intensity. The weighting procedure included is based on field data (where available), expert judgements or policy assessments.

The result is aggregated to a single score for each substance or treatment with the intention to indicate environmental and operator health risks respectively. However, the indicator score or sum does not quantify actual pesticide risks. Instead, the purpose is to indicate trends in potential risks at national level and farm level.

Communication and awareness raising campaigns

The Federation of Swedish Farmers has organized the information campaign *"Safe Use of Pesticides"***.** The campaign is built on collaboration between authorities, chemical companies and the farmer organisation. It is an example of the possibility for authorities to work together with the agricultural sector to successfully reach environmental goals. Federation of Swedish farmers (LRF), Swedish Crop Protection Association, The Nationals Chemicals Inspectorate (KemI), the Swedish Board of Agriculture (SJV) and The Swedish Environmental Protection Agency are all involved in the campaign.

The Swedish Board of Agriculture, answer for training, information and advisory service concerning safe handling of pesticides, reduced use of pesticides, integrated crop protection including pest prognoses and early warning. Activities are carried out by local extension officers and by the five plant protection centres that has been established.

The board is also responsible for the mandatory training courses for farmers and farm workers who carry out pesticide spraying professionally, the programme for voluntary tests

of sprayers in operation and weed, pest and technical research and development. The board is responsible for the co-ordination of the programme.

The aim of the Plant Protection Centres is to make plant protection in agri and horticulture both efficient and environment friendly. They are located in five different places in Sweden. The presence of pests, and the need for pesticides, varies a lot from year to year, and also from field to field in one year. These regional centres help to adapt the use of pesticides according to actual and local needs. These centres take active part in a large number of courses, field excursions, telephone meetings, and national and international conferences. Finally, Local extension officers' gives advice and information concerning the use of pesticides, and the risks associated with this use. In 2009 about 1 400 farmers received individual farm advice and about 5800 participated in different courses.

The UK

History

The UK National Action Plan was developed as a result of the adoption of "*Pesticides and the Environment: A Strategy for the Sustainable Use of Plant Protection Products*" in March 2006, that was updated in 2008.

Objectives and governance of the programme

The aim of the strategy to "*promote uses of plant protection products that achieve high standards in environmental protection whilst maintaining the economic viability of crop production*" by:

- Reducing water pollution caused by plant protection products to the standards required by the water framework directive;
- Reversing the loss of biodiversity caused by plant protection products;
- Encouraging the introduction of alternative chemicals, greater use of integrated approaches and lower product dependency;
- Establishing best practice in the amenity sector;
- Maintaining the availability of sufficient products, tools and techniques to control pests and disease; and
- Preventing inappropriate disposal of amateur products.

The UK plan is original in the sense that there is no single indicator used against a single national goal but a large number of simple indicators which are statistics. No modelling approach has been taken in the UK so far.

There are five separate parts to the UK plan. They cover the subjects of: water protection; promoting biodiversity; amateur use; amenity use and availability. Separate plans are being developed for each of these subjects by groups of stakeholders. The plans contain the following elements: use of pesticide legislation and risk assessment processes, establishing

appropriate links and supporting associated government initiatives, development of industry/voluntary approaches, communication, R&D and knowledge transfer. The Pesticides Forum, a stakeholder group formed in 1996 to advise the government on practical measures to minimise pesticides use, reviews the work of the each of these groups to ensure that the package of measures will deliver the desired aim. The last three years the forum has develop a much closer working relationship with both the Advisory Committee on Pesticides and the Pesticides Residues Committee. The improved links between the three organisations have enhanced information exchange between authorities and stakeholders.

Several plans are currently in place as follows:

- The Pesticide incident Apraisal Panel (PIAP) which is a monitoring action. This plan considers all incidents where there is any allegation that the use of a pesticide has caused ill health. PIAP is notified of these incidents only on completion of the inspector's investigation. The main purpose of PIAP is to provide an overview of alleged ill health attributed to pesticide exposure (as reported to and investigated by HSE) so that new issues and trends can be identified, and to inform the pesticides approval process. The full interpretation of the overall PIAP database is not limited by the lack of product information, but also by the fact that the relative importance of particular categories of pesticide may simply reflect the fact that their usage is more widespread rather than indicating that they are more hazardous. Therefore a review of this program is on-going;
- The Wildlife Incident Investigation Scheme (WIIS) investigates the deaths of wildlife (birds, bees, and animals), including beneficial insects and some pets, throughout the UK where there is evidence that pesticide poisoning may be involved;
- The UK pesticides residues monitoring programme which is the programme to answer to the EU request. It is the most expensive program in the UK (about 2.5 million Euros annually).

