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National Action Programme for achieving sustainable use of plant protection products

Final report on progress over the period 2013-2017

MKGP, UVHVVR

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LIST OF ABBREVIATIONS

| | |
|--------|--|
| ARSO | Slovenian Environment Agency |
| CRP | Target Research Programme |
| EFSA | European Food Safety Authority |
| EPPO | European Plant Protection Organisation |
| PPPs | Plant Protection Products |
| EIG | Economic Interest Grouping |
| ISO | International Standard Organisation |
| IPM | Integrated Pest Management |
| PAAS | Public Agricultural Advisory Service |
| CAFS | Chamber of Agriculture and Forestry of Slovenia |
| AEP | Agri-Environment Payments 2007–2013 |
| AECP | Agri-Environment-Climate Payments 2014–2013 |
| LOQ | Limit of Quantification |
| MKGP | Ministry of Agriculture, Forestry and Food |
| MOP | Ministry of the Environment and Spatial Planning |
| MDW | Monitoring of Drinking Water |
| MRL | Maximum Residue Levels |
| NAP | National Action Programme |
| NIPH | National Institute for Public Health |
| WMP | Water Management Plan |
| RDP | Rural Development Programme |
| SA | Drinking Water Supply Areas |
| SURS | Statistical Office of the Republic of Slovenia |
| PE | Pest |
| UVHVVR | Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection |
| ZFFS-1 | Plant Protection Products Act (<i>Uradni List RS</i> (UL RS; Official Gazette of the Republic of Slovenia) No 83/12)) |

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On the basis of point 8 of the National Action Programme for Achieving Sustainable Use of Plant Protection Products for the 2018–2022 Period, the Ministry of Agriculture, Forestry and Food hereby adopts the

**Final Report on Progress in Achieving the Objectives of the
National Action Programme for Achieving Sustainable Use Of Plant Protection Products
for the 2013–2017 Period.**

INTRODUCTION

The National Action Plan (hereinafter: the NAP) for achieving sustainable use of plant protection products is provided for by the Plant Protection Products Act (UL RS No 83/12 – ZFfS-1), which is harmonised with 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.

The Government of the Republic of Slovenia adopted the NAP for the 2012–2022 period by Resolution No 34300-2/2012/3 of 12 December 2012. The NAP sets out a series of objectives and measures for achieving the reduction of risks that can arise from the use of PPPs. The measures adopted by the Government are more broadly connected to the tasks of ministries and their services and experts in the field, for example: water management plan, general health of bees and their inclusion in agricultural production, safety belts in PPP use in vicinity of buildings, measures for agricultural and environmental policy and so forth. Documents related to the NAP (NAP 2012–2022, NAP 2013–2015 Report, Amendments to the NAP for the 2018–2022 Period, and Report on the NAP 2013–2017 Implementation) are available on website of the Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection (hereinafter: the Administration).¹

Under Directive 2009/128/EC, all Member States are obliged to send their NAPs to the European Commission, as well as report any changes, amendments and extensions. Pursuant to Article 4(2) of Directive 2009/128/EC, the Government adopted Amendments to the National Action Programme for Achieving Sustainable Use of Plant Protection Products for the 2018–2022 Period by Resolution No 34300-1/2018/7 of 24 May 2018. The 2018–2022 NAP is published on the Administration's website.

Regarding the sustainable use of pesticides, the following two terms are used: pesticides and plant production products. Definition of the term 'pesticide' under Article 3(10) of Directive 2009/128 states the following:

'pesticide' means:

- a) a plant protection product as defined in Regulation (EC) No 1107/2009;
- b) a biocidal product as defined in Regulation (EU) of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products (repealing Directive 98/8/EC).

Plant protection products and biocidal products may contain the same active substances.

Regulation (EC) No 1107/2009 (authorisation of PPPs) uses the term 'plant protection products', while Regulation (EC) 396/2005 (maximum levels for pesticide residues), Directive 2009/128/EC (sustainable use) and Regulation (EC) No 1185/2009 (statistics) use the term 'pesticides'. In this text, both terms are used so as to correspond to the area of legislation.

In preamble (2) to Directive 2009/128/EC, the Commission's intention regarding the use of biocidal products is explained, namely: 'At present, this Directive should apply to pesticides which are plant protection products. However, it is anticipated that the scope of this Directive will be extended to cover biocidal products.'

¹ http://www.uvhvvr.gov.si/si/delovna_podrocja/fitofarmaceutvska_sredstva/nacionalni_akcijski_program/

In the preamble (4) to Regulation (EC) No 1185/2009, the Commission's intention regarding the collection of data on biocidal products is explained, namely: 'Since the effects of the Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market (OJ L 353, 24.4.1998, p. 1) will not become apparent until the first evaluation of active substances for use in biocidal products is finalised, neither the Commission nor most Member States currently have sufficient knowledge or experience to propose further measures regarding biocides. The scope of this Regulation should thus be limited to pesticides which are plant protection products covered by Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market (OJ L 309, 24.11.2009, p. 1), for which substantial experience already exists on data collection.'

Since 2016, a website containing information on regulation of all areas referred to in Directive 2009/128/EC in all Member States is available on European Commission websites.²

This report is the final report on the NAP for the 2013–2017 period, and is composed of the summary of the situation and achievement of the specific objectives of the NAP according to 24 measures and 19 risk indicators, in the context of which the data for the 2013–2017 period are collected. The purpose of the NAP and the report on progress is a long-term monitoring of the situation according to the given risk indicators and progress regarding the reduction of risk caused by the use of plant protection products (hereinafter: PPPs), and proposal for amendment or audit of the NAP in line with the legal deadlines, should it be necessary.

2 General objectives, defined in the NAP for the 2013–2017 period:

- to reduce the danger and risk to human and animal health and to the environment from the use of PPPs, including by replacing the most hazardous substances with safer ones (including non-chemical substances);
- to reduce the levels of harmful active substances in food and drinking water, including through the substitution of the most dangerous ones with safer (including non-chemical) alternatives;
- to encourage agricultural production in such a way that PPPs are used in accordance with the principles of integrated pest management (hereinafter: IPM) only when absolutely necessary or economically justified, in particular by increasing users' awareness regarding safe PPP use and encouraging the development and introduction of organic farming and of other environmentally friendly farming practices;
- to create a transparent system for reporting on the progress being made in achieving the goals of the strategy and on the checks being made of the progress achieved, including by developing appropriate indicators;
- to ensure the sustainable use of PPPs for all species of plant by reducing the risk arising from PPP use.

3 Specific objectives as defined in the NAP for the 2013–2017 period:

- to reduce the use of PPPs (especially PPPs that contain active substances which, when they come up for re-approval under Regulation (EC) No 1107/2009, will not meet the criteria for approval referred to in points 3.6 to 3.8 of Annex II to that Regulation);
- to ensure the professionally justified use of PPPs, which should be based on improving technological procedures for the production of cultivated plants, with the help of the observation and forecasting service;
- to improve the professional competence of users;
- to reduce PPP residues in Slovenian agricultural products (the MRL should not be exceeded in any domestic product);
- to reduce the pollution of surface waters and groundwater from PPPs with the aim of achieving the environmental targets for surface waters in accordance with the regulations governing the status of surface waters, and for groundwater in accordance with the regulations governing the status of groundwater;

² https://ec.europa.eu/food/plant/pesticides/sustainable_use_pesticides_en

- to improve controls of PPP use (for agricultural and non-agricultural purposes) and the disposal of waste PPP packaging;
- to establish the systematic monitoring of the impact of PPPs on certain non-target organisms and the systematic monitoring of the poisoning of bees, birds and fish, and to reduce as far as possible the number of instances of the poisoning of bees, birds and fish resulting from PPP use;
- to establish systematic monitoring of the impact of PPPs on the health of users of these products.

In order to achieve these objectives, there are 24 measures given in the NAP that must be gradually implemented during its duration. In this report, the initial situation in individual areas following the adoption of the NAP in December 2012 is summarised, as well as indicators in the 2013–2017 period where these data are available.

4 Report on the achievement of the objectives by individual measures as defined in the NAP for the 2013–2017 period:

Measure 1: Training: *The Administration responsible for plant protection products will upgrade the contents of the existing training system, with the emphasis on minimising the adverse impacts of PPPs on human health and the environment; and promoting the use of non- chemical methods.*

In 2009 the European Union introduced the system of additional training for advisors, vendors and users of PPPs through adoption of Directive 2009/128/EC on the sustainable use of pesticides, while Slovenia imposed a system of training for users, sellers and advisors of PPPs in shops as early as in 1994 through the Plant Protection Act that was in force at that time, with the exception of advisors of the Agricultural Advisory Service who did not undergo this training. From 1994 to the present, the system of additional training on PPPs in Slovenia developed in the context of legislation on PPPs, while certain requirements under Article 5 of Directive 2009/128/EC have been enforced before adoption of that Directive, except the emphasis on issues regarding protection of health and the environment.

Directive 2009/128/EC was transposed into the Slovenian legislation by the Plant Protection Products Act (UL RS No 83/12): (hereinafter: ZFFS-1). That Act stipulates that all PPP users who use products registered for professional use or who sell them or advise on their use (including agricultural advisers) must undertake additional PPP training which also includes issues regarding protection of health and the environment.

In 2013 the Administration upgraded the content of the additional training with issues regarding protection of health and the environment, as well as with the content pertaining to IPM. Moreover, in 2013 the PPP Division has, together with the Agricultural Institute of Slovenia, prepared the material entitled: *Temeljna načela dobre kmetijske prakse varstva rastlin in varne rabe fitofarmaceutskih sredstev* (Basic principles of good agricultural practice of plant protection and safe use of plant protection products) as the material for training of advisors, users and vendors of PPPs that contains all aspects of PPP use and measures to prevent negative impacts on human and animal health and the environment. The material was reproduced in 2014, and is also available at the websites of the Administration and the Agricultural Institute of Slovenia³.

The training comprises basic training with an examination, after which participants acquire a training card, and refresher courses which the cardholders must attend regularly in order to renew the validity of the training cards, namely PPP vendors and advisers every three years, and PPP users every five years. The separate programmes are organised for the vendors, advisers and users of PPPs, while the main cultivated crops in individual areas (fruit-growing, wine-growing, arable farming and horticulture) are taken into consideration when organising the lectures. The training card is issued by the Administration. The Administration authorises external providers to provide training; these providers must meet the conditions regarding staff, equipment and premises, and must provide the standardised training programme laid down by the Administration. Training providers must keep records of courses provided and training cards issued in the Administration's electronic database via a data-entry form.

3

http://www.uvhvvr.gov.si/si/delovna_podrocja/fitofarmaceutvska_sredstva/promet_uporaba_usposabljanje_in_naprave/uporaba_ffs/brosure/#c19176
https://arhiv.kis.si/datoteke/File/kis/SLO/VAR/Publikacije/Temeljna_nacela_dobre_kmetijske_prakse_varstva_rastlin_in_varne_rabe_FFS.pdf

In October 2013, the new Rules on training on plant protection products (UL RS No 85/13) were published, which replaced the previous ones and more precisely defined the rules to provide training. In January 2014, the new public tender for authorisations for the training providers was published, on the basis of which the new training providers were selected, as well as the new authorisations issued. There are 16 providers, while their authorisations are valid for 5 years.

In risk indicators, the data are provided under points 5 and 6 (page 26) on the number of issued training cards under the new system for additional training on PPPs. It should be emphasised that the validity of training card must be renewed every three years for the advisors and users of PPPs, and every five years for the users of PPPs. Thus the number of issued or renewed training cards may significantly vary between individual years.

In 2014 the Rules on integrated pest management were adopted (UL RS No 43/14), which summarise the general guidelines of IPM for the implementation of Directive 2009/128/EC on the sustainable use of pesticides. The Rules laid down general standards for IPM, on the basis of which the Ministry and the Administration began preparing special standards for IPM, as well as measures under the Rural Development Programme and public service for plant health protection.

Measure 2: PPP trade: *The current system of PPP sales remains in force. PPPs are only sold by legal entities that employ qualified persons who meet all the conditions in force for entry into the register of distributors. In addition to PPPs, the distributors also sell suitable personal protective equipment for users, provide information regarding the safe use of PPPs and alternative pest control methods (diseases, pests and weeds) according to the advice of the forecasting service and the general principles of integrated pest management.*

Similar to the training on PPPs, Slovenia has regulated PPP sale before the publication of Directive 2009/128/EC through the legislation on PPP in force at that time.

The system of PPP sale is regulated, i.e. each PPP sales point must be entered in the register of PPP sales outlets, namely it has to have an employee with concluded secondary level agricultural education and performed training on PPPs, as well as an advisor with concluded higher education in agronomy and performed training on PPPs, who is available to customers at least 6 hours per week. PPP sales is divided into PPP sales for professional purposes, for which a buyer must show a valid training card – a certificate of having acquired knowledge on plant protection products, and PPP sales for non-professional use that does not require showing of this card. The sales outlets that only sell PPPs for non-professional use do not have to satisfy the conditions pertaining to personnel, which are prescribed for sales outlets that sell all PPPs.

At trainings on PPPs, vendors and advisers take note of new developments in the use of PPPs and IPM, and can transfer this knowledge to buyers when selling PPPs, i.e. PPP users.

In 2013, the new Rules on conditions for selling of plant protection products and sales record keeping (UL RS No 107/13) were published, which summarised and combined the content of three previous regulations issued on the basis of previous legislation, and harmonised the wording with the new ZFfS-1 from 2012. The Rules lay down that the distributors of PPPs also include protective equipment into their sales programmes, as determined by the regulations governing the health and safety at work.

On page 23, under Risk indicators 1–4, the statistical data on PPP trade are shown.

Measure 3: Information: *The Administration adopts the information and awareness-raising programme on PPPs. The programme of publicity also includes the information on pesticide acute poisoning incidents where relevant, as well as on the development of chronic poisoning among groups that may be regularly exposed to pesticides such as operators, agricultural workers or people living close to pesticide application areas.*

Public information on PPPs is conducted via websites of the Ministry and the Administration, information campaigns in cooperation with stakeholders (e.g. the Slovenian Beekeepers' Association, PPP EIG and CAFS), and brochures, prospectuses and materials available at trainings, in shops selling PPPs, as well as through the media news shows.⁴

⁴ http://www.uvhvvr.gov.si/si/delovna_podrocja/fitofarmaceutvska_sredstva/

Data on in-patient treatments of poisonings with pesticides are kept by the National Institute for Public Health, while the data on emergency treatments and calls to the Poison Centre are kept by the Clinical Pharmacology and Toxicology Centre at the Ljubljana University Medical Centre. These data are shown in chapter **Risk indicators** under item 19 (page 41). Data on poisonings may be a reflection of awareness of users on potential threats that certain PPPs may pose to health and understanding of their proper handling.

More detailed data are available at the website of NIPH.⁵

The Administration provides information on safe use of PPPs to the public. All information on PPP operational areas are available at the Administration's website. The links to regulations from the area in question, instructions and forms for submission of different applications, as well as leaflets and brochures containing information on safe use and material for PPS training that can be printed is available to users. The printed version of manual *Temeljna načela dobre kmetijske prakse varstva rastlin in varne rabe fitofarmaceutskih sredstev* (Basic principles of good agricultural practice of plant protection and safe use of plant protection products) are distributed to participants of the basic and additional training on PPPs. The informative leaflets and brochures are sent to PPP distributors from the register kept at the Administration to be offered to the buyers in shops.

Moreover, the links to websites of the European Commission, EFSA and EPPO that are closely linked to the registration of PPPs are available at the Administration's website.⁶

The website's content is regularly updated, and the latest information are available to the users. The websites pertaining to PPPs are also available in the English language.⁷

In informing the users on the safe use of PPPs, the Economic Interest Grouping of Producers, Distributors and Representatives of PPPs (PPP EIG) also participates. The following brochures were issued in the 2013–2017 period: *Preprečevanje točkovnega onesnaženja s FFS* (Prevention of Point Source Pollution with PPPs), *Preprečevanje zanašanja* (Drift Prevention), *Management of PPP Waste Packaging and Agricultural PPP Waste from Agriculture*, *12 osnovnih korakov varne rabe FFS* (12 Basic Steps of safe use of PPPs), *Varna uporaba FFS- nasveti za male uporabnike* (Safe Use of PPPs – Advice for Small Users), *Opozorila pred ponarejenimi in nelegalnimi FFS* (Warnings on Falsified and Illegal PPPs, including a film) and *Priporočila za osebno varovalno opremo* (Recommendations for Personal Protective Equipment enclosed to the personal protective equipment kits for advisors and training providers, including a film). Moreover, two manuals were issued: *Dobra kmetijska praksa* (Good Farming Practice) (protection of air, water and soil, and biodiversity preservation)⁸ and *Biopurifikacija* (Bio-Purification), and reprint of the following manual: *Temeljna načela dobre prakse varstva rastlin in varne uporabe FFS* (Basic Principles of Good Plant Protection Practice and Safe Use of PPPs)⁹.

Lately, the PPP EIG regularly organises one-day workshops on safe use of PPPs for PPP advisors. So far in the 2014–2016 period, three workshops have been carried out, at which the main procedures of PPP handling and use in the sense of protection of health and the environment were presented in detail.

