Analysis of trends, priority and good practices in the context of harmonised risk indicators under Directive 2009/128/EC
Republic of Bulgaria

Harmonised Risk Indicator 1 (HRI1): The first Harmonised Risk Indicator is based on data on the quantities of active substances placed on the market in plant protection products (PPPs) under Regulation (EC) No 1107/2009 belonging to the groups defined in Commission Directive (EU) 2019/782 of 15 May 2019 amending Directive 2009/128/EC of the European Parliament and of the Council as regards the establishment of harmonised risk indicators.

Figure 1: Harmonised Risk Indicator 1 – Evaluation of the overall weighted index, with a baseline of 100, averaged over the period 2011-2013

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
BG HRI1, 2011-2023	231	41	27	23	63	112	91	162	164	114	88	59	48

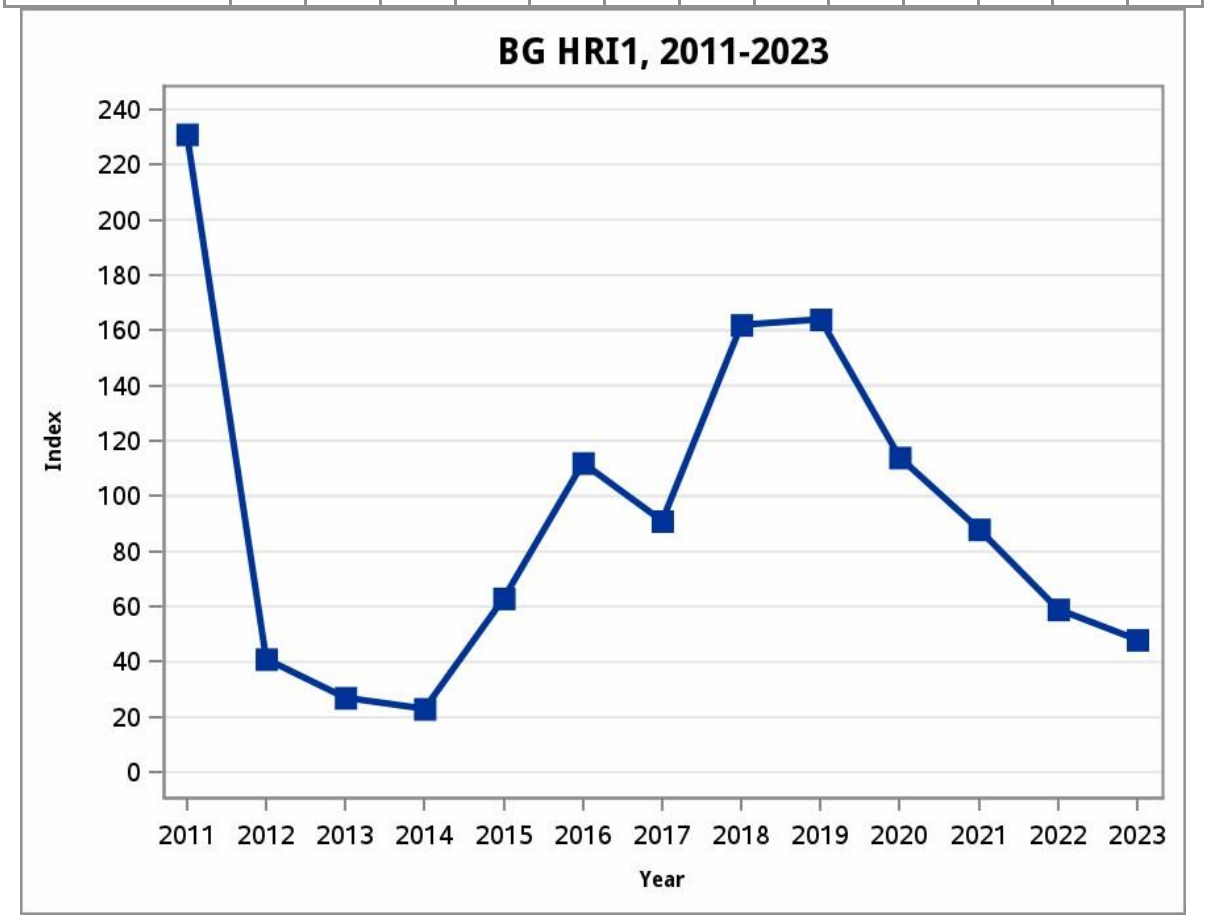
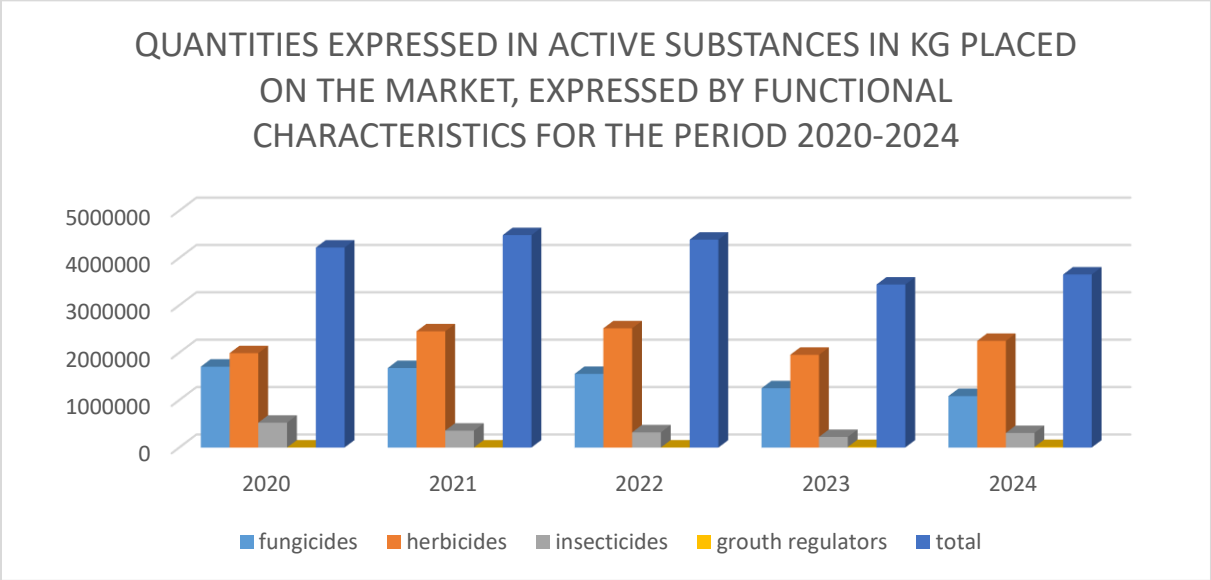