Development of risk and impact indicators

As mentioned above, one of the characteristics of the UK approach is that no indicators based on models are currently in place for assessing the impacts. However research works are currently on going for developing some indicators. When these indicators have been finalised, harmonised risks indicators will be calculated.

Communication and awareness raising campaigns

The communication and awareness raising campaigns are part of the National Pesticides Strategy and imminent UK National Action Plan.

The UK Government employs a variety of means to provide information to the general public through its National pesticides Strategy's working groups. This outreach is backed up by online and downloadable codes of practice both from the HSE website and advisory leaflets also downloadable.

The most common situation where the general public comes into contact with pesticides is through the buying and use of non-professional products. A section of the HSE website is dedicated to providing information to such users, the risks from their use and how to mitigate them. Similar

information can be found on the Direct.gov website, the UK Government's information portal for the general public.

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National Web pages

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Article 4 National Action Plans	**SK https://portal.mze.cz/ssl/web/mze/zivotni-prostredi/udrzitelne-pouzivani-pesticidu** **SE** : **http://www2.jordbruksverket.se/webdav/files/SJV/trycksaker/Pdf_rapporter/ra08_14.pdf** **FI** **http://www.mmm.fi/attachments/mmm/julkaisut/tyoryhmamuistiot/newfolder_25/5xCfswKPg/trm2011_4.pdf** **FR www.agriculture.gouv.fr/ecophyto-2018** http://agriculture.gouv.fr/Ecophyto-in-English **DE** The NAP (english version) is published under the following link: **http://www.bmelv.de/SharedDocs/Standardartikel/EN/Agriculture/NationalActionPlan2008.html** and **http://nap.jki.bund.de** The BVL published annually "Reports about domestic sale and export of PPP". http://www.bvl.bund.de/cln_007/nn_492010/DE/04__Pflanzenschutzmittel/01__ZulassungWirkstoffpruefung/02__Inlandsabsatz__und__Export/psm__zulassung__inlExp__node.html__nnn=true **UK** **http://www.pesticides.gov.uk/environment.asp?id=70** **CZ :** Restricted platform for discussion and exchange of opinion. (https://portal.mze.cz/ssl/web/mze/zivotni-prostredi/udrzitelne-pouzivani-pesticidu - The website for public is as follows: http://eagri.cz/public/web/mze/zivotni-prostredi/udrzitelne-pouzivani-pesticidu.html **IT** **www.minambiente.it** **www.reterurale.it**
Article 5 Training	**NL www.erkenningen.nl** **EE** : Please find atached a link to national legislation in force. (1.Plant protection act - **http://www.legaltext.ee/et/andmebaas/tekst.asp?loc=text**