Since November 2017, the new website IVR.si operates that is offering information from the field of IPM.¹⁰

Measure 4: Waste PPPs: In cooperation with the stakeholders from PPP sales and the Directorate responsible for environment, the Administration amends the guidelines for management of waste PPPs, intended for the users and distributors of PPPs containing dangerous substances as well as their packages.

The guidelines are available to all users and buyers of PPPs, training participants and owners of the spraying equipment.

⁵ <http://www.nijz.si/>

⁶ http://www.uvhvvr.gov.si/si/delovna_podrocja/fitofarmaceutvska_sredstva/

⁷ http://www.uvhvvr.gov.si/en/areas_of_competence/plant_protection_products/

⁸ http://www.kis.si/f/docs/Druge_publicacije/Kodeks_dobre_kmetijske_prakse_1.pdf

⁹ http://www.uvhvvr.gov.si/si/delovna_podrocja/fitofarmaceutvska_sredstva/promet_uporaba_usposabljanje_in_naprave/uporaba_ffs/brosure/#c19176

¹⁰ <http://www.ivr.si>

In cooperation with the PPP EIG and CAFS, the brochures with instructions on management of waste PPPs and collection of packaging, good agricultural practice and water protection, personal protective equipment when working with PPPs, safe use of PPPs and warnings on purchase and use of falsified PPPs, were issued in the 2013–2017 period.

The brochures and leaflets are available in PDF format at the Administration's website.¹¹

In Slovenia, the system of collecting waste packaging (bottles) and waste PPS is financed and organised by the PPP EIG via company SLOPAK. The system is now well-established; it is estimated that 67–69 % of packaging waste bottles is collected, which corresponds to the EU average. The PPP EIG has information on how much of this PPP waste was collected; these data are included as an indicator in the Report on Implementation of NAP 2018–2022.

Measure 5: Low-risk PPPs: Applicants for the authorisation of PPPs that fall in the group of low risk substances to the environment and human health (pheromone traps, biological control products, PPPs based on basic substances, and low-risk PPPs) are encouraged by means of the lower authorisation fees.

The Administration consistently considers a new scientific knowledge on the impacts of PPPs on human health and the environment in accordance with the Regulation (EC) 1107/2009 and eliminates PPPs that signify unacceptable impact.

The Government lays down authorisation fees for the low-risk PPPs.

In order to promote the authorisation of low-risk PPPs, a regulation was adopted in 2015, which lowered fees for mutual recognition of zone registration of PPPs that contain low-risk active substances. With this measure, the Administration wishes to promote placing on the market and use of larger number of PPPs based on low-risk substance. In 2018/2019 the Administration plans to amend the regulation that lays down costs in order to further lower the costs of authorisations of PPPs based on low-risk substance. This way, it wishes to encourage companies to place more of such PPPs on the market so as to enable the users to choose from as much low-risk PPPs as possible.

In the procedure of PPP authorisation, the Administration regularly follows the new scientific knowledge on PPP impact on human health and the environment in accordance with Regulation (EC) 1107/2009, and excludes all PPPs from sales, for which it is established under the EU assessment procedure that they cause unacceptable effects, and are removed from the list of approved substances in EU.

Measure 6: Integrated pest management: The Ministry supplements the AEP training programmes with the contents on integrated pest management, protection of human health and the environment, and WMP.

The Ministry has already supported the integrated production in agriculture and hop-growing, fruit-growing, wine-growing and vegetable cultivation under the Rural Development Programme of the Republic of Slovenia 2007–2013 (hereinafter: the RDP 2007–2013) by means of the agri-environment sub-measures (hereinafter: the AEP sub-measures). In order to participate in the implementation of these sub-measures, the beneficiaries had to attend the annual 4-hour educational programmes containing the contents on IPM. In cooperation with the agricultural experts, the Ministry prepared the technological instructions for the integrated production of arable crops, hops, fruit, grapes and vegetables that describe the agro-technical measures in such production, while they also contain a special chapter on IPM. These technological instructions are available at the Ministry's website.¹²

In 2014 the Ministry prepared the new Rural Development Programme of the Republic of Slovenia 2014–2020 (hereinafter: RDP 014–2020), which contains the contents on protection of human and animal health and the

¹¹

http://www.uvhvvr.gov.si/si/delovna_podrocja/fitofarmaceutvska_sredstva/promet_uporaba_usposabljanje_in_naprave/uporaba_ffs/brosure/#c19176

¹² http://www.mkgp.gov.si/si/delovna_podrocja/kmetijstvo/integrirana_pridelava/tehnoloska_navodila/

environment, with a special emphasis on water protection. Under this program, the Ministry by means of the agricultural-environmental-climate payments measure (hereinafter: the AECF measure), namely 19 operations referring to the agriculture, vegetable cultivation, hop-growing, fruit-growing, wine-growing, permanent grassland management, preservation of grasslands important from the nature-protection point, protection of water sources, preservation of landscape and genetic resources, supports the implementation of above-standard farming practices that also take IPM into account. Before taking part in this measure, the beneficiaries must participate in the 6-hour pre-training, at which they also get familiar with the significance of the water and ground protection, whereby the water protection areas and water management plan are presented to them. In addition to the contents pertaining to particularities of the farming at the nature and water protection areas and areas under the Water Management Plan, the mandatory 4-hour programmes of the regular annual training contains contents on significance of the professionally justified use of PPPs, and the preservation of the environment and water sources relegated thereto. As an aid for more efficient implementation of the operations of the AECF measure that refer to IPM, the Ministry prepared in cooperation with the agricultural experts the technological instructions for these operations, available at the MKGP's website.¹³

Moreover, the Ministry supported the development of the forecasting service in the field of plant protection and horticulture in 2014. In 2015 is also supported the programme to support the development of IPM that is still regularly implemented. The specific IPM guidelines are drawn up, the non-chemical methods of plant protection and methods using low-risk PPPs are researched, and new information are included in the user advices. The programme is showing first results which were published at a special IPM website that was published as late as at the end of 2017.¹⁴

Nevertheless, more has to be done in the field of IPM research, education and transfer of knowledge into practice.

Measure 7: Correct PPP use: *By a ministerial regulation, the requirements are defined for PPP users concerning the proper use of PPPs to prevent adverse effects on honeybees, other non-target arthropods and other wild animals.*

Together with the Administration and in cooperation with the stakeholders, the Ministry prepares a code of good agricultural and beekeeping practice that will signify the minimum risk possible for honeybees in the agricultural environment (e.g. access to the water, avoiding placing beehives in the critical vicinity of spraying, and dialogue with agricultural producers).

Under the Targeted Research Programme (hereinafter: TRP), the research of the impact of PPPs on honeybees is promoted in order to protect the Carniola honeybee (*Apis mellifera carnica*).

In 2014 the Rules on the proper use of plant-protection products was published (UL RS No 71/14), which determine requirements relating to PPP use in order to prevent risk to human and animal health and the environment, inter alia regarding the use of PPPs that are marked as hazardous to honeybees and in sowing of the treated seeds. At regular courses, the providers of the additional training inform the users of PPPs about the prescribed and recommended measures they have to implement in order to protect bees and the environment.

In the framework of the United Nations Organisation (UN), Slovenia proposed 20 May to be declared the World Honeybee Day. After three years of international efforts, the Member States of the United Nations unanimously approved the Slovenia's proposal on 20 December 2017 and, thus, 20 May was declared the World Honeybee Day. Honeybees are one of the most important pollinators that ensure food and food security, sustainable agriculture, biological diversity and significantly contribute to mitigation of climate change and preservation of the environment. Thus the protection of honeybees and beekeeping sector contributes in the long run to the poverty and famine reduction, and preservation of healthy environment and biodiversity. Scientific studies prove that honeybees are becoming increasingly endangered. Joint efforts are the only way to ensure safety of honeybees and their living environment.

In cooperation with the Slovenian Beekeepers' Association, each spring the Ministry prepares a campaign on informing and awareness raising for the PPS users in a sense of the honeybees protection. In the context of these campaigns, the Ministry finances a poster, a leaflet and a promotional TV spot. The instructions on good

¹³ <http://www.program-podezelja.si/sl/knjiznica>

¹⁴ www.ivr.si

beekeepers practice have not yet been prepared; in cooperation with the stakeholder, the Ministry is preparing a three-year beekeeping programme for the next period. A research may be proposed in this area pertaining to Measure 12: Research and development.

In November 2017 the Slovenian Government adopted the position on approval of the active substance glyphosate, namely a measure aiming to ban the use of glyphosate, whereby a proper adjustment period for agriculture is to be provided. In the NAP, Slovenian Government undertakes to reduce the use of chemical PPPs in general, to restrict the use of herbicides in public areas and to reduce risks caused by the use of PPPs to health and the environment by reducing the volume of use in the long run. Based on this position, the minister responsible for agriculture prepared the amendment proposals for two regulations limiting in 2019 the use of herbicides in public areas, roads and railway lines, as well as PPP sales without the training card to only those PPPs that are allowed in organic production and packed for use in areas up to 500 m². At the Administration's website, the list of registered PPPs that may be used in organic farming is also available among the theme PPP lists. This list is composed of PPPs that are registered in Slovenia and allowed under Regulation (EC) 306/2005.¹⁵

Each year, at the beginning of the growth season, the Administration prepares information on safe use of PPPs and publishes them at its website.

The achievement of the goals of Measure 7 is also supported by Measure 12 (Research). Examination of an impact of PPPs on honeybees was addressed by the TRP project Cumulative and synergy effects of diverse chemicals on honeybees, and the applicative project Establishment of honeybee cell lines and standardised in-vitro tests for assessment of adverse effects of poisons and contaminations on honeybees. Report on the former project is available in the Digital Library of Slovenia¹⁶, while the report on the latter will be available soon.¹⁷

In order to support the ban of the use of glyphosate and promotion of the use of non-chemical methods of weeds control, the three-year TRP project Examination and selection proposal for the most suitable non-chemical methods of weeds control substituting the use of glyphosate and other herbicides used for Slovenia started to be implemented in 2018.

Measure 8: Prevention of the drift of PPPs: *The Ministry defines the PPP use regime in the areas located in the direct vicinity or within the inhabited areas.*

The Ministry includes instructions for PPP use within inhabited areas into the spatial management guidelines.

Users and workers have access to the personal protective equipment.

Users must learn about the measures aiming at reducing drift of pesticide mixtures to the neighbouring surfaces.

The Rules on conditions for marketing of plant protection products and the keeping and communication of data on such marketing (UL RS No 107/13) require from the PPP distributors to include personal protective equipment into their sales programme as specified in the regulations governing the health and safety at work.

In cooperation with the PPP EIG and CAFS, a brochure on personal protective equipment outlining the types of equipment and their use was printed and distributed. From the PPP EIG, the PPP advisers received a PPE demonstration kits, together with detailed materials regarding the use of PPE in different circumstances of PPP use and handling. A video was also prepared, which was shown 12 times in the spring of 2016 during the

¹⁵ http://spletni2.furs.gov.si/FFS/REGSR/FFS_SeznL.asp?top=1

¹⁶ <http://www.dlib.si/stream/URN:NBN:SI:DOC-BPCWUHMF/8789a5b5-9363-4111-8183-8fc8c5814138/PDF>

¹⁷ http://www.sicris.si/public/jgm/prj.aspx?lang=slv&opdescr=orgSearch&opt=2&subopt=405&code1=org&code2=nameadvanced&psize=1&hits=1&page=1&count=&search_term=name=401%20and%20sci=%20and%20fil=%20and%20sub=%20and%20statfrm=&id=8722&slng=&order_by=

Sunday agricultural programme on TV Slovenia, *Ljudje in zemlja* (People and Soil) (channel 1). Moreover, the PPP EIG issued a brochure on drift prevention, and organised workshops on the subject of drift prevention. During the reporting period, the PPP EIG carried out three workshops on the safe use of PPPs for the PAAS.

The Rules on the proper use of plant-protection products (UL RS Nos 71/14 and 28/18) regulate the method of using PPPs and safety distances from buildings used by people and animals, as well as the methods of preventing the drift of pesticide mixtures to the neighbouring surfaces. The user must perform treatment at a proper distance from buildings, use technical solutions such as special low-drift nozzles, or install a suitable protective barrier preventing the drift. Users are informed of the PPP drift-reduction measures through the PPP user training system and the Advisory Service.

The use of PPPs in public areas is regulated (or restricted) by Article 34 of the Plant Protection Products Act so that the use of PPPs is not permitted, or is only exceptionally permitted, except on school and preschool playgrounds where such use is always prohibited. At the end of 2017, the Government adopted policy orientations regarding the reduction of chemical PPP use, i.e. it undertook to reduce the use of herbicides in public areas and non-professional use. Based on these orientations, the Ministry prepared amendments to the rules for restricting the use of herbicides in public areas, which have been used since 2019.

Regarding the measures to reduce spray drift, according to the PPP Act, a regulation is foreseen to promote the use of a low-drift spray technique as well as to advise on its use relating to environment protection following the German and Austrian model. This subject raises many questions and is associated with funds for setting up the certification of low-drift equipment and regular inspection of such equipment, which would require additional equipment and time for inspection, and in turn make the inspections of such equipment significantly more expensive. Nevertheless, in the coming period, a solution for designing a less complex system must be found and a regulation must be adopted because this area needs to be regulated.

Measure 9: PPP residues: Agricultural practices are stimulated (organic and integrated farming and other schemes) which have a proven impact on reducing PPP residues in food, drinking water and the environment.

A system is established to inform the public consistently on the data on pesticide residue levels in food from different types of production, which are analysed in monitoring procedures.

The publication of the Rules on the integrated pest management (UL RS No 43/14) made the general principles of the integrated pest management mandatory.

The Ministry promotes the development of integrated production and organic agricultural production. Under risk indicators 17–18 (page 42), the data on the number of farm holdings and agricultural land with organic production are shown.

The Administration carries out a regular annual programme to control pesticide residues in food and feed. The data is regularly submitted to the European Food Safety Authority, which collects data from all Member States and, based on their reports, compiles the annual report on pesticide residues in the EU. For its part, the Administration prepares the annual report on the situation in the Slovenia and publishes it on its website.¹⁸

This control programme covers all types of food. Under risk indicators 12–13 (page 30), the data until 2014 is shown together for all samples. For 2015 and 2016, the data for foodstuff samples from domestic organic production is additionally shown.

Measure 10: Inspection of equipment for the application of PPPs: The Administration will upgrade the existing inspection system for the PPP application equipment (further training of inspectors, oversight of equipment inspectors, implementation of a more modern approach to inspection, and equipment compliant with standards).

The training of PPP users includes practical presentation of calibration and inspection of the equipment before applying PPPs.

In 2013 the Rules on the requirements for the correct operation of equipment for the application of plant protection products, and on the conditions and method for conducting inspections of such equipment (UL RS

¹⁸ http://www.uvhvvr.gov.si/si/delovna_podrocja/ostanki_pesticidov/

No 101/2013), which superseded the preceding rules issued on the basis of an older act, updated the detailed rules and aligned them with the requirements of the Plant Protection Products Act. In 2014 a public tender was conducted, and new authorisations and contracts to nine inspectors of equipment for the application of PPPs were granted.

The users must bring their sprayers to be inspected every three years. Following a successful inspection, they receive a label and a certificate on proper functioning of the equipment. Under Risk indicators, Item 8, the number of inspected sprayers and the number of issued certificates according to the new system of sprayer inspection are provided. Because the equipment needs to be inspected every three years, the number of inspections between years may vary.

In 2015 the ISO published 4 new standards in the field of equipment inspection, ISO 16122-1-4:2015, which are used in the EU in conjunction with Article 8 of Directive 2009/128/EC. The implementation of new standards required the modification of the national rules, and the Ministry began preparatory work for amending the rules in 2017.

A practical demonstration of the calibration and inspection of the equipment before applying PPPs is an integral part of the PPP user training; such requirement is set out by the Rules on training on plant protection products (UL RS No 85/13).

Under risk indicators 8–10 (page 29), the data on the number of inspected and new pieces of equipment is shown.

Measure 11: Technical solutions for PPP drift reduction: *The Ministry will stimulate the purchase of new application equipment for PPPs and seed treatment with PPPs that meets the requirements for reducing spray drift and for uniform adhesion of PPPs on the seeds.*

The option of incentives for upgrading the existing equipment by using appropriate nozzles to reduce spray drift is considered.

The Administration prepares legal requirements for an appropriate classification of the machinery and equipment into basic spray-drift reduction classes in terms of technical possibilities for reducing spray drift.

The Ministry included the incentives for purchasing new equipment for PPP application into the Rural Development Programme 2014–2020 in order to stimulate the purchase of different types of blowers and sprayers. The investors investing in such machinery will receive additional points under application assessment criteria because they contribute to environment protection. The number of purchased pieces of equipment as part of this measure is shown under indicator 11 (page 30).

With the Rules on the proper use of plant-protection products (UL RS No 71/14), the Ministry allows for the possibility that a specific safety distance to the neighbouring surfaces and buildings can be reduced by a specific percentage if low-drift nozzles and air curtains are used in order to promote techniques preventing PPP drift during the application on crops or plantations.

Rules on the classification of the PPP application machinery and equipment into basic spray-drift reduction classes have not been prepared in this period, while the Ministry funded research in the field of PPP application ensuring the basis for the preparation of the rules.

