III.

MATERIAL

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NATIONAL ACTION PLAN ON THE SAFE USE OF PESTICIDES IN THE CZECH REPUBLIC

FOR 2018–2022

Content

Introduction

The National Action Plan on the Safe Use of Pesticides (hereinafter referred to as the “NAP“) is a set of measures for implementing the programme to reduce the adverse effects of plant protection products (hereinafter referred to as "preparations" or "PPPs") in EU Member States (hereinafter referred to as “MSs") on human health and the environment. Pursuant to Article 4 of Directive 2009/128/EC of the European Parliament and of the Council establishing a framework for Community action to achieve the sustainable use of pesticides (hereinafter referred to as "Directive 2009/128/EC"), each MS prepares its own National Action Plan and shall communicate it to the European Commission and the other MSs by 26 November 2012 with effect from 1 January 2013. This NAP does not concern the use of biocidal products.

The NAP sets quantifiable objectives, interim and final objectives, measures and timetables for reducing risks and limiting the impacts of the use of the preparations on human health and the environment, with the aim to support the development and implementation of Integrated Plant Protection (hereinafter referred to as the “IPP“) and alternative approaches or procedures to reduce dependence on the use of the preparations. The NAP takes into account the plans for the use of pesticides laid down by other Community legislation, such as measures under Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy.

When developing and revising the NAP, account must be taken of public health, the impact of the intended social, economic and environmental measures, specific national, regional and local conditions and the legitimate interests of all parties involved.

1. Legislative framework and related policies

The Czech NAP is based on the provisions of Section 48a of Act No. 326/2004 Coll., on Phytosanitary Care and on Amendments to Certain Related Acts, as amended (hereinafter referred to as the "Phytosanitary Act"). At the same time, it respects the relevant provisions of Act No. 254/2001 Coll. as amended (the Water Act) and Act No. 258/2000 Coll., on the Protection of Public Health and on Amendments to Certain Related Acts, as amended (hereinafter the "Public Health Protection Act").

The NAP includes in particular:

- harmonized[1] and non-harmonized risk indicators,
- trends in the use of active substances,
- active substances, crops, areas or procedures which must be given priority attention,
- timetable of correct procedures to achieve safe use of preparations,
- evaluation of the necessary intervals of controls of equipment for the application of preparations used for spraying and of the additional devices for the application of preparations which are only used to a limited extent by professional users,
- possible ways of informing persons who might be exposed to spray drift,
- procedures to support the implementation of integrated plant protection.

The Ministry of Agriculture (hereinafter referred to as the “MoA”), in cooperation with the Ministry of Health (MoH) and the Ministry of the Environment (MoE) develops and evaluates and updates the NAPs no later than every 5 years. The Ministry of Agriculture publishes the NAP proposal or its updates in a way allowing for remote access. At the same time, the

[1] By introducing mandatory data collection, this Regulation’s main objective is to ensure that comparable data is collected in all Member States

Ministry informs the public by means of an announcement in the periodical press about the publication of the NAP proposal or its updates and about the possibility of the persons who feel affected by it to notify the Ministry of their comments. The deadline for submitting the comments is two months from the date of publication of the NAP proposal or its update.

The NAP is approved by the Government of the CR. Before submitting the proposal to the Government, the Ministry will evaluate and take into account the comments submitted on the NAP proposal or its update. The general evaluation of the comments that are clearly related to the submitted proposal shall be made public by the Ministry in a manner allowing for remote access. If the comment is not accepted, it will also publish the reason why.

The Ministry will publish the approved NAP in a way allowing for remote access and promptly announces to the European Commission (hereinafter referred to as "the Commission") any significant changes in the NAP.

2. Subject of the NAP and the baseline status of the concerned areas

The subject of the NAP are the areas that are or may be affected by negative impacts caused by the use of plant protection products. The NAP covers three areas:

- the protection of human health, the prevention of acute and chronic poisoning or other potential harm or threat to health resulting from accidents and the careless use of plant protection products, and the health risks resulting from the consumption of foodstuffs with over-limit contents of residues and the monitoring of foodstuffs containing residues, the consumption of which could carry health risks,

- protection of ground and surface waters, in particular sources intended for waterworks use,

- protection of non-target living organisms (plants, invertebrates, vertebrates), directly or indirectly (via the food chain), endangered by the use of preparations in agricultural and forest ecosystems.

The vast majority of preparations marketed in the CR are classified as dangerous for human health, i.e. they have assigned a hazard category in the relevant hazard class. If all the recommendations or limitations proposed by the

National Institute of Public Health (hereinafter referred to as the “NIPH“) are followed, as well as all general requirements for the application of the preparations (e.g. adjustment and control of the application equipment, selection of nozzles, maximum wind speed, travel speed, application pressure etc.), no possible counterfeits are used, then even these preparations can be handled in such a way as not to endanger human health.

The overview of the groups of persons who may be at risk (or harmed) in case of improper handling of the preparations because:

- they are directly disposing of the preparations (storage, mixing, application, cleaning of application equipment, accidental leakage handling, etc.),
- they may „accidentally“ occur at the site and time of application of the preparation,

- they are entering the treated areas (professionals – inspections, post-harvesting, etc., or non-professionals - especially in areas used by the general public or vulnerable groups of inhabitants);
- they are living or permanently occurring in the given location (inhabitants of the territory – residents);
- subsequently consuming (plants, their products variously processed in food, but also animals fed by the plant products, etc.),
- they use drinking water that could have been contaminated with the preparations.

In the field of human health protection, healthcare facilities are reporting according to the International Statistical Classification of Diseases and Associated Health Problems (ICD). The toxic effect of pesticides is listed under item T60. When comparing reports from the IHIS from 1995 to 2016, every year several dozen hospitalizations in hospitals are reported under this diagnosis. However, as has been shown for a long time, these statements are burdened with a major error. It is assumed that the absolute numbers of statistically recorded data do not correspond to reality for the following reasons:

- it is often not revealed that the cause of the problems is the exposure to the preparations,
- diseases can be reported under other codes (such as clinical diagnoses),
- T60 code includes biocidal preparations and plant protection products,
- statistics that are available only include cases of hospitalization in the hospital.

According to the Commission's report addressed to the EP and the Council on Member States' national action plans and on the progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides; COM (2017) 587 final, the version of 10 October 2017 there is a similar situation in collecting information on poisoning and challenging the accuracy of the data obtained in other EU Member States.

The National Register of Occupational Diseases has been kept in the CR since 1991 at the Centre of Occupational Medicine of the State Health Institute, and in 2003 it was linked to the EUROSTAT statistical system of occupational diseases. However, the information from reports on professional poisoning by the preparations for this purpose is very difficult to find and prove (that they were caused only by the preparations), because the report was not designed for this purpose. Since 2006, the T60 code from the ICD system has not been used for the register (exactly due to the connection to the EUROSTAT statistical system on occupational diseases). Diseases are reported by symptoms. There is no solution at the national level. In addition to the above-mentioned factors influencing the reporting, according to the ICD it has to be taken into account that some employees in order not to lose their jobs may conceal the causes and symptoms of poisoning.

Data from the Toxicological Information Centre (TIC) was also used for guidance on the extent of possible health problems caused by pesticides on human health. During its consultations the TIC solves queries not only from health workers but also other persons. Part of the consultations consists of cases where people did not follow the recommended precautions and application procedures when handling the preparations, and a small group consists of intentional self-harm. The stated health statistics records health damages caused by "pesticides" or questions to the TIC, and only exceptionally distinguishes between plant protection products and biocidal preparations. The statistics includes not only the area of agriculture but also other areas (such as communal hygiene).

The development of the number of all TIC queries increases. Along with this, the number of pesticide inquiries is also rising. In recent years, it has accounted for around 4-5% of

all inquiries, which corresponds to about 600-700 pesticide queries per year. The largest number of queries is regarding rodenticides, herbicides, and also insecticides.

The risk of residues of active substances for human health is their occurrence in food or raw material for food production. These values are regularly monitored throughout the process of cultivation, storage and processing of plant commodities by the Czech Agriculture and Food Inspection Authority (CAFIA), the State Veterinary Administration (SVA), or the Central Institute for Supervising and Testing in Agriculture (CISTA). The overview of the occurrence of residues in products originating in the CR, other EU Member States and third countries for the period 2012–2016 from CAFIA sources can be found in the summary table in Annex no. 1a, while the situation in selected commodities of plant origin is shown in the table in Annex no. 1b.

The overall survey shows that over the last five years, the total number of samples tested has increased slightly and the number of monitored substances has also increased in the orders of tens. The share of positive samples remains almost unchanged in the CR and in the EU there has seen a slight decline since 2012. In 2016 positive samples from third countries show a slight decrease. However, the proportion of samples of Czech origin with the over-limit residue occurrence remains unchanged percentage-wise and their number remains in the order of several units per year. An overview of the occurrence of residues according to selected commodities shows that for the commodities of fruit and vegetables the share of samples of Czech origin with the over-limit presence of residues is rather exceptional, their number is in the order of several units and this trend is persistent. For commodities, such as baby food, potatoes and cereals, and for products made from them the presence of residues in the samples is virtually nil. However, it should be noted that for some commodities the number of samples taken is low.

The occurrence and concentration of active substances of preparations and their metabolites in water environment are affected, in addition to the properties of the individual preparations, such as water solubility, mobility and persistence in the soil and rock environment, water etc., also by the extent and frequency of their use, the vegetation period, the growth phase of the treated crops during application, the slope of land, soil and weather conditions and other influences, including application methods and the application techniques used.

Following the available data from the Water Monitoring Information System administered by the Czech Hydrometeorological Institute (CHMI), an overview of the most frequently detected active substances of preparations in surface waters in the CR was prepared. In particular, these residues of active substances, including their metabolites currently occur in surface waters: metazachlor (OA – oxanilic acid, ESA – ethanesulfonic acid), metolachlor ESA, AMPA, dimethachlor ESA, chloridazon methyl desphenyl, alachlor ESA, acetochlor ESA, terbuthylazine, atrazine, metolachlor OA, glyphosate, quinmerac and bentazone – see Annex No. 2. The increase in consumption of certain active substances, especially herbicidal in recent years due to changes in the structure of crops correlates with the frequency of detection of these substances in surface waters.

From the point of view of the occurrence of residues in surface waters, it can be stated that the biggest problem concerns the herbicides applied pre-emergently or early post-emergently (i.e. at the time after sowing or shortly after emergence) and often in wide-row crops where the soil surface is not sufficiently covered by vegetation. At this time, in case of strong or torrential or long-lasting rains, the surface waters are contaminated with the used preparations as a result of washing off or their leaching from the soil into drainage systems. However, a gradual improvement of this situation can be expected

given the ongoing review of active substances and preparations in line with Regulation (EC) No. 1107/2009 of the European Parliament and of the Council.

