No.: **U34335-17/2023**

Date: 15.12.2023

2018-2022

National Action Plan

for

Sustainable Use of PPPs

Final report for period 2018 – 2022

MAFF, AFSVSPP

Contents

[Introduction 3](#_Toc172027292)

[Targets in the NAP in the period 2018 – 2022: 3](#_Toc172027293)

[Placing on the market and use of PPPs 4](#_Toc172027294)

[Placing on the market PPPs containing active substances that are candidates for substitution 7](#_Toc172027295)

[Placing on the market of PPPs containing microorganisms 8](#_Toc172027296)

[Limiting the accessibility of PPPs for professional use to non-professional users 9](#_Toc172027297)

[Estimated quantities of illegal PPPs on the market 9](#_Toc172027298)

[Samples of agricultural produce and food with exceeded pesticide residues 10](#_Toc172027299)

[Groundwater and drinking water sampling 10](#_Toc172027300)

[Aerial spraying of PPPs 12](#_Toc172027301)

[PPP-application equipment 12](#_Toc172027302)

[Training on plant protection products of the PPP-users 13](#_Toc172027303)

[Integrated pest management (IPM) 15](#_Toc172027304)

[Assessment of extent of use of non-chemical plant protection methods 16](#_Toc172027305)

[Public Agricultural Extension Service 16](#_Toc172027306)

[Public Plant Health Service 17](#_Toc172027307)

[Official controls of PPPs 17](#_Toc172027308)

[Organic farming 18](#_Toc172027309)

[Estimation of results of all calculated risk indicators 19](#_Toc172027310)

[Trends and progress in achieving indirect goals 19](#_Toc172027311)

Tables

[Table 1: Risk indicator 1 movement 5](#_Toc161657863)

[Table 2: Risk indicator 2 movement 7](#_Toc161657864)

[Table 3: Placing on the market active substances – candidates for substitution in kg. 8](#_Toc161657865)

[Table 4: Placing on the market PPPs containing MOs in kg of AS 9](#_Toc161657866)

[Table 5: Number of samples in the national program and percentages of non-compliant samples 10](#_Toc161657867)

[Table 6: Number and proportion of water supply areas tested for pesticides in relation to all water supply areas (Source: mpv.si) 11](#_Toc161657868)

[Table 7: Number of water supply areas with exceeded value of an individual active substance, per statistical region (Source: mpv.si) 11](#_Toc161657869)

[Table 8: Statistics of PPP-application equipment inspections 12](#_Toc161657870)

[Table 9: Number of valid certificates on training in PPPs per year, and proportion of certificates issued to PPP-advisors, PPP-sellers and PPP-users. 13](#_Toc161657871)

[Table 10: The number of courses performed per year and per training program. 14](#_Toc161657872)

[Table 11: The total number of inspections; and the number and proportion of irregularities 17](#_Toc161657873)

[Table 12: The number of controls on PPP-users and the number of sanctions imposed on PPP-users in the period 2018 – 2022. 17](#_Toc161657874)

[Table 13: Proportion of organic farms and areas under organic production in Slovenia. 17](#_Toc161657875)

Graphs

[Graph 1: Risk indicator 1 movement 6](#_Toc161658225)

[Graph 2: Harmonised risk indicator 2 movement 7](#_Toc161658226)

[Graph 3: Sales of candidates for substitution in kg by year 8](#_Toc161658227)

[Graph 4: Sales of AS in PPPs containing MOs. 9](#_Toc161658228)

[Graph 5: The number of PPP-equipment in the Registry and the number of inspected PPP-equipment 13](#_Toc161658229)

[Graph 6: Declining trend in numbers of valid training certificates 14](#_Toc161658230)

Graph 7: Number of visits to the IPM Portal.………..………………..………………………………………………………………………..…15

Abbreviations

|  |  |
| --- | --- |
| AFSVSPP | Administration for Food Safety, Veterinary Sector and Plant Protection |
| EC | European Commission |
| EU | European Union |
| EUROSTAT | European Statistical Office |
| IPM | Integrated Pest Management |
| MAFF | Ministry of Agriculture, Forestry and Food |
| MOs | Microorganisms |
| NAP | National Action Plan for Sustainable Use of PPPs |
| PPPs | Plant Protection Products |
| RS | Republic of Slovenia |
| SORS | Statistical Office of the Republic of Slovenia |
| SUD | Sustainable Use Directive |

Based on point 8 of the National Action Plan to achieve sustainable use of plant protection products for the period 2012 – 2022, the Ministry of Agriculture, Forestry and Food adopted the

**Final report on the progress of reaching targets defined by National Action Plan to achieve sustainable use of plant protection products for the period 2018 – 2022.**

### Introduction

Act on Plant Protection Products (APPPs) (UL RS[[1]](#footnote-1) 83/12, 35/23) established the National Action Plan (hereinafter: NAP) to achieve sustainable use of plant protection products (PPPs). APPPs 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 (SUD).

The Government of the Republic of Slovenia adopted the NAP for the period 2012-2022 on 12 December 2012 (Decision No 34300-2/2012/3); and on 24 May 2018, the amendments to the NAP for the period 2018-2022 (Decision No 34300-1/2018/7). NAP documents (the NAP and reports) are published on the website of the Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection (hereinafter referred to as: AFSVSPP; in Slovenian: Uprava za varno hrano, veterinarstvo in varstvo rastlin (UVHVVR).[[2]](#footnote-2)

Based on SUD requirements, all the EU Member States had to publish their respective NAPs concerning the use of PPPs. Information on implementation of SUD in the respective EU Member States is available on the European Commission website, as from 2016.[[3]](#footnote-3)

This is the final report on implementation of the NAP in the period 2018-2022. The report consists of evaluation of the progress towards targets on reducing the use and risk of PPPs; and other related data concerning the training of users, sellers, and advisors, testing of PPP-application equipment, progress in organic farming, and similar.