Measure 12: Research: *Under the TRP, the Ministry will provide support to research and development in the field of PPP application quality using low-drift equipment and low-drift nozzles (anti-drift nozzles), and by adjusting operational parameters of spraying when using standard nozzles, in order to establish a list of appropriate PPP application equipment and low-drift nozzles (anti-drift nozzles).*

Under the TRP, the Ministry supported a three-year research project Improving the quality of PPP application and drift reduction by using low-drift nozzles and equipment (2014–2016), addressing the subject of PPP drift reduction and the use of low-drift technique. The results were publicly presented upon the completion of the projects, at professional conferences and in proceedings. Whenever research results could be applied into

practice, they were included in the technological instructions for agricultural production. The reports on the completed projects are available from the Digital Library of Slovenia.¹⁹

Relating to the reduced PPP use in production, the following TRP projects were also carried out between 2013 and 2017:

- Studying environment-friendly technologies of corn production and pest control
- Using low-risk methods for vegetable protection

Between 2016 and 2019, the TRP project Estimation of pest resistance to PPPs in Slovenia has been under way, which investigates the resistance of pests in hop fields, fruit growing and wine growing, on garden and field crops and on non-agricultural surfaces. Risk assessments and amended technological instructions relating to the prevention of pest resistance within the IPM will be prepared.

For the coming period, the needs for research in the field of good beekeeping practice (Measure 7) and research aimed at investigating surface drainage of PPPs and fertilisers with different methods of tillage and under different weather conditions (Measure 11: Technical solutions for PPP drift reduction) will be needed. Under certain conditions, such drainage can be massive, leading to the rinsing of PPPs and fertilisers into surface waters.

The results of the projects are presented at professional conferences and in proceedings, and the relevant results of the projects are included into technological instructions for the implementation of individual measures in agricultural production.

Under the TRP, the Ministry supported a three-year research project Improving the quality of PPP application and drift reduction by using low-drift nozzles and equipment (2014–2016), addressing the subject of PPP drift reduction and the use of low-drift technique. The results were publicly presented upon the completion of the projects, while the report has not been published yet in the Digital Library of Slovenia.

Relating to the reduced PPP use in production, the following TRP projects were also carried out between 2013 and 2017:

- Studying environment-friendly technologies of corn production and pest control²⁰
- Using low-risk methods for vegetable protection²¹

Between 2016 and 2019, a research project (TRP) Estimation of pest resistance to PPPs in Slovenia has been under way, which investigates the resistance of pests in hop fields, fruit growing and wine growing, on garden and field crops and on non-agricultural surfaces. Risk assessments and amended technological instructions relating to the prevention of pest resistance within the IPM will be prepared.

Measure 13: The aerial spraying of PPPs remains prohibited in Slovenia.

Aerial application has been prohibited in Slovenia since 1994 by its first Plant Protection Act. In the later versions of this Act which regulated PPPs this ban was maintained. Even the new Plant Protection Products Act (UL RS No 83/12 – ZFFS-1) contains a provision prohibiting aerial treatment.

Measure 14: Water protection: *When preparing the RDP 2014–2020, the Ministry, in cooperation with the professional services for plant protection and the environment, will include the measures to protect the aquatic environment and drinking water resources in the context of the measure of agro-environmental payments.*

¹⁹

<https://www.dlib.si/results/?euapi=1&query=%27keywords%3dciljni+raziskovalni+projekti%27&pageSize=25&type=ciljni+raziskovalni+projekti&sortDir=ASC&sort=date>

²⁰ [Studying environment-friendly technologies of corn production and pest control](http://www.dlib.si/details/URN:NBN:SI:DOC-RJFXGEPW) published on: <http://www.dlib.si/details/URN:NBN:SI:DOC-RJFXGEPW>

²¹ [Using low-risk methods for vegetable protection](http://www.kis.si/Ciljni_raziskovalni_programi_CRP/Projekt_V4-1602_Uporaba_metod_z_nizkim_tveganjem_za_varstvo_zelenjadnic/) (the project is still under way: http://www.kis.si/Ciljni_raziskovalni_programi_CRP/Projekt_V4-1602_Uporaba_metod_z_nizkim_tveganjem_za_varstvo_zelenjadnic/)

In the RDP 2014–2020, the focus is on three main areas with which Slovenia ensures improvement of biodiversity (29 % of included agricultural land): the status of waters (25% of included agricultural land) and soil (27 % of included agricultural land), competitiveness of the agricultural sector (3.4 % of agricultural land will receive support for investment) and social inclusion and local development of rural areas (as much as 66 % of population will be included in local development strategies and almost 600 new jobs will be created). These areas largely reflect the priorities which Slovenia defined on the basis of an analysis of the natural resources and the status of agriculture, food and forestry, as well as the integration of these industries into the developments in both the rural areas and the whole area.

In 2016 the Decree on the water management plans in the aquatic areas of the Danube River and Adriatic Sea (UL RS No 67/16) was adopted, which lays down the Danube River Aquatic Area Management Plan 2016–2021 and the Adriatic Sea Aquatic Area Management Plan 2016–2021 (hereinafter: Water Management Plans). To realise the goals of the Decree on the water management plans in the Danube and Adriatic river basins and both water management plans under the Decree, the Programme of water management measures was adopted (Government Decision No 35500-7/2016/5 of 27 October 2016), which includes the measure 'Supplementary measures on reducing airborne pollution of surface waters with PPP (Measure No DUDDS23).' This measure was prepared by the ministry responsible for water and the ministry responsible for agriculture and to a large extent summarises the AECF measures.

Table 1: The values achieved by the operation Water Resources under the AECF measure from the RDP 2014–2020 and 2015–2017

| Requirement | 2015 | | | 2016 | | | 2017 | | |
|---|--------------------|--------|------------------|--------------------|--------|------------------|--------------------|--------|------------------|
| | No of applications | ha | Payment (EUR) | No of applications | ha | Payment (EUR) | No of applications | ha | Payment (EUR) |
| Cover crop on arable land (VOD_ZEL) – mandatory | 1,867 | 27,409 | 5,010,133 | 1,965 | 29,258 | 5,230,449 | 1,969 | 29,774 | 5,442,225 |
| Use of only PPPs allowed in the inner WPAs (VOD_FFSV) – mandatory | 1,848 | 34,694 | 1,505,692 | 1,940 | 36,526 | 1,564,584 | 1,939 | 37,058 | 1,613,486 |
| Non-overwintering intermediate crops (VOD_NEP) – optional | 38 | 1,041 | 158,876 | 39 | 1,036 | 157,459 | 42 | 1,133 | 171,694 |
| Sowing plants for green manure (VOD_POD) – optional | 752 | 7,498 | 1,465,891 | 915 | 9,456 | 1,798,044 | 925 | 9,990 | 1,999,540 |
| In total | | | 8,140,592 | | | 8,750,536 | | | 9,226,945 |

Under the AECF measure, the operation Water Resources is intended for maintaining or improving the quality of water resources, which means changing the existing agricultural practices. The operation, which has been carried out since 2015, includes the mandatory and optional requirements. The beneficiaries are required to implement the mandatory requirements but can also choose one or two optional requirements of this operation. As many as 1969 agricultural holdings participate in the operation. At an annual level, the amount of funds paid for the whole operation (implementation of both the mandatory and optional requirements) is around EUR 9.2 million.

The operation Water Resources is carried out on the catchment areas of the surface water bodies and the areas of groundwater bodies defined in the regulation governing the AECF measures, organic farming and payments to areas facing natural or other specific constraints under the RDP 2014–2020. The beneficiaries are required to perform this operation in the Drava basin on at least 30 % of arable land and on at least 20 % of arable land in other areas of bodies of surface water and groundwater, unless otherwise specified in an individual requirement.

The mandatory requirement 'VOD_ZEL: Cover crop on arable land' is carried out with a view to prevent nutrient leaching and reduce groundwater pollution. The mandatory requirement 'VOD_FFSV: Use of only PPPs allowed in the inner WPAs⁹ contributes to the use of environmentally friendly products, the improvement of the state of water and the prevention of PPP leaching into the groundwater. The optional requirements 'VOD_NEP: Non-overwintering intermediate crops' and 'VOD_POD: Sowing plants for green manure' also help to improve the state of water and reduce nutrient leaching and PPP leaching into the groundwater.

Indirectly, the operation Farming and Vegetable Cultivation is intended for the prevention of nutrient leaching and PPP leaching into the subsoil. The beneficiaries whose surfaces are situated on the catchment areas of the surface water bodies and the areas of groundwater bodies defined in the regulation governing the AECF measures, organic farming and payments to areas facing natural or other specific constraints under the RDP 2014–2020 are included in the implementation of the operation Farming and Vegetable Cultivation only if they are at the same time included in the implementation of the operation Water Resources with at least 30 % of arable land in the Drava basin and at least 20 % of arable land in other areas of bodies of surface water and groundwater. In this way it is ensured that in the areas that are problematic in terms of pollution of agricultural origin (the Drava basin and other areas of bodies of surface water and groundwater) priority is given to the implementation of the operation Water Resources.

As a tool for more effective implementation of the operations Water Resources and Farming and Vegetable Cultivation, the Ministry, together with agricultural experts developed, Technological instructions for these operations, which are available on the Ministry's website.²²

The results of the monitoring of groundwater, surface water and drinking water are presented under the indicators 14–16 (page 35).

Measure 15: PPP selection: *Whenever two or more PPPs are available on the market with the same or similar effectiveness, preference should be given to the product that has less adverse effects on surface water and groundwater and that does not contain any active substances from the list of priority substances or special pollutants defined in the regulations governing surface waters.*

In the context of the AECF measure from the RDP 2014–2020, the operation Water Resources has been implemented since 2015, which includes the mandatory and optional requirements. One of the mandatory requirements of this operation, which are already described under measure 14, is the requirement 'VOD_FFSV: Use of only PPPs allowed in the inner water protection areas' (hereinafter: VOD_FFSV). This requirement has to be carried out on all arable land within the catchment areas of the surface water bodies and the areas of groundwater bodies defined in the regulation governing the AECF measures, organic farming and payments to areas facing natural or other specific constraints under the RDP 2014–2020 by using only specific plant protection products (active substances), which are allowed in inner water protection areas by the regulations governing the water protection areas for the bodies of water of aquifers of Ljubljana field, Selnica rolling lowland, Ruše, Vrbanski plateau, Limbuš rolling lowland, Drava field, Drava-Ptuj field, Apače field, Ljubljana moor and the surroundings of Ljubljana and Rižana, and for the municipalities of Šmartno ob Paki, Polzela, Braslovče, Jezersko, Jesenice, Slovenj Gradec, Črnomelj, Metlika and Semič. The active substances that are prohibited for use in these areas include: bentazon, s-metolachlor, terbuthylazine, metamilon, isoproturon, mcpp, mcpp-p, mcpa, dimethenamid, chloridazon, tritosulfuron, nicosulfuron, rimsulfuron, flurochloridon, pethoxamide, clopyralid, dicloprop-p, metalaxyl-m and metazachlor, dicamba, metribuzin, flufenacet, dimethachlor, chlorothalonil, chlorantraniliprol and triasulfuron. The list of these active substances may be amended on the basis of changes in the regulations governing surface waters and the regulations governing groundwater.

The list of active substances referred to in the preceding paragraph is drawn up by the ministry responsible for agriculture, in cooperation with the ministry responsible for the environment and the ministry responsible for

²² <http://www.program-podezelja.si/si/knjiznica>.

health, each year at the latest by the end of December for the following year on the basis of examining all PPPs registered in Slovenia by taking into account the data on potential leaching of active substances into groundwater obtained at the time of PPP registration, the data obtained in the assessment of active substances at the European Community level, and based on the results of drinking water monitoring for the area concerned in the preceding year provided by the Ministry of Health and the results of monitoring the status of waters for the area concerned in the preceding year provided by the Slovenian Environment Agency. The list is published on the website of the ministry responsible for the environment.

As many as 1939 agricultural holdings are included in the implementation of the mandatory requirement VOD_FFSV, which annually receive around EUR 1.6 million (Table 1).

Measure 16: Public areas: *The Ministry defines the restrictions of PPP use in public areas.*

In doing so, it considers the use of non-chemical methods, particularly the possibility of mechanical pest control and biological plant protection. On non-agricultural areas such as road verges or railway lines, the feasibility and economy of non-chemical method pest control is verified (e.g. the use of water steam).

On sports fields, the use of PPPs is restricted to spot application only if the use of these products is urgent. In this case, the minimum exposure is ensured to humans who come to the sports field after PPP application. Following a preliminary evaluation of the urgency of the measure, PPPs may be exceptionally allowed for use on the whole area.

Pursuant to Article 34 of the Plant Protection Products Act (UL RS No 83/12), the use of PPPs in public areas is prohibited. Only non-chemical methods may be used for pest control. In some cases, If non-chemical methods are not sufficient for controlling pests and the danger they pose to plants, to the environment or to human health, chemical PPPs may be exceptionally used, which is further specified in Article 12 of the Rules on the proper use of plant protection products (UL RS No 71/14). The public has to be informed of any PPP application by appropriately marking the treated area and preventing access thereto. However, this exemption does not apply to children's and school playgrounds where chemical PPPs are never to be used.

In November 2017, the Slovenian Government adopted a decision (No 34300-1/2017/3) in favour of banning the use of glyphosate and setting a transitional period for agriculture. In its explanation of the decision, the Slovenian Government strives for optimising PPP use by reducing and professionalising it. According to the Slovenian Government, agricultural production of food and feed has been subject to excessive "chemisation" in recent decades; however, the Government is aware that agricultural production without PPPs is not possible in the short run, while non-professional use of PPPs is not necessarily required for the production of food for the market.

On the basis of the guidelines laid down by the Slovenian Government, the minister responsible for agriculture prescribed amendments to two set of rules.

The Rules amending the Rules on the proper use of plant protection products were published in UL RS No 28/18. These Rules restrict the use of herbicides in public areas, including golf courses, sports fields and public infrastructure facilities, such as roads and railway lines. The Rules entered into force on 5 May 2018 and will become effective as of 1 October 2019, except for roads and railway lines, for which they will become effective as of 1 April 2021. The period up to the date of application of the Rules is an 18-month transitional period for the stakeholders to adjust to the new situation with regard to the use of PPPs in public areas and a 3-year transitional period for roads and railway lines.

The Rules amending the Rules on conditions for marketing of plant protection products and the keeping and communication of data on such marketing (UL RS No 30/18) changed the criteria for determining the sale of PPPs without a training identification card. As of 1 October 2019, without presenting a training identification card, it will be possible to sell PPPs that are allowed in organic production and packed as a concentrate in a volume corresponding to the preparation of one single-use mixture sufficient for applying to the surface not exceeding 500 m² or packed as a ready-for-use product in a volume sufficient for applying to the surface not exceeding 500 m².

Measure 17: Integrated pest management: *When preparing the measure of agro-environmental payments in the context of the RDP 2014–2020 and quality schemes, the Ministry will include the option to upgrade the integrated pest management measures.*

The Ministry set out mandatory general IPM guidelines in the Rules on integrated pest management (UL RS No 43/14).

Already in the last period of the Rural Development Programme, the Ministry promoted environmentally friendly agricultural production with support for integrated production in farming, hop-growing, fruit-growing, wine-growing and vegetable cultivation, which was provided until the end of 2014 in the framework of the AEP sub-measures under the RDP 2007–2013.

Despite the fact that in the 2007–2013 programming period integrated production (the number of participating farms and the scope of production) remained more or less at the same level throughout the years, integrated production as a quality scheme with more demanding conditions of production was well accepted by producers, while consumers' demand for such products increasingly grew. Particularly in the production of fruit and vegetables, integrated production has become almost the required standard in the market.

In the new 2014–2020 programming period, the concept of measures is designed differently; instead of the previous package approach, a system of an individual set of requirements was established for the first time. The changed concept of the AECp measure allows the beneficiaries to design their own package of requirements, which are carried out under specific conditions. Because certain higher standard requirements from the previous integrated production sub-measures under the RDP 2007–2013 are included in the set of requirements in the context of individual actions of the AECp measure from the RDP 2014–2020 (e.g. crop rotation, mechanical weed control, the use of pheromone traps, confusion and disorientation methods), by participating in the AECp measure support for these actions will be provided to the beneficiaries so as to actually support IPM implementation. As a tool for more effective implementation of AECp measure actions relating to IPM, the Ministry together with agricultural experts prepared technological instructions for these actions, which are available on the Ministry's website.²³

Nevertheless, the integrated production scheme remains a national, Slovenian quality scheme on a voluntary basis. The farmers wishing to obtain an integrated production certificate register for integrated production control with the organisations for the control and certification of integrated production, which have thus far implemented control and certification of integrated production.

The farmers who were (or even if they are still) included in integrated production and are accustomed to follow the appropriate legislation and control may take a step forward and convert to organic production.

In the context of the RDP 2014–2020, the organic farming measure is an independent measure not part of the AECp measure. The amount of organic farming payments will vary depending on the different crops and/or use; in addition, in the new programming period a higher payment is provided to the farms in the conversion process. The producers farming in accordance with the organic farming principles may not sell their products as organic until they obtain the certificate, and therefore their costs are higher during the conversion. The organic farming measure may be combined with the AECp measures.