The number of active substances and their metabolites monitored in this database has increased since 2000. Annex no. 3 contains the data monitored by the CHMI in the CR for the period 2012–2016 and includes the frequency of residue occurrence in groundwater with % of positive samples and % of samples over the limit, Annex no. 4 gives the maximum concentrations of active substances and metabolites of preparations in groundwater during the monitoring of the CHMI in the CR in the period 2012–2016. The active substance alachlor, acetochlor is abundant in groundwater and in recent years the frequency of occurrence of the active substance chloridazon and metazachlor, including their metabolites, has increased considerably.

The MoH regularly prepares detailed reports on the quality of drinking water in the CR, including the pollution caused by the active substances of PPPs and their metabolites. The data obtained from the standard national water quality monitoring in the years 2004 to 2015 have so far shown that there is a gradual moderate improvement in the quality of drinking water distributed by public water supply systems - which, however, applies to the nationwide processing of the results and does not exclude that in some water pipelines there could be significant aggravation or (rather) improvement of the condition. In 2015 this trend stopped when more frequent non-compliance with the highest limit was observed than in previous years. The main cause is the observation of a larger spectrum of pesticides and their metabolites, and the more frequent finding of higher concentrations of these substances, as well as of old burdens. In the available drinking water quality report for the period 2012–2016, active substances or metabolites of herbicidal preparations (in particular terbuthylazine, desethylatrazine, atrazine, acetochlor and metazachlor) appeared every year in the evaluated samples of treated drinking water.

An important aspect of drinking water monitoring is the fact that the range of active substances of preparations and their metabolites monitored is not precisely defined. Decree No. 252/2004 Coll., laying down the sanitary requirements for drinking and warm water and the frequency and scope of drinking water control, as amended, states that the supplier of drinking water has the obligation to monitor the preparations and their metabolites with a probable occurrence in the given source, and if some preparations are not part of a complete analysis, the drinking water producer must justify why they do not expect the presence of residues in the source. When selecting active substances to monitor in regard to their occurrence in waters, new information on the hazards of particular substances must be taken into account. The volume of application of these products is considerable. Drinking water suppliers currently have only very limited access to information on the application of the preparations, their possible occurrence in water sources, including drinking water (there is only an incomplete national total sum of the amount of applied preparations or active substances with one- to two-year delay). Thus, in many cases, the extent of analyzes performed is incomplete and not directed, which can lead to under-estimation of the real situation. Information on relevant metabolites of some active substances, their toxicological properties and methods of determination in raw or drinking water is also limited. Therefore, public water supply operators do not have sufficient information to ensure adequate monitoring of the quality of drinking water. Despite the relatively broad spectrum of monitored substances, the existing monitoring still cannot be considered as sufficiently targeted, i.e. based on a clear relationship to specific applications at a certain place and time.

When evaluating the above mentioned data on the occurrence of residues in waters, it can be stated that in the last few years preparations with the active substance atrazine (e.g. Zeazin 50) and hexazinone (Velpar) have been eliminated in the CR and their

registration cancelled, as well as the preparations with the active substances of atrazine, terbutryn and alachlor, which are no longer on the Czech market. The occurrence of atrazine, which is still present in elevated concentrations (including metabolites) in both ground and surface waters in the CR and in most European countries, is a consequence of its former mass and long-term use in doses of up to 5 kg of active substance/ha in the systems of monoculture maize growing. The situation is similar in the case of the hexazinone substance, because the Velpar preparation has been extensively used in forest management in the dosage of up to 2.7 kg of active substance per hectare. The consumption of MCPA - 4-chloro-o-tolyloxyacetic acid has significantly decreased. The active substance alachlor is abundant in groundwater and in recent years the frequency of occurrence of metabolites of the active substance of chloridazone and metazachlor has increased significantly.

Thus, for surface water sources, the occurrence of active substances and their metabolites of newly used preparations can be observed at the expense of the active substances of preparations the use of which is gradually discontinued. However, for some groundwater sources, even after a long period of time since ending the use of the preparations, there is not a corresponding decrease in the concentration of the active substances or their metabolites. In connection with the emerging analytical techniques, metabolites of the active substances of preparations previously unmonitored are also found in surface and ground drinking water sources.

In order to minimize the risk of penetration of PPP residues into water as a result of their use, specific management principles (especially in protection zones) are key; they are based on agro-technical measures (soil treatment, sowing process), good application practice, local geological and field conditions (slope, erosion threats), soil quality (stiffness, humus content), or the nature of agricultural drainage.

Changes in the management of water reservoirs and water courses (surface and ground) in view of the risks associated with the use of plant protection products in their vicinity must be primarily addressed by Act No. 254/2001 Coll., on Water and on Amendments to Certain Acts, as amended (hereinafter also referred to as the "Water Act"), or using the Government Order on Anti-erosion Measures and the Implementing Decree to Water Act No. 137/1999 Coll., establishing a list of water reservoirs and the principles for establishing and changing the protection zones of water resources.

The existing system of protection of significant water resources against contamination by foreign substances is based on the existence of protection zones in the vicinity of groundwater and surface water sources (Source Protection Zones – SPZs) in accordance with the provisions of the Water Act. However, it is clear from the outputs of monitoring the movement of foreign substances in surface and ground waters that the sources of contamination of water resources, in particular reservoirs, are often detected on much larger areas than can be covered by the institute of protection zones. In addition, the institute of protection zones is used for sources with a permitted collection of more than 10 000 m3/year and, thus, does not affect smaller resources and individual resources and does not even provide for preventive protection of surface and groundwater for their possible use as drinking water sources in the future. For the successful elimination of pesticides in large water sources, it is therefore necessary to consider the possibilities of effective general protection of waters against pesticides and the regulation of the use of certain PPPs in the part of the water catchment area where the active substance, metabolite and its residues have been repeatedly detected in over-limit amounts in the water source.

In some situations the protection zones established according to previous regulations (in the form of hygienic protection zones – HPZs) are according to the new terminology, the

water source protection zones of the second degree, considered insufficient in accordance with the approval decisions of the Institute with regard to the changes in the management. Furthermore, the anti-erosion technologies determine the dependence of the erosion threat of lands not only on their slopes, but also, among other things, on the length of the slope. Thus, even a fairly straight slope can be endangered by erosion or formation of surface runoff if it is long, solidified and low in humus; so the used preparations can run off into watercourses.

It is also technically and financially demanding to demonstrate noncompliance in controlling the preparation application in the SPZs, and there is a lack of inter-departmental integration and of the PPP electronic register, especially for professional users, following the system of controls. The sources of drinking water contamination are often not detected and there is a lack of integration and continuity of the control system (control of the use of preparations in SPZs x monitoring of residues in drinking water sources, especially surface). In addition, in some cases, the farming entities have difficulties finding data on the valid borders of the announced SPZs.

Other potential sources of active substance residues in waters are applications of preparations outside agricultural management, i.e. applications on non-agricultural land (e.g. railways, roads, golf courses and other public spaces or infrastructure), including applications by non-professional users.

In the field of protection of non-target living organisms against the negative effects of the preparations, it is advisable to assess these impacts separately according to the monitored groups of these organisms – against bees, game and other wild vertebrates, invertebrates, fish and other aquatic organisms and non-target plants.

The information of the Bee Research Institute (BRI) was used to assess the long-term development of the impact of preparations on bees in the conditions of the CR.

According to the BRI evaluation, the number of suspected acute bee poisonings due to preparations decreased after the ban on the use of the insecticide preparation Regent with the active substance fipronil. The question of the toxicity of the preparations depends on whether they are metabolizable and whether proper treatment dosages and correct application practice are recommended in this respect, as recommended by the Institute. At present, other active substances are discussed, such as thiacloprid and its rate of degradation in relation to humidity and temperature, followed by the effect of the combination of the primary active substance and the residual metabolites. At present, the issue of the chronic impact of pesticides and their metabolites on bees is more relevant, and the problems of pesticide residues in pollen and honey are newly becoming topical; the values are still under-limit but already detectable. With the development of laboratory techniques and detection methods, these values can be expected to increase and to reveal other active substances.

In recent years, some Western European countries (France, Germany, Italy) have reported new serious problems for bees that are associated with the use of certain insecticides (imidacloprid, clothianidin and thiamethoxam) in the form of seed treatment, especially of rape and sunflower. The discussed presumed reasons for the harmful effects of these seed disinfectants include the time overlapping of the systemic efficacy up to the blossom of the treated crops, application deficiencies in the use of the treated seed associated with a certain sowing technique, where the mordant is dispersed and the contamination of the environment occurs, as well as the possible co-action of sublethal doses of insecticides with bee colony weakening by infections. Legislative requirements for mandatory equipment for macerated seed sowing are not yet determined, as is the case with sprayers. This persisting condition does not contribute to the reduction of

application risks (abrasion dust escape on the surrounding flowering crops, etc.) during sowing (especially for pneumatic seeding machines) of the treated seed. Another probable hypothesis in this regard is the collection of guttation water by bees from systemically "poisoned" emerging crops originating from the macerated seeds (colonies need a relatively large amount of "drinking" water at certain stages of their development). In connection with this fact, in 2013 the EU banned the use of insecticidal disinfectants on the basis of the three stated neonicotinoid active substances in agricultural crops, which were assessed to be attractive for pollinators. According to the Bee Research Institute, bees may be burdened by several factors simultaneously. In addition to neonicotinoids that are the focus of interest, there are other agrochemicals - insecticides, fungicides and herbicides that can act synergically. Often the negative effects of agrochemicals are also blamed for bee diseases, their poor nutrition and mistakes in breeding practice.

There is a generally favourable factor of a growing number of professional users of preparations with proficiency in handling the preparations, and the decreasing share of for bees particularly risky groups of preparations in the range of permitted and auxiliary plant protection products.

For the objective and comprehensive evaluation of the impact of the used preparations in operation on wild vertebrates, in particular their indirect impact on biodiversity, there is only limited or insufficient evidence for the territory of the CR.

In the CR there is a lack of regular and targeted monitoring focused on these risks, which categorizes the identified risks in a way that allows to effectively address these risks.

Thus, to assess the risk of harmful effects of preparations on wild vertebrates in the CR, this document uses the data on the extent of use and the number and type of preparations with increased risk for wild vertebrates, and the evaluation of the causes and frequency of the cases of proven damage, i.e. chronic and acute cases of poisoning mammals and birds. In general, in recent years there has been a significant change in the range of preparations marketed in the CR with an increasing proportion of active substances with a more gentle effect on non-target organisms. In this respect, rodenticides, which have not undergone the necessary innovation, are an exception.

For most of the products (with the exception of the category of particularly dangerous preparations for bees and rodenticides), unreasonable risks of harmful side effects on certain groups of wild vertebrates were not confirmed during their long and widespread use in the CR (with reservation about the absence of targeted monitoring of these risks). Insecticide disinfectants represent a relatively new risk group. They are marketed for agricultural practice already in the form of treated, mostly coated seed. The possible risks are related to the attractiveness of the seed as a source of food for some game species in the event of insufficient incorporation of the seed in the soil.