### Targets in the NAP in the period 2018 – 2022:

Reducing possible impacts from the use of PPPs to human health and the environment was **a general target of the NAP.** More **detailed targets** included:

* Reducing the risk from the use of PPPs.
* Restricting the use of certain PPPs in public areas.
* Restricting the availability of PPPs to unprofessional users.
* Considering the possibilities for reducing risk arising from the use of PPPs containing the substances of concern, where there are alternatives available.
* Monitoring the risk and trends of pesticide residue quantities in food and feed from the EU Member States, third countries, and in domestic produce.
* Reducing the level of active substances harmful to health in drinking water, reducing the number of underground water measurement points where environmental quality standards regarding PPPs are exceeded, the monitoring of surface water pollution with PPPs.
* Promoting agricultural production using the principles of IPM in a way that chemical PPPs are used only when necessary or economically justifiable, especially by increasing the awareness of users as to the safe use of PPPs, promoting organic production and other environment friendly farming practices.
* Providing information to and training of PPP-users, inspecting PPP-application equipment, and promoting the use of advanced spraying techniques to reduce the risk arising from the use of PPPs.

### Placing on the market and use of PPPs

**PPP-use, and risk reduction evaluation trends**

The PPP-use and risk reduction trends are currently assessed indirectly, based on the turnover of PPPs, i.e. using two risk indicators calculated according to the EC methodology. The European Statistical Office (EUROSTAT) calculates risk indicators on an annual basis, using sales data sourced by the European Commission from the EU Member States.

Statistical Office of the Republic of Slovenia (hereinafter referred to as: SORS) gathers data on actual use of PPPs in the period 2010-2025 via sample research at certain intervals determined by the EU Regulation concerning statistics on pesticides. [[4]](#footnote-4) SORS had already collected the data on use of PPPs for years 2014 and 2017, whilst the research for 2023 is still under way. [[5]](#footnote-5) In accordance with the APPPs, professional users of PPPs are obliged to keep data on PPP-use for 3 years and submit them to the Competent Authority upon request, or during on-site inspections. Management and storage of data in electronic format had in the past not been required.

On 10 March 2023, Implementing Regulation (EU) 2023/564 of the European Parliament and of the Council as regards the content and format of the records of plant protection products kept by professional users pursuant to Regulation (EC) No 1107/2009 [[6]](#footnote-6) was published, laying down the mandatory electronic data keeping by professional PPP-users. Regulation shall apply as from 1 January 2026, allowing for certain national derogations by 2030, to create relevant online databases.

In 2023, the Ministry of Agriculture, Forestry and Food (hereinafter referred to as: MAFF) started preparing legislation relevant to the electronic PPP-use data management. Professional PPP-users shall have to adapt to these new requirements.

On 23 November 2022, Regulation (EU) 2022/2379 of the European Parliament and of the Council on statistics on agricultural input and output [[7]](#footnote-7) was published, laying down new requirements for data management on the use of PPPs in agriculture, as from 2025.

All the EU Member States will have to provide detailed statistics on the use of PPPs in agriculture annually, as from 2028, based on 95 % of the coverage in each reference year. However, there is a transitional period in place in 2026 during which Member States can provide data based on a sample survey, but under new coverage requirements.

**Trend evaluation calculating Risk indicator 1 and Risk indicator 2 (EUROSTAT)[[8]](#footnote-8)**

**EUROSTAT calculated risk indicators 1 and 2 for each Member State for the period 2011 – 2021. Indicators for 2022 had not been calculated up to the time of preparation of this report. The two indicators calculated for the Republic of Slovenia are shown hereinafter.**

**Risk indicator 1****: EUROSTAT** calculated Risk indicator 1 using sales data of active substances in PPPs and using analysis factors based on the properties of PPPs classified into 4 groups. Baseline is average PPP sales from 2011 to 2013, indexed by 100.

Table 1: Risk indicator 1 movement

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2011 – 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| Risk indicator 1 | 100 | 98 | 100 | 107 | 98 | 103 | 75 | 72 | 68 |

Graph 1: Risk indicator 1 movement

As from 2018, the turnover in PPPs has been decreasing in the Republic of Slovenia, along with the calculated risk indicator 1. From the starting value of 100 in the period 2011 – 2013, it decreased by 32 percent by 2021.

In 2021, we recorded the lowest PPP sales data in the entire official monitoring thereof. The main reason for lower sales and use is probably the drought in 2021, causing lower use of fungicides in permanent plantations. The use of fungicides in permanent plantations (orchards and vineyards) represents over 90 % of all fungicide use in Slovenia. Fluctuations in PPP sales depend on weather conditions in each growing season, pressure from harmful organisms, types of active substances in PPPs, and economic reasons.

However, the data should be evaluated with caution, as not all the PPPs sold have been used solely in agriculture. Certain active substances can also be used on other surfaces, for example for the maintenance of public surfaces, including roads and railways. All purchased quantities may not have been used in the same year, but may have remained in stock at the grower for use in the following year. We estimate that PPP use in agriculture is lower than the data on PPP turnover. SORS evaluated the actual use of PPPs, and a share of PPPs sold in agriculture for the year of 2014. SORS estimated that 71 % of active substances – fungicides, 56 % active substances – herbicides, and 65 % active substances – insecticides had been used in agriculture in 2014. [[9]](#footnote-9)

Sulphur contributes the largest share to the value of harmonized risk indicator 1 in the entire analysed period, representing more than 35 % of all chemical PPPs sold. Sulphur is used in much higher doses than other PPPs and therefore contributes a significant portion in the calculation of risk indicator 1. Copper, paraffin oil and potassium hydrogen carbonate together contribute around 9 % to the value of risk indicator 1.