	&dok=X70049K2&keel=en&pg=1&ptyyp=RT&tyyp=X&query=taimekaitse and Governmental regulation - **http://www.legaltext.ee/et/andmebaas/tekst.asp?loc=text&dok=XX00005&keel=en&pg=2&ptyyp=RT&tyyp=X&query=taimekaitse**) **DE:** http://www.gesetze-im-internet.de/pflschsachkv/BJNR017520987.html **(Non official English translation)** **http://www.bvl.bund.de/SharedDocs/Downloads/04_Pflanzenschutzmittel/rechtsgrundlagen/02_national/PflSchSachkV-En.html?nn=1414868** **UK :** Current UK pesticides legislation: **http://www.pesticides.gov.uk/approvals.asp?id=329** Pesticides codes of practice link (covers all planning, handling, use, disposal etc.) : **http://www.pesticides.gov.uk/safe_use.asp?id=870**
Article 6 Requirements for sales of pesticides	**DE:** http://www.gesetze-im-internet.de/pflschsachkv/BJNR017520987.html **(Non official English translation)** **http://www.bvl.bund.de/SharedDocs/Downloads/04_Pflanzenschutzmittel/rechtsgrundlagen/02_national/PflSchSachkV-En.html?nn=1414868**
Article 7 Information and awareness-raising	**SK www.ntic.sk** **NL www.ggd.nl** **HU** (**http://www.vm.gov.hu**) and the CAO (**http://www.mgszh.gov.hu**), "Plant Protection days", dissemination of information by chemicals companies
Systems for gathering information on pesticide acute poisoning incidents as well as chronic poisoning developments among groups that may be exposed regularly	
Article 8 Inspection of pesticides application equipment	**NL www.sklkeuring.nl** **DE:** http://www.gesetze-im-internet.de/pflschmgv/BJNR017540987.html
Article 11 Specific measures to protect the aquatic environment and drinking water	**EE:** Regulation is available in English (**http://www.legaltext.ee/et/andmebaas/tekst.asp?loc=text&dok=XXX0021&keel=en&pg=1&ptyyp=RT&tyyp=X&query=taimekaitse** **UK :** Pesticide buffer zone guidance: **http://www.pesticides.gov.uk/safe_use.asp?id=207** **UK:** Catchment Sensitive Farming initiative (water protection): **http://www.naturalengland.org.uk/ourwork/farming/csf/default.aspx**

Article 12 Reduction of pesticide use or risks in specific areas	**UK:** Herbicide Handbook (dated but still good indication) – herbicide use on conservation sites: **http://naturalengland.etraderstores.com/NaturalEnglandShop/IN125**
Article 13 Handling and storage of pesticides and treatment of their packaging and remnants	**NL www.gewasbescherming.nl**
Article 14 Integrated pest management	**UK:** Farm assurance schemes link: **http://www.redtractor.org.uk/site/REDT/Templates/GeneralWho.aspx?pageid=14&cc=GB**
Promotion of low pesticide-input pest management IPM and organic farming	**EE** : Organic Action Plan is available only in Estonian language on following link: (**http://www.agri.ee/mahepollumajandus/?id=10932**
Availability supporting technical services meteorological data, warning services, laboratories for identification of pathogens, research support	**DE** See **www.zepp.de** **UK:** Industry levy board link: **http://www.ahdb.org.uk/** and within that, example of work in cereals and oilseeds sector: **http://www.hgca.com/content.template/0/0/Home/Home/Home.mspx**
Article 15 Indicators	**NL www.nmi.alterra.nl** **DE www.nap.jki.de** **UK** Stakeholder Pesticides forum and indicators report link: **http://www.pesticides.gov.uk/pesticides_forum_home.asp**
National risk indicators	
Identification of trends in the use of certain active substances	**UK :** Pesticide usage survey -reports: **http://www.fera.defra.gov.uk/plants/pesticideUsage/fullReports.cfm** - data tables: **http://pusstats.csl.gov.uk/index.cfm**

Annex 7: Status regarding transposition of Article 9 of the SUD Directive (aerial spraying)

MS	Status of transposition	Governance of granting derogations	Approach to derogations	No of derogations requested	Mean of communication to general public	Monitoring	Problems and obstacles faced during transposition
AT	Already ban in Austria						
BE	Not transposed yet (a draft version has been developed)	Federal Public Service, Public Health, Safety of the Food Chain and Environment	High toxic PPP are prohibited.	None	Local administration to be informed by Ministry in charge of granting derogation	If any, every application if duly registered	
BG	Not transposed yet	**National:** Bulgaria Food Safety Agency		2290 (2010) 2513 (2011)			
CZ	Not transposed yet	**National:** State Phytosanitary Administration	Granting of derogation by regional PPP inspectorates		To be organised by regional PPP inspectorates	Detailed reports on carried out applications will be provided to central SPA. Statistical yearly analysis on various aspects. Results will be part of NAP indicators. Statistical data will be provided to Ministry of Health in order to evaluate the impact on human health and contribute to the comprehensive assessment.	Not expected
DE	Not transposed yet (in preparation)	**Regional:** Federal Länder (derogations) and BVL (approval of PPP's)	Restrictive use of derogations, mainly for steep vineyards and forest				
DK	No aerial spraying is carried out in Denmark						
ES	Not transposed yet						
FI	Transposed, principles are set, no cases so far in agriculture	**National:** The Finnish Forest Research Institute Metla and the Finnish Forestry Centre Metsäkeskus evaluates the need of the aerial spraying, and the two institutes apply for a permission to spray.	Aerial spraying abandoned in agriculture in 2006. Cases of aerial spraying in agriculture have not occurred during at least the last 25 years. Derogations can be granted for biological control of high invasion of a forest insect pest or disease devastating	aerial spraying of *baculovirus* against European pine sawfly *Neodiprion sertifer* in 2008, 700 ha	No website	The need of derogations has been and will be evaluated carefully by monitoring the pest population by the Finnish Forest Research Institute Metla.	