Measure 18: Integrated pest management guidelines: *In cooperation with professional services, the Ministry will prepare integrated pest management guidelines for each agricultural production sector.*

Each year in the context of the RDP 2007–2013, in cooperation with professional services, the Ministry prepared the Technological instructions for integrated production of grapes, field crops, fruit and vegetables²⁴, in the framework of which specific IPM guidelines for individual crops were described and in which part of the content is dedicated to the technique of using products and alternative methods of pest control. In this way, the purpose and objective of IPM is included in other agricultural production programmes.

In the RDP 2014–2020, support is provided to individual IPM measures included in the set of requirements in the context of individual actions of the AECp measure (e.g. crop rotation, mechanical weed control, the use of pheromone traps, confusion and disorientation methods), which comprise IPM.

In 2015 a programme for the design of specific IPM guidelines and instructions was adopted, which was launched in 2016 and is described in detail in Measure 19.

Measure 19: Specialist tasks in integrated pest management: *In order to achieve the objectives of integrated pest management, the Ministry will provide for the programming (functional) connection of plant health, plant conservation, use of PPPs and technology of specific agricultural*

²³ <http://www.program-podezelja.si/sl/knjiznica>

²⁴ http://www.mkgp.gov.si/fileadmin/mkgp.gov.si/pageuploads/podrocja/Kmetijstvo/Integrirana_pridelava/IPG-TN_2015_final.docx

production methods through the regular programming of expert tasks undertaken by public services, professional and research institutions and research work in the field of agriculture.

The Ministry will set priorities for the development of integrated pest management, to be implemented through contracts with different public services, professional and research institutions, and research work in the field of agriculture by taking due regard also of professional services in the field of plant protection and of cultivation technology.

Since 2016 and in the context of specialist tasks of IPM for plants, the Ministry has promoted IPM development through the public service for plant protection, which connects the professional and research institutions working in the field of agricultural production, thereby ensuring the connection of plant health, plant conservation, PPP use and the technology of specific agricultural production methods for the attainment of IPM objectives.

For the purpose of disseminating IPM information, a website was developed in Slovenia, which has been running since November 2017²⁵.

This website combines all current descriptions and information about the pests of individual crops as well as the descriptions of measures that can reduce the use of chemical PPPs. The website is continuously developed and updated with new information.

IPM in Slovenia was developed for the needs of pest control, which should not solely depend on the use of chemical substances. IPM means systematic and deliberate pest control by combining various approaches to plant health in a complete sustainable programme based on the combination of biological, cultivation and production, physical, biotechnological and chemical methods of plant protection in order to reduce the risks to the economy of agricultural production and the health of people and the environment.

IPM is a process which is continually upgraded and expanded with many innovative solutions, which are adapted to the place and time of production of agricultural plants and which significantly contribute to reducing the dependence of agricultural production on the use of PPPs.

In the coming period, more effort is required to disseminate information about the IPM website and to organise the presentation of this content for PFAS.

The organisation, tasks and activities of the public service are described in detail on the Administration's website.²⁶

Measure 20: Machinery for non-chemical control methods: The Ministry will support financially and by other means the purchase of machinery for carrying out non-chemical control methods.

In the context of the Rural Development Programme of the Republic of Slovenia 2014–2020, the M04 measure is defined, which is intended for investment in fixed assets. Under this measure, the Ministry will promote investment in greater environmental efficiency of agricultural holdings and food processing plants by promoting higher energy efficiency of these plants, the use of renewable energy sources (RES) and the establishment of wastewater treatment plants.

The measures designed to reduce the use of PPPs (special mechanisation, arranging plantations of hardy varieties of perennial plants such as permanent crops, root-stock nurseries, tree nurseries, etc.), purification and saving techniques on agricultural holdings (rainwater, waste), adjusting to the special requirements of farming in environmentally vulnerable areas (WPA, the Nitrates Directive), arranging permanent plantations and pastures (meadow orchards, extensive pastures), and organic food production are planned within the M04.1 sub-measure.

In the framework of two public invitations to tender for 2016 and 2017, eligible costs are the costs for the following machinery for non-chemical control methods: harrows, inter-row hoes, mulchers and other machines for mechanical weed control. In addition to these machines, costs of machines for mechanical fruit thinning are considered eligible costs. The investors who invested in this type of machinery received an additional number of points in the application assessment criteria, because in this way they contributed to the protection of the environment (indicator 11, page 30).

²⁵ <https://www.ivr.si/>

²⁶ http://www.uvhvvr.gov.si/si/delovna_podrocja/zdravje_rastlin/sluzba_za_varstvo_rastlin/

Measure 21: Forecasting the occurrence of pests: *The Administration will upgrade the pest forecasting system and/or the system for recommending plant protection measures, which will include all agricultural branches: special attention will be devoted to the development of methods in arable farming, vegetable cultivation and growing of ornamental plants.*

In addition to the forecasting of pests on individual cultivated plants, the forecasting will include alternative pest control methods to chemical methods. With regard to the proposed chemical measures, the preference will be given to PPPs which pose the lowest risk to human health and the environment and which comply with the principles of integrated pest management. With the assistance of professional services, the Ministry will provide long-term access to information in different ways to all producers.

The information intended for PPP users will be comprehensive; all the risks arising from the lower effectiveness of alternative and non-chemical methods used as well as the effects on crop quality will be indicated, including the warnings of economic consequences.

The observation and forecasting activity for plant protection is part of the Public Plant Health Service of Slovenia, organised by regions and operating under the coordination of the Administration. It is carried out by plant protection experts employed in the institutions that have a concession of the Administration to perform these services. The purpose of the observation and forecasting activity is to monitor the occurrence and development of economically significant plant diseases and pests causing damage in the production of agricultural and other plants. Based on their occurrence, weather conditions and development of host plants, the level of threat to plantations and crops is determined, of which plant producers and/or owners are informed. The aim of warnings and instructions is to take appropriate protection measures, which limit the spread of pests by taking into account the rules of good agricultural practice and optimum and responsible use of PPPs and employing various technological measures. The goal of these activities is to produce quality, healthy food and preserve the natural environment.

By developing annual work programmes, the Administration ensures targeted and uniform operation of the Public Plant Health Service aimed at achieving the following set objectives:

- ensuring the implementation of the observation and forecasting activity relating to plant pests in fruit-growing, wine-growing, arable farming, horticulture, hop-growing and olive-growing;
- recording outbreaks and monitoring the pest population;
- timely and quality notification of producers and guiding them to the correct and safe use of PPPs.

The implementation of the observation and forecasting activity requires various hardware, software and other equipment enabling measurements of agro-meteorological and biological parameters and the collection, analysis and accessibility of data and measurements. This activity is supported by the network of 87 agro-meteorological stations reasonably situated in areas across Slovenia with the most intensive agricultural production. The agro-meteorological network consists of ADCON stations, which provide data access via a portal where the data from ARSO reference stations are collected for use in agriculture.

In the context of annual plans, the Administration is not only responsible for regular replacement and renewal of spent or worn parts of equipment which are necessary for the coherent operation of the agro-meteorological network but also ensures other investment in equipment for the collection and processing of the data relevant to plant protection.

Between 2014 and 2017, the Ministry supported the implementation of the programme for the development of the observation and forecasting activity in horticulture, which had not been set up until then. The annual work programmes set the priorities of the observation and forecasting activity in vegetable production in individual areas across Slovenia based on production potential, guidelines and capacity:

- design of basic technologies of the protection against diseases and pests for individual types of vegetables, taking into account all other production aspects which have an impact on the health of plants;
- making a list of priority diseases and pests for each type of vegetables separately, which will be included in the observation and forecasting system;
- establishment of the network and extent of visual or technical (e-Pest Alert) monitoring of the occurrence of diseases and pests for priority types of vegetables as the basic support system for the selection and forecasting of plant protection measures;

- on the basis of expert assessments in the design of basic technologies, preparation of expert bases to extend PPP registration, introduce biological agents and other alternative methods for the control of diseases and pests of vegetables in the areas not yet covered;
- implementation of the existing prognostic models, which are based on meteorological parameters, for those diseases and pests of priority types of vegetables for which these models already exist but have not been used or are very little used in practice;
- advising and training of producers and the establishment and unification of the notification system of vegetable producers via the already established notification methods (acquisition and accessibility of prognostic data and forecasts and the preparation of prognostic notifications for producers via websites, e-mail, GSM messages, telephone answering machines, flyers and other notification channels).

Based on observations and agro-meteorological measurements, the Public Plant Health Service prepares prognostic notifications, which are published on the website of the Agro-meteorological Portal of Slovenia and telephone answering machines, while producers can also receive them by e-mail or via SMS. In the reporting period, activities for the improvement of access of different producers to information were carried out. Apart from that, a new and modern module for prognostic notifications was designed, which is available on the website; furthermore, the modules for monitoring the occurrence of apple scab and codling moth (*Cydia pomonella*) were developed and implemented, which were made publicly available on the website of the Agro-meteorological Portal of Slovenia. This portal also lists the locations of prognostic stations, where producers can access the necessary agro-meteorological data. As many as 1300 new olive growers were included in the notification system via SMS (GSM messages).

All information is available on the FITO INFO website.²⁷

The Administration's website contains publicly accessible lists of commercial products for biological protection which are authorised for marketing and use in Slovenia.²⁸

Measure 22: Advising: To support the implementation of integrated pest management backed by the operation of the observation and forecasting service and experts in plant protection, the Ministry will take actions to improve advisory services, equipment and information systems, reinforce the staff and expand the scope of work by building on the established principles of good plant protection practices and through integrated pest management or, as appropriate, organic plant protection.

Plant protection advisory services are among the priorities set in the PAAS annual work programme.

With a view to strengthening the observation and forecasting activity of plant protection and training of producers for IPM, the Public Agricultural Advisory Service has been included in the implementation of certain prognostic tasks since 2013. This Service is involved in the monitoring of the key parameters in plant production, which are necessary not only for targeted and most accurate forecasting of disease outbreaks and pest gradation but also for selecting the time and methods for their control.

In recent years, the observation and forecasting activity has been upgraded with the introduction of traps with glue boards (together with electronics and solar batteries), which provide remote monitoring of particular pests (EFOS devices). The device captures a photo of the glue board once a day and transmits it via the GPRS connection to the computer, where images are stored and processed. By using this device, frequent field visits are no longer needed.

Between 2014 and 2017, the Ministry supported the implementation of the programme for the development of the observation and forecasting activity in horticulture, as described in measure 21.

More effort is required to achieve more effective transmission of the results of experimental and research work in the PAAS in the coming period of the NAP as well as to improve this transfer of knowledge and shorten its path to the user.

Measure 23: Aiming to reduce PPP use, experimental centres for fruit-growing, wine-growing and olive-growing and professional institutions in horticulture, arable farming and hop-growing will

²⁷ <http://www.fito-info.si/index.asp?ID=Prognoze/index.asp>

²⁸ http://www.uvhvvr.gov.si/si/delovna_podrocja/zdravje_rastlin/

carry out research on optimal production technologies which are effective in disease and pest control and reduce the risks arising from PPP use and their adverse effects, including biological plant protection, sustainable use of PPPs and thereby a lower risk. The testing of new resistant or tolerant varieties will continue. Examples of good agricultural practice will be presented to users by organising visits, lectures and practical presentations to keep them informed of all novelties with regard to plant health.

The experimental centres for fruit-growing, wine-growing and olive-growing, which were set up with the aim of performing the specialist tasks of selection and plant breeding, have been focused in their programmes on reducing the use of pesticides since 2013. They examine optimal production technologies for effective disease and pest control, including biological protection, which lead not only to the sustainable use of PPPs but also reduce the risks from PPP use and their adverse effects.

Apart from the experimental centres for fruit-growing, wine-growing and olive-growing, which are financed by the MAFF, the following institutions play an important role in achieving more effective plant health and lower PPP use: the Agricultural Institute of Slovenia, the Biotechnical Faculty in Ljubljana, the Faculty of Agriculture and Life Sciences in Maribor, the Slovenian Institute of Hop Research and Brewing, the School of Agriculture and Food Technology in Nova Gorica, the Agricultural School Grm in Novo Mesto, the Ptuj Selection and Experimental Centre and the Rakičan Biotechnical School. The results of experimental and research work mostly help the Public Agricultural Advisory Service with regard to plant health and specialist technological advisory services, the knowledge of which is transferred to PPP users with the aim of reducing the use of PPPs.

The experimental centres for fruit-growing, wine-growing and olive-growing breed new domestic varieties or clones, which are adapted to the Slovenian growth and more extreme climatic conditions (a better responsiveness and tolerance of varieties or clones in stress conditions, reduced PPP use with built-in resistance to diseases and pests, greater tolerance to drought stress, lesser use of nutrients) and their entry in the RS list of varieties or the protection of these varieties. To prevent the spread of dangerous plant diseases and pests in Slovenia's climatic conditions, the selected material represents the starting point for the production of quality propagating material and later for the production of quality products. The result of several years of work was the approval and entry in the RS list of varieties of 39 new Slovenian clones of vines and two new Slovenian walnut varieties as well as the publication of the Catalogue of Slovenian clones of grapevine varieties in 2010.

In the context of the Rural Development Programme of the Republic of Slovenia 2014–2020, the following 16.1 sub-measure is defined: Technological development in agriculture, forestry and food: Support for the setting up and operation of the operational groups of the European partnership for innovation in agricultural productivity and sustainability, the goal of which is to place greater emphasis on improving the use of PPPs and making it more sustainable, in addition to improving technologies. This sub-measure started to be implemented in 2017.

The objective of the Strategy for the implementation of the Resolution on strategic guidelines for the development of Slovenian agriculture and food technology up to 2020 is to transform these experimental centres for fruit-growing, wine-growing and olive-growing into competence centres, the task of which will include an effective disease and pest control.

The purpose of this sub-measure is to establish cooperation between different actors in agriculture and rural development in the implementation of projects related to technological development in agriculture, forestry and food, which will contribute to the achievement of the set rural development objectives.

Measure 24: New technological solutions: The Ministry will promote the development, search and implementation of new technological solutions with the emphasis on integrated pest management and the testing of varieties that are resistant to diseases and pests or tolerant to stressful growth conditions and that are suitable for Slovenia's soil and climatic conditions.

Furthermore, the Ministry will promote organic farming in gardens; to this end, together with professional services, it will develop guidelines for good plant protection practices in gardens.

In the context of the Rural Development Programme of the Republic of Slovenia 2014–2020, the following 16.1 sub-measure is defined: Technological development in agriculture, forestry and food: Support for the setting up and operation of the operational groups of the European partnership for innovation in agricultural productivity and sustainability.

The purpose of this sub-measure is to establish cooperation between different actors in agriculture and rural development in the implementation of projects related to technological development in agriculture, forestry and food, which will contribute to the achievement of the set rural development objectives, including the development and implementation of new IPM technological solutions and the testing of resistant varieties.

The M11 measure is designed for payments for converting to organic farming practices and methods and their maintaining. They are intended for farming that provides for the protection and improvement of the environment, landscape elements, natural resources and biodiversity, as well as for adjusting to climate change. They are allocated to voluntary conversion to organic farming practices and methods as set out in the Regulation 834/2007/EC.

In Slovenia's soil and climatic conditions, technologies with a highly positive energy balance, a sustainable technological approach and market attractive products are implemented for practical application. New technological solutions are an integral part of the programmes for introduction or special testing of varieties and bases by integrating resistant and semi-resistant varieties based on:

- a reliable and quality product of appropriate size with the objective of increasing the current Slovenian average yield;
- a reduced use of synthetic chemical products and their replacement with sufficiently effective natural active substances and mechanical methods with the aim of achieving a 50 % reduction compared with integrated production while at the same time implementing alternative organic plant protection methods;
- the rational use of water for irrigation with the goal of setting the minimum water quantities to ensure stable fertility and high quality of products.

Organic production in gardens is currently not dealt with separately, but in the context of organic production in general. The guidelines of good plant protection practices in gardens need to be drawn up in the coming period.

Risk indicators

1. Volume of sales of PPPs

Volume of sales of PPPs is shown in kg of active substances in products that are used as PPPs. These data also include information on sales of copper and sulphur products and similar ones that, due to their less risky features, may also be used in organic farming. Data on volume of sales re informative, since they cover the sales of PPPs and not their actual use. In the given year, PPPs from stock may be used, i.e. the purchased quantities are not fully used. The sales cover all PPPs, namely those used in agriculture as well as those that are used in other areas (yards, parks, roads, tracks, sport fields, cemeteries, etc.). According to the SURS data, 67 % of PPPs sold in 2014 were used in that year. Data are available at SURS's website.²⁹

The volume of sales of PPPs varies due to various reasons, whereby the impact of weather on crops and plantations is the most important, since in less favourable weather conditions for the development of pests the need for their control is smaller. Smaller use is, with a certain delay, also evident in the smaller PPP sale. Other reasons may be economic; the price of products may influence their sale. However, the total amount of the sold active substances is affected by the type of formulation or the percentage of active substances contained in the products.