Figure 2: Quantities of PPPs placed on the market, expressed by functional characteristics for the period 2020-2024



Herbicides are the most widely used category of PPPs and they are the most marketed PPPs by volume over the years.

1. Analysis of the course of the curve:

The curve presents the trends in PPPs placed on the market for the period 2011-2023.

The trend of the curve shows a stable trend towards a significant reduction of PPPs placed on the market for the period 2019-2023.

Large quantities of active substances, expressed in kilograms and litres, e.g. glyphosate, were provided for 2011. The peak of the curve is due to the fact that a number of active substances placed on the market are highly hazardous, as they were notified in 2011 under Directive 91/414 EEC. In accordance with the legislation in force in 2011, PPPs containing notified active substances were authorized for three years. For this reason, such active substances have been identified as risky.

From 2012 to 2015, the data provided to Eurostat were incomplete and unrepresentative. During this period, data on PPPs placed on the market were submitted only by some companies, with the largest ones not providing them. For this reason, we refrain from analysing for this period. When voting on Directive 2019/782, the Republic of Bulgaria expressed its position of disagreement with the approach that the basis for calculating the quantities of PPPs placed on the market expressed as the quantity of active substance should be determined on the basis of the data for 2011-2013, for the following reasons:

- According to Regulation (EC) No 1185/2009, the first reference period for submission of the data on the active substances placed on the market shall be the second calendar year after 30-th of December 2009, thus making the information gathered for the first year of the application of this Regulation (i.e. 2011 through 2013) largely incomplete and not corresponding the actual quantities.