Based on published information and expert judgment, the main problems in recent years have been the deliberate misuse of highly toxic preparations for aquatic organisms, their illicit circulation and use to poison certain species of wild and domestic animals, i.e., criminal cases. We recommend tightening the rating – Criminal Offence "Illegal Traps" using the Furadan 350 F insecticide concentrate with the active substance carbofuran, used in the past to protect hops and ornamental horticulture. Also, toxic preparations that are deliberately used to poison the locally overpopulated stone martens and stray dogs and cats pose an extraordinary danger of direct and secondary intoxication of protected, often very rare predators and owls. In 2007 the Institute decided to discontinue the registration of Furadan 350 F (and other formulations containing carbofuran) for outdoor use with a permit for stock consumption in 2008 and, at the request of the Institute, the producer has withdrawn its stock of this preparation from the distribution network. Due to

the long-term toxic effect of carbofuran, there is still a risk of illegal spread and abuse of Furadan.

Regarding the impact of the preparations on fish and other aquatic organisms, there is a functional monitoring system of accidental fish deaths in the CR, followed by an analysis of the causes, including the assessment of the impact of the harmful effects of the preparations.

The results of this monitoring in the period 2000-2015, according to the annual reports of the Research Institute of Fish Culture and Hydrobiology, University of South Bohemia, show that the use of preparations in recent years has not been the cause of accidental fish deaths. In 2014 one case of fish death and crayfish caused by the active substance chlorpyrifos was laboratory confirmed. The accidental deaths of aquatic organisms recorded during this period were mainly caused by oil and organic pollution associated with oxygen deficiency and increased ammonia concentrations. Long-term monitoring shows that accidents caused by incorrect application or manipulation with plant protection products appear sporadically. At present, the issue of chronic effects of preparations and their metabolites on aquatic organisms is more topical than acute poisoning.

So far no functional monitoring system has been in place in the CR to analyze changes in the communities of soil microorganisms and invertebrates, changes in their population dynamics due to the effects of preparations. Although the results of a number of research studies bring information also from the CR on the decline of the species spectrum of invertebrates in agroecosystems, it is not possible to determine the share of preparations in reducing the biodiversity of invertebrates because the changes in their communities are the result of changes in soil management systems and technologies.

In particular non-selective zoocides, the use of which in the CR is now already banned or restricted in the systems of integrated production of fruit, vegetables and grapevine, have negative impact on the communities of invertebrates.

At present the protection of invertebrates, like the protection of non-target plants, is subject to the obligation to maintain untreated protection zones along the edges of the lands, provided that it is specified in the instructions for use (label) for the individual preparations. Except for the regimes of territories protected due to nature and countryside conservation, for the practical protection of the invertebrates the significance of this measure is minimal, compared to the across the board treatment of the land with these preparations. The information on bees partly shows the impacts.

According to the analysis of the impact on non-target plants (field crops, perennial crops or individually growing trees and shrubs) adjacent to the land where the application of the preparations is carried out, such a case is always associated with an incorrect procedure and non-compliance with the principles laid down for the use of the preparations. In this context, it should be pointed out that the damage caused by incorrect application of the preparations or their substitution is in many cases solved by the so-called silent way in the form of insurance claims, which, however, do not have any educational impact on the entities that caused the damage.

Conclusion:

The overall trend in breaches of the principles set out for the use of plant protection products has a downward tendency, which is related to strengthening the awareness of farmers by applying the requirement of professional competence to those working with the preparations or providing consultancy, to introducing the system of regular control testing of mechanical devices for plant protection, to the gradual upgrading of the application technology, as well as to the targeted state supervision focused on the area of handling the preparations. At the

same time, the amendment to the Phytosanitary Act focused on tightening the distribution of PPPs so as to reduce the proportion of illegal pesticides on the market. In terms of the protection of non-target living organisms, it is necessary to identify the risk groups of pesticides and the areas most affected by their use, and to propose measures to limit their use.

It is necessary to focus on the awareness of possible acute and chronic risks, understanding the importance of protecting all vulnerable groups of persons; and, of course, the consistent application of protective measures and their control in practice.

It is necessary to ensure the enforcement of the principles for the application of measures to minimize the risks for non-target organisms and the environment not only in case of foliar applications of the preparations but also for the sowing of treated seeds, including the assessment of the possibilities of updating the relevant mechanization legislation.

Also the influence of other factors of the use of PPPs on the resulting impacts on water resources (soil type, humus content, soil stiffness, climatic conditions, sowing processes, etc.) has not been sufficiently examined. Therefore, in the second planning period, the National Action Plan should focus in particular on setting the conditions and rules for the realistic assessment of the impact of the preparations on water bodies, in particular on water resources (monitoring). Furthermore, on the basis of realistic results, it is then necessary in the second planning period of the NAP to design, assess and implement measures for the improvement of the situation, e.g. by designing and implementing appropriate agri-environmental measures, management principles, or by targeted support of technologies for removing PPP residues from water, and implement these measures into the Czech legal system.

It is necessary to prefer non-chemical methods and methods of plant protection, which include the introduction of general principles and specific guidelines for individual crops and sectors within integrated production and integrated plant protection, preferably with the preferential use of non-chemical methods of plant protection and alternative approaches, or methods for reducing the addiction to using plant protection products.

3. Objectives and sub-objectives of the NAP and the methods of their implementation

The setting of the NAP objectives and sub-objectives for the Czech Republic respects the fundamental mission of phytosanitary care, i.e. to ensure the health of plants and plant products with respect to food safety and consumer protection, and is based on the identification of the risks associated with the use of the preparations. These risks are identified and analyzed in chap. 2 of this document. In a mature society, there must be a balance between the benefits of plant protection products in food production in order to balance society's needs and the potential risks that these substances may pose to humans and the environment.

With regard to the departure of a Member State from the EU (the so-called Brexit) and the redistribution of the evaluation responsibilities to the remaining Member States, it is expected that the accountability of other Member States, including the Czech Republic, will increase in both quantity and quality of the required European evaluations, not only for PPPs, but especially the time-consuming evaluations of active substances. If the substance is evaluated poorly for the EU, the given substance in the EU is eliminated and consequently there may be imports of agricultural commodities into Europe treated with the same active substances or plant protection products under the so-called import tolerance.

In the context of the selection of measurable indicators of the risk development associated with the use of PPPs, there is no long-term comparison of the consumption of preparations in the CR, particularly in view of differences in the methodology of data collection. Generally, however, the consumption of preparations in the CR is significantly lower in comparison with the EU MSs, both in absolute terms and per hectare of agricultural land. Among the most problematic are herbicides used to protect rape and maize.

A fundamental prerequisite for the successful practical implementation of the principles of sustainable use of PPPs is the expertise and experience of decision-makers on plant protection in practice, also obtained through objective and independent plant protection consultancy. This consultancy cannot be generalized, but the consultants must be specialized and specifically educated with regard to the wide range of crop types and methods of detecting and controlling the occurrence of plant pests, including the regular updating of such training, taking into account the rapid development and changes in Integrated Production (IP), IPP and preparations.

It is necessary to update the form/content and scope (i.e. the number of hours) of the basic course to acquire professional competence and of additional training. Comparing across the EU, it has become evident that the vast majority of other EU Member States require more training hours than the CR, e.g. in the framework of basic courses. The number of training hours in the CR, last amended by the 2012 amendment, is lower in this comparison.

The main general principles of integrated plant protection already function in practice in the CR, so it will be about re-directing the existing practices and highlighting the positive environmental and economic effects of the measures applied. Since 2014, all available information on pest control can be found at the Institute's Phytosanitary Portal. Growers can find information here about the methods of protection (both chemical and non-chemical), including the degree of risk arising from the application of individual preparations for the individual components of the environment, current threshold values and occurrence of harmful organisms, a prediction system for selected diseases, photo gallery and monitoring outputs regarding resistant populations of certain harmful organisms. There will also be an

effort to support the practical presentation of cultivation measures in the form of demonstrations in operation or semi-operation. This area is in the hands of the consultancy. The introduction of integrated plant protection must not harm agricultural entrepreneurs economically, the entrepreneur must assess the possibility of using all the general principles of integrated protection in the context of a specific managerial decision on the way of growing given crop on the given land, taking into account the risk of pest damage to the production, which needs to be realistically considered under the given conditions.

The CR has not yet sufficiently exploited the possibilities of product authorization under the so-called minority use. Although national legislation has previously introduced administrative simplification and simplification of the authorization process, there has been insufficient increase in the number of such authorized preparations in minor crops to the extent that will provide reliable protection against harmful organisms. The number of effective substances authorized in such preparations is insufficient to ensure the functioning of anti-resistant strategies, especially with regard to the introduction of new harmful organisms into the CR and their generally higher potential for the emergence of resistant populations with regard to global warming. In this respect, the European Commission's financial support can be used with an advantage, or the administrative and logistical assistance from the European and Mediterranean Plant Protection Organization.

At present four levels of the plant protection system can be identified in the CR: conventional plant protection and production, integrated plant protection, integrated plant production, and organic farming. All four systems can be uniquely recognized from each other.

At the end of 2016, 4 234 organic farmers were registered in the CR, which farm on the area of 500 000 ha of agricultural land, which represents approximately 12 % of its total area. Most of the organically managed land consists of permanent grassland (over 400 000 ha), the cultivation of which generally does not require a high proportion of chemical plant protection.

Integrated plant production forms an intermediate stage of gentle practices between standard conventional plant production and organic farming. The International Organisation for Biological Control (IOBC[2]) has established a philosophy, guidelines, and expert guidance for IP as a system management that produces high quality food and other natural products by applying regulatory mechanisms to replace pollutant inputs and ensure sustainable agriculture. Emphasis is placed on a comprehensive system approach, the central role of agro-ecosystems and a balanced nutrient cycle. The biological, agro-technical and chemical methods used are balanced with respect to environmental protection, agricultural entrepreneur’s profitability and social requirements.

Although EU legislation relating directly to IP does not exist, this term is set out in a number of EU and Czech legal documents[3]. In the CR, guidelines have been issued for the application of IP in the systems of fruit, vegetable and grapevine cultivation. For grapevines, the directive is issued and updated by the Association of Integrated and Organic Grape and Wine Production (“EKOVIN”)[4], for fruit by the Association for Integrated Fruit Growing

[2] See http://www.iobc-global.org.

[3] At the EU level, it concerns, in particular, Commission Implementing Regulation (EU) No. 543/2011 laying down detailed rules for the application of Council Regulation (EC) No. 1234/2007 in respect of the fruit and vegetables and processed fruit and vegetable sectors. In Czech legislation, IP forms mainly part of Government Decree No. 79/2007 Coll., on conditions for the implementation of agri-environment measures, or Government Decree No. 318/2008 Coll., on the implementation of certain measures of the CMO for fruit and vegetables.

[4] See http://www.ekovin.cz/sekce-integrovane-produkce/smernice-integrovane-produkce

Systems ("SISPO")[5] and for vegetables by the Association for Integrated Vegetable Production System[6].