Copper is a substance that is also a candidate for substitution, and we must therefore significantly reduce its use in accordance with the requirements of the "Farm-to-Fork" Strategy.

Sulphur, copper, paraffin oil and potassium hydrogen carbonate contribute more than 40 % to the sales figure of chemical PPPs.

These substances are used in organic farming and represent essential plant protection in cases where other alternatives for plant protection are not available.

Sales figures of substances like sulphur and copper should be analysed in a different way, using a different analysis factor. Plans for increasing surfaces under organic production are in contradiction with the PPP-use-reduction goals, particularly as regards the candidates for substitution.

**Risk indicator 2: EUROSTAT calculated Risk indicator 2 from the number of PPP emergency use authorisations issued in each year, adding analysis factors based on the properties of PPPs classified into 4 groups. The European Commission defined a starting value (index 100) as the average number of authorisations issued in the period 2011 – 2013.**

**Table 2 and Graph 2 show Risk indicator 2 movement.**

Table 2: Risk indicator 2 movement

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2011 – 2013 | | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| Risk indicator 2 | | 100 | 182 | 39 | 150 | 150 | 111 | 150 | 316 | 205 |

Graph 2: Harmonised risk indicator 2 movement

In the past, few PPP-emergency use authorisations were granted in the Republic of Slovenia. More authorisations were granted more recently. This is why Risk indicator 2 fluctuated greatly over the past years.

As from 2018, the total number of PPP-emergency use authorisations has increased, along with Risk indicator 2. In 2021, compared to baseline value of 100 from the period 2011 – 2013, it increased by 105 percent.

However, it should be noted that the PPP volumes from emergency authorisations are included in statistics for calculation of Risk indicator 1, and the number of authorisations as such does not necessarily imply an increased risk.

There are several reasons for an increase in the number of PPP-emergency use authorisations.

Fact is that Slovenia represents a small market, and that is reflected in gaps in regular PPP-authorisations due to a lack of interest on the side of PPP-authorisation applicants. Additionally, there are few new substances in PPPs approved at EU level; there apply strict conditions for renewal of existing PPP-authorisations in the EU, so there is a reduction in the numbers available on the market; there are few effective alternative non-chemical plant protection methods; and there is an ever-increasing pressure of harmful organisms, and of new types of harmful organisms, conditioned by the geographic location of Slovenia (along the Adriatic Sea and neighbouring on southern zone countries), in addition to global warming that is faster in Slovenia than the world average. In the period 1980 – 2021, global air temperature increased by approximately 0.8 degrees Celsius, and in Slovenia by 2.2 degrees Celsius.[[10]](#footnote-10)

In Slovenia, PPP-emergency use authorisations play an important role also in organic farming. In 2022, we granted 38 % of PPP-emergency use authorisations in organic farming, and 27 % in 2021.

### Placing on the market PPPs containing active substances that are candidates for substitution

The turnover in PPPs containing active substances (AS) that are candidates for substitution according to Regulation (EC) No 1107/2009 fluctuated over the past 5 years and was lower in 2022, as compared to previous years. In 2022, the turnover in these active substances amounted to 9 % less than the average turnover in the period 2017 – 2021.

Table 3: Placing on the market active substances – candidates for substitution in kg.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| All candidates for substitution (including Cu) | 77764.99 | 80367.03 | 78876.26 | 84761.44 | 81705.13 | 73022.64 |
| Copper (Cu) | 41212.77 | 38959.6 | 39875.67 | 38559.82 | 38793.66 | 37449.4 |
| Cu Percentage | 53.00 % | 48.48 % | 50.55 % | 45.49 % | 47.48 % | 51.28 % |

Graph 3: Sales of candidates for substitution in kg by year

The reason for fluctuation in use is the pressure of harmful organisms. The higher the incidence of pests, the more of these PPPs are used. Approximately half of the turnover in these substances are represented by copper products, which are widely used in organic farming. The turnover in substances that are candidates for substitution represents around 8 % of the total turnover in all active substances in PPPs.

### Placing on the market of PPPs containing microorganisms

Turnover in substances in PPPs, based on microorganisms (hereinafter referred to as: MOs), is growing slowly but constantly. However, it represents only a small share of the total turnover in PPPs. In 2022, it amounted to 0.11 %.

Reasons for the slow growth of the use of MO-based PPPs may among others be the high prices of products, poorer efficacy than chemical PPPs, and bad experiences from the past. The functioning mode of these PPPs differs from chemical PPPs, so the user of PPPs must have more knowledge and must precisely follow the use instructions. All these are reasons for user distrust in the efficacy of such PPPs.

PPP-authorisation holders or PPP-distributors in Slovenia have not been trying to expand the supply of MO-based PPPs, mostly because of Slovenia’s small market. AFSVSPP has for several years been trying to stimulate distributors to expand the supply, including by exempting them from paying the PPP-authorisation fee, when Slovenia is not a reporting country for the central zone (B zone), but with limited success. Because of the small turnover, producers are not recompensated for investing in the market.

Table 4: Placing on the market PPPs containing MOs in kg of AS[[11]](#footnote-11)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| MO in kg of AS | 219.93 | 438.48 | 586.39 | 1,028.40 | 940.83 | 971.58 |
| Part MO | 0.02 % | 0.04 % | 0.06 % | 0.10 % | 0.10 % | 0.11 % |

Graph 4: Sales of AS in PPPs containing MOs

### Limiting the accessibility of PPPs for professional use to non-professional users

The accessibility of PPPs for professional use to non-professional users is limited by national rules defining proper use of PPPs and criteria for dividing PPPs for professional and non-professional use.