Table 2: Data on sales by the main types of pesticides (in kg of active substance) in the 2010–2017 period

| Wholesale of pesticides in kg of active substances by the main groups | | | | | | | | |
|---|---------|---------|---------|---------|---------|---------|---------|---------|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Fungicides and bactericides | 789,323 | 797,073 | 700,234 | 647,499 | 724,489 | 759,240 | 857,715 | 789,816 |
| Herbicides, haulm destructors and moss killers | 253,778 | 264,289 | 257,007 | 223,472 | 238,502 | 224,430 | 244,089 | 233,335 |

²⁹ <https://www.stat.si/StatWeb/News/Index/6258>

| | | | | | | | | |
|----------------------------------|------------------|------------------|------------------|----------------|------------------|------------------|------------------|------------------|
| Insecticides and acaricides | 61,840 | 38,617 | 41,732 | 26,866 | 33,577 | 38,040 | 43,334 | 50,396 |
| Molluscicides in total | 1267 | 974 | 453 | 810 | 2,241 | 3,296 | | |
| Plant growth regulators in total | 923 | 594 | 784 | 564 | 580 | 1,473 | 2,664 | 3,442 |
| Other PPPs | 27,239 | 20,326 | 15,858 | 18,272 | 10,523 | 20,379 | 18,728 | 13,140 |
| Pesticides – TOTAL | 1,134,370 | 1,121,873 | 1,016,068 | 917,483 | 1,009,912 | 1,046,858 | 1,166,530 | 1,090,129 |

Figure 1 shows fluctuations in PPP sales by the main groups (in kg of active ingredients) in the 2010–2017 period:

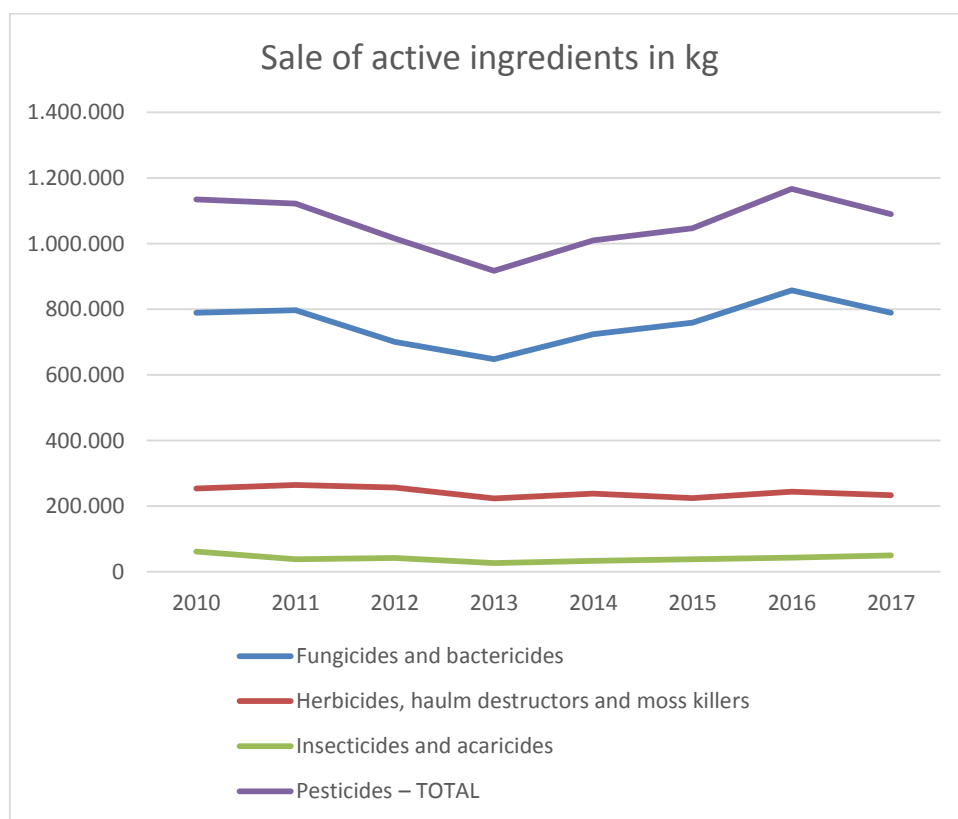


Figure 1: Sales of PPPs (active substances) by the main groups in the 2010–2017 period in kg

Fungicides constitute the largest share of sales (appropriately 70 % of 68.9–73.5 % by individual years), showing that in Slovenia, the plant pathogens cause the biggest burden due to the moist and warm climate. A significant share in sales of fungicides is composed of the products based on copper and sulphur (more than 50 %), which are allowed to be used in organic farming. Figure 2 shows the ratio in sales of copper, sulphur and other fungicides.

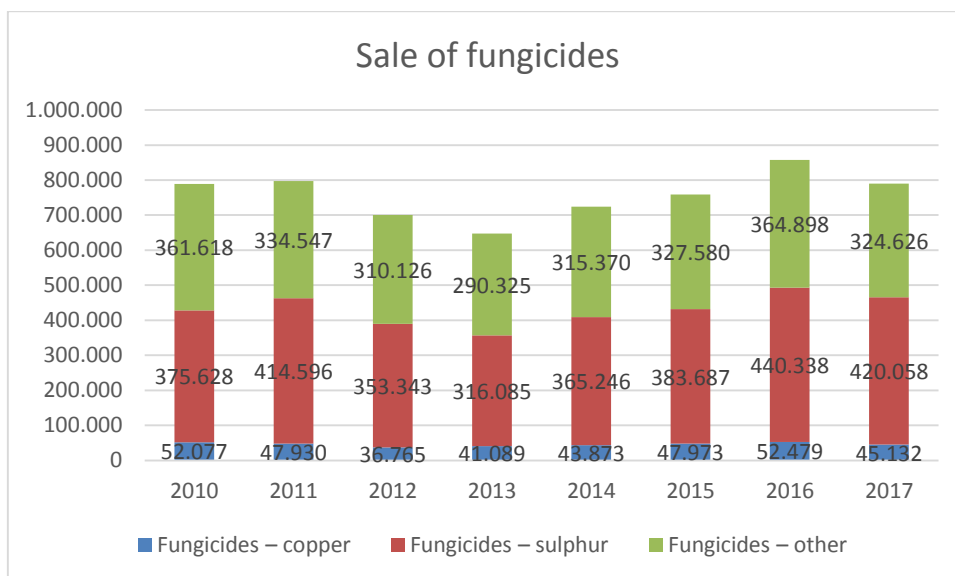


Figure 12: Sales of fungicides in individual years (in kg of active ingredient)

The share of sales of fungicides based on copper and sulphur in the total sales of all PPPs amounts to approximately 40 %.

2. PPP use frequency

PPP use frequency and treatment frequency index reflect the information on how many times a certain agricultural surface may be treated in each year with the sold quantity of a certain PPP, provided that a product is applied in the recommended doses;

$$TF\text{-index} = \sum (SA \text{ a. s.} / SD) / AUC$$

SA a. s.: sold amount of a certain active substance

SD: standard dose in certain culture

AUC: area under cultivation by that culture

Test calculations of this index on the basis of statistics on active substances sold and areas in which particular crops are grown in comparison with calculations of potential actual use of certain PPPs on specific crops, based on the registered uses in 2014, produced significantly different results, on average. TF-index is lower when a more accurate calculation of potential use of PPPs is calculated than the average use. This comparison can be carried out only for active substances that have a registered limited number of uses, if the more precise data on PPP use are not known. Where there is a higher number of PPPs based on the same active substance and more registered uses of PPPs evident from the data on sales, it is not possible to establish which PPPs were used in which areas. When interpreting this indicator, due consideration must be given to the fact that the entire sale of an active substance is reported as the use in agriculture sector although certain active substances may also be used in other sectors.

The sold amount of active substance myclobutanil in 2014 was used as an example for calculation comparison. Only three products based on this substance were authorised in Slovenia in 2014. In 2014 one of them was not sold, the authorised use for the second one was for hops only, while the authorised use for the third one was for grapevines only:

- In average calculation, based on sold active substance on grapevines and hops together, the joint TF-index of 0.45 was calculated.
- In calculation, based on sold two products for grapevines and hops separately, the joint TF-index of 0.22 was calculated.

In both examples, the areas in which grapevines and hops were grown were not overloaded with this active substance; however TF-indices, calculated for all active substances in PPP that were used on grapevines and hops in 2014, should be added. The difference between the two calculated TF-indices is big enough for factor 2. The calculation example shows that, in order to realistically present this indicator, real data from records on PPP use are necessary, therefore the sold amount of active substance in formula (SA a. s.) should be replaced with the used amounts.

TF-index could be monitored in statistical processing of data on PPP use that are monitored by SURS the framework of Regulation concerning statistics on pesticides.

TF-index could also be a useful tool for calculating the frequency of PPP use and comparison between different types of production (e.g. integrated and organic production), if data on the actually used quantities of PPPs and actually used doses on precisely specified areas of certain crops are available.

3. Load index

Load Index (LI) is used to indicate the relative risk to other organisms in the environment due to PPP use. It reflects the data on load to areas, in which particular crops are grown, for certain organisms due to the use of a certain active substance in PPP. The calculation is based on sold amounts of active substance in a certain year, and on data on LD₅₀ or LC₅₀ for a certain organism (LD₅₀ or LC₅₀ means a dose or concentration that causes death in 50 % of specified organisms):

$$LI = \sum (SA \text{ a. s.} / (TOX \times TCL))$$

SA a. s.: sold amount of a certain active substance in one year

TOX: LD₅₀ or LC₅₀ for a certain organism (mammals, birds, honeybees, etc.)

TCL: total cultivated land

In example of LI for mammals, the same data were used as in the TF-index example. In case of active substance myclobutanyl in 2014, LI for mammals was calculated in the following two manners:

- In average calculation, based on sold active substance on grapevines and hops together, the joint TF-index for mammals was 0.06.
- In calculation, based on sold two products for grapevines and hops separately, the joint TF-index for mammals was 0.03.

The same as in the TF-index example, the difference is big enough for factor 2. In both examples of this TF-index, the load for mammals due to the use of this active substance is very small. However, in order to calculate the relative load, all PPPs that are used on these crops should be added, as well as the data from records on actual use of PPPs applied, also because certain active substances in PPP may be used in other sectors than agriculture, while the data on sales of active substance cover the whole sales.

The same as in case of TF-index, LI could be monitored in statistical treatment of data on PPP use that are monitored by SURS the framework of Regulation concerning statistics on pesticides.

4. Use of PPPs in agriculture

The use of PPPs in agriculture is reflected by the use of active substances in kg/ha per year.

Use of PPPs in agriculture cannot be treated as sales of PPPs in Slovenia for the following reasons:

- Certain active substances may be used in other areas, for example for maintaining public areas, including roads and rails.
- Since the need for PPP use strongly depends on the weather conditions, all the amounts purchased may not be used in the same year, but remain in stock at producers to be used the following year.

Under ZfS-1 (Article 19), PPP users for professional purposes must keep records of PPP use for three years to be provided in case of inspection. The same article lays down that these records must be provided to the Administration on request, so as to be submitted to SURS for statistical purposes.

Therefore the Administration collected these data from adequate sample for 2014, and submitted them to SURS to be processed in line with the statistical methods prescribed under Regulation (EC) No 1185/2009. SURS published the results at its website.³⁰

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http://pxweb.stat.si/pxweb/Database/Okolje/15_kmetijstvo_ribistvo/07_reprodukcija_material/03_15708_raba_pesticidov/03_15708_raba_pesticidov.asp

According to the SURS's data, PPP use in agriculture was for approximately one third smaller than PPP sale.

Per hectare of the entire area with certain crops in 2014, in average the most PPPs were used in intensive orchards (29.1 kg/ha) and vineyards (24.4 kg/ha). Mostly fungicides were used in this agricultural land, i.e. 22.8 kg/ha in intensive orchards and 23.8 kg/ha in vineyards. In the areas under wheat and spelt, 0.8 kg of PPPs were used in average per hectare, of which 0.4 kg/ha of fungicides and 0.3 kg/ha of herbicides. In areas under corn (for grain and silage), 1.4 kg of PPPs per hectare were used in average (mostly herbicides) (Source: SURS).

Statistical data on PPP use in agriculture were processed and published for the first time in Slovenia in 2016 for 2014. Regulation (EC) No 1107/2009 envisages reporting once every 5 years. The next data for 2017 will be published in 2019.

5. Number of PPP users who have received the training

Number of PPP users (operators) who have received the training in handling of PPPs under the new programme that was expanded with knowledge pertaining to the protection of health and the environment:

All PPP users who use products registered for professional use or who sell them or advise on their use, must undergo additional training in the handling of PPPs. Training comprises basic training with an examination, after which participants acquire a training card, and refresher courses which users of PPPs for professional purposes must attend every five years in order to extend the card's validity. The training card is issued by the Administration. The Administration authorises external providers to provide training; these providers must meet the conditions regarding staff, equipment and premises, and must provide the standardised training programme laid down by the Administration. Providers must keep records of training cards issued in the Administration's electronic database via a data-entry form.

The renovation of the system with new authorisations followed the publication of the Rules on training on plant protection products (UL RS No 85/13); in January 2014, the public tender was conducted, on the basis of which 16 training providers were newly authorised, whereby cooperation contracts were concluded with them, namely to provide trainings for the users, vendors and advisors of PPPs. Implementation of the new training programme, which contains additional topics pertaining to the protection of health and the environment, began in 2014.

The PPP Division maintains an up-to-date online database of the issued training cards, while details of training providers and training timetable are available at the Administrations' website.

Table 2 provides an overview of PPP users who have received the training in handling of PPPs under the new programme. The number varies from year to year, because PPP users must extend the validity of their training cards every five years.

Table 3: Number of trainings and issued or renewed cards for PPP users

| | 2014 | 2015 | 2016 | 2017 |
|--|--------|--------|-------|-------|
| Number of issued/renewed training cards for PPP users (basis training and refresher courses) | 21,064 | 11,341 | 7,930 | 3,885 |

http://pxweb.stat.si/pxweb/Database/Environment/15_agriculture_fishing/07_consumption/03_15708_use_pesticide/03_15708_use_pesticide.asp

6. Number of PPP distributors, advisors and vendors who have received the training

All PPP distributors and vendors, as well as the advisors, must undergo the additional training in the handling of PPPs. Training for this group is organised at the higher level than for PPP users, since the aim is to prepare PPP vendors and advisors for giving advice regarding PPPs to users. It comprises basic training with an examination, after which participants acquire a training card, and refresher courses which vendors and advisors must attend every three years. The training card is issued by the Administration. The Administration authorises external providers to provide training; these providers must meet the conditions regarding staff, equipment and premises, and must provide the standardised training programme laid down by the Administration. Providers must keep records of training cards issued in the Administration's electronic database via a data-entry form.

Table 3 provides an overview of the number of PPP vendors and advisors who have received the training in handling of PPPs since 2014.

Table 4: Number of issued or renewed training cards for sellers and advisors

| | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|
| Number of issued/renewed training cards for distributors, sellers and advisors (basic training and refresher courses) | 394 | 299 | 535 | 397 |

Table 4 provides total number of issued training cards for vendors, advisors and users.

Table 5: Total number of valid training cards for PPP vendors, advisors and users:

| Type | 2014 | 2015 | 2016 | 2017 |
|--|--------|--------|-------|-------|
| Number of all participants in basic training in the handling of PPPs and training cards issued following successful completion of training | 1,739 | 2,092 | 1,854 | 2,554 |
| Number of participants in refresher courses in the handling of PPPs and renewed training cards | 19,719 | 9,548 | 6,605 | 1,548 |
| TOTAL | 21,458 | 11,640 | 8,459 | 4,102 |

7. Number of farmers who have received the training under Rural Development Programme

Since 1998 MAFF has been promoting the development of and transition to more environmentally friendly methods of agriculture. Already in the 2007–2013 programming period, the AEP sub-measures were aimed to reduce the negative impacts of agriculture on the environment, preservation of natural resources, biological diversity, fertility of soil and traditional landscape, as well as to protect the protected areas. These orientations are also followed by the AECM measure from the RDP 2014–2020 with the aim to promote the above-standard farming and environmentally friendly farming practices which are directed towards the following priority areas of action:

- preservation of biological diversity and landscape;
- appropriate water and soil management;
- mitigation and adaptation of agriculture to climate change.

The same as has applied for the AEP sub-measures under the RDP 2007–2013, mandatory annual participation of beneficiaries at 4-hour regular training is one of the conditions to receive payments also for the AECM measure under the RDP 2014–2020.

Table 6: Number of farmers who have received the training in PPP use under Rural Development Programme

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|--------|-----------------|----------|----------|----------|
| Number of participants at the AECF trainings in IPM | 9,509* | Not available** | 5,688*** | 6,741*** | 6,651*** |

* Data refer to the number of participants who attended 4-hour educational programme for the integrated arable farming (3,620 participants), integrated fruit-growing (1,911 participants), integrated wine-growing (2,141 participants) and integrated horticulture (1,837 participants) in the framework of the AEP sub-measures under the RDP 2007–2013. The educational programmes also included contents on IPM.

** 2014 was a transitional year between these two programmes, financed by the European Agricultural Fund for Rural Development. The RDP 2007–2013 concluded and a new RDP 2014–2020 was adopted.

*** Data refer to the number of participants that underwent the 4-hour regular annual training for the AECF measure under RDP 2014–2020. The contents of this training did not directly refer to IPM; however, the participants were informed of the significance of the professionally justified use of PPPs, and the preservation of the environment and water resources related thereto.