In systems of organic farming and integrated plant production, plant protection with low inputs of preparations is fully applied and, in some respects, farming requirements in these systems go beyond the general principles of integrated plant protection. Therefore, existing incentives for organic farming and integrated plant production in the CR should be maintained. The objectives and sub-objectives of the NAP are therefore formulated so as to be in line with the Czech programmes for the further development of organic farming and integrated plant production. In the CR, there are also several supported crop cultivation systems, or landscape care systems, aimed at preserving or improving the environment, and elements of these systems that relate to plant protection methods are often interconnected (e.g. green zones, support of natural pest antagonists). When formulating the general principles of integrated plant protection, it is essential to use the elements of all these systems, as well as support for their use.

As one of the outputs of the NAP, the Institute has put into operation a "Phytosanitary Portal" on its website, which provides comprehensive information on the practical possibilities of using integrated plant protection in the CR and, in particular, on the suitability of the preparations authorized in the CR for integrated protection systems (based on a "semaphore" principle). This portal will continue to be developed and updated as an already well-proven tool of rapid flow of expert information.

In order to fully exploit all the principles of integrated plant protection, it is important to provide as much information to professional users as possible for qualified decision-making on the necessity or the extent of their use. It is therefore necessary to further develop and streamline the system of the nationwide monitoring of plant pests, including the monitoring of their resistance to PPP effective substances, to develop and update predictive models of their occurrence. This system must as much as possible use the most up-to-date available tools (e.g. GIS technologies, advanced observation techniques) and must integrate all relevant and available source information (e.g. LPIS, CHMI, Galileo, Aladin). Information from this system as an output for the farmers must be provided in the most up-to-date way and, if possible, online, in the most transparent form and with the greatest possible relevance (Phytosanitary portal, development of mobile applications in the mobile phone).

An essential prerequisite for the effective use of the preparations is the knowledge of the presence of populations of harmful organisms resistant to the effective substances of preparations authorized in the CR. An important goal of the NAP is therefore to ensure the routine monitoring of this resistance in the CR and correct interpretations of the results obtained, which will ensure the use of truly effective preparations within a suitable anti-resistant strategy.

The number of effective substances in such authorized preparations is insufficient to ensure the functioning of anti-resistant strategies, especially with regard to the introduction of new harmful organisms into the CR and their generally higher potential for the emergence of resistant populations with regard to global warming.

Within the framework of the inter-departmental working group for the implementation of the NAP, the NAP working sub-group," Resistance of harmful organisms to pesticides and minor use of plant protection products", was established and started its activity in the autumn of 2016. In 2016 another inter-departmental working group on the problem of poisoning and the illegal killing of wildlife started its activity within the MoE.

[5] http://www.ovocnarska-unie.cz/web/web-sispo/
[6] http://www.zelinarska-unie.cz/Portals/0/PRAVIDLA%20IPZ.pdf

The amendment to the Phytosanitary Act, approved in 2017, allowed the use of aids, tools and substances intended for the monitoring of plant pests in the CR, as this monitoring is one of the basic prerequisites for the routine use of integrated plant protection. Another reason for the Ministry of Agriculture to produce this bill is the fact that the market for plant protection products is facing an increasing incidence of trafficking in illegal plant protection products, which are fake or non-approved. The use of illegal products is associated with considerable risks to both the environment and human health.

The CR has not yet sufficiently exploited the possibilities of product authorization under the so-called minority use. Although national legislation has already introduced administrative simplification of the authorization process, there has been insufficient increase in the number of such authorized preparations in minor crops to the extent that will provide reliable protection against harmful organisms. The number of active substances in such authorized preparations is insufficient to ensure the functioning of anti-resistant strategies, especially with regard to the introduction of new harmful organisms into the CR and their generally higher potential for the emergence of resistant populations with regard to global warming. In this respect, the European Commission's financial support can be used, or the administrative and logistical assistance from the European and Mediterranean Plant Protection Organization.

The method of fulfilling the objectives and sub-objectives of the Czech NAP cannot directly establish a new obligation or increase the administrative burden of agricultural entrepreneurs in the Czech Republic.

One of the methods used to ensure the fulfilment of the NAP sub-objectives is to determine space and time-defined lands where the use of the preparations poses a higher risk to non-target organisms and the environment (so called “hot spot management”). The main factors of higher risk include:

- aerial and frequent use of one or more preparations within a certain indication (crop + harmful organism) in a given area in conjunction with other risk conditions, such as numerous rainfall or erosive soil,
- constantly deteriorating soil quality,
- water bodies where water quality (ground, surface) exceeds the EQS (environmental quality standards) in terms of pesticides.

A. Objectives and sub-objectives of the NAP

Objective I. Reduce the risks associated with the use of the preparations.

In the field of health protection:

Sub-objective I. a) - to take measures to limit health damage resulting from the use of preparations, including illegal ones for the persons applying the preparations and for persons occurring on the treated areas and in the treated spaces.

Method of implementation:

- Improve awareness in the area of direct risks of the preparations to human health, for example, with regard to possible ways of informing people who might be exposed to the drift of the sprayed liquid[7].
- Enhance education and state supervision of compliance with the professional users' duties accordingly also in the field of the preparations use for the establishment and maintenance of public and private greenery and the use of rodenticides in the control of rodents as plant pests, focusing on areas used by the general public or vulnerable groups of inhabitants[8].
- Train the persons authorized by the MoH to provide knowledge regarding the protection of human health and to specify the legislative requirements for the professional use of plant protection products.
- To complete the phytosanitary consultancy concept and the accompanying grant programme "Demonstration Farms".
- Revise the training system (to improve its effectiveness).
- Identify individual options for gathering information about people's intoxication cases[9].
- Promote a legislative change in the Penal Code – a shift from the current Misconduct classification to the Criminal Offense classification when viewing the hazards of illegal PPPs having different composition compared to the approved and evaluated specification by the Institute. Interdepartmental negotiations between the MoA and the Ministry of Justice are necessary.
- Promote the traceability of the origin of illicit preparations through the gradual introduction of the electronic register of preparations using two origin identifiers: the batch number of the formulation manufacturer and the production dates of the formulation manufacturer.
- Focus on the active substances to be replaced – see Regulation (EU) 2015/408 and Part E of the Annex to Commission Implementing Regulation (EU) No. 540/2011 (substances to be replaced) – their restriction and gradual replacement.

Sub-objective I. b) - to take measures to reduce the risks associated with the occurrence of residues in raw materials, food and feed of plant and animal origin.

Method of implementation:

- Improve the education of agricultural public, between food producers and distributors and consumers, including information on the risks of the combined use of preparations and subsequent cumulative and aggregated exposure, using the expertise of non-governmental organizations.

[7] See Article 10 of Directive 2009/128/EC.
[8] See § 2 para. 1 point. x) of the Phytosanitary Act.
[9] See Article 7 (2) of Directive 2009/128/EC.

- Enhance the state supervision of compliance with the obligations of professional users in regard to storage of harvested plants and plant products, focus the content of basic trainings and supplementary courses for professional users of preparations to acquire professional competence for the handling of preparations also on methods of safe post-harvest application of preparations.
- Ensure a system for an effective control of the presence of residues in raw materials and food of plant origin in the market network, including checking the correct indication of their origin.
- Ensure better communication and exchange of information between the CAFIA and the Institute on agricultural crops and their harvested commodities where the application of illegal plant protection products has been detected by the Institute before harvesting. At national level, ensure an interconnection set up between the Institute's communication warnings on detected applications of illegal preparations and their extent of use triggered by the CAFIA initiative to commence inter-related analyses of harvest safety and measures to halt the further spread of harmful agricultural commodities to processing into the food industry and consequently to consumption in the food chain.

Specific indicators of meeting the sub-objective:

- number of samples of residues in food and feed,
- number of mycotoxin-containing samples in food and feed in samples taken before harvesting the crops in the field.

Sub-objective I. c) - to verify the sufficiency of existing national measures to limit the risks to human health and the environment based on the assessment of so-called auxiliary plant products authorized pursuant to Act No. 156/1998 Coll., on fertilizers, auxiliary soil substances, auxiliary plant preparations and substrates and on agrochemical testing of agricultural soil, as amended (hereinafter referred to as the "Fertilizers Act").

Method of implementation:

- By 2020 the MoA will review and, if necessary, in conjunction with the Institute, propose to extend the requirements for the submitted data on the risks of so-called auxiliary plant products authorized under the Fertilizers Act. It will further consider whether the fertilizer evaluation procedure sufficiently excludes any conflict with Article 29 of the Regulation on plant protection products, if the fertilizers contain substances that fall within the scope of Article 2 para.1 of this Regulation and that are to be assessed in accordance with this Regulation with regard to the fate and risks of these substances in the environment. The MoA proposes legislative changes in conjunction with the Institute to prevent these conflicts from continuing.

Sub-objective I. d) - to take measures to limit the risk to the general public arising from the use of preparations in areas used by the general public or vulnerable groups of inhabitants.

Method of implementation:

- Continue to develop awareness of the public, towns and municipalities and professional users of plant protection products in areas used by the general public or vulnerable groups of inhabitants defined by law.

- Decide on the concept of monitoring compliance with the measures required by the Phytosanitary Act to reduce health risks to people in areas used by the general public or vulnerable groups of inhabitants.
- Sufficiently integrate the issue into the system of education for the existing or future users of the preparations (especially in basic courses, additional trainings).
- Consider the advantages/disadvantages of the distribution of the PPP PC (professional competence) according to the type of activity (e.g. for persons applying PPPs on the field, in an orchard, railway, in closed premises/warehouses, by air, in public areas).

In the field of water protection:

Sub-objective I. e) – to take precautionary measures to reduce the occurrence of residues in surface and groundwater, with an emphasis on resources used or usable to supply the population with drinking water.

Method of implementation:

- Methodologically and legislatively ensure the implementation of appropriate preventive measures, especially in the protection zones of water resources, and ensure the availability of up-to-date information on declared protection zones for business entities (e.g. transition to less risky PPPs, protection zones of watercourses and reservoirs, reduction of non-food production share and increased support for organic farming).
- Support research in the area of evaluating the relationships between farming practices, soil quality, climatic conditions, PPP application and the consequent occurrence of residues in water.
- Methodologically ensure the agrotechnical principles of PPP application in SPZs in terms of water protection with respect to specific geological, terrain and climatic conditions and the type of soil.
- Ensure systematic support for the maintenance and improvement and protection of soil properties in terms of sorption properties in order to prevent PPP residue leaching (densification, humus content, anti-erosion measures, etc.).
- Improve awareness and communication between professional users of preparations operating in protection zones of water resources and in protection distances, water authorities and water managers through the completion of the electronic update of lands in SPZs in state administration. Prepare documentation for the introduction of a record-keeping system for the use of plant protection products available to protect drinking water sources and entities producing drinking water.
- Pursuant to Section 30 of the Water Act, finalize the Decree for the establishment of the SPZs.