In PPP-authorisation procedure, AFSVSPP issues a Decision that, in addition to other conditions for PPP placing on the market and use, lays down whether PPPs shall on the basis of defined criteria be sold for professional or non-professional use. AFSVSPP maintains a list of PPPs for non-professional use that is accessible via the AFSVSPP website.

Only sales points that are specialized in the sale of PPPs shall be authorised for sale of PPPs for professional use.

PPPs for professional use may be sold to buyers only, who present a PPP-training certificate that is valid at the time of purchase.

However, PPPs for non-professional use may be sold at other sales points as well, which deal in non-food goods, and the buyer does not need to present a valid PPP-training certificate in order to purchase such a product.

### Estimated quantities of illegal PPPs on the market

Unfortunately, there are also counterfeit and unauthorised PPPs in circulation, which are sold at a much lower price than the officially authorised PPPs. Such counterfeits are subject to criminal prosecution by the EC and the EU Member States. They are placed on the market for high earnings only, whilst their composition, efficacy and impact on health and the environment fail to meet the standards required by the law. They are mostly harmful, or completely ineffective.

In conducting the inspection and control of PPPs on domestic market, the AFSVSPP inspectors seized small quantities of unauthorized PPPs, which were estimated only, as certain packages had been opened and not full.

In 2020, 2 kgs of illegal PPPs were seized from the market, 15 kgs in 2021 from PPP-users, and 32 kgs in 2022 from a natural person (illegal trade). All the PPPs that were seized were submitted for destruction.

### Samples of agricultural produce and food with exceeded pesticide residues

Regulation (EC) 396/2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin regulates pesticide residues in food and feed in the EU.

Slovenia controls pesticide residues implementing a multi-year national control program, which is coordinated with the EU multi-year control program. Agricultural products and foods of plant and animal origin are sampled.

Table 5 shows the number of samples taken by year and the proportion of non-compliant samples. Samples taken were of Slovenian origin, EU-origin, and third-country origin.

Table 5: Number of samples in the national program and percentages of non-compliant samples[[12]](#footnote-12)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | 2018 | 2019 | 2020 | 2021 | 2022\* |
| No. of samples | 835 | 865 | 862 | 944 | 716 |
| Percentage of non-compliant samples | 2.5 % | 2.7 % | 3.9 % | 5.3 % | 2.1 % |

\* partial AFSVSPP report

Data of the period 2018 – 2021 were derived from national reports for the EU. Data for 2022 were taken from the partial AFSVSPP report that did not include all the national data, as the report for the EU had not been finalised to that date, and thus the number of samples was lower.

More details and explanations are available in annual reports on controls of pesticide residues, accessible via the AFSVSPP website.[[13]](#footnote-13)

### Groundwater and drinking water sampling

**Drinking water monitoring**

As from 2004, the Ministry of Health has been inspecting the compliance of drinking water, by regular drinking water monitoring system.

They check the compliance with the requirements, the purpose of which is to protect human health from harmful effects due to any pollution of drinking water.

Drinking water monitoring system was laid down by the Rules on Drinking Water (UL RS 19/04, 35/04, 26/06, 92/06, 25/09, 74/15, 51/17), (hereinafter referred to as: Drinking Water Regulation).

The purpose of monitoring is to verify the compliance of drinking water with the requirements of the Drinking Water Regulation. Drinking water shall meet the requirements set for limit values of parameters laid down in Annex I to Drinking Water Regulation, so as to protect human health from any harmful effects of contamination. Drinking water monitoring is carried out in accordance with a program that defines sampling frequency, sampling methods, and physical, chemical and microbiological testing. Drinking water sampling is carried out directly at users, and in places where water is used as drinking water.

Monitoring for pesticide residues was conducted at drinking water supply areas, where the presence may be expected on the basis of analysis results of previous years, and based on risk assessment.

Table 6 shows the number of all existing supply areas, the drinking water supply areas tested for the presence of pesticides, and the proportion of water supply areas tested in the period 2017 – 2022.

Table 6: Number and proportion of water supply areas tested for pesticides in relation to all water supply areas (Source: [mpv.si](http://mpv.si/))

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Number of all existing water supply areas | 866 | 858 | 858 | 873 | 870 | 868 |
| Water supply areas tested for pesticides | 81 | 218 | 90 | 33 | 41 | 25 |
| % of water supply areas tested for pesticides | 9.4 % | 25.4 % | 10.5 % | 3.8 % | 4.7 % | 2.9 % |

Of the pesticides monitored, only the values of desethylatrazine (DA) and bentazone were exceeded in individual years in the Pomurska, South-Eastern, Savinjska and Podravska regions (Table 7).

Concentration of desethylatrazine (DA) in groundwater and consequently in drinking water is continually decreasing. Desethylatrazine concentrations measured were, on average (median value), below 0.05 µg/l. In certain individual samples, the limit value of 0.10 µg/l was exceeded due to various factors, mainly hydrological, meteorological and geological.

Table 7: Number of water supply areas with exceeded value of an individual active substance, per statistical region (Source: [mpv.si](http://mpv.si/))

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Pomurska region | 0 | 2 (B)\* | 0 | 1 (B) | 1 (B) | 0 |
| South-Eastern region | 0 | 0 | 2 (DA)\*\* | 1 (DA) | 1 (DA) | 1 (DA) |
| Savinjska region | 1 (B) | 0 | 0 | 1 (DA) | 0 | 0 |
| Podravska region | 0 | 0 | 0 | 0 | 1 (DA) | 0 |

\*B = bentazone

\*\*DA = desethylatrazine

Under the Drinking Water Monitoring program, the monitoring of presence of all active substances, including atrazine and its degradation products, in water shall continue.

Data on drinking water monitoring and results are available on the Drinking Water Monitoring website[[14]](#footnote-14).