8. Number of items of PPP application equipment tested under the new programme

All users who apply PPPs for pest control must use PPP application equipment that is in perfect technical working order. Authorised organisations check that the equipment is working faultlessly in accordance with the requirements, and attach labels provided by the Administration during regular inspections. The owners of the equipment must submit their equipment to be inspected every three years and obtain a new label. Providers must keep records of the equipment inspected and the labels issued in the Administration's electronic database via a data-entry form.

Following the publication of Rules on the requirements for the correct operation of equipment for the application of plant protection products, and on the conditions and method for conducting inspections of such equipment (UL RS No 101/2013), a public tender was conducted in 2014, and new authorisations and contracts to nine inspectors of PPP application equipment were granted.

In 2014 the ISO published 4 standards regarding the inspection of PPP application equipment, which became applicable as mandatory standards for the inspection of PPP application equipment in the EU as required by Directive 2009/128/EC on the sustainable use of pesticides.

The PPP Division keeps an updated internet database of the inspected equipment and the labels used, while the Administration website gives access to the information on the authorised inspectors of equipment and the scheduled deadlines for equipment inspection.

Table 6 shows the number of items of PPP application equipment inspected according to the new programme following the publication of the new Rules. The equipment must be inspected every three years, so the number of inspections between years may vary.

Table 7: Number of items of equipment inspected and the number of certificates and labels issued between 2014 and 2017

| | 2014 | 2015 | 2016 | 2017 |
|--|-------|------|-------|-------|
| The number of items of PPP application equipment inspected and number of certificates and labels issued | 9,411 | 955 | 7,792 | 8,301 |

9. Number of new PPP application equipment in use

In terms of technique used for PPP application, it is important to know the extent of equipment renewals, because new equipment, technically more elaborate and not worn, allows for higher-quality application of PPPs, resulting in lower negative impact on the environment. As of 31 December 2014, 18,183 items of equipment with a valid inspection label were registered in the database of inspected PPP application equipment in use, 18,644 in 2015, 18,205 in 2016 and 17,178 items of equipment in 2017.

The table below shows the number of new items of equipment purchased between 2014 and 2017.

Table 8: Number of new items of PPP application equipment

| | 2014 | 2015 | 2016 | 2017 |
|---|--------|--------|--------|--------|
| Number of new PPP application equipment in use | 198 | 203 | 235 | 264 |
| Number of all registered items of equipment with a valid inspection certificate | 18,183 | 18,644 | 18,205 | 17,178 |

10 Average age of PPP application equipment in use

Similar to the preceding item, the average age of the application equipment is an indication of the situation in this field. It depends on the renewal of machinery and purchase of new equipment. The average age of the equipment in 2015, 2016 and 2017 was 22 years, while in 2014, it was 21 years; the information refers to all registered items of equipment with a valid label as of 2017

Table 9: Average age of the PPP application equipment (in years)

| | 2014 | 2015 | 2016 | 2017 |
|--------------------------|------|------|------|------|
| Average age of equipment | 21 | 22 | 22 | 22 |

11 Number of new devices for non-chemical pest and weed control

Within the Rural Development Programme and the Agri-environmental Programme, the purchase and use of devices for mechanical weed control is promoted. The use of such devices reduces herbicide use and is highly important from the perspective of human and animal health protection as well as environment protection. The table below states the number of newly purchased devices for non-chemical weed control between 2013 and 2017. They mostly include combing machines, mulchers and hoes.

Table 10: Number of new devices intended to the non-chemical control of pests and weeds

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Number of new devices for non-chemical weed control | 32 | 70 | 34 | 0 | 178 |

12 Proportion of food samples with exceeded pesticide residues (non-compliant samples)

Pesticide residues in the EU are regulated by Regulation (EU) 396/2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin.

According to the definition from this Regulation, pesticide residues are residues, including active substances, metabolites and/or breakdown or reaction products of active substances currently or formerly used in PPPs

which are present in or on the products covered by Annex I to this Regulation as a result of use in plant protection.

The Administration conducts control of pesticide residues based on the multiannual national control programme aligned with the multiannual Union control programme. In addition to the information from the annual sampling programme, the report is supplemented by the data on the analyses from the additional control and from the official control during the import.

More details are provided in the annual reports on the control of pesticide residues on the Administration's website.³¹

Every year the data on the results of the analyses of the samples taken is submitted to the European Food Safety Authority, which uses the data received from the Member States to prepare the report on the control on pesticide residues in the EU.

Table 10 shows the number of samples taken, proportions of samples from domestic production and other countries, and proportions of non-compliant samples by origin between 2010 and 2016. For 2015 and 2016 the data for foodstuff samples from domestic organic production is also shown.

Table 11: Data from the national control programme for pesticide residues in food in the last 7 years

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--|------|------|------|------|------|------|------|
| Total number of samples taken | 1239 | 1125 | 1045 | 1075 | 777 | 784 | 735 |
| Proportion of samples from domestic production – % | 40.6 | 43 | 45 | 50.7 | 39.8 | 32.3 | 48 |
| Proportion of samples – other EU countries – % | 46.6 | 40 | 37 | 34.2 | 42.3 | 44.6 | 28 |
| Proportion of samples– third countries production – % | 12.8 | 17 | 18 | 15.1 | 17.9 | 23.1 | 23.3 |
| Proportion of samples from domestic organic production – % | | | | | | 8.4 | 10.9 |
| Proportion of samples with non-consistent MRL of the amount of samples from domestic production – % | 1 | 1.9 | 0.86 | 0.4 | 0.1 | 1.2 | 0 |
| Proportion of samples with non-consistent MRL of the amount of samples from EU countries – % | 1.7 | 2 | 0.52 | 0.2 | 0.3 | 0.86 | 1.9 |
| Proportion of samples with non-consistent MRL of the amount of samples from third countries – % | 1.3 | 4 | 2.15 | 0.4 | 0.3 | 1.3 | 1.9 |

The number of samples taken is indicated in Figure 3. The observed downward trend of sample numbers is mostly due to the development of chemical substances and analytical methods because an increasing number of substances that are being placed on the market require specific analytical methods, which are more expensive and demanding than the group methods. This changes the structure of costs within the foreseen funds for the control programme, resulting in the analysis of fewer samples.

³¹ http://www.uvhvvr.gov.si/si/delovna_podrocja/ostanki_pesticidov/porocila/

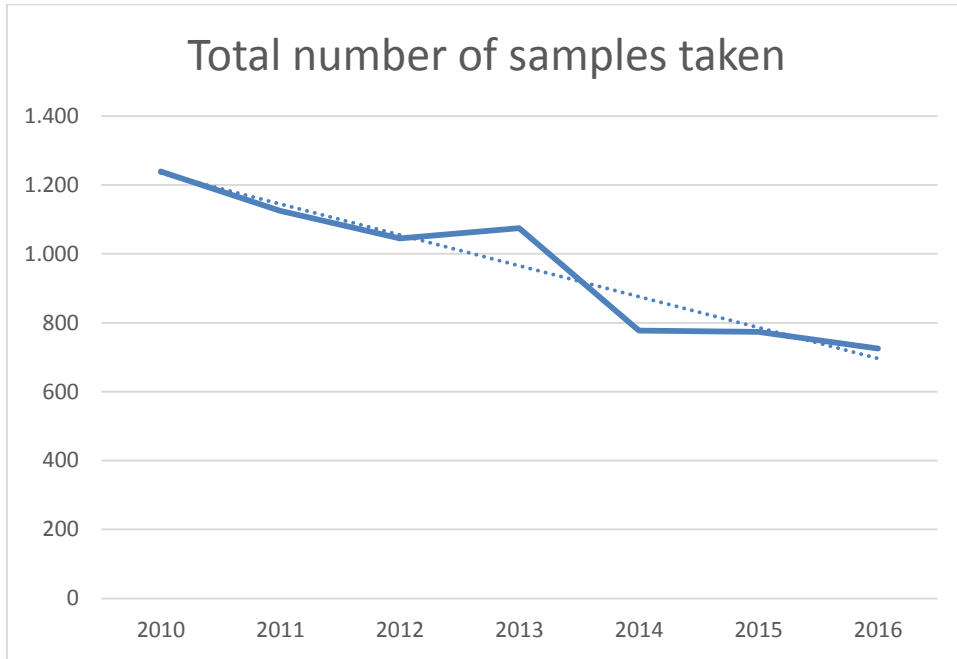


Figure 3: Number of samples taken in the national control programme for pesticide residues between 2010 and 2016

The results of the official control of pesticide residues in food samples show that we mostly eat foodstuffs that do not contain such amounts of pesticide residues which could be harmful to human health. Figure 4 shows the proportion of non-compliant samples among the total number of samples analysed versus compliant samples.

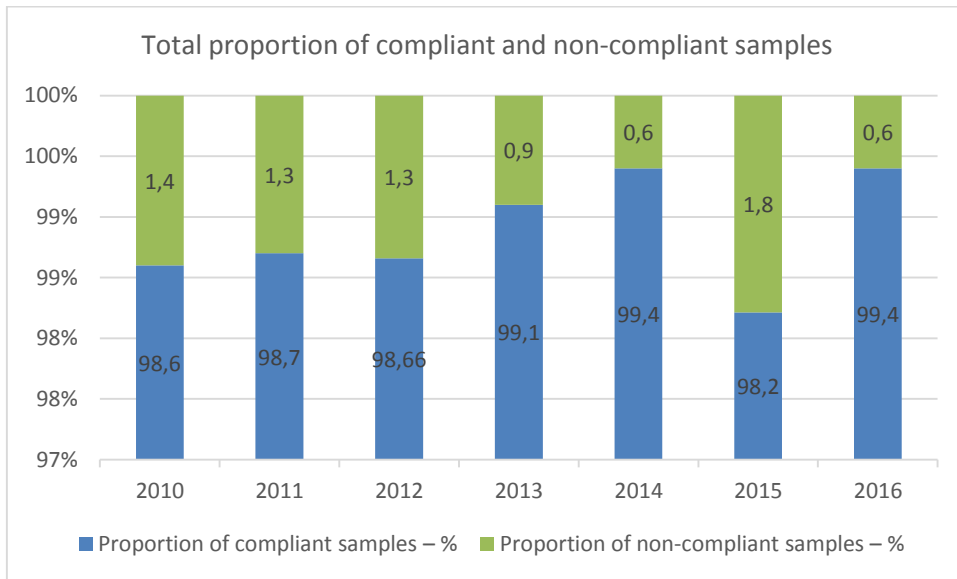


Figure 4: Proportion of compliant and non-compliance samples of the total amount of samples

The control programme is aimed at analysing samples of different origin. The proportions of samples taken by year originating from third countries, EU countries and domestic production are shown in Figure 5.

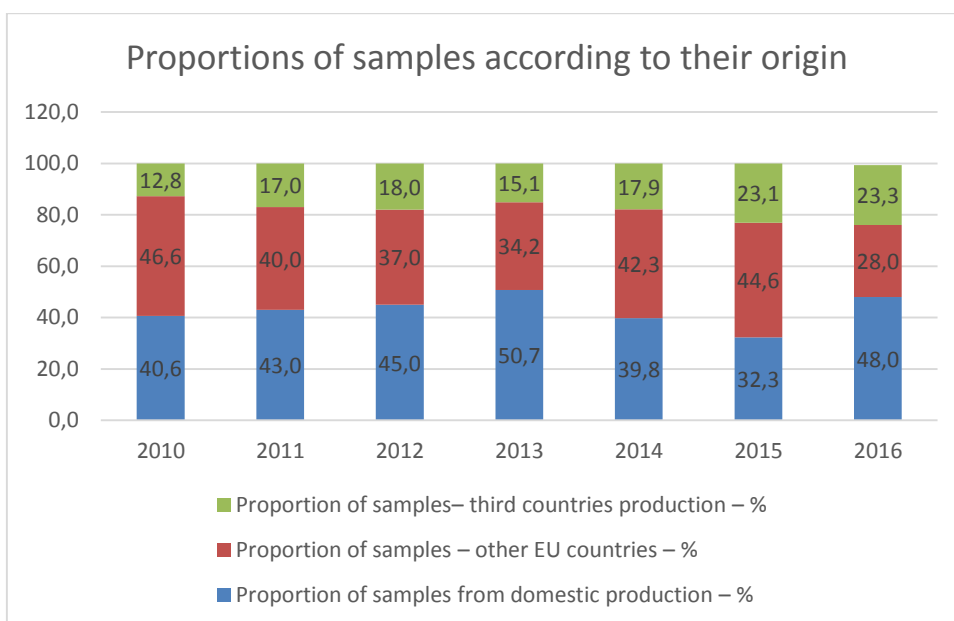


Figure 5: Shares of taken samples according to their origin

The proportion of samples containing pesticide residues is relatively small. If MRLs are exceeded, a risk assessment is prepared to assess whether such foodstuffs constitute a risk to human health and whether they are safe according to the provisions of Article 14 of Regulation (EC) No 178/2002.

The proportion of samples with exceeded MRLs shows a slight downward trend. Figure 6 shows the proportions of samples with exceeded MRLs of different origin (domestic production, EU countries and third countries).

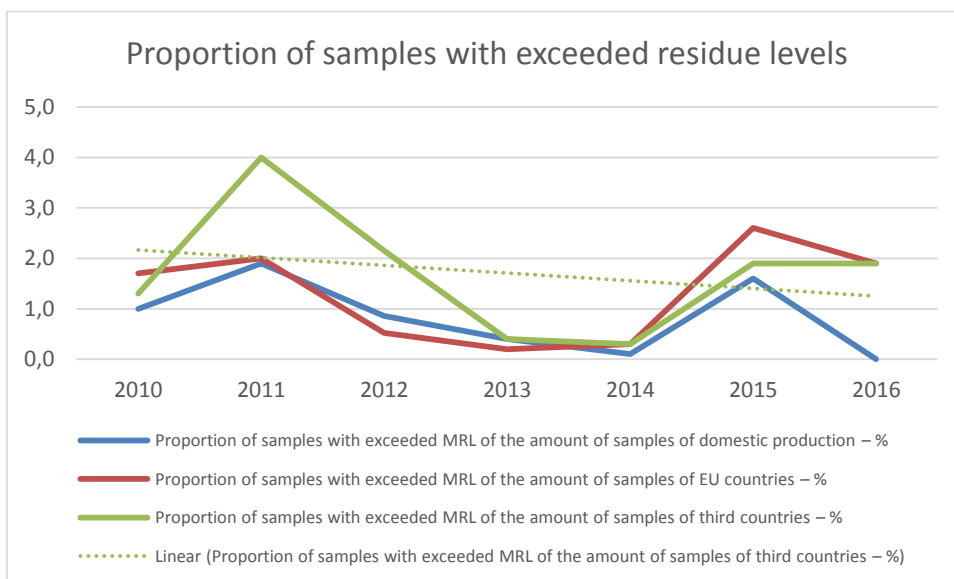


Figure 6: Proportions of samples with exceeded MRLs according to sample origin

13 Proportion of samples with pesticide residues (compliant and non-compliant samples together)

Table 11 shows the proportions of food samples containing detected pesticide residues (above LOQ). The data is collected according to the origin of food: fruit, vegetables, cereals, baby food, foodstuffs of animal origin. The limit of quantification for pesticide residues is laid down by Regulation (EC) 396/2005 on pesticide

residues for each pesticide/product combination and depends on analytical methods. The information on MRLs and LOQs is available at the European Commission's website.³²

Table 12: Data from the national control programme for pesticide residues in food by year – established residues above LOQ

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--|------|------|------|------|-------|------|------|
| Proportion of established residues in samples of fruit, vegetable, oil seeds, sugar crops and processed food – % | 56.9 | 54.9 | 55.7 | 46.8 | 58.16 | 42.3 | 32.2 |
| Proportion of established residues in samples of cereals – % | 27.8 | 33.3 | 39 | 10 | 22 | 27.3 | 5.4 |
| Proportion of established residues in samples of baby food – % | 0 | 1.7 | 0 | 0 | 0 | 0 | 0 |
| Proportion of established residues in samples of food of animal origin – % | 2.5 | 1.3 | 0 | 0 | 0 | 0 | 0 |

The proportions of samples with pesticide residues above LOQ, irrespective of compliance, are shown. The residues were most often present in two categories of samples: fruit, vegetables, oil seeds and sugar crops; and cereals. pesticide residues in baby food samples were not found, except in 2011. The samples of food of animal origin also contained less residues, or even none between 2012 and 2016. Figure 7 illustrates the proportions of samples containing pesticide residues.