- At present, not any harmonized EU approach has been achieved under Regulation (EC) No 1185/2009 not only as regards gathering reliable statistical data about the actual use of PPPs (as it is mentioned in point 6 of the Preamble of the draft Directive in question), but there is also no such harmonized approach to PPPs placed on the market and therefore there is no reliable data.

For this reason, the Republic of Bulgaria proposes to designate the time period 2016-2018 as a reference period, taking into account that this is the 3-years period prior to the adoption of the Directive amending Directive 128/2009 on the introduction of harmonized risk indicators.

2. Data analysis for the period 2020-2023:

There is a trend of a significant decrease in the curve which is due to:

- Restricting usage of PPPs that are candidates for substitution;
- Increasing usage of low-risk plant protection products in agriculture;
- Low rainfall and high temperatures make it necessary to reduce the use of PPPs in certain crops (fruit crops and vineyards). This is one of the reasons for the reduction in the quantities of fungicides placed on the market during that period;
- Economic reasons are also a factor influencing this trend;
- Part of the quantities of PPPs placed on the market may not be used in the current year and may remain for use in the following year.

3. Active substances placed on the market in the largest quantity

For the period 2020-2024, the active substances placed on the market in the largest quantities were again glyphosate (herbicide), s-metolachlor (herbicide), sulphur (fungicide), tebuconazole (fungicide), copper compounds (fungicide), azoxystrobin (fungicide), pendimethalin (herbicide), terbuthylazine (herbicide), cypermethrin (insecticide).

Figure 3: Quantities of PPPs placed on the market in the largest quantity, expressed in active substances and the crops on which they are applied for the period 2020-2024.

	PLACED ON THE MARKET IN THE LARGEST QUANTITY (KG), EXPRESSED IN THE ACTIVE SUBSTANCE AND CULTURES IN WHICH THEY APPLY FOR THE PERIOD 2020-2024								
	ACTIVE SUBSTANCE	**type**	**2020**	**2021**	**2022**	**2023**	**2024**	**Average amount**	**Cultures**
1	**GLYPHOSATE**	**herbicide**	1091310	1239635	1285501	921213	1145358	1136603	**fruit species, vines, cereals, vegetables**
2	**S-METOLACHLOR**	**herbicide**	139948	222754	275851	247289	254973	228163	**cereals, potatoes, tobacco, vegetables, vines, apples**
3	**SULPHUR**	**fungicide**	187612	160041	282404	214159	139478	196739	**vines, potatoes, tobacco, vegetables, cereals**
4	**TEBUCONAZOLE**	**fungicide**	171575	194556	221806	188157	184546	192128	**vines, cereals**

5	**COPPER COMPOUNDS**	**fungicide**	187501	161209	165479	63682	115611	138696	**vines, potatoes, fruit crops, vegetables**
6	**AZOXISTROBIN**	**fungicide**	86640	135676	162955	173693	110680	133929	**oilseeds, cereals**
7	**PENDIMETALIN**	**herbicide**	114351	152911	131458	80371	113994	118617	**cereals, potatoes, tobacco, vegetables, vines, apples**
8	**TERBUTYLAZINE**	**herbicide**	66863	107841	124059	110925	111908	104319	**maize, sunflower**
9	**ALUMINUM PHOSPHIDE**	**insecticide**	69851	75814	65895	53082	117246	76378	-
10	**PARAFFIN OIL**	**insecticide**	57036	109422	87040	56388	60512	74080	**vines, fruit crops**
11	**CYPERMETHRIN**	**insecticide**	138272	71949	67145	38169	46777	72463	**cereals, vines, vegetables**
12	**FOSETYL - ALUMINIUM**	**fungicide**	62041	91160	70790	62463	62719	69835	**vines, fruit crops, vegetables**

➢ Plant protection products containing glyphosate are the most widely used pesticides on the market. The high dose of application per unit area is one of the reasons for the leading position of this active substance. Products containing glyphosate are among the most used worldwide. It allows farmers to achieve long-term control over a wide range of weeds.