MS	Status of transposition	Governance of granting derogations	Approach to derogations	No of derogations requested	Mean of communication to general public	Monitoring	Problems and obstacles faced during transposition
			large areas of forests and causing significant economic losses	Since 2011, no aerial sprayings against quarantine pests so far.			
FR	Transposed in May 2011	**Local:** Local administration	• 12 months derogation for bananas, rice, maize and vine granted at regional level (region) • Case by case derogation granted by "départements"	No review completed to date	Website of local administration (département). Communication of granted derogations to bees' keepers association.	Yearly reporting performed by Ministry of Agriculture based on data submitted by the region.	Discussion with stakeholders to define derogation conditions
IE	No aerial spraying in Ireland since 1993. Since that occasion only the Armed forces have applied for permission to apply selective PPPs from aircraft (about 200 ha every 3 to 4 years)						
IT	Transposed	**National:** Ministry of Agriculture	Individual requests to Ministry of Agriculture		Prior information to general public defined on a case by case basis	Functional control and certification of equipment used for spraying and aircraft	
LT	Transposed		Limited number of derogations planned in new PPP Law			No surveillance activities carried out so far	
NL	Transposed November 2011	**National:** Ministry of Agriculture	Aerial spraying is allowed under special circumstances. Such circumstances have not occurred and are, due to specific Dutch agricultural circumstances, unlikely to occur.				
PL	To be implemented via the planned new Law on PPP	**National**: The Voivodeship Inspectors of Plant Health and Seed Inspection Service will be in charge of approving "application plan" and granting permission for aerial spraying, specified in "application plan".	To be defined by the new Law		To be defined by the new Law	The majority of cases of Aerial Spraying of pesticides is performed on forests owned by the State and managed by a public entity. There are only four companies that are capable of performing AS operations in Poland, and these companies have broad expertise and are well controlled. Impacts of AS operations are not regularly monitored currently, the new law on PPP will set out the	N.A.

MS	Status of transposition	Governance of granting derogations	Approach to derogations	No of derogations requested	Mean of communication to general public	Monitoring	Problems and obstacles faced during transposition
						basis for that.	
RO	Transposed	**National:** Ministry of Agriculture and Rural Development and Ministry of Environment and Forests				The County Phytosanitary Units and Environmental Protection Agencies monitor all the pesticides applications through aerial spraying	Lack of staff and resources. Low quality of spraying equipment
SE	Transposed						
SK	Transposed	**National:** Ministry of Agriculture and Rural Development (in cooperation with Ministry of Environment)	Compliance monitoring to be met by administrative measures in enforcement regime. The current system requires monthly reports to be sent to the Pesticides Usage Survey and submission of these, showing areas sprayed and products used.				
UK	Planned by November 2012	**National**: CRD, Natural England and the Environment Agency	The UK's existing control regime allows aerial spraying in only limited circumstances as laid down in Schedule 4 of the UK's Plant Protection Products (Basic Conditions) Regulations 1997. A prohibition will be enacted in the SUD legislation, which will make the necessary changes to the existing regime to accord fully with the 'permitting' system envisaged in the Directive.		To be defined		

Annex 8: What can be learned from Third Countries?

The situation in three countries (U.S., Canada, and Australia) was looked at with a view on key features of their approach on monitoring and surveillance on the impacts of use of PPP.