**Groundwater monitoring**

At relevant measuring points, the content of nitrates, pesticides, and industrial chemicals (solvents) is measured as part of chemical status monitoring of groundwater bodies.

Based on measurements, the Slovenian Environment Agency (ARSO) prepared an assessment of groundwater chemical status.

Chemical status of the Mura, Savinja, and Drava river basins is poor due to the presence of all the above parameters. In the Mura and Drava river basins, the presence of prohibited atrazine and its degradation product desethylatrazine are measured, and the values are showing a downward trend. More detailed information on groundwater monitoring is available on ARSO website: arso.gov.si/vode[[15]](#footnote-15).

### Aerial spraying of PPPs

In the Republic of Slovenia, aerial spraying of PPPs is prohibited by law, and it is not carried out. AFSVSPP has not granted any PPP-authorisations for aerial spraying thereof.

### PPP-application equipment

Inspection of PPP-application equipment, laid down by law as early as 1994, has been carried out in the Republic of Slovenia for many years.

The inspection system is well established and is regularly upgraded in line with new EU regulations and standards.

According to regulatory requirements, PPP-application equipment is regularly inspected every three years, except for new devices, which are inspected for the first time 5 years after the date of purchase.

Inspection is not mandatory for hand-held or backpack-borne sprayers, sprayers and devices intended for contact suppression of weeds, which are not used as tractor-mounted equipment (e.g. lubrication devices).

Authorised PPP-application equipment inspectors enter and maintain data on inspections electronically in the Registry of Inspected PPP-application Equipment, managed by AFSVSPP.

Table 8 shows the number of PPP-application equipment in the Registry, the number of inspected equipment and the proportion of inspected and compliant equipment per individual years.

Table 8: Statistics of PPP-application equipment inspections[[16]](#footnote-16)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| No. of equipment in the Registry | 17,988 | 18,636 | 17,978 | 16,758 | 17,090 | 16,373 |
| No. of inspected equipment | 8,372 | 1,368 | 7,325 | 6,638 | 1,985 | 6,648 |
| No. of compliant equipment | 8,312 | 1,347 | 7,278 | 6,577 | 1,972 | 6,619 |
| Proportion of inspected equipment | 46.54 % | 7.34 % | 40.74 % | 39.61 % | 11.61 % | 40.6 % |
| Proportion of compliant equipment | 99.28 % | 98.46 % | 99.36 % | 99.08 % | 99.35 % | 99.56 % |

We estimate that all PPP-equipment in use is entered in the Registry of inspected PPP-equipment. Their number fluctuates slightly, depending on the exchange of old devices for new ones. A slight downward trend may indicate a decrease in the number of professional PPP-users. The number of registered devices in use has from 2017 up to 2022 decreased by around 10 %.

Graph 5: The number of PPP-equipment in the Registry and the number of inspected PPP-equipment

The number of inspections fluctuates due to the 3-year interval in which the equipment must be inspected, and thus changes every third year.

The share of compliant equipment is very high. Around 99 % of equipment successfully passes the first and second inspections. Equipment that is found non-compliant during inspection is required to be submitted to repair. Upon repair, the inspector issues a certificate and affixes a label on the device as proof of compliance.

### Training on plant protection products of the PPP-users

Like the inspection of PPP-application equipment, the training of professional PPP-users, PPP-sellers and PPP-advisors is a long-established system.

All the PPP-advisors, PPP-sellers and PPP-professional users shall have completed the basic training and shall regularly attend the refresher courses so as to renew the validity of their respective training certificates.

At training courses, the contents covered shall include applicable legislation implementing the requirements of Directive 2009/128/EC on sustainable use of PPPs.

Table 9: Number of valid certificates on training in PPPs per year, and proportion of certificates issued to PPP-advisors, PPP-sellers and PPP-users[[17]](#footnote-17).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| No. of valid certificates | 58,795 | 56,908 | 54,934 | 54,161 | 54,754 | 52,789 |
| Proportion of PPP-advisors | 0.91 % | 0.96 % | 1 % | 1.01 % | 1.02 % | 1.07 % |
| Proportion of PPP-sellers | 1.28 % | 1.34 % | 1.39 % | 1.44 % | 1.52 % | 1.44 % |
| Proportion of PPP-users | 97.81 % | 97.71 % | 97.61 % | 97.55 % | 97.45 % | 97.49 % |

The number of valid training certificates is on a downward trend. In 2022, there were around 10 % fewer valid certificates entered in the Registry, as compared to 2017, mainly due to a decreased number of certificates for PPP-users. This trend is comparable to the declining trend in the number of inspected PPP-application equipment, which is also around 10 %. This could mean a declining trend in the number of farmers in intensive agricultural production.

Graph 6: Declining trend in numbers of valid training certificates

Certificates have a 3-year validity for PPP-advisors and PPP-sellers, and a 5-year validity for PPP-users. The number of mandatory training courses for prolongation of certificate validity thus varies from year to year.

Table 10: The number of courses performed per year and per training program[[18]](#footnote-18).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Number of courses for professional users | 131 | 265 | 451 | 218 | 294 | 156 |
| Number of courses for PPP-sellers | 14 | 8 | 18 | 11 | 17 | 14 |
| Number of courses for PPP-advisors | 7 | 5 | 5 | 7 | 5 | 5 |
| TOTAL | 152 | 278 | 474 | 236 | 316 | 175 |

### 

### Integrated Pest Management (IPM)

Integrated Pest Management (hereinafter referred to as: IPM) means the systematic and planned control of harmful organisms and combines various plant protection approaches into a comprehensive, sustainable program, based on a combination of preventive measures, low-risk methods, and the use of PPPs. The aim of IPM is reducing the risk to the economy of agricultural production, to human health and to the environment.