Specific indicators of meeting the sub-objective:

- number of supported research projects in the area of the evaluation of the relationships between the method of farming, soil quality, climatic conditions, PPP application and consequent occurrence of residues in water;
- number of updates of the summary register of protection zones of water resources maintained pursuant to Act No. 254/2001 Coll.;

- number of seminars, publications and workshops aimed at transmitting the information on the occurrence of PPP residues in waters between water authorities, business companies and water managers;
- number of seminars, publications and workshops focusing on the agro-technical principles of PPP application in relation to water protection;
- number of legislative adjustments to ensure and promote the protection of soil beneficial properties;
- number of water bodies with over-limit occurrence of PPP residues – due to the exceeding the environmental quality standards[10] based on the presence of residues[11];
- completion of the electronic register of land in the SPZs in state administration,
- size of agricultural land where "appropriate preventive measures" have newly been applied.

Sub-objective I. f) – to take measures to increase the efficiency of monitoring the presence of groundwater, surface and drinking water residues.

Method of implementation:

- To develop methodologies for targeted monitoring of the occurrence of PPPs and their metabolites separately for the monitoring of surface, groundwater and monitoring of drinking water, including screening monitoring of water resources for individual drinking water supply. When integrating the methodology, the existing monitoring of surface and groundwater should be taken into account. Monitoring of groundwater and surface water should be based on the knowledge of the relationships between the spectrum of crops grown and the products used, the nature of the natural environment (e.g. hydrology, hydropedology and other characteristics of the area), especially in the declared water sources protection zones, or other areas important for the possible impacts on the quality of raw water. In addition, ensure that this monitoring is carried out, and evaluate its results with regard to the above and make it available to the relevant water supply operators (drinking water producers).
- Methodological rules for targeted monitoring of the presence of PPP residues in the drinking water supplied (or also raw and treated water) should also take into account the possible need to examine groundwater resources (wells) for individual needs in agricultural areas.
- Plan to prepare the availability of information about the specific place and time of the applied preparations for the purposes of monitoring management and evaluation, preferably in the form of an existing authorized access internet portal, where professional users should be required to enter data on PPP applications. The aim is to ensure the availability of up-to-date information on the quantities and types of pesticides applied, including the date and place of the application, for the purpose of targeted and effective water monitoring. For a gradual transition to the electronic register of the use of plant protection products by professional users, use a harmonized approach with the choice of one type of electronic codes on

[10] Environmental quality standard (EQS) means the concentration of a substance or group of substances in water, sediments or living organisms, which must not be exceeded due to the protection of human health and the environment. The EQS for surface waters is laid down in Government Decree No. 61/2003 Coll., for groundwater bodies in Decree No. 5/2011 Coll.

[11] Taking into account the deviation due to the occurrence of residues in the monitored period already in the preparations unauthorized in the CR (the so-called "old burdens").

preparations in phytosanitary legislation (2-D Matrix codes). By 2022, gradually introduce compulsory electronic records in stages (first for agricultural entities operating on acreage of more than 50 hectares of cultivated agricultural land - by 2020). Set up an exactly defined structure of registered electronic usage data, including the production date and the batch number of the manufacturer of the formulation allowing for traceability of the origin and the data transfer and access for various state administration departments, in particular the MoA, MoE, MoH and water supply operators and other entities carrying out the monitoring of groundwater, surface and drinking waters required by law.

- Ensure continuous communication between the Institute, the NIPH, professional users of preparations and water managers, in particular as regards the availability of information on active substances and their properties, relevant metabolites of active substances of preparations, methods of analytical determination, toxicological properties in relation to drinking, surface and groundwater, and reporting the application time, together with the specifics of the applied substances on agricultural and non-agricultural land.

Specific indicators of meeting the sub-objective:

- developing a targeted monitoring methodology,
- number of monitoring objects, on which PPP residue of surface and groundwater monitoring is carried out,
- number of drinking water distribution areas with targeted monitoring of PPP residues,
- gradual introduction of an electronic portal for entering data on PPP application by professional users,
- number of monitored objects of screening monitoring of water resources for individual supply.

Sub-objective I. g) – to adopt legislative measures to increase the effectiveness of controls to ensure adherence to correct principles of use of the preparations.

Method of implementation:

- Finalize the implementation and continuous maintenance of the system for the flexible transmission of information on the detection of over-limit occurrence of residues in surface, groundwater and drinking water between the CHMI, Povodí enterprises, the Institute, water managers and the CEI.
- Continuously maintain the system of targeted and flexible control of adherence to the correct principles of use and application of the preparations, based on the transmission of information on the detected over-limit occurrence of the preparations in waters, especially in areas with over-limit occurrence of residues in surface water, groundwater and drinking water.

Specific indicators of meeting the sub-objective:

- number of inspections carried out of compliance with the correct PPP use principles on the basis of complaints,
- number of defects detected during these inspections, based on the introduction of a system of targeted and flexible control on both agricultural and non-agricultural land.

Sub-objective I. h) - to regulate the use of some PPPs in an area where the active substance and its residues have been repeatedly found in an over-limit

amount (see point 4.24) in a water source or in a surface or groundwater body.

Method of implementation:

- Ensure gradual reassessment of some already unsatisfactory HPZs or SPZs, so that they correspond to the current situation (PPPs, mechanization, etc.)
- Methodologically ensure the agrotechnical principles of PPP application in the SPZs with the possibility of utilization on lands adjoining the SPZs and on lands forming the water catchment area of surface and groundwater bodies with over-limit PPP residues from the point of view of water protection with respect to specific geological, terrain and climatic conditions and the type and quality of soil, including the support of crop-growing systems less demanding as to the use of PPPs in combination with the authorization of the PPPs to be used, using the provisions of Section 38b of the Phytosanitary Act.

Specific indicators of meeting the sub-objective:

- number of active substances found in an over-limit amount in the water source
- appropriate ways of regulating the application of PPPs in the SPZs
- number of planned controls on land management entities in SPZs and adjacent to bodies of surface water (yes, it is possible to focus more also on the entities operating in the SPZ neighbourhood)

Sub-objective I. i) – reduce the risk of negative impacts on water when using the preparations on non-agricultural areas.

Method of implementation:

- Ensure the availability of information at the specific location and time of the preparations applied on non-agricultural land for the purposes of management and evaluation of the monitoring, preferably in the form of an existing internet portal with an authorized access, where professional users would enter data on PPP applications. The aim is to ensure the availability of up-to-date information on the quantities and types of pesticides applied, including the date of application, the batch number of the formulation producer, the production date of the formulation producer and the location, for the purpose of a targeted and effective water monitoring.
- Ensure the application of restrictive conditions for the use of preparations along roads and railways, including point application (on non-agricultural land), on a highly permeable surface or other infrastructure near surface or groundwater, or on impermeable surfaces with a high risk of run-off into surface waters or waste systems.

Specific indicators of meeting the sub-objective:

- number of seminars, workshops, trainings for PPP users on non-agricultural areas

Sub-objective I. j) – to provide targeted support for measures to reduce over-limit local occurrence of residues in the drinking water supply, where temporarily satisfactory quality will not be achieved by regulating the application of the preparations by means of preventive measures under Sub-objective I.e. These technological measures, however, must not replace the implementation of effective measures in the water catchment areas of water resources.

Method of implementation:

- Establish a system of targeted support for the implementation of measures on water treatment plants and water resources aimed at removing over-limit PPP residues in the treatment of drinking water.
- Provide methodological support for the design and implementation of measures in areas where insufficient effectiveness of the interventions already carried out has been demonstrated.

Specific indicators of meeting the sub-objective:

- Number of persons supplied with drinking water from sources with a high occurrence of residues.

In the field of protection of non-target living organisms:

Sub-objective I. k) - reducing environmental risks associated with the use of preparations in areas important for nature and landscape conservation (protected areas, sensitive species areas, etc.), including non-agricultural land.

Method of implementation:

- Harmonize the systems of measures for agricultural activities that limit the risks to the environment in the framework of the MoA support and controls; in particular to harmonize the legislative conditions under the so-called conditionality and standards for maintaining good agricultural and environmental conditions (GAEC) with measures for compliance with the general principles of integrated plant protection.
- Bring together the legal regulations and the resulting procedures, methodologies, etc. of the MoE and MoA departments and supplement legislative and other measures mitigating risk and negative impacts on non-target species and naturally valuable territories.
  Improve mutual awareness among preparation users, nature conservation authorities, phytosanitary authorities and the public.
- Propose legislative measures to reduce the risks **associated with the use of plant protection products** and the control system for environmental protection and biodiversity conservation. If this increases the current burden on agricultural entrepreneurs in areas protected under Act No. 114/92 Coll., on Nature Conservation and Landscape Protection, as amended, then ensure the relevant adjustment of the existing financial support to agricultural entrepreneurs for the limited use of land in these territories.
- Design a monitoring system for proven poisoning of non-target living organisms, including a uniform methodological approach.

Specific indicators of meeting the sub-objective:

- number of measures taken in practice to reduce the risks **associated with the use of plant protection products** in areas of major environmental importance,
- number of inspections in the context of monitoring compliance with the conditions for the professional use of PPP´s in areas of importance for nature and country conservation, and the number of defects detected during these inspections.

Objective II. Optimizing the use of PPPs without limiting the extent of agricultural production

A. Support for verification and implementation and optimization of the existing and development missing crop-based non-chemical methods of plant protection and methods of the protection with low inputs of preparations usable in the economic and production conditions of the CR (with emphasis on support of regional food and raw materials production) while preserving the quality of production

- Raise the awareness of professional users of preparations, ensure publication and updating of information using professional non-governmental organizations.
- Use the phytosanitary consultancy concept in the CR, following the MoA grant programmes, using the so-called "demonstration farms" project to support expert consultancy in line with the MoA's consultancy concept.
- Using the capacities of research organizations, further develop crop systems for integrated plant protection, with an emphasis on the development and use of functional and economically viable non-chemical methods of plant protection, and propose best practices in selecting a suitable plant protection method with low preparation inputs.
- Continually update the recommended procedure and criteria for the use and selection of preparations suitable for the integrated plant protection systems (see the Phytosanitary Portal).
- Ensure the routine monitoring of pest populations resistant to the active substances authorized in the CR, and on the basis of its results, introduce a system for updating the so-called anti-resistant strategies for the use of preparations.
- Continue to develop and upgrade the system of area-wide plant pest monitoring and develop and update predictive models of their occurrence, focusing on easy accessibility of information to users in a comprehensible and clear form.
- Continue to support organic production, allow compensatory restrictions of the crop production requiring the use of PPPs in the basins of water reservoirs (especially technical crop production), promote integrated plant protection and prioritize research and development of non-chemical methods of plant protection.
- Develop tools and means to support and develop integrated plant protection.
- Ensure the functioning of a flexible preparation authorization system within the so-called minor use to the extent will be able to provide sufficient protection against plant pests while maximizing the use of the targeted financial support of the European Commission and the logistics of the European and Mediterranean Plant Protection Organization.