Plant protection products containing glyphosate are classified as second professional category products.

In order to ensure a greater level of safety, the following restrictions on use are introduced when authorising PPPs containing glyphosate:

- Not to be applied on areas used by the general public or by vulnerable groups as defined in Article 3 of Regulation (EC) No 1107/2009, such as public parks and gardens, sports and recreation grounds, school and children's playgrounds, as well as in the immediate vicinity of health or educational establishments;

- Not to be applied in protection zones defined in the Act on waters or other areas defined by an order of the Minister of Environment and Water.

➢ The second most important group for the period 2020-2024 are PPPs containing the active substance S-metolachlor, selective herbicides for the control of annual grasses and certain broadleaf weeds, widely used in cereal, legumes, and industrial crops, including vegetables. Commission Implementing Regulation (EU) 2024/20 of 12 December 2023 does not renew the active substance S-metolachlor and, in that context, the BFSA withdraws authorisations for all plant protection products containing that active substance by setting a grace period for the sale, storage, use and disposal of existing stocks of those products until 23 July 2024.

➢ Tebuconazole is the most widely used fungicide to prevent and control nearly 30 diseases in various crops in agriculture. It is a highly effective, broad-spectrum and systemic triazole fungicide. Due to its high motility, the fungicide quickly moves to the site of accumulation of parasitic fungi, destroys infection and provides long-term protection to crops, destroying pathogens both on the surface and inside the grain. It is compatible with many insecticides and

fungicides used for seed treatment and foliar use in various crops.

➢ Among the ten active substances with the highest market share are sulfur and copper compounds, which are also used in organic farming.

Sulfur does not present a risk due to its low toxicity. It is on the list of substances for which there is no need to set an MRL under Regulation (EC) No 396/2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin.