The US

Enforcement of compliance with PPP law

Compliance monitoring in the sense of enforcing that PPP are used in line with legal requirements (and notably with requirements of Federal FIFRA Act), are within the primary responsibility of the States. The agency with primary responsibility for pesticides differs from state to state (State's department of agriculture, environmental agency or other agency).

For example, California has a comprehensive pesticide use reporting programme in place, including communication of much information to the public[39], where all agricultural pesticide use must be reported monthly. An important part of monitoring/surveillance activities is coordinated by the Federal Agency EPA. Its activities in this field of monitoring and surveillance comprise e.g. inspections on different actors in the field of sale or distribution of pesticides, including farms, and a compliance programme regarding the health of agricultural workers from the effects of exposures to pesticides. EPA makes available an enforcement and compliance data base National Compliance Data Base System and FIFRA/TSCA Tracking System (NCDB/FTTS) which is planned to be expanded to allow users to view, query, and search selected compliance and enforcement data.

Occupational health and safety

Regarding issues of occupational pesticide-related illness and injury, EPA co-operates with other federal bodies such as the Occupational Safety and Health Administration (OSHA), and the research agency National Institute for Occupational Safety and Health (NIOSH), or institutes under the Department of Health and Human Services (HHS) such as the National Institute of Environmental Health Sciences (NIEHS). For example, the long-term monitoring study Agricultural Health Study (AHS) exploring the potential health effects of pesticide exposures in commercial pesticide applicators, farmers, and their families is conducted in several US states is a collaborative research project including EPA and NIEHS.

NIOSH established the Sentinel Event Notification System for Occupational Risks - Pesticides Programme (SENSOR-Pesticides[40]) to reduce the number of injuries and illnesses associated with occupational pesticide exposure. The programme is a state-based surveillance effort that monitors pesticide-related illness and injury in (currently) 11 states.

Monitoring compliance of residues in food

Monitoring compliance with Maximum Pesticide Residue Limits (“tolerances” in the wording of US legislation) set by EPA is supervised by the Federal bodies US FDA (Food and Drug Administration) and the US-DA (United States Department of Agriculture).

Regarding monitoring of impacts on health and the environment, EPA generally provides assistance grants to states and territories, in developing and maintaining comprehensive pesticide programmes that address all aspects of pesticide enforcement, sponsor cooperative surveillance, monitoring and analytical procedures, and encourage regulatory activities within the states. Occurrence and

[39] See **http://www.cdpr.ca.gov/docs/pur/purmain.htm**
[40] See http://www.cdc.gov/niosh/topics/pesticides/overview. html

behaviour of pesticides in different environmental compartments is conducted at various levels and various institutions. For instance, pesticides on water are monitored within the Pesticide National Synthesis Project in the framework of the National Water-Quality Assessment (NAWQA) Program, conducted by the United States Geological Survey (USGS). The programme is a national-scale assessment of pesticides in streams and ground water of the US, and the potential for pesticides to adversely affect drinking-water supplies or aquatic ecosystems[41].

Biomonitoring

To note that long time biomonitoring is a well-established approach in the US and includes biomonitoring of pesticides. For instance, the National Centers for Disease Control and Prevention (CDC), a federal agency under the HSS, conducts biomonitoring of pesticides within the National Health and Nutrition Examination Survey (NHANES). CDC publishes national reports on Human Exposure to Environmental Chemicals (current 4th ed. of 2009, available[42]), assessing more than 250 chemicals, among this a number of pesticides. Again, additional activities are ongoing at states level.

Canada

Compliance with PPP law

The Federal Health Department (Health Canada) is in charge with compliance and enforcement activities of pesticides law, namely the Federal Pest Control Products Act, including supervision of proper use and application of PPP.

Within the department, a number of federal agencies are operating, namely Pesticide Management Regulatory Agency (PMRA), Public Health Agency (PHAC) and Canadian Food Inspection Agency (CFIA). CFIA is in charge with enforcing Foods and Drugs Act and related regulation, and thus for supervision of compliance with MRL within raw commodities, feed and food. The Federal bodies are supported by Provincial authorities.