Specific indicators of meeting the sub-objective:

- number of natural persons accredited within the consultancy system of the MoA as a phytosanitary consultant,
- number of preparations authorized in the CR suitable for organic farming systems, integrated plant production and integrated plant protection with low environmental burden,
- number of so-called minor uses of preparations authorized in the CR,
- number of training courses in support of integrated plant protection intended for agricultural entrepreneurs,
- number of agricultural entrepreneurs taking part in professional seminars to promote integrated plant protection.

B. Quantitative evaluation indicators for meeting the NAP objectives

1. Residues in foodstuffs of plant origin and in plant raw materials intended for the production of food grown and produced in the CR shall be reduced by 2020 by 10% compared to the average in the reference period 2009–2012, taking into account the deviations resulting from progress in the development of analytical technologies.[12]

   Assessable parameter: the proportion of samples from all samples taken by the CAFIA in order to find residues from foodstuffs of plant origin and raw materials for their production originating in the CR without the occurrence of residues, the number of samples taken and analysed. In this regard, it is necessary to indicate separately the outputs from random checks (the actual error rate) and from checks based on complaints (checks aimed at suspicious areas).

2. Reducing the number of bodies of groundwater with an inappropriate chemical status due to the exceeding the environmental quality standards[13], based on the presence of residues[14] "with the exception of residues of preparations already unauthorized in the CR".

   Assessable parameter: number of bodies of groundwater.

3. Reducing the number of surface water bodies which, based on the presence of residues, do not achieve a good chemical status due to exceeding the environmental quality standards or do not achieve good ecological status or good ecological potential as a result of non-compliance with one or more environmental quality standards, "with the exception of residues of preparations already unauthorized in the CR".

   Assessable parameter: number of surface water bodies

4. Reduction in the number of inhabitants supplied with drinking water with over-limit PPP residues compared to 2017, incl. inhabitants supplied from individual sources.

   Assessable parameter: number of supplied inhabitants in the distribution areas with excessive content of PPP residues, number of inhabitants supplied from individual sources with excessive content of PPP residues

5. Increase in the number of drinking water distribution areas with targeted residue monitoring compared to the reference year 2017.

[12] According to the CAFIA, due to technological progress, the number of measurable (detectable) active substances of the preparations and their metabolites will increase (an increase of about 10 substances each year), but the detection sensitivity level will still be set the same (with sensitivity differences depending on the purpose of use of the raw material or foodstuff – e.g. difference for the same raw material intended for the production of baby food and intended for other purposes).

[13] Environmental quality standard (EQS) means the concentration of a substance or group of substances in water, sediments or living organisms, which must not be exceeded due to the protection of human health and the environment. The EQC for surface waters is laid down in Government Decree No. 61/2003 Coll., for groundwater in Decree No. 5/2011Coll.

[14] Taking into account the deviation due to the occurrence of residues of preparations already unauthorized in the CR in the monitored period (the so-called "old burdens").

Assessable parameter: number of distribution areas with targeted monitoring of PPP occurrence in drinking water.

6. Increase in the number of water treatment plants with the targeted PPP residue removal technology compared to the reference year 2017.

Assessable parameter: number of water treatment plants with the added technology.

7. Extending the use of biological plant protection

Assessable parameter: increase in the number of applications for the subsidy programme 3.a) biological protection as a substitute for chemical plant protection.

C. General indicators for meeting the NAP objectives

In addition to the specific indicators of performance of some NAP sub-objectives (see Part A.), the following general indicators are considered as indicators for meeting the NAP objectives:

- number of natural persons with valid first, second and third degree certificates on professional competence for handling preparations pursuant to Section 86 of the Phytosanitary Act,
- number of trained instructors, or persons authorized by the MoH to provide knowledge regarding the protection of human health (pursuant to Section 86a of the Act)

4. Measures to ensure the achievement of the NAP objectives and sub-objectives

In general – for all objectives and sub-objectives:

4.1 By 2022 the MoE, the MoA and the MoH, including the subordinated departmental offices and organizations will ensure the improvement of the monitoring system for the impact of preparations on the environment and non-target organisms (in compliance with the indicators of the NAP objectives fulfilment), especially focused on:

- collecting information on cases of acute and chronic poisonings of people caused by preparations (MoH);
- establishment of an integrated system for monitoring the cases of proven wild animal poisoning, damages to plants or habitats caused by preparations, including a uniform methodological procedure, categorization of poisonings or damages with regard to the use of the preparations, and the cooperation of the competent authorities and institutions (MoA and MoE);
- updating of the training to acquire professional competence for handling preparations (mainly the basic courses and additional trainings - scope, content, etc.).

4.2 The MoA will continue to ensure through the Institute, with the participation of the MoH and in cooperation with the scientific research base[15], universities and professional non-governmental organizations the preparation of information programmes and documents for professional users of preparations, other authorized persons and the public, and their publication remotely, through the Internet Phytosanitary Portal aimed at correct and safe use of the preparations and at promoting the use of integrated plant protection systems and non-chemical methods for professional users of preparations, and at the continually updated results of pest monitoring. In the coming years, the current Phytosanitary Portal will focus on the gradual interconnection with other usable information technologies and expert information at the NIPH website, in particular on:

- gradual updating of crop-specific IPP methodological procedures for other crops, including ornamental plants and forest wood,
- development and transfer (linking) of existing applications of the Institute regarding monitoring, forecasting and warning to the Phytosanitary Portal,
- development and transfer (linking) of existing applications of the Institute regarding plant protection products to the Phytosanitary Portal,
- further development and regular updating of the information on pest resistance of to the active substances of preparations in the CR and on the available anti-resistant strategies,
- building an Internet phytosanitary consultancy centre (linked to accredited phytosanitary consultants) www.agroporadenstvi.cz/registr/
- creating the option of the portal user's own profile - automatic sending of current information, local connection to monitoring results with possibilities of forecasting and warning on pest occurrence.
- building closer links with the scientific research base and universities, including the addition of references to the related information systems of these entities.

[15] These are "public research institutions" according to Act No. 341/2005 Coll., on Public Research Institutions, as amended, or on "research organizations" pursuant to Act No. 130/2002 Coll., on the Promotion of Research, Experimental Development and Innovation from Public Funds and on the Amendment to Certain Related Acts (Act on the Support of Research, Experimental Development and Innovation), as amended.

4.3 By 2022 the MoA in cooperation with the Institute, professional associations of professional users of preparations and with non-governmental organizations will ensure the optimization of plant protection consultancy in order to focus on obtaining and transferring information on usable methods of environmentally friendly plant protection towards:

- supporting the monitoring of pests at regional and local level by professional users of preparations and plant protection consultants; the establishment and operation of consultancy centres focusing on the replacement of toxic preparations preferably with non-chemical methods or with preparations less toxic;
- supporting the demonstration of functional and economically viable non-chemical methods and methods with low input of preparations;
- providing balanced consultancy on the use of preparations in setting up and maintaining public and private green areas.

The implementation of this measure will be based on the inclusion of phytosanitary consultancy in the forthcoming Rural Development Programme of the CR for the years 2018–2022, and on the
analysis of the existing national agricultural consultancy systems that are relevant to or can be used in the field of integrated plant protection, and on the recommendation on how to optimize support for usable consultancy through the use of non-public and public resources.

4.4 The MoE will actively support the applied research on the impact of the PPP use on non-target growths of plants, invertebrates and vertebrates.

4.5 The Institute will propose general legal amendments to conditions for the sale of preparations to end-users, especially non-professional users of preparations; with the solution of the requirements for online sale and its control. It is essential to strengthen the control of the PPP "black market" (without registration) by means of an electronic register of license holders, distributors and agricultural primary production via electronic codes. The Institute and the NIPH will, as needed, raise awareness towards producers and distributors to explain the labelling requirements, especially emphasizing the meaning of the batch number and the production date of the formulation producer as the basic element of traceability of origin for inspection and supervisory activities of the Institute. The Institute will, as needed, raise awareness of producers, distributors and professional users of preparations about legislative changes and the possibilities connected to the gradual preparing for the use of the electronic register of preparations for professional users via electronic codes.

4.6 The Institute and the CCPA will continuously focus on the area of detecting preparations unauthorized in the CR when they are imported, relocated to the CR and sold, including greater involvement of the Customs Administration and the Police.

4.7 The MoA analyzes in cooperation with representatives of secondary agricultural schools and universities and in cooperation with the MoH (or the NIPH) the scope and quality of phytosanitary education (framework educational programmes, study programmes) at agricultural secondary schools and universities, both in connection with the further continuation of phytosanitary specialization, and especially given the sufficient awareness of all graduates of secondary schools and agricultural universities about the importance and the main principles of phytosanitary care in relation to human health, animal health and the environment.

4.8 The MoA in cooperation with the MoH analyzes the possibility to include the following in the system of professional phytosanitary education using EU support grant programmes for rural development after 2017:

- primary courses and additional training for agricultural entrepreneurs, the completion of which is set by the Phytosanitary Act to obtain the certificate on professional competence for handling the preparations;
- consultancy canters created by implementing Measure 4.3;
- university agricultural or forest farms pursuant to Act No. 111/1998 Coll.[16], and school farms according to Decree No. 108/2005 Coll.[17]

4.9 The MoA, in co-operation with the CAAS continuously formulates the phytosanitary research priorities focusing on:

- (in cooperation with the MoH and the MoE) methods for the assessment of the risks related to the use of preparations to human health, non-target organisms and the environment, methods for monitoring these risks, and for developing methods and measures to manage (eliminate) these risks,
- improvement of integrated plant protection systems for individual crops or groups of crops,
- developing and updating economic harm thresholds of pests,
- developing non-chemical methods, methods with low preparations inputs, including breeding of plant genotypes with high resistance to biotic factors and development of anti-resistant strategies.

4.10 The MoA, the MoH and the MoE will establish a system for mutual cooperation and coordination in setting the priorities of research aimed at plant and plant products protection, or the impact of preparations on human health and protection of non-target organisms, or at the protection of surface and groundwater, especially water resources.

4.11 The MoA in cooperation with the CAAS, professional associations of professional users of preparations, and with professional associations will analyze the procurement and evaluation system of phytosanitary research projects and, according to the analysis result, proposes changes in this system in order to increase the efficiency of research by its focus on topics with higher utilization of research results in agricultural practice, and taking into account the needs arising from the change of phytosanitary legislation.

4.12 The MoA in cooperation with the Institute, the CAAS, departmental research institutes and agricultural universities will link, on the basis of the carried out inventory, the issued certified methodologies and other results of an application nature (utility models, patents, technologies, semi-operations, etc.) on plant protection as results of the MoA projects (and other providers' projects, including institutional support results) with IT systems, and will ensure their publication by remote access, or their use for a fee.