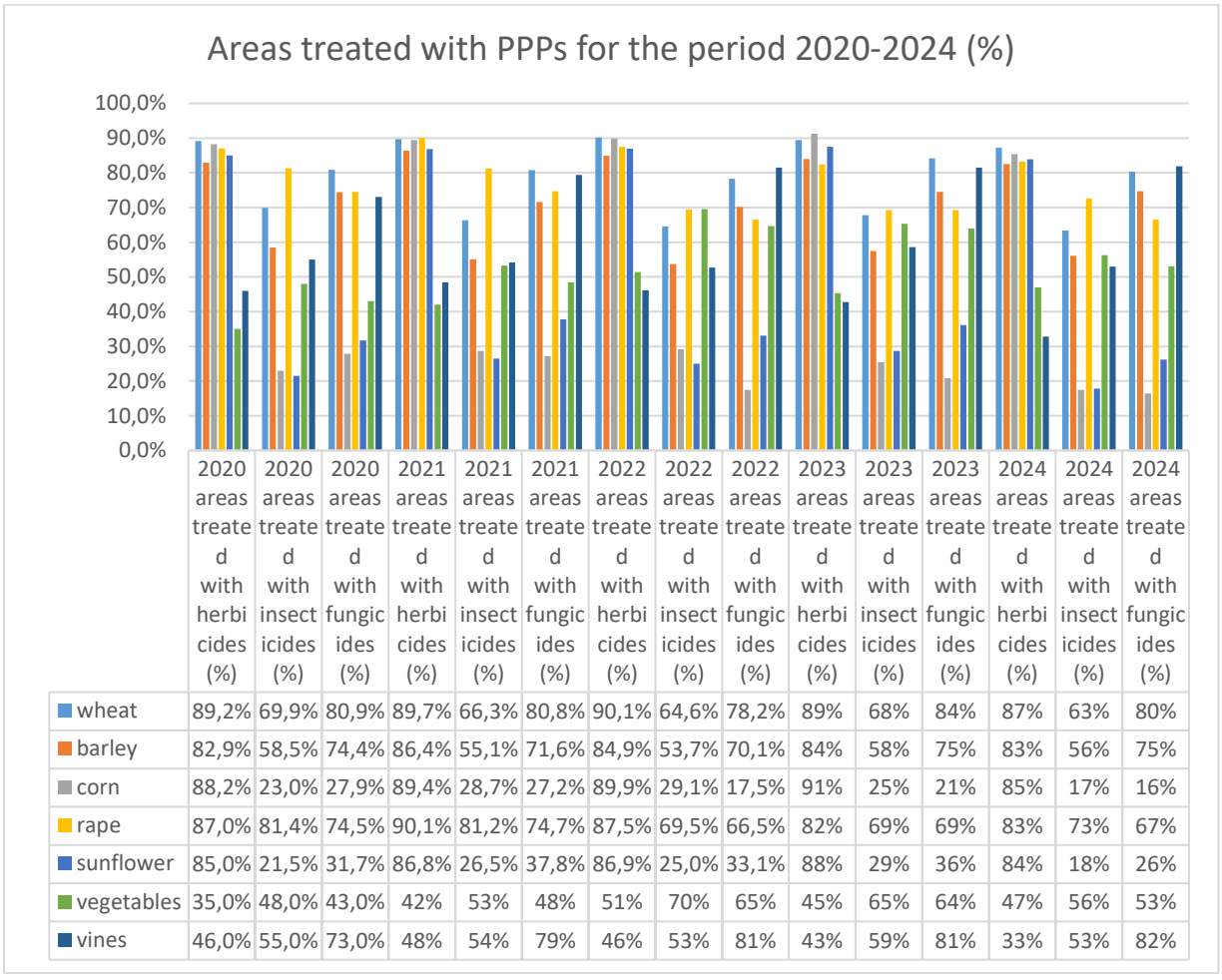
PPPs containing copper compounds are used to combat a wide range of fungal and bacterial diseases and are also used in organic farming to combat these diseases. In cases of bacterial diseases, copper compounds are often the only solution, whether in organic or conventional agriculture.

Plant protection products containing copper compounds and sulphur are used at higher doses and in a large number of crops, which is a prerequisite for the use of higher quantities of these active substances.

➢ There has been an increase in the quantities of PPPs placed on the market containing the active substance azoxystrobin due to its broad spectrum of action in a large number of crops and its high effectiveness in fungal diseases.

4. Treated areas with PPPs of main agricultural crops according to data from the Ministry of Agriculture and Food.

Figure 4: Treated areas with PPPs of agricultural crops for the period 2020-2024 in %



	2020 areas treated with herbicides (%)	2020 areas treated with insecticides (%)	2020 areas treated with fungicides (%)	2021 areas treated with herbicides (%)	2021 areas treated with insecticides (%)	2021 areas treated with fungicides (%)	2022 areas treated with herbicides (%)	2022 areas treated with insecticides (%)	2022 areas treated with fungicides (%)	2023 areas treated with herbicides (%)	2023 areas treated with insecticides (%)	2023 areas treated with fungicides (%)	2024 areas treated with herbicides (%)	2024 areas treated with insecticides (%)	2024 areas treated with fungicides (%)
wheat	89,2%	69,9%	80,9%	89,7%	66,3%	80,8%	90,1%	64,6%	78,2%	89%	68%	84%	87%	63%	80%
barley	82,9%	58,5%	74,4%	86,4%	55,1%	71,6%	84,9%	53,7%	70,1%	84%	58%	75%	83%	56%	75%
corn	88,2%	23,0%	27,9%	89,4%	28,7%	27,2%	89,9%	29,1%	17,5%	91%	25%	21%	85%	17%	16%
rape	87,0%	81,4%	74,5%	90,1%	81,2%	74,7%	87,5%	69,5%	66,5%	82%	69%	69%	83%	73%	67%
sunflower	85,0%	21,5%	31,7%	86,8%	26,5%	37,8%	86,9%	25,0%	33,1%	88%	29%	36%	84%	18%	26%
vegetables	35,0%	48,0%	43,0%	42%	53%	48%	51%	70%	65%	45%	65%	64%	47%	56%	53%
vines	46,0%	55,0%	73,0%	48%	54%	79%	46%	53%	81%	43%	59%	81%	33%	53%	82%