IPM includes eight essential principles laid down in the EU legislation:

- Prevention and suppression of harmful organisms with agrotechnical measures,

- Monitoring and forecasting of harmful organisms,

- Deciding on measures based on pest control thresholds and local factors,

- Preferred choice of non-chemical methods of controlling harmful organisms,

- Selection of PPPs with specific mode of action and lower impact on the environment and health,

- Use of PPPs at lower doses while simultaneously preventing the resistance of harmful organisms,

- Prevention of the resistance of harmful organisms by using different PPPs,

- Keeping records of implemented IPM measures and checking their effectiveness.

On account of focused professional work of the public agricultural extension service, the public plant health service, and expert work at agricultural institutes and centres of long-standing operation, the basic IPM principles are applied in most cultivated areas.

In addition to the basic IPM principles, Slovenia is also developing voluntary specific IPM guidelines for individual cultivated plants.

All the IPM guidelines are published on the website: ivr.si[[19]](#footnote-19), as a collection of expert contributions from agricultural faculties, institutes and centres in Slovenia, which are involved in plant protection.

Graph 7: Number of visits to the IPM Portal

Expert work and the IPM-website are financed by AFSVSPP. PPP-users can additionally get expert advice in person, or by phone, from the Public Agricultural Extension Service, and Public Plant Health Service.

### Assessment of extent of use of non-chemical plant protection methods

Non-chemical plant protection methods have been most successful in controlling the weeds and insects. Unlike in the past, growers have more recently been using a combination of mechanical measures (for example, dominating hoeing or combing crops) and herbicides for controlling the weeds. Mechanical weed control by hoeing is a common supplementary measure in the production of corn, soybeans, sunflowers, oil pumpkins and potatoes (performed by 40-60 % of market growers). In cereal production, growers often perform mechanical weed control by combing the crop (up to 30 % of the crop). In hops cultivation, growers do not use herbicides (100 %); they regulate weed vegetation by more frequent mechanical tillage and by companion planting. And, the excess hop shoots are removed manually, i.e. non-chemically.

In the cultivation of vegetables, growers use less herbicides for weed control (up to 30 % of areas). Instead of herbicides they most often use different cover foils and frequent mechanical tillage. They use insect nets and agriculture textile coverings to protect crops from pests. Up to 60 % of market growers regularly use various bio stimulants (algae, amino acids). Beneficial organisms (20 % of areas) are used as pest control at cultivation in sheltered areas (e.g. thrips, mites, greenhouse whitefly).

In the cultivation of berries and small fruits, growers cover the soil with various foils against weeds. In the last two years, growers have also been growing berries and small fruits in pots or bags; 50-60 % of growers use nets and food traps against insects.

Growers have been reducing the use of herbicides also in orchards and vineyards. When used, herbicides are only applied in a belt under fruit trees or vines, and the space between the rows is mowed or mulched. Larger market growers regularly use pheromone baits and coloured sticky boards (e.g. white for monitoring sawflies, yellow for cherry fruit fly) to monitor the occurrence and abundance of the most common pests. Pest control is then decided based on monitoring pest development and pest control thresholds.

Increasingly, biological PPPs and methods of confusion are used in pest control. Growers are not deciding on using the basic substances, plant extracts and MO-based PPPs more frequently because of a limited supply on our market, and due to concerns as to their efficacy as opposed to chemical PPPs, and bad experiences at use of such products in the past. Stone fruit and berry growers rarely decide on purchasing and using insect nets, mainly due to a high cost of nets and their installation.

Market growers combine various non-chemical plant protection methods with chemical methods (depending on a year and pest pressure in each individual year). At least 60 % of market growers have implemented more than 1 non-chemical plant protection method per year, per crop or plantation.

### Public Agricultural Extension Service

Public Agricultural Extension Service has been operating in Slovenia for many years. It is organized within the framework of the Agriculture and Forestry Chamber of Slovenia and divided by regions. In accordance with their work program, agricultural advisors provide expert support in monitoring activities related to harmful organisms. They also advise on the correct use of PPPs, based on the principles of good plant protection practice, and consistent with the general IPM principles.

### Public Plant Health Service

Public Plant Health Service, organised by AFSVSPP, carries out tasks of monitoring, observation and forecasting the occurrence of plant diseases and pests (prognosis of harmful organisms).

As part of the forecast, the Public Plant Health Service advises the growers and directs them regarding the appropriate protective measures to control plant diseases and pests through prognostic notifications[[20]](#footnote-20). Forecasts are available free of charge on the Agrometeorological portal of Slovenia and on the websites of authorized institutes and centres. The service users can order free forecasts on the protection of vineyards, orchards, vegetables, or arable crops, and receive them per e-mail or SMS message.

In disease and plant pest forecasting, the Public Plant Health Service uses a variety of pest monitoring tools, from spore traps, light baits, pheromone baits, food baits, sticky boards, to the novel remote monitoring techniques (Trapview) [[21]](#footnote-21). A variety of hardware, software and other equipment is also needed to enable the measurement of various parameters, the collection and analysis, and the availability of data and measurements.

Measurements are provided from several agrometeorological stations, reasonably distributed in areas of Slovenia with most intensive agricultural production. Their locations, and measurement and observation data in each area are accessible to the public via the Agrometeorological Portal of Slovenia[[22]](#footnote-22).

As from 2021, AFSVSPP provides for the funding of institutes and centres involved in Public Plant Health Service so as to carry out many professional tasks for developing the alternative plant protection methods and techniques (i.e. IPM demonstration experiments). To this end, the Public Plant Health Service has been strengthened in terms of personnel. At various meetings and in various ways, Public Plant Health Service experts transfer the results of professional experiments and tasks to experts of other services in agriculture and to growers. Results of professional tasks are published on the IPM Portal.