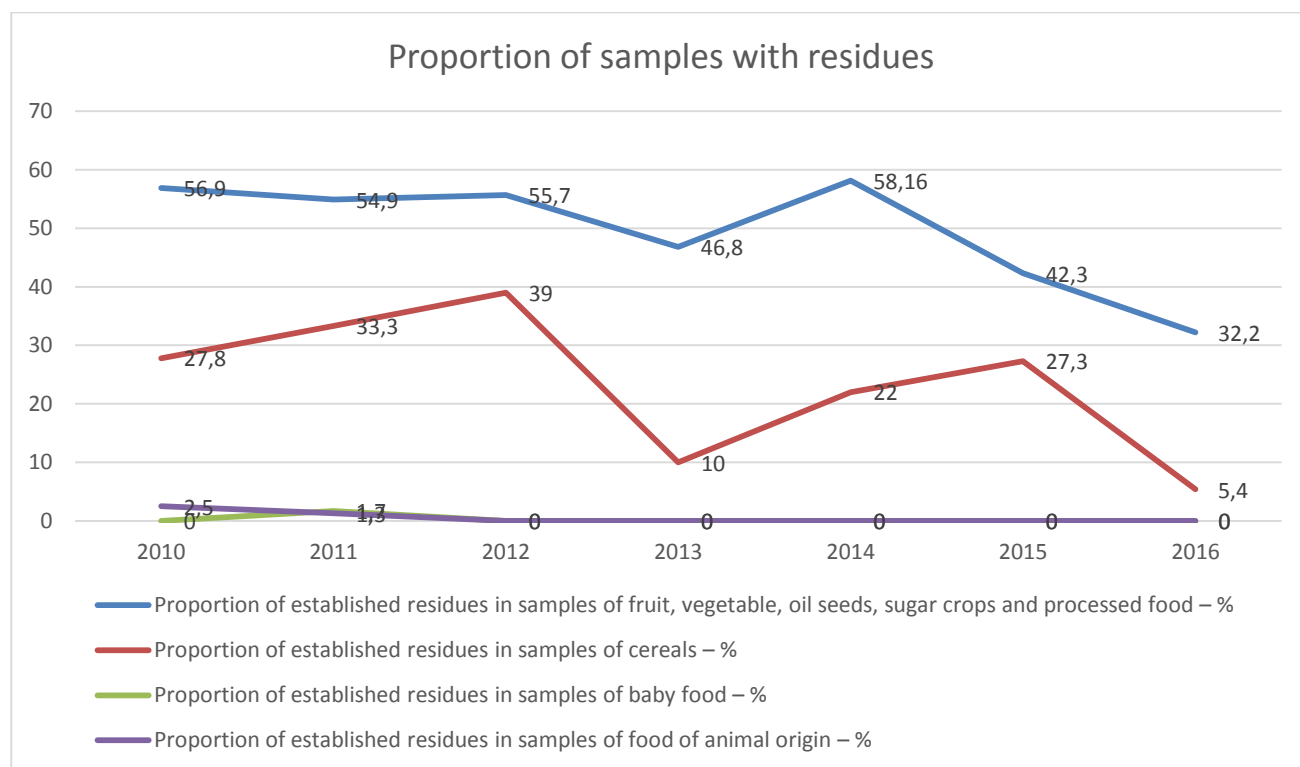


Figure 7: Proportions of samples in which residues above LOQ were found

Figure 8 also shows the data from the analysis of organic production products for 2015 and 2016. In 2015 65 samples were taken from organic production, with 3 samples containing residues between LOQ and MRL, but not above MRL. LOQ is different for each active substance/product combination and is laid down by Regulation (EC) 306/2005.

³² <http://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/public/?event=download.MRL>

In 2016 79 samples were taken from organic production, with 3 samples containing residues between LOQ and MRL, and no sample containing residues above MRL. However, two substances were identified in two samples during control which are not approved for organic production.

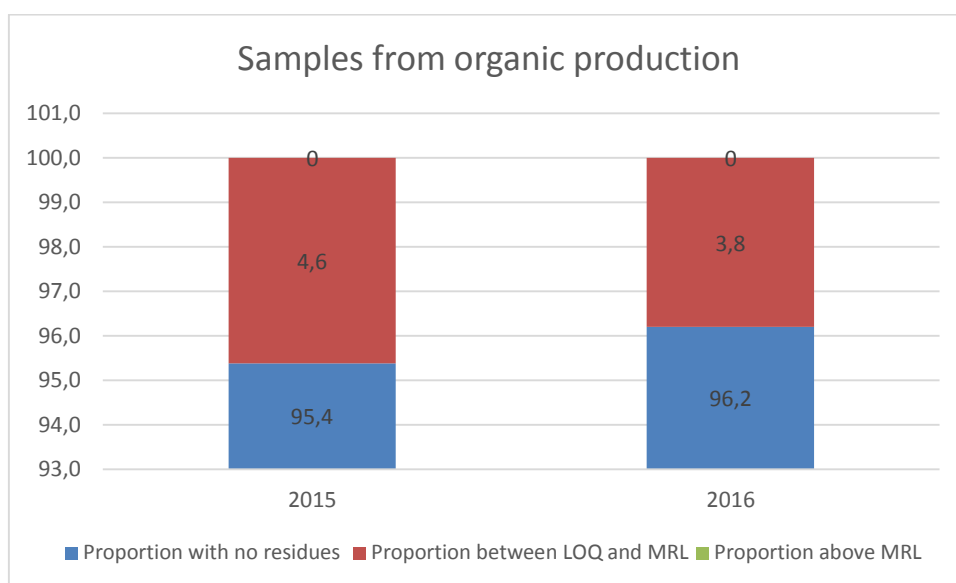


Figure 8: Proportion of samples from organic production with established pesticide residues

14 Chemical status of groundwater

Through the adoption of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework of Community action in the field of water policy (hereinafter referred to as the Water Framework Directive), an approach for comprehensive water management in the territory of all countries of the European Community was set up. The Water Framework Directive was transposed into the Slovenian legislation with the Waters Act (2002) and the Environmental Protection Act. The purpose of the Water Framework Directive is to establish a framework for water protection.

The determination of chemical status of groundwater is specified in more detail by Directive 2006/118 of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration, which requires from all EU countries to observe uniform quality standards (QS) for nitrates and pesticides.

The method for determining chemical status of groundwater in Slovenia is specified by the Decree on groundwater status (UL RS Nos 25/09, 68/12 and 66/16) (hereinafter referred to as: the Decree on groundwater status). Inter alia, the Decree on groundwater status also sets out the following quality standards:

- The quality standard for an individual pesticide and their relevant breakdown products³³ is 0.1 µg/L. The quality standard applies to all pesticides, except to aldrin, dieldrin, heptachlor and heptachlor epoxide, which have a limit value of 0.030 µg/L.
- The quality standard for the sum of all pesticides (PPPs) quantified and their relevant breakdown products is 0.5 µg/L.³⁴

The content of pesticides in Slovenian groundwater has been decreasing in the last years, with a statistically significant decline observed at the majority of monitoring points. Pesticides appear either at continuously contaminated monitoring points (mostly pesticides considered old burdens, notably atrazine and its degradation product desethyl-atrazine) or at random monitoring points, where inappropriate use is suspected.

It should be noted that regular sampling is carried out at problematic points, while at points where there are no problems, sampling is performed to a smaller extent, i.e. only to monitor the status.

³³ The relevant degradation products are relevant degradation products of pesticides (PPPs) according to the rules regulating registration and placing on the market of PPPs.

³⁴ The sum of pesticides means the sum of all pesticides detected and quantified in the monitoring procedure, including their relevant metabolites, degradation and reaction products.

During groundwater status monitoring, if pesticides are expected, sampling is performed twice annually at the same monitoring point, in the spring and in the autumn. The data in Figure 9 and Figure 10 is shown for monitoring points (MP).

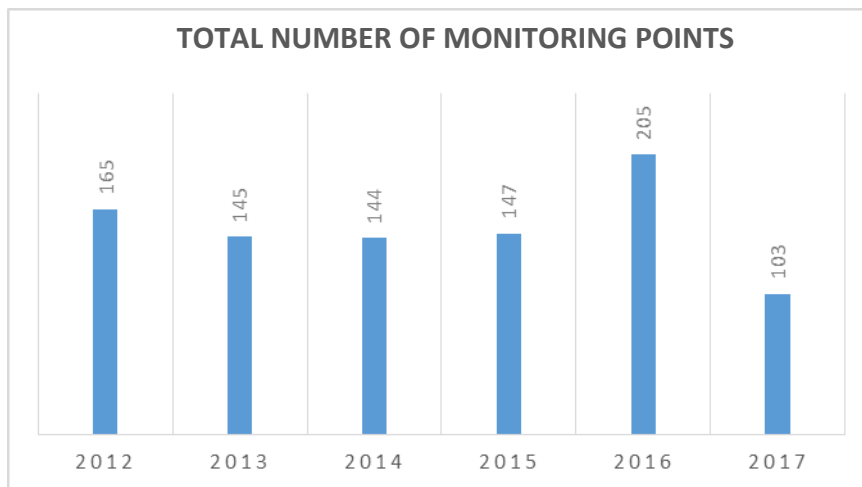


Figure 9: Number of monitoring points for determining chemical status of groundwater between 2010 and 2017

The proportions of monitoring points within the national groundwork status monitoring where monitoring of groundwater status between 2012 and 2017 showed an exceeded quality standard for individual pesticides and/or the sum of pesticides are shown in Figure 10. Taking into account the 2013–2017 period covered by the report on progress, the proportion of monitoring points with exceeded quality standard for individual pesticides ranges between 9.7% and 15.5%, while the proportion of monitoring points with exceeded quality standard for the sum of pesticides ranges between 0 % and 4.7 %.

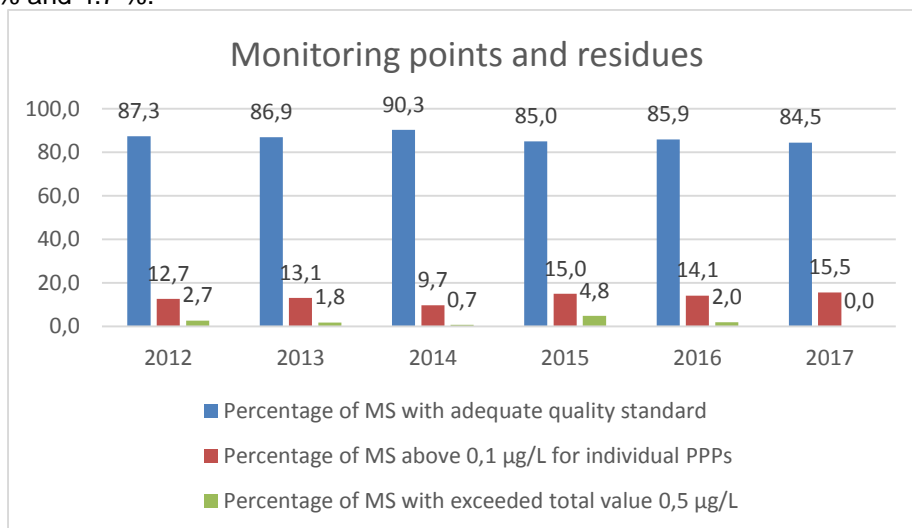


Figure 10: Proportions of monitoring points with the achieved quality standard, with the exceeded quality standard for an individual pesticide and with the exceeded quality standard for the sum of pesticides

Source: Ministry of the Environment, Slovenian Environment Agency

Samples of groundwater still contain PPPs which have not been permitted in the EU for years and are not registered in Slovenia and constitute the so-called old burdens (such as atrazine and its degradation product desethyl-atrazine, prometryne, bromacil).

The content of PPPs at 205 monitoring points was monitored in 2016 as part of the national groundwater status monitoring (Figure 9). Based on the monitoring, quality standards were found to be exceeded for individual PPPs at 29 monitoring points, of which 22 cases were due to old burdens, in 6 cases the samples exceeded the quality standard for individual PPPs which are permitted in the EU and Slovenia for weed control (2,4-D, metolachlor, izoproturone, MCPA), and in one case the quality standard was exceeded for a PPP which is permitted in the EU but is not registered in Slovenia (chloridazon).

The content of PPPs at 103 monitoring points was monitored in 2017 as part of the national groundwater status monitoring (Figure 9). Based on the monitoring, quality standards were found to be exceeded for individual PPPs at 15 monitoring points due to old burdens (atrazine, desethyl-atrazine, prometrine), and at one monitoring point for the permitted PPPs (MCPA).

The data on the monitoring is published on the website of the Slovenian Environment Agency.³⁵

15 Monitoring of drinking water

The compliance of drinking water with the requirements aimed at protecting human health against harmful consequences of any contamination of drinking water has been verified by the Ministry of Health through the monitoring of drinking water since 2004.

The monitoring of drinking water is laid down by the Rules on drinking water (UL RS Nos 19/04, 35/04, 26/06, 92/06, 25/09, 74/15 and 51/17) (hereinafter referred to as: the Rules on drinking water). The purpose of monitoring is to check compliance of drinking water with the requirements of the Rules on drinking water, particularly with the requirements for limit values of parameters set out by Appendix I. It is carried out in accordance with the programme which specifies the frequency of sampling, methodology of sampling, and physico-chemical and microbiological tests. The testing of drinking water is performed at user taps and points where water is used as drinking water within a supply area. In the period between 2013 and 2017 covered by the report, there are between 849 (in 2014) and 886 (in 2015) supply areas registered in the information system for monitoring of drinking water (IS MDW) as shown in Table 12

Pesticides are regularly tested only in those areas where they are expected to be present. Table 12 shows the data on the total number of supply areas (SAs) and the number and proportion of SAs tested for pesticides.

Table 13: Number and proportion of SAs tested for pesticide content versus the total number of SAs:

| SA | 2013 | 2014 | 2015 | 2016 | 2017 |
|--|------|------|------|------|------|
| Number of all supply areas (SAs) | 885 | 849 | 886 | 869 | 866 |
| Number of SAs tested for pesticides | 66 | 120 | 124 | 68 | 81 |
| Proportion of SAs tested for pesticides | 7.5 | 14.1 | 14.0 | 7.8 | 9.4 |

Similar to groundwater described under preceding item, drinking water most commonly contains herbicides (weed control PPPs) and substances which are no longer permitted to be used as PPPs and constitute old burdens (atrazine and its degradation product desethyl-atrazine, simazine, propazine). Occasionally, there are trace amounts of substances allowed to be used as PPPs in the EU and Slovenia (metolachlor, terbuthylazine, bentazone and fungicide metalaxyl (found in quantities between 0.007 and 0.012 µg/L)), and diuron, which is permitted in the EU but not registered in Slovenia.

The fluctuation of atrazine and desethyl-atrazine levels is associated with the hydrological status of groundwater, the pumping regime and mixing of groundwater from deeper and shallower aquifers. Based on the data on the quality of groundwater (ARSO programme), it can be summarised that the downward trend of atrazine levels in groundwater in the Drava basin water body is slower than seen for groundwater from other water bodies (e.g. Sava basin). Pesticides were most commonly found in the area of alluvial aquifers in Slovenia. Increased pesticide levels in drinking water from drinking water supply systems are mostly found in the Mura and Drava basins, and to a smaller extent in the Sava basin. However, the general status is

³⁵ <http://www.arso.gov.si/vode/podatki/>

improving, with a downward trend for pesticide content observed. Figure 11 shows data on the proportion of SAs tested for pesticides showing exceeded values for atrazine, desethyl-atrazine and the sum of all pesticides found in samples between 2013 and 2017.

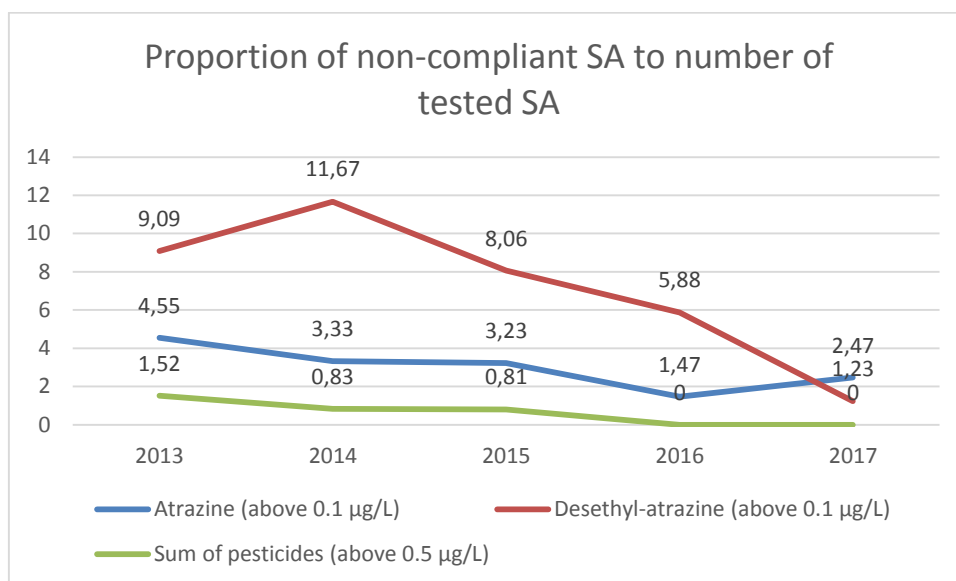


Figure 11: Proportions of SAs tested for pesticides with exceeded values for atrazine, desethyl-atrazine and the sum of all pesticides found in samples between 2013 and 2017

Source: Ministry of Health, National Laboratory of Health, Environment and Food

The data on the monitoring of drinking water and its results are available from the website on Monitoring of drinking water.³⁶

16 Surface waters

Chemical status of surface water bodies is determined in accordance with Decree on surface water status (UL RS Nos 4/09, 98/10, 96/13 and 24/16) (hereinafter: Decree on surface water status) that summarises the requirements of the Water Directive. Environmental quality standards are specified as the annual average value of parameter of water chemical status (hereinafter: AA-EQS), providing protection against long-term exposure, and as the maximum allowable concentration of parameter of water chemical status (hereinafter: MAC-EQS), preventing short-term consequences of pollution.