Co-ordination: The 6NR Working Group

Within the framework of the so-called 6NR Working Group ("6 Natural Resources Departments Pesticides and Pest Management Working Group"), activities regarding pesticide research and monitoring and/or on and pest management issues of the above mentioned key federal authorities Health Canada, CFIA, and Environment Canada are co-ordinated with those of further federal bodies active in that field. "6NR Working Group" was formed as part of an initiative called "Building Public Confidence (BPC) in Pesticide Regulation", launched in 2002. The monitoring and surveillance activities discussed and prioritized within the Working Group comprise:

- Enforcement activities, including control results proper use of pesticides (e.g. by means of an incident reporting system),
- Activities of regular monitoring on presence and effects of pesticides in different compartments (drinking and surface water, soil, even – through downwind concentrations of certain compounds in regions of high pesticide use – air surveillance); but also
- Specific research projects (e.g. pesticide residues present on processed food products typically consumed by children).

The Working Group serves as an important tool for observing developments and trends in the use of pesticides. This includes co-ordination of different cases of not appropriate use and "hot spots".

[41] See **http://water.usgs.gov/nawqa/pnsp/**
[42] See **http://www.cdc.gov/exposurereport/**

Results of the discussion may also lead to setting geographical priorities of training and awareness raising activities on the use of PPP (which itself are subject to a specific Working Group, composed of members of Health Canada, PMRA, and State representatives).

National Pesticides Monitoring and Surveillance Network

Monitoring in the water are e.g. carried out in the framework of the "National Pesticides Monitoring and Surveillance Network" which has been established with support of the Federal Department of the Environment (Environment Canada). The network aims at studying, evaluating and reporting on pesticides in water. Results of long-term effects of pesticides is described within the document "Environmental Sustainability of Canadian Agriculture: Agri-Environmental Indicator Report Series - Report No.3", where risk of water contamination by pesticides was identified as one Agri-Environmental indicator[43]. Environment Canada also conducts air surveillance Investigations on downwind concentrations of compounds that are deemed to have a high mammalian or avian toxicity and investigations on ambient air concentrations in regions of high pesticide use.

Aerial Spraying

Regarding impacts of spray drift from aerial spraying of pesticides on non-target organisms, a Pesticide Drift and Non-Target Exposure Working Group has been established under the umbrella of Health Canada, considering pesticide drift issues related to potential non target exposures to the environment and humans. The Working Group includes members from the health, environment and agriculture sectors.

Communication to the general public

Health Canada provides exhaustive information for the general public and for professional users of pesticides at their online presence. The information available is complemented by publicly available reporting on the state of contamination different protection goals with pesticides (see e.g. for the water area the document "Environmental Sustainability of Canadian Agriculture: Agri-Environmental Indicator Report Series - Report No.3", where risk of water contamination by pesticides was identified as one Agri-Environmental indicator).

Australia

Compliance with PPP law

The Pesticides and Veterinary Medicines Authority (APVMA), a statutory government authority, is responsible for registration of agricultural and veterinary (agvet) chemicals up to the point of retail sale. After retail sale, the various state and territory governments are responsible for the control of use.

Each state and territory has its own departmental/agency structure but generally there are three main agencies that have a role in the management of agvet chemicals. These are the Departments of Primary Industries (i.e. agriculture), the Departments of Health and the Departments of the Environment. Generally, the agriculture departments conduct a larger amount of proactive monitoring and audits, than the other two agencies that tend to do more reactive work in relation to complaints. The responsibility for agvet chemical products after the point of sale, which includes the act of purchase, lies with state and territory governments who monitor their safe use and disposal. Their regulations cover:

[43] The document is available at **http://www4.agr.gc.ca/AAFC-AAC/displayafficher.do?id=1296059933990 &lang=eng**)

- Basic training requirements for users;
- Licensing of commercial pest control operators and ground and aerial spray operators;
- Residue monitoring;
- Arrangements to enforce the safe use of chemicals, including the use of codes of practice, spray drift guidelines and other user awareness raising initiatives.

The Victorian Department of Primary Industries (DPI) uses monitoring and surveillance as a key component of its performance outcome and risk based regulatory system. The information is used to determine whether controls are effective and efficient or whether they need to be reviewed, feeding into continuous improvement of chemical use practices. DPI conducts targeted monitoring of agvet chemicals in primary produce, with trace backs conducted in instances where significant residue detections are made.