In the field of human health protection:

4.13 In cooperation with the Institute, the MoA prepares the national policy principles in the area of substitutions of plant protection substances to be replaced with regard to human health and environmental protection (in particular those set out in the Commission Implementing Regulation (EU) 2015/408 and in Part E of the Annex to Commission Implementing Regulation (EU) No. 540/2011, as amended.

[16] See § 35 para. 1 of Act No. 111/1998 Coll., on Higher Education Institutions and on Amendment and Supplement to Other Acts (Higher Education Act), as amended.

[17] See § 13 of Decree No. 108/2005 Coll., on School Educational and Accommodation Facilities and School Purpose Facilities, as amended.

4.14 The Institute continuously edits the list of preparations authorized in the CR.

4.15 The MoA, in co-operation with the Institute, will continue to ensure ongoing, up-to-date and appropriate education of professional users of preparations and the public and the appropriate scope of post-authorization control of the professional use of preparations in areas most at risk for human health, especially in areas used by the general public or vulnerable groups of inhabitants[18] and in their surroundings, including the areas of establishment and maintenance of public and private green areas, storage of harvested plants and plant products.

4.16 By 2022 in close co-operation with the MoE and the Institute, the MoA will prepare information and its regular update for distributors selling preparations for non-professional users on the legal requirements for handling the packaging from preparations, on which, in accordance with valid regulations, the distributors are obliged to instruct when selling the preparations to non-professional users of the preparations.

4.17 The MoA in cooperation with the MoE will ensure an adequate form of education for all groups of professional users, distributors of preparations for professional use regarding their handling obligations, or disposal of the packaging from the preparations.

4.18 The MoE in cooperation with the MoH will analyse the possibility of decontaminating the packaging from the preparations and their subsequent recycling or re-use, e.g. energy utilization, including the inventory of the quantity of packaging from the active substance preparations, which can be decontaminated from the packaging.

4.19 The MoA in collaboration with the Institute and the NIPH (primarily the designated educational establishments) will support the introduction of the closed transport and dosing systems for plant protection products in order to increase operator safety, devices for application and reduction of environmental pollution and management of health risks. It will also promote the introduction of cleaning devices, aids and tools for external and internal cleaning of application devices after finishing the application of preparations, including devices preventing waste water contamination by rinsing pesticide residues.

In the field of water protection:

4.20 The MoE will consider the need to issue a new Decree setting out the list of water reservoirs and the principles for establishing and modifying the protection zones of water resources taking into account the forthcoming changes regarding compensation for damage to owners or tenants as a result of the constraints resulting from the SPZ mode, even in connection with the possible extensive update of the historically demarcated HPZ zones.

4.21 The MoE, as the administrator of the register of water resource protection zones, pursuant to Section 22 of the Water Act, will complete the updating of the register of known protection zones (SPZs and HPZs) during 2018 and after 2018 will periodically update this register. The MoE will provide data from this register in the appropriate data layer for the purpose of updating in the LPIS (soil register) of the MoA, Department of Information and Communication Technologies.

[18] For more information see ECPA information: http://www.ecpa.eu/article/pesticide-use/roadmap-establishing-container-management-programme-collection-and-disposal-em

4.22 The MoA and the Institute in cooperation with the CHMI will provide water managers with uniform methodological rules for targeted residue monitoring in surface and groundwater used to supply the population with drinking water based on the knowledge of the applied preparations, structure of crops, and available information on the occurrence of residues so far.

4.23 The MoE in co-operation with its departmental organizations and the Institute will prepare the principles for the monitoring of residues in surface and groundwater within the situational, operational, or exploratory monitoring of surface and groundwater in the CR. The principles will include a simple computational programme for calculating the priority index for the inclusion of a particular pesticide or metabolite in the monitoring. In addition, by 2020 it will introduce the method of reciprocal data transfer between the CISTA and the CHMI/ water catchment area administrators, public health protection authorities and drinking water producers on the occurrence of residues in surface and groundwater in the form of a common database and its regular updating min. twice a year (e.g. the Arrow information system, Pesticide Passportisation). Part of the system will also include the transmission of information on the occurrence of residues in surface, groundwater and drinking water between the CHMI, Povodí enterprises, the Institute, drinking water producers and the CEI. When designing the system, the current registers will be taken into account and used as much as possible.

4.24 The MoE will ensure a regular review and continuous updating of limits for the evaluation of the occurrence of pesticide residues and their metabolites in surface waters. The revision of the limits depends on the development of EU legislation (determination of environmental quality standards – EQS), which are binding for the MoE in terms of assessing the condition of surface water bodies.

4.25 The Institute will ensure a continuous system of controls of the observance of the correct principles of use of preparations both in the framework of the planned inspections of the entities operating on the land in the SPZs and neighbouring with bodies of surface waters, as well as in connection with the complaints sent in connection with the detection of over-limit concentrations of residues of preparations in drinking water sources (surface, underground).

4.26 Examine the options for introducing a system of a mandatory electronic register of PPP use available to ensure the protection of drinking water resources, including technical and legislative measures – a task for the MoA in cooperation with the MoH, the MoE, the Institute and the NIPH.

4.27 The MoA in cooperation with the Institute, the MoE and professional interest associations continuously updates the risks of preparations in regard to the contamination of surface and groundwater and shall take the result into account in the development of criteria for the evaluation of preparations in regard to excluding or limiting their use in SPZs and on lands forming the water catchment area of surface and groundwater bodies with over-limit PPP residues.

4.28 By 2020 the MoA in cooperation with the Institute, and the research organizations will prepare the principles of farming in the SPZs of drinking water sources and the bodies adjacent to the bodies of surface water, as well as on the lands forming the water catchment area of bodies of surface and groundwater with over-limit PPP residues based mainly on agro-technical measures (soil cultivation, sowing method), taking into account the specific geological, terrain and climatic conditions, type and nature of the soil, focusing on the

principles for the use of the preparations applied on the soil (before sowing, before emergence, soon after emergence), especially herbicides, in terms of surface and groundwater threats, either in sloping terrain or in places with increased risk of rapid infiltration of water into the soil in connection with agricultural drainage systems. Preventive measures for soil protection will be included to reduce the risk of the PPP leaching (anti-erosion measures, compaction, organic matter content and humus content). The support of research projects in this area will be an integral part of the measure. The abovementioned will be linked to the authorization of usable preparations, especially in SPZs using the provisions of Section 38b of the Phytosanitary Act. By 2018 the MoA will carry out an economic analysis of the impact of the measures proposed in the SPZs on farming entities and will prepare a proposal to take these impacts into consideration in the CR's subsidy policy.

4.29 The Water Act in Section 39 regulates the handling of harmful substances. For specific use and information of professional users of the CISTA it indicates in their authorizations for which applications the plant protection products are authorized. Based on the observation of the behaviour of the preparations in these applications, the Institute will proceed to the possible regulation of the authorization of use of these preparations.

4.30 By 2020 the MoA will examine the possibilities of systematically supporting soil-forming measures (reduction of compaction, anti-erosion measures, maintenance of organic matter and humus content) in terms of water protection against the release of PPP residues.

4.31 By 2020 the MoA will examine the possibilities and, possibly, will introduce a system of targeted subsidy support for technical measures to reduce the residue content of preparations in the production of drinking water in locations where it will not be possible to achieve a sufficiently effective reduction of PPP concentrations by applying appropriate agro-technical measures.

4.32 The MoA in cooperation with the MoE will determine space and time-defined lands where the use of the preparations presents a higher risk for non-target organisms and the environment (so-called "hot spot management"), specific environmental conditions (e.g. areas with high watercourse density, high soil permeability, protection zones of drinking water sources) using already existing database and information systems – e.g. Arrow – pesticide passportisation managed by the CHMI.

In the area of reducing the risks associated with the use of preparations in terms of non-target organisms and areas of importance for nature and landscape protection:

4.33 By 2021 the MoE will prepare the principles for the application of measures to minimize the risks of application of preparations for the environment, non-target organisms and biodiversity. By 2022 the MoA in cooperation with the MoE will carry out an economic analysis of the impact of the proposed measures on farming entities and will prepare a proposal to take these impacts into consideration in the CR's subsidy policy.

4.34 In order to obtain support for livestock production from the State Agricultural Intervention Fund, an applicant farming in the water catchment area of a water reservoir where there is a proven over-limit occurrence of pesticides in water used for human consumption, will be favoured. Livestock production with preferential support must be based primarily on its own feed base grown using minimum quantities of PPPs (for example, legumes and perennial crops).

4.35 On the basis of the results of the post-authorization inspection, research results and practice responses in the case of confirmation of the negative effect of the preparations on non-target organisms, the Institute will regularly evaluate the risks of using certain groups of preparations and their mixtures with regard to their possible negative impact on non-target organisms, and will regularly inform the MoA, the MoE and, if necessary, directly the agricultural practice, e.g. in the form of purposefully organized seminars, including their publication by remote access.

4.36 In cooperation with the Institute, the MoE will create a simple and rapid system for the publication of information on the territorial delimitation of protected areas and the locations of occurrence of species sensitive to the PPPs, and on the conditions and recommendations for the use of preparations in these territories, so that professional users of preparations are able to easily obtain and verify the relevant requirements; the system should be based on the already verified forms, e.g. under the cross-compliance regime, the FARMÁŘ/FARMER portal, etc.).

4.37 The MoA in cooperation with the Institute, the State Veterinary Administration, the BRI and the Beekeepers Association will by the end of 2019:

- analyse the extent of use of preparations that are high-risk for pollinators, such as foliar insecticides, insecticidal granules, insecticidal disinfectants and other preparations, and in relation to the risk of mass poisoning of bees, according to the results will assess the need for accepting further measures to eliminate risks;
- consider the proposal to amend Decree No. 327/2012 Coll., on the protection of bees, game, aquatic animals and other non-target organisms in the case of use of plant protection products and, as appropriate, will propose legislative adjustments to potentially improve risk management for pollinators in the case of professional treatment of seed and planting stock, including certification, and in the case of subsequent handling and sowing of treated seeds/planting stock in agricultural primary production;
- consider the applicable law on seed and planting stock and the implementing decree and their coherence with the valid Phytosanitary Act and the implementing decree in the stated matter. Based on the outcome of the legal-phytosanitary assessment, it may propose legislative amendments to the EU and the CR standardisation of the marking of the package tags/labels for treated seed/planting stock taking into account risk management for pollinators and other non-target organisms;
- in cooperation with crop associations () analyse changes in the pest occurrence intensity, changes in the intensity of use of different insecticidal applications, especially in rape, maize, poppy, sunflower, etc.;
- consider the legislative possibilities in the mechanization decree, in the Act on Phytosanitary Care (chapter mechanization means), and in the draft decree on amending Decree No. 327/2012 Coll., on the protection of bees, game, aquatic animals and other non-target organisms when using plant protection products, where it is possible to respond to technological development and possibilities in the equipment of mechanization means.