In the current water management plans, the assessment of the chemical status of surface waters is given based on the data of the chemical status monitoring for the 2009–2015 period. A good chemical status of water was, without the exceeded EQS for mercury in living environment being considered, established for 149 (96 %) of surface water bodies. For five water bodies (3 %), a bad chemical status was established. All water bodies of the coastal and territorial waters have the bad chemical status, as has already been established for the 2006–2008 period. The reason for the poor chemical status lies in exceedance of the environmental quality standard for tributyltin compounds that are used as coatings to protect ships against algae overgrowth. In general, the Slovenian surface areas are not loaded with the priority or priority dangerous substances.

Ecological status of surface water bodies is assessed on the basis of the biological, general physico-chemical and hydro-morphological elements of quality, and special pollutants. The environmental quality standards for special pollutants are specified as AA-EQS and MAC-EQS in Decree on surface water status, and also include pesticides chlorotoluron and its degradation product desmethyl chlorotoluron, glyphosate, pendimethalin, S-metolachlor and terbuthylazine. In order to prepare the current water managements plans, the ecological status of surface waters was assessed by taking the data on the surface water monitoring for the 2009–2015 period into consideration. The assessment of the ecological status of surface waters shows that 59 % of surface water bodies are achieving at least a good ecological status, and thereby meet the goals

³⁶ <http://www.mpv.si>

of the Water Directive, 38 % of water bodies are not achieving a good ecological status, while 3 % of them are not assessed.

In Slovenia, the water bodies of Mura basin are assessed the worst. The frequent problem in this part of Slovenia is exceedance of limit values for certain special pollutants, since at some tributaries of Mura, a certain moderate ecological status was established due to exceedance of limit values for S-metolachlor, cobalt and terbuthylazine, which is consistent with farming activity in this part of Slovenia. Also in the Drava river basin (Poljskava and Pesnica), certain water bodies do not achieve a good ecological status due to exceedance of limit values for S-metolachlor and glyphosate. Moreover, the elevated levels of S-metolachlor concentration established in the area of the lower Sava River (Mestinjščica).

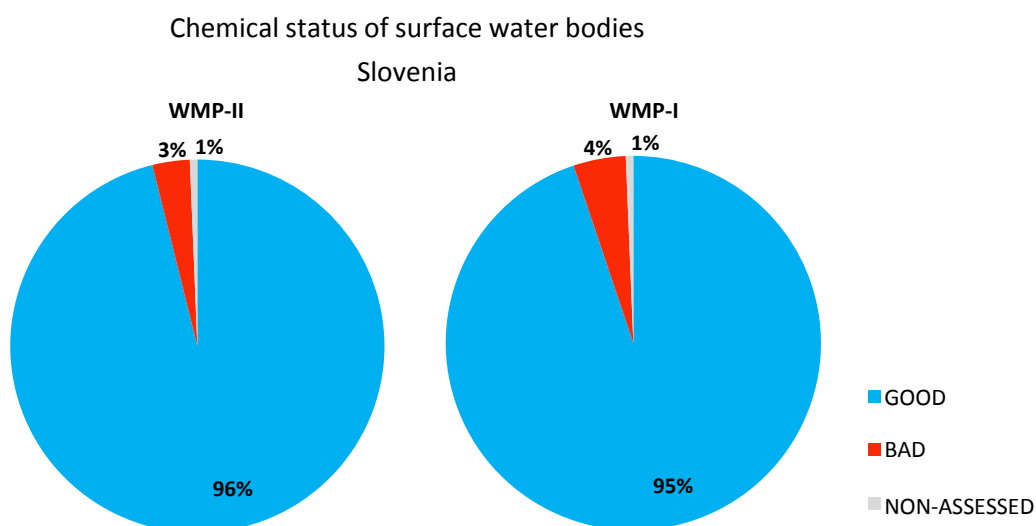


Figure 12: Demonstration of comparison between WMP-I, covering data on chemical status monitoring in the 2006–2008 period, and WMP-II, covering data on chemical status monitoring in the 2009–2013 period

Table 14: Section of rivers which have not achieved a good ecological status due to special pollutants in the 2009–2013 period (WMP-II), including reasons for moderate status and comparison with the 2006–2008 (WMP-I).

| Name of water body | River | Monitoring point | 2006–2008 period (WMP-I) | 2009–2013 period (WMP-II) | |
|--|------------------|------------------|----------------------------|---------------------------|------------------------------|
| | | | Reason for moderate status | Status estimate | Reason for moderate status |
| WB Mura Gibina – Podturen | MURA | Orlovšček | AOX | * | |
| WB Ščavnica, Gajševci Lake reservoir – Gibina | ŠČAVNICA | Veščica | Metholachlor | Moderate | Metholachlor |
| WB Ledava, Ledava Lake reservoir – confluence with Velika Krka | LEDAVA | Gančani | Metholachlor, cobalt | Moderate | Metholachlor |
| | LEDAVA | Benica-Pince | – | | |
| WB Ledava, border section | LEDAVA | Murska šuma | Cobalt | Moderate | Metholachlor |
| WB Kobiljanski Stream, Povirje – state border | KOBILJSKI STREAM | Kobilje | – | Moderate | Metholachlor, terbuthylazine |
| WB Kobiljanski Stream, state border – Ledava | KOBILJSKI STREAM | Mostje | * | Moderate | Cobalt |

| Name of water body | River | Monitoring point | 2006–2008 period (WMP-I) | 2009–2013 period (WMP-II) | |
|---|--------------|--------------------------------|--|---------------------------|--|
| | | | Reason for moderate status | Status estimate | Reason for moderate status |
| WB Velika Krka, Povirje – state border | VELIKA KRKA | Hodoš | – | Moderate | Cobalt, metholachlor |
| | VELIKA KRKA | Krplivnik | Cobalt | | |
| WB Polskava, Zgornja Polskava – Tržec | POLSKAVA | Lancova vas | – | Moderate | Glyphosate |
| WB Pesnica, state border – Pernica Lake reservoir | PESNICA | Pesniški Dvor | Cobalt | * | |
| WB Pesnica, Pernica Lake reservoir – Ormož | PESNICA | Zamušani | Metholachlor | Moderate | Metholachlor |
| WB Sotla, Dobovec – Podčetrtek | SOTLA | Rogaška Slatina | Boron | * | |
| WB Mestinjščica | MESTINJŠČICA | At the other bridge in Bukovje | * | Moderate | Metholachlor |
| WB Krupa | KRUPA | Klošter | Polychlorinated biphenyls | Moderate | Polychlorinated biphenyls |
| WB Paka Velenje – Skorno | PAKA | Šoštanj | Sulphate, molybdenum | Moderate | Molybdenum |
| WB Paka Skorno – Šmartno | PAKA | Slatina | Molybdenum | * | |
| WB Voglajna, Slivnica Lake reservoir – Celje | VOGLAJNA | Celje | Sulphate, cobalt, zink | * | |
| WB Hudinja Nova Cerkev – confluence with Voglajna | HUDINJA | Celje | Sulphate, cobalt, zink | Moderate | Sulphate |
| WB Temenica I | TEMENICA | Grm | * | Moderate | Zink |
| WB Koren | KOREN | Nova Gorica | Anioactive detergents, mineral oils, cobalt, copper, AOX | Moderate | Anioactive detergents, mineral oils, AOX |

WB Water Body

* good status

– there is no parameter measurement due to which the status is moderate or the parameter was not considered in the status assessment due to the exceeded LOQ level.

AOX Adsorbable Organic Halides

The monitoring data are published on the Slovenian Environment Agency's website.³⁷

The presence of herbicide glyphosate and its degradation products in rivers is also monitored, but not at all monitoring points of the national surface water monitoring. In 2015 the samples from one monitoring point were analysed for glyphosate, whereby it was also found therein. In 2016 and 2017 the samples from three monitoring points were analysed for the presence of glyphosate, and for two of them the presence was confirmed.

In addition to the parameters that determine the chemical and ecological status (special pollutants) of the surface waters, other pesticides may also appear in them. The general review of the measurements shows that there are substances in the surface waters that are allowed to be used as PPPs in EU and Slovenia (herbicides metolachlor, erbuthylazine and, in a few cases, dicamba, 2,4-D, isoproturon, MCPP, napropamide and metamitron, insecticide chlorpyrifos-ethyl, and fungicides folpet and Propiconazole). In some cases, atrazine was present, but not its degradation product desethyl-atrazine. From herbicides that are not allowed in EU and Slovenia, alachlor and terbutryn were present, as well as the substances that are allowed in EU, but not authorised in Slovenia (diuron and chloridazon). The below table indicates the number of river monitoring stations at which the value of measured concentration of an individual substance was above 0.1 µg/L (glyphosate was not measured at all stations).

Table 15: Rivers, No of stations at which the measured value of individual PPP was above 0.1 µg/l and the sum of pesticides above 0.5 µg/l in the 2015–2017 period

| Active substance | 2015 | 2016 | 2017 |
|---|----------------|----------------|----------------|
| | No of stations | No of stations | No of stations |
| 2,4-D | 0 | 1 | 0 |
| Alachlor (not registered as PPP) | 1 | 0 | 0 |
| Atrazine (not registered as PPP) | 1 | 0 | 3 |
| Desethyl-atrazine (atrazine metabolite) | 0 | 0 | 0 |
| Dicamba | 1 | 1 | 0 |
| Diuron (not registered as PPP) | 1 | 0 | 0 |
| Folpet | 1 | 0 | 0 |
| Glyphosate (+AMPA) | 1 | 2 | 2 |
| Isoproturon | 1 | 1 | 0 |
| Chloridazon (not registered as PPP) | 1 | 0 | 0 |
| Chlorpyrifos-methyl | 0 | 1 | 0 |
| MCPP | 1 | 1 | 0 |
| Metalaxyl | 0 | 0 | 1 |
| Metamitron | 0 | 1 | 0 |
| Metholachlor | 9 | 18 | 8 |
| Napropamide | 0 | 1 | 0 |
| Propiconazole | 0 | 1 | 1 |
| Terbuthylazine | 3 | 8 | 6 |
| Terbutryn (not registered as PPP) | 1 | 2 | 0 |
| Number of all monitoring stations | 105 | 130 | 100 |
| Number of stations with value above 0.1 µg/L for an individual pesticide | 22 | 38 | 21 |
| Proportion of stations with value above 0.1 µg/L for an individual pesticide | 21.0 | 29.2 | 21.0 |
| Number of stations with value above 0.5 µg/L for a sum of pesticides | 5 | 10 | 9 |
| Proportion of stations with value above 0.5 µg/L for a sum of pesticides | 4.8 | 7.7 | 9.0 |

³⁷ <http://www.arso.gov.si/vode/podatki/>

Source: Slovenian Environment Agency

17 Agricultural holdings participating in organic production

Organic production constitutes a form and method of farming that is becoming increasingly important in the Slovenian agricultural area. Slovenia has varied natural resources with different types of regions, richness in terms of landscape division and a large share of high-mountain farms and other areas with limited possibilities for agricultural activity. This is the reason why it also has excellent possibilities for further and accelerated development of this farming method that significantly contributes to the provision of public goods, preservation of cultural agricultural landscape, preservation and improvement of biological diversity, protection of drinking water resources and, in general, the entire environment.

So far, the control of organic farms and increase of organic land is constantly growing, which is also expected in the next period. The need for larger quantities of products and organised participation on the market by raising awareness of consumers and producers is still present. In the current production, the grassland and livestock farming strongly prevails, although the highest consumer demand is for fresh vegetable and fruit, and non-meat processed products, i.e. mill and milk products.

Tables 15 and 16 show the number and proportion of farms participating in organic production, and proportion of agricultural land participating in the said production.

Table 16: Number and proportion of agricultural holdings participating in organic production

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|-------|-------|-------|-------|-------|
| Number of farms participating in organic production | 3,049 | 3,298 | 3,417 | 3,518 | 3,635 |
| Proportion of farms participating in organic production (%) | 4.1 | 4.6 | 4.76 | 5.0 | 5.2 |

18 Agricultural land participating in organic production

Table 17: Proportion of agricultural land participating in organic production

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|------|------|------|------|------|
| Proportion of agricultural land participating in organic production (%) | 8.4 | 8.7 | 8.7 | 9.03 | 9.6 |

19 Monitoring of adverse effects of PPPs on human health

Data on poisoning with PPPs (toxic vigilance) are collected at two levels in Slovenia. The National Institute for Public Health (NIJH) collects data at the level of in-patient treatment due to injuries and poisonings with PPPs.

On the other hand, the Clinical Pharmacology and Toxicology Centre at the Ljubljana University Medical Centre collects data about the emergency treatment cases.

- A. Data for hospitalisations at the level of in-patient treatment due to injuries and poisonings with PPPs are collected in the NIJH's database and are available at the NIJH's website (data portal).³⁸

Figure 13 shows the number of in-patient treatments due to poisonings with PPPs in the territory of Slovenia in the 2004–2016 period. The number of in-patient treatments of poisonings is declining in this decade, and has significantly declined in 2014 compared to 2004 and 2005.

³⁸ <http://www.nijz.si/sl/podatki>

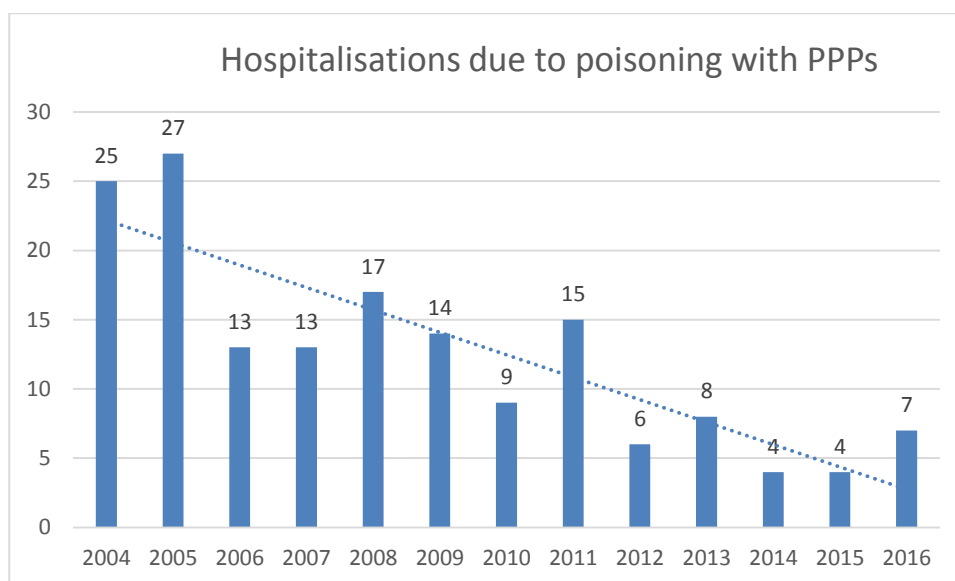


Figure 13: Number of hospitalisations due to poisoning with PPPs in the territory of Slovenia in the 2004–2016 period

Table 17 indicates data on the number of in-patient treatments of poisonings with PPPs by regions in the 2004–2016 period.

Table 18: Number of hospitalisations due to poisoning with PPPs by regions of residence in the 2004–2016 period

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|----------|----------|----------|----------|----------|
| SLOVENIA | 25 | 27 | 13 | 13 | 17 | 14 | 9 | 15 | 6 | 8 | 4 | 4 | 7 |
| Pomurska | 8 | 4 | 3 | 1 | 2 | 1 | 3 | 4 | 2 | 1 | 1 | | 1 |
| Podravska | 6 | 13 | 7 | 1 | 3 | 5 | 1 | 4 | 2 | 1 | 1 | 2 | 1 |
| Koroška | | | | | 1 | | | | | 1 | | 1 | |
| Savinjska | 2 | 4 | 2 | 2 | 3 | 1 | 1 | | | 1 | | 1 | |
| Zasavska | | | | | | | | | | | | | |
| Posavska | 1 | 1 | | 2 | 1 | | 1 | | 1 | 1 | 1 | | 1 |
| South-East Slovenia | 1 | 1 | | 1 | 3 | 2 | 2 | 3 | | 2 | | | 1 |
| Central Slovenia | 4 | 1 | 1 | 4 | | | | | | 1 | | | |
| Gorenjska | | 3 | | 1 | 2 | 1 | | 3 | | | | | |
| Primorsko-notranjska | | | | | 1 | | | 1 | 1 | | | | 1 |
| Goriška | 3 | | | 1 | 1 | 1 | | | | | 1 | | |
| Obalno-kraška | | | | | | 3 | 1 | | | | | | 2 |

Source: National Institute for Public Health

- B. Cases of emergency treatments by the Clinical Pharmacology and Toxicology Centre are gathered in Table 18.

For these data, only the cases (patients) that had clinical signs of poisoning, whereby it was possible to establish a connection between exposure to PPPs and clinical picture with a sufficient degree of probability were considered (exposures to PPPs without signs of poisonings were not considered).

Table 19: Number of urgent treatments of poisonings in the 2013–2017 period

| Number of urgent treatments of poisonings | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|-------------|-------------|-------------|-------------|-------------|
| Number of poisonings of workers professionally handling PPPs | 0 | 1 | 0 | 3 | 1 |
| Number of poisonings due to improper use of PPPs by users that are not professionally involved in agriculture | 13 | 7 | 13 | 7 | 8 |