Maximum Residue Levels

Regarding enforcement of compliance of most commodities with MRL regulations is mainly the NRS (National Residue Survey) division within the Department of Agriculture, Fisheries and Forestry (DAFF). NRS programmes include random, targeted and compliance monitoring of agricultural and veterinary chemical residues and environmental contaminants in selected animal products (e.g. meat, egg, honey and fish) and plant products (e.g. grain, oilseed and horticulture). Random residue monitoring programmes were conducted in for a total of (2008/2009) 22 animal and 26 plant products, further, targeted monitoring projects are conducted. Compliance of food with MRL is monitored by Food Standards Australia New Zealand (FSANZ). The amount of pesticides (alongside with other contaminants) present in food and estimates their intake in the diets of the general public is monitored in the framework of Australian Total Diet Survey under the responsibility of FSANZ[44] .

Water monitoring

The National Water Quality Management Strategy (NWQMS) is a joint national approach to improving water quality in Australian and New Zealand waterways. Since 1992, the NWQMS has been developed by the Australian and New Zealand Governments in cooperation with state and territory governments. Ongoing development is currently overseen by the Environment Protection and Heritage Council, the Natural Resource Management Ministerial Council and the National Health and Medical Research Council.

The main policy objective of the NWQMS is to achieve sustainable use of water resources, by protecting and enhancing their quality, while maintaining economic and social development. The NWQMS process involves development and implementation of a management plan for each catchment, aquifer, estuary, coastal water or other water body, by community and government. These plans focus on reducing pollution (including pesticides) released into coastal hotspots and other aquatic ecosystems around the country. Local government, community organisations and other agencies carry out these plans using the NWQMS to protect agreed Environmental Values. Water quality benchmarks target fresh and marine waters and groundwater uses such as recreation, drinking and agriculture[45].

Communication of the results from the monitoring and surveillance activities to the general public

[44] See **-http://www.foodstandards.gov.au/scienceandeducation/monitoringandsurveillance/australian- total-diets1914.cfm**)

[45] Further information can be found at http://www.environment.gov.au/water/policy-programmes/nwqms/#guidelines.

Communication is done by each state and territory. Various means of communication are used, including intensive web communication.

Common elements and challenges, and possible approaches

To note that in all these three countries, the importance of monitoring and surveillance of PPP in different dimensions was emphasised.

The following common main elements and challenges with respect to monitoring and surveillance of impacts of use of PPP are identified:

- A number of different authorities from different policy fields are involved in monitoring and surveillance activities on the presence of pesticides in different areas; no specific authority is in charge of coordinating all monitoring activities. All of the three countries have a federal system in place, adding the dimension of the need for coordination and exchange between the different institutional levels to the above mentioned problems of data from different policy fields;
- Most of existing activities have specific protection goals, and the focus is another than the sustainable use of pesticides, e.g. water quality, food safety. It is not always obvious how such projects can contribute to the knowledge about impacts of use of pesticides, or sustainable use in general, since for many of the projects causal use-related explanations of detected levels with cannot be derived.

The first aspect is addressed by establishing suitable communication channels between the involved authorities. The combination of data stemming from different monitoring / surveillance activities can either:

- Deliver support for the improvement of the administrative approach (e.g. as a tool for improving quality of controls, or to use them for geographical or substantial prioritisation of training and communication activities), or
- Serve as input for strategic decision for the political level, which determines the necessary communication channels.

The second aspect is more difficult to approach. In none of the three countries a system of impact indicators has been developed, providing robust information about the impacts of use of PPP.

Finally, communication to the general public is in place in all the three countries.

However, in terms of using the findings of the description of these systems in order to derive findings for the purpose of this study, it should be expressed that the efforts of those countries were not assessed with a view on obligations similar to those of the SUD Directive, since no such obligation exists at this stage. Particularly, it is obvious that a number of major monitoring activities is actually done at the stage of federated states or provinces; a national co-ordination body is not in place in all of the three countries – let alone an institution which is in charge of using the data for assessing the progress of sustainable use.