According to assessments, all the PPP-users are regularly benefitting from the advice and information presented by Public Plant Health Service and Public Agricultural Extension Service.

### Official controls of PPPs

The AFSVSPP Phytosanitary Inspectors carry out the official controls of PPPs. They verify the compliance of PPPs on the market with the marketing authorisation. At PPP-distributors, they check compliance with registration in the register of distributors, personnel, premises, and record-keeping on PPP-sales. At PPP-professional users, they check PPP-use record-keeping (electronic record-keeping of PPP-use was not mandatory in that particular period in Slovenia), implementation of IPM, PPP-user training certificates, certificates and labels from inspection of PPP-application equipment, storage areas for PPPs, handling empty packages and remnants of PPPs, labels on the packaging of seed materials, and sampling of green parts of plants before technological maturity, thereby verifying the correct use of PPPs. Inspectors also verify the implementation of inspections of PPP-application equipment, and the implementation of trainings of PPP-advisors, PPP-sellers and PPP-professional users. Inspectors act depending on the nature and severity of the identified irregularity; they may issue an administrative inspection decision, a decision on a misdemeanour, a warning in accordance with the legislation on misdemeanours, or a payment order.

Data on all inspections and irregularities identified are shown in Table 11. Data for 2020 and 2021 deviate from the average on account of the Covid-19 virus pandemic. There were fewer inspections in 2021, but they were more targeted at irregularities detected in previous years and during other types of control, what resulted in a higher number of irregularities detected in 2021.

Table 11: The total number of inspections; and the number and proportion of irregularities[[23]](#footnote-23)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | 2018 | 2019 | 2020 | 2021 | 2022 |
| Total inspections | 3,292 | 1,224 | 686 | 695 | 2,036 |
| Total irregularities | 401 | 237 | 127 | 194 | 239 |
| Proportion of irregularities | 12.18 | 19.36 | 18.51 | 27.91 | 11.74 |

Most irregularities detected at PPP-users involve the record-keeping of use of PPPs. Table 12 shows data on the number of inspections conducted, and sanctions imposed on PPP-users.

Table 12: The number of controls on PPP-users and the number of sanctions imposed on PPP-users in the period 2018 – 2022.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | 2018 | 2019 | 2020 | 2021 | 2022 |
| Controls at PPP-users | 2,544 | 845 | 442 | 469 | 927 |
| Sanctions | 48 | 72 | 61 | 30 | 14 |
| Proportion of sanctions | 1.89 % | 8.52 % | 13.80 % | 6.40 % | 1.51 % |

### Organic farming

Organic farming is a form and method of farming that is slowly gaining importance in the Slovenian agricultural area. The share of organic farms is slowly increasing (by 2% from 2012 to 2022) and the share of areas under organic production (by 3.4% from 2012 to 2022).

Table 13: Proportion of organic farms and areas under organic production in Slovenia.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 2012 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Proportion of organic farms | 3.60 % | 5.40 % | 5.40 % | 5.40 % | 5.50 % | 5.60 % |
| Proportion of organic land | 7.60 % | 10.02 % | 10.40 % | 11 % | 11 % | 11 % |

In view of slow growth of organic production, and in view of the EU's commitments under the Green Deal, the Ministry of Agriculture, Forestry and Food (MAFF) commissioned an analysis of organic food market in the Republic of Slovenia[[24]](#footnote-24). To promote the development of organic production, MAFF prepared an Action Plan for the development of organic farming by 2027[[25]](#footnote-25), involving all the stakeholders in its preparation. The Action Plan introduces a series of measures and incentives to increase the share of agricultural land under organic production to 18 % of all agricultural land by 2027.

In the past decade, organic food market has developed significantly in Slovenia, achieving high annual growth of 10 – 15 %. Retail chains constitute the most important organic-food sales channels, through which the majority of all organic food is sold.

Imported organic food still predominates. Slovenian organic food accounts to around 15 % and, being of high quality, it is more expensive than imported organic food. This is a problem for the market and the consumer. Slovenia depends too much on seasonal organic food supply as there is no all-year-round production. This further contributes to greater imports of organic food. Most challenging is the small-range supply of Slovenian organic fruit and vegetables, primarily due to inadequate interlinks between Slovenian organic producers. Collective presence on the market would facilitate delivering greater and more constant quantities of organic food to the market.

To increase Slovenian organic food supply, it is crucial that as many existing organic farms as possible remain involved in organic controls. Conventional farms should be encouraged to convert to organic production. Such farms should be highly market-oriented to increase turnover in Slovenian organic food and agricultural products.

### Estimation of results of all calculated risk indicators

**Trends and progress in achieving national objectives of reducing risks from use of PPPs**

The use of PPPs in Slovenia, estimated with calculated risk indicator 1 from sales of PPPs, fluctuates between years, depending on occurrence of harmful organisms. Nevertheless, indicator 1 shows a downward trend in relation to initial reference period (average sales between 2011 – 2013, indexed as 100), decreasing by 32 % in 2021.

On the other hand, risk indicator 2 increased in relation to initial reference period, by 105 % in 2021. Reasons include the unexpected and excessive occurrence of harmful organisms, the complex and time-consuming PPP-authorisation system that does not follow the occurrence of harmful organisms. Thus, users apply for PPP-emergency authorisations. Negative climate change impacts are seen in agriculture. High temperatures and unpredictable weather conditions stimulate the development of pests. Additionally, new pests are evolving through the free global market.

Quantities of PPPs sold under PPP-emergency authorisations are included in the PPP-sales statistics and in calculation of risk indicator 1. It can be affirmed that PPP-sales in Slovenia have a significant downward trend.