The percentage of treated areas varies from crop to crop. There was a reduction in the percentage of treated areas for maize and sunflower crops in 2024. For the remaining crops, the percentage of treated areas remained relatively constant over the period 2020-2024.
In the case of vineyards, there has been a decrease in areas treated with herbicides and a slight increase in areas treated with fungicides during that period.

5. Statistical data on plant protection products used in the main crops - barley, rapeseed, wheat, maize and sunflower, provided by the MAF (Ministry of Agriculture and Food)

In 2024, the areas with these crops accounted for 87.6% of the arable land and 60.8% of the UAA (utilized agricultural area) of the country.

According to preliminary data for these crops, 1 351 tonnes of plant protection products in active substance were used in 2024, which is 15.1% less than in the previous observation period – 2018 for the same crops.

The largest amount of herbicides was used in 2024 – 59.1% of all products, with 44.2% of the active substance of all herbicides used on sunflower fields, 32.7% on corn fields, and 18.2% on wheat fields. The total reduction in herbicide use for the five crops is 6.6%.

Fungicides account for 38.5% of all products, with the largest share of fungicides (82.9%) used on wheat and 8.8% on barley. In total, 13.9% less fungicides were used in 2024.

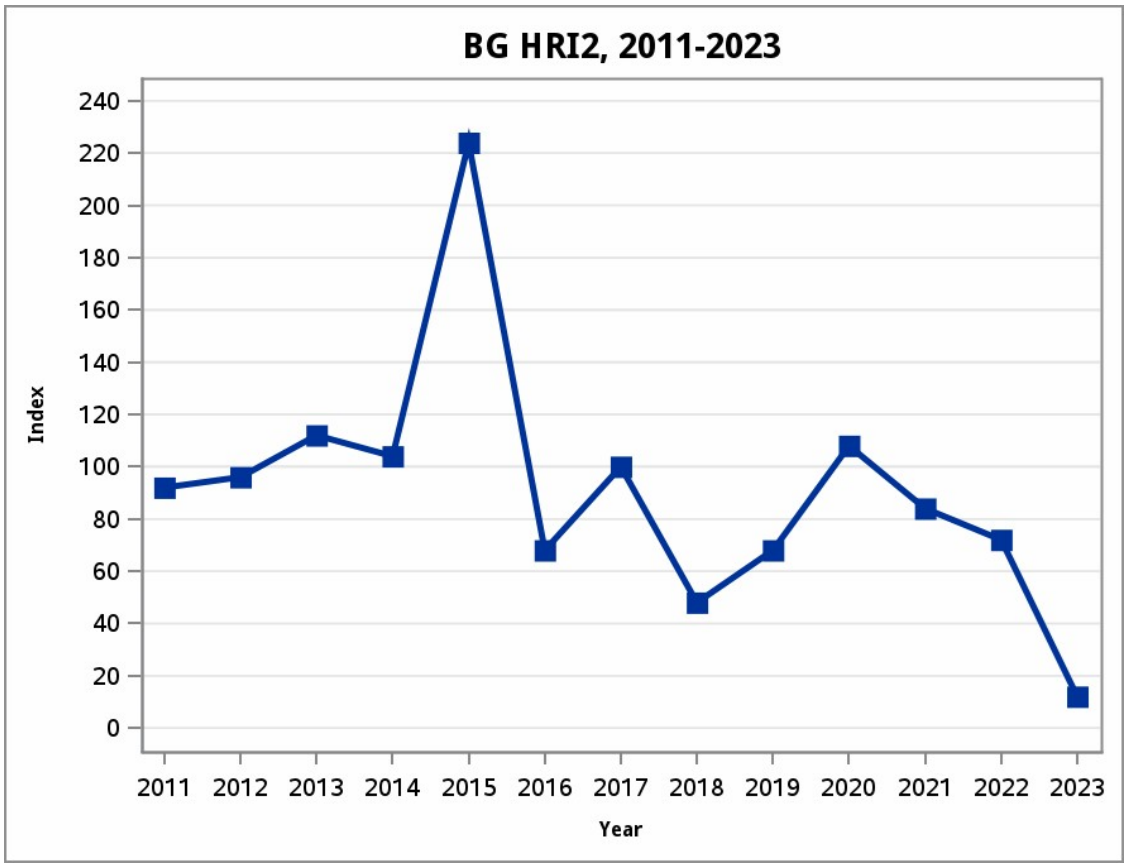
Insecticides account for 2.2% of all products, with 52.5% used on wheat fields, 27.9% on corn fields, and 9.6% on barley fields. The total reduction in insecticide use in 2024 compared to 2018 is 76.0%.