The sale of PPPs containing substances - candidates for substitution also has a downward trend. Compared to the average sales in the period 2017 – 2021, it decreased by 9 % in 2021.

Approximately one half of sales of these substances constitute the copper-based products, which are also used in organic farming. Effective alternative plant protection methods should be developed to phase out the use of copper-based PPPs. Existing alternative methods, especially for organic production, are not effective enough.

### Trends and progress in achieving indirect goals

All PPP-users are involved in sustainable PPP-training system that is well established in Slovenia and has been prepared and conducted for many years. To extend the validity of their respective training certificates, PPP-users regularly participate in refresher courses, to familiarise themselves with new developments in this particular area of expertise, and to augment their knowledge and skills.

Inspection of PPP-application equipment has been in place during the same period.

It can be affirmed that all PPP-application equipment in use is included in the inspection system with relevant certificate-granting system.

On introduction of mandatory PPP-application equipment inspections, technical integrity of PPP-application equipment subjected to inspections immediately improved. Devices requiring repair shall first be repaired in order to be eligible for granting a certificate at second inspection. In general, inspection of PPP-application equipment has positively impacted the overall quality of such devices.

It can be affirmed that all PPP-users are regularly making use of the advice and information provided by the Public Agricultural Extension Service and Public Plant Health Service. These services are well-established in the long-standing practice in their respective areas of expertise, as they have been providing useful advice and conducting for a number of years. Information is made easily accessible to growers, who regularly apply the essential IPM principles. The downward trend in PPP-sales, decreasing numbers of PPP-application equipment, and decreasing numbers of valid training certificates require close monitoring, as they may imply that the number of growers in intensive agricultural production is decreasing in Slovenia. Numbers of producers in intensive agricultural production may decrease as well, due to a possible increase in the number of producers in organic production. It should be borne in mind that Slovenia is not self-sufficient in food production and is heavily dependent on food imports, except for milk and meat production.

1. UL RS – *Uradni list Republike Slovenije* – Official Gazette of the Republic of Slovenia [↑](#footnote-ref-1)
2. <http://www.uvhvvr.gov.si/si/delovna_podrocja/fitofarmacevtska_sredstva/nacionalni_akcijski_program/> [↑](#footnote-ref-2)
3. <https://ec.europa.eu/food/plant/pesticides/sustainable_use_pesticides_en> [↑](#footnote-ref-3)
4. Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides [↑](#footnote-ref-4)
5. <https://pxweb.stat.si/SiStat/sl> [↑](#footnote-ref-5)
6. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32023R0564> [↑](#footnote-ref-6)
7. <https://eur-lex.europa.eu/eli/reg/2022/2379/oj> [↑](#footnote-ref-7)
8. [Risk indicators for monitoring progress in the reduction of risk and adverse impacts of plant protection products | GOV.SI](https://www.gov.si/en/topics/risk-indicators-for-monitoring-progress-in-the-reduction-of-risk-and-adverse-impacts-of-plant-protection-products/) [↑](#footnote-ref-8)
9. <https://www.stat.si/StatWeb/News/Index/6258> [↑](#footnote-ref-9)
10. ARSO: Poročilo o okolju v Republiki Sloveniji 2022 / Slovenian Environment Agency (ARSO): 2022 Report on the environment in the Republic of Slovenia [↑](#footnote-ref-10)
11. Data source: AFSVSPP [↑](#footnote-ref-11)
12. Data source: AFSVSPP [↑](#footnote-ref-12)
13. [Ostanki fitofarmacevtskih sredstev | GOV.SI](https://www.gov.si/teme/ostanki-fitofarmacevtskih-sredstev/) [↑](#footnote-ref-13)
14. [mpv.si](http://mpv.si/) [↑](#footnote-ref-14)
15. [Podzemne vode (gov.si)](https://www.arso.gov.si/vode/podzemne%20vode/) [↑](#footnote-ref-15)
16. Data source: AFSVSPP [↑](#footnote-ref-16)
17. Data source: AFSVSPP [↑](#footnote-ref-17)
18. Data source: AFSVSPP [↑](#footnote-ref-18)
19. [Integrirano varstvo rastlin - IVR](https://www.ivr.si/) [↑](#footnote-ref-19)
20. <https://agromet.mkgp.gov.si/APP2/Prognostika/Index/-> [↑](#footnote-ref-20)
21. [Pest Monitoring and Forecasting - Trapview - Integrated Pest Management](https://trapview.com/) [↑](#footnote-ref-21)
22. [Agrometeorološki portal Slovenije (gov.si)](http://agromet.mkgp.gov.si/APP2/sl/Content/plant-health#:~:text=Javna%20slu%C5%BEba%20zdravstvenega%20varstva%20rastlin%20izvaja%20naloge%20s,varstvenim%20ukrepom%20za%20obvladovanje%20bolezni%20in%20%C5%A1kodljivcev%20rastlin.) [↑](#footnote-ref-22)
23. Data source: AFSVSPP [↑](#footnote-ref-23)
24. [ANALIZA-TRGA-EKO-ZIVIL-V-RS\_koncno-porocilo\_prilagojeno.docx (live.com)](https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.gov.si%2Fassets%2Fministrstva%2FMKGP%2FPODROCJA%2FKMETIJSTVO%2FEkolosko_kmetovanje%2FAnaliza-trga-z-ekoloskimi-zivili-v-Republiki-Sloveniji-%2FANALIZA-TRGA-EKO-ZIVIL-V-RS_koncno-porocilo_prilagojeno.docx&wdOrigin=BROWSELINK) [↑](#footnote-ref-24)
25. <https://www.gov.si/assets/ministrstva/MKGP/Dokumenti-/ANEK/ANEK_eng.pdf> [↑](#footnote-ref-25)