In 2024, growth regulators accounted for only 0.1% of the active substance in all products and were mainly used on wheat (68.6%) and barley (16.4%). Total growth regulator use was 73.4% lower than in 2018.

Harmonised Risk Indicator 2 (HRI2): The second indicator is based on data on the number of authorisations granted to PPPs, pursuant to Article 53 of Regulation 1107/2009, classified into 4 groups in accordance with Commission Directive (EU) 2019/782 of 15 May 2019 amending Directive 2009/128/EC of the European Parliament and of the Council as regards the establishment of harmonised risk indicators.

Figure 5: Harmonised Risk Indicator 2 – Evaluation of the overall weighted index, with a baseline of 100, average in 2011-2013

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
BG HRI2, 2011-2023	92	96	112	104	224	68	100	48	68	108	84	72	12



The trajectory shows a stable trend towards a significant decrease in the number of authorisations granted to PPPs under Article 53 of Regulation 1107/2009 for the period 2020-2023.

In voting on Directive 2019/782, the Republic of Bulgaria expressed its position that the Harmonized Risk Indicator 2, which is based on the number of the PPP authorisations issued under Article 53 of Regulation 1107/2009, does not reflect the real risk of using the PPPs authorized under this procedure. Such an indicator is irrelevant taking into account that the quantities placed on the market for restricted and controlled use of PPPs will be counted as quantities of the corresponding weight in Harmonized Risk Indicator 1 no matter the procedure, under which their authorisations has been granted.

Analysis of the curve for restricted and controlled use (RCU):

In 2020, three permits were issued for the restricted and controlled use (RCU) of PPPs containing the following active substances (AS): oxathiapiprolin - approved AS; oxadiazon - non-approved AS; quinclorac - non-approved AS.

In 2021, eight permits were issued for the restricted and controlled use (RCU) of PPPs containing the following active substances (AS): cyantraniliprole; tefluthrin, oxathiapiprolin, metalaxyl-M, oxadiazon - unapproved AS; quinclorac - unapproved AS.

In 2022, 18 permits were issued for the restricted and controlled use (RCU) of PPPs containing the following active substances (AS): *Bacillus thuringiensis var. kurstaki* strain ABTS-351; *Bacillus thuringensis, subsp. kurstaki*, strain EG 2348 tau-fluvalinate; esfenvalerate; chlorantraniliprole; azadirachtin; spinetoram; spinosad; cyantraniliprole.

In 2023, two authorizations were issued for the restricted and controlled use (RCU) of PPPs containing the following active substances (AS): fludioxonil; sedaxane; halauxifen-methyl.

In 2024, three authorizations were issued for the restricted and controlled use (RCU) of PPPs containing the following active substances (AS): tau-fluvalinate; *Bacillus thuringiensis ssp. aizawai* strain GC-91; *Beauveria bassiana* strain ATCC-74040.

The curve for the period 2020-2023 shows a downward trend in the Harmonized Risk Indicator 2 from 108 in 2020 to 12 in 2023.

In 2021, authorizations were issued for the restricted and controlled use (RCU) of PPPs for the treatment of sunflower seeds for sowing against wireworms (family Elateridae).

The reason for the large number of permits issued for RCU of PPPs in 2022 is the declared calamity for the meadow butterfly *(Loxostege sticticalis)* in connection with the established mass reproduction of the pest. However, they are given for plant protection products containing approved AS microorganisms.

In connection with the established mass reproduction of the Moroccan locust, a calamity of the Moroccan locust *(Dociostaurus maroccanus)* was declared for the territory of the Kardzhali and Blagoevgrad regions by order of the Minister of Agriculture and Food in 2024.

Ways to reduce the identified trends:

1. Increasing the number of trained farmers.

Training of farmers is essential for the proper use of PPPs and the primary application of integrated pest management (IPM) or other alternative non-chemical methods. In order to take account of progress under this measure, a new indicator has been introduced in the updated National Action Plan for Sustainable Use of Pesticides in the Republic of Bulgaria: „Annual increase of 5 % of the number of trained farmers in comparison with the total number of registered to up to 100 % of trained farmers using plant protection products of a professional category of use“.

2. Implementation of good agricultural practices.

Regulation № 14 of 19 September 2016 on the protection of plants and plant products from economically important pests regulates the development and the approval of rules for good plant protection practices, described in manuals.
In order to measure progress under the integrated pest management (IPM) measure, the updated National Action Plan for Sustainable Use of Pesticides in the Republic of Bulgaria requires that the guidelines for integrated pest management be updated within one year after the entry into force the Ordinance on Integrated Production.
According to Article 5 of Ordinance No. 9 of February 26, 2021 on integrated production of plants and plant products and the control of integrated production, the Academy of Agriculture is determined to develop up-to-date guidelines for IPM for the following crops: vegetable, fruit, berry, essential oil, technical, cereals and legumes, cereals and vineyards.
The Manual for integrated production of cereals (wheat, barley, rye, oats, corn) and sunflower has been updated:

https://bfsa.egov.bg/wps/wcm/connect/bfsa.egov.bg19113/9dc1d682-699f-4efb-ae5d-bc316f18df32/%D0%A0%D1%8A%D0%BA%D0%BE%D0%B2%D0%BE%D0%B4%D1%81%D1%82%D0%B2%D0%BE.pdf?MOD=AJPERES&CVID=pfPIRTE

The updated guidelines will enable the application of good crop protection practices in modern agriculture under the current conditions.

3. Effective inspections of pesticide application equipment carried out by the structures of the Ministry of Agriculture and Food responsible for the control and registration of agricultural and forestry machinery.
Effective inspections and the use of accurate and well-maintained equipment are prerequisites for reducing spray drift and protecting water bodies.

4. Establishment and use of a web-based platform for the coverage of plant protection and fertilization activities carried out by the farmers (keeping electronic logbooks) and for tracking the movement of plant protection products and fertilizers placed on the market to the end user.

The development and the use of a web-based platform will allow for the full traceability of PPPs from placing on the market to end-user use, for the generation of statistical information for the calculation of harmonised risk indicators, for the identification of trends in the use of certain active substances and priority sites or good practices, in accordance 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 system will enable the control authorities to systematically control the use of plant protection products and fertilizers, including farmers' electronic logbooks.

5. Limited the use of PPPs that are candidates for replacement and reduce the use of chemical plant protection products.

6. Promoting the use of specialized scientific units and consultants on the proper use of plant protection products and fertilizers and integrated pest management.

7. Prioritising the use of low-risk plant protection products, non-chemical alternatives, integrated production and organic farming.

8. Implementation and use of advisory systems and mathematical models for predicting the development of key pests in strategic agricultural crops for the country.

9. Financial incentives for farmers applying the integrated production.