4.38 The MoA and the MoE in cooperation with the Institute, the State Veterinary Administration, the Forestry and Hunting Research Institute and the Czech Hunting Association will until the end of 2019:

- review the existing legislation on the protection of non-target vertebrates when using preparations and will update it, so that the legislative requirements are realistic for

both professional users of preparations and for supervisory authorities, and reflect the current level of risk with regard to lower toxicity of authorized products.

In the area of optimizing the use of plant protection products without limiting the extent of agricultural production and quality of plant products:

4.39 The MoA continuously ensures that the recommended methodological procedures to support the application of the general principles of integrated plant protection for specific crops:

- were preferably created or verified by institutions involved in phytosanitary research;
- were created on the basis of real economic and other objective conditions of crop production in the CR, were as simple as possible, controllable and flexible; before official publication the factuality of economic and other objective comments should be objectively professionally and practically opposed, in particular, by representatives of the holders of product authorizations for the IPP and for organic farming.

4.40 In co-operation with the scientific research base, the relevant ministries shall continuously ensure adequate support:

- of the development of anti-resistant preventive strategies in plant protection and (especially) their application in practice, including the introduction of varieties resistant to biotic factors (MoA);
- of the development of expert systems (mainly using software and remote data transmission) for prediction of plant pest occurrence and decision-making tools on plant protection and their application in practice (MoA);
- of the development of functional and economically viable non-chemical methods and plant protection products, especially for crops harvested for direct consumption (MoA);
- of optimizing the diagnosis of plant pests by promoting the introduction of faster, more sensitive and more specific diagnostic methods (MoA);
- of the development and standardization of methods for determination of residues in raw materials, food, feed, water and soil (MoA, MoH, MoE);
- of the development of methods for the assessment of the preparations risks to human health and environment (MoH, MoE) in line with the EFSA and EU Commission positions.

4.41 By 2018 the MoA in cooperation with the Institute, the scientific research base, educational organizations, professional associations of professional users of preparations and non-governmental (ecological) organizations will ensure the establishment of a system for practical demonstration of new and updated methods of integrated plant protection within the framework of vocational training in plant protection and certification of consultants using the so-called "demonstration farms" project.

4.42 By 2021the MoA in close cooperation with the Ministry of Education, Youth and Sports (MEYS) shall update the curricula of secondary schools and universities in all fields of agriculture and forestry aimed at plant cultivation focusing on ways of eliminating the risks associated with the use of PPPs, the introduction of non-chemical methods and methods of protection with low inputs of preparations, in particular information on usable methods of environmentally friendly plant protection, including integrated plant protection and organic farming. These curricula (in particular the educational parts concerning health protection) will then be submitted to the MoH for consideration.

4.43 From 2019 the MoA in cooperation with the MoH, or the National Institute of Public Health, the Czech Plant Protection Association and in cooperation with the research and development base will prepare a flexible system of authorization of preparations under the so-called minor use to the extent that will be able to provide sufficient protection against plant pests. The system will maximally use the targeted financial support of the European Commission and the logistics of the European and Mediterranean Plant Protection Organization.

4.44 Through the Institute the MoA will ensure the operation of a system of area-wide plant pest monitoring, forecasting of their occurrence and signalling of protective interventions to the extent appropriate to the needs of agricultural practice, using to the maximum extent modern technologies and providing current outputs for farmers in the most transparent form, online and with the the best relevance.

5 Material and financial implementation of the NAP

Implementation of a large number of individual NAP measures poses high institutional securing requirements. The Phytosanitary Council will be used to professionally support the MoA activities; it was established pursuant to Section 71, para. 1 point d) of the Phytosanitary Act, and in particular the coordinating working group for the preparation of the NAP, which has been working under the coordination of the MoA since 2011. It will be possible to delegate, for example the following tasks to the Coordinating Working Group (CWG), which will have the status of an advisory body to the director of the MoA specialized department:

- co-operation in further specification and updating of tasks,
- drawing up opinions on individual draft decisions,
- evaluation of the experience gained during the implementation of the measure,
- recommendations for further programme development,
- assessing the achievement of measurable targets.

The implementation of the NAP objectives assumes the expenditures of an investment nature at the MoA in the range of approximately CZK 8 million per year for the equipment and renewal of laboratory equipment and instruments necessary for the analysis of samples of preparations and for testing of preparations and other means in field, greenhouse and laboratory conditions, and the modification of database systems. For the introduction of modern technologies in the system for the area-wide monitoring of plant pests, the MoA will need the investment costs of approximately CZK 50 million spent gradually during the years 2019–2022. To carry out inspection activities at the MoA connected with the prepared inspection of the electronic form of the register of preparations and auxiliary means for professional users, the MoA may need the investment costs of up to CZK 3 million spent gradually during 2020–2022 (i.e. funds intended mainly to extend software – e.g. the MoA Farmer's Portal etc.) – adding functionality by creating compatibility with the smart phone 2D code reader on labels/packaging of preparations and auxiliary means for professional users to improve the efficiency of the performance of inspection and control activities of the state administration.

The implementation of the NAP objectives for completing the electronic register of land in the SPZs for agricultural primary production and state administration at the inter-departmental level assumes the expenditure of an investment nature at the MoE within the range of approx. CZK 2 mil.

For the implementation of the NAP objectives following Brexit and the strengthening of the evaluation role of the CR as an EU Member State in areas of the EU evaluation of active

substances and the EU zonal evaluation of preparations, the NIPH can require up to CZK 5 million.

The NAP has been implemented since 2013. An interim evaluation of its performance is expected twice a year based on the minutes of the CWG meeting. An annual report on the implementation of the NAP is prepared once a year and presented at the level of ministers of agriculture, health and environment for information. The NAP update will be prepared on the basis of a draft submitted by the ministers of agriculture, health and environment to the government for approval by a resolution no later than every 5 years.

The fulfilment of the NAP is based on the existing system of state supervision over the fulfilment of the obligations arising from the legal regulations; the instruments for fulfilling the NAP thus determine the focus of control activities of the supervisory bodies, especially the Institute and the Czech Environmental Inspectorate. A number of NAP measures are aimed at increasing the effectiveness of existing control activities, e.g. through the mutual exchange of information on monitoring results, therefore, no more costs are expected in this area.

The costs of fulfilling the statutory obligations arising from the need to implement the provisions of Directive 2009/128/EC and the impacts on the entities concerned are already outlined in the explanatory memorandum to the amendment to the Phytosanitary Act[19] transposing Directive 2009/128/EC. Costs related to the obligations of municipalities under Section 52 of the Phytosanitary Act are already spent by municipalities in connection with the application of the preparations. Plant commodity producers and other professional users of preparations will be burdened with the cost of mandatory application of the general principles of integrated plant protection and with the modification of the system of certification of the so-called professional competence for handling the preparations.

However, requirements for additional expenditure may arise during the implementation of the NAP on the basis of the results of ongoing analysis and the evaluation of the effectiveness of the instruments set by the NAP. In the preparation of the budget, adequate funds must be required each year into the budgets of the MoA, MoH and MoE.

To cover the costs of transferring expertise and information to support trainings for farmers as a condition for obtaining the certification of professional competence for handling the preparations and for the completion of the professional consultancy system for plant protection, the main source of funding are the resources of the Rural Development Programme of the CR for the years 2014–2020 to the extent determined by the result of the current amendment of the relevant EU regulations. Specifically, the provisions of Articles 12 to 14 of the proposal for the Regulation (EU) No 1306/2013 of the EP and of the Council on the financing, management and monitoring of the common agricultural policy, which establishes the obligation for MSs to introduce an agricultural consultancy system. It also concerns the proposal for the Regulation (EU) No 1305/2013 of the EP and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD), which assumes support for measures under Article 14 "Knowledge transfer and information actions" and Article 15 "Consultancy, management and support services for agriculture". This is a direct non-repayable support and the co-financing rate of a MS is 25%. The funds for co-financing the EU subsidy are allocated in the framework of the implementation of the Rural Development Programme of the Czech Republic in the budget.

[19] Act No. 199/2012 Coll., amending Act No. 326/2004 Coll., on Phytosanitary Care and on Amendment to Certain Related Acts, as amended, Act No. 455/1991 Coll., on Trade Licensing (Trade Licensing Act), as amended, and Act No. 321/2004 Coll., on Viniculture and Viticulture and on the Amendment of Some Related Acts (Act on Viniculture and Viticulture), as amended.

6 Conclusions

In accordance with Article 4 of Directive 2009/128/EC of the EP and of the Council establishing a framework for Community action to achieve a sustainable use of pesticides, the National Action Plan to ensure the safe use of pesticides is a set of measures, through which the programme to reduce the adverse impact of plant protection products on human health and the environment is implemented in the CR. The NAP includes two main objectives:

- reducing the risks associated with the use of preparations in the areas of human health protection, water protection and environmental protection, optimizing the use of preparations without limiting the extent of agricultural production and the quality of plant products;
- follow-up sub-objectives and time-bound measures to ensure that they are met.

As the quantitative indicators of the NAP fulfilment, the NAP sets the reduction of the ratio of samples with findings and without findings of residues in food and water carried out in the reference period 2018–2022. Another quantitative indicator is the reduction of the area of groundwater bodies, or the number of surface water bodies where environmental quality standards have been exceeded due to the presence of residues.

An interim evaluation of the NAP implementation is expected twice a year, and the annual report on the NAP implementation is being prepared once a year. The report is presented to ministers for agriculture, health and environment for information. The NAP update is prepared on the basis of a draft submitted by the agriculture, health and environmental ministers to the government for approval by a resolution no later than after five years.

Glossary

Organic farming is a sustainable agricultural production system that uses environmentally friendly ways to control weeds, pests and diseases, prohibits the use of synthetic pesticides and fertilizers, ensures the overall harmony and biodiversity of the agroecosystem, and prioritises renewable energy and recycling of raw materials.

Fungicide is a plant protection product designed to control the originators of plant fungal diseases.

The herbicide is a plant protection product designed to control weed plants.

Insecticide is a plant protection product designed to control animal pests of plants from the class of insects.

Integrated Plant Protection (IPP) is a set of measures that, after considering all available plant protection methods, suppress the development of pest populations, support natural pest control mechanisms and reduce risks to human health and the environment. IPP is part of integrated plant production.

Integrated Plant Production (IP) is the concept of sustainable agriculture that is based on the use of natural resources while applying regulatory mechanisms to replace polluted inputs. Emphasis is placed on a complex system approach, the central role of agro-ecosystems and the balanced nutrient cycle. The used agro-technical measures of a preventive nature and the biological, physical and chemical methods used are balanced with respect to environmental protection, farmer's profitability and social requirements. Integrated plant protection is part of the IPP.

Pesticide is

a) a plant protection product as defined in Regulation (EC) No. 1107/2009 of the EP and of the Council;
b) a biocidal product as defined in Directive 98/8/EC of the EP and of the Council of 16 February 1998 concerning the placing of biocidal products on the market.

Plant protection product is a mixture or solution composed of two or more substances and is intended for use as plant protection products.

Residue is a substance present in or on plants or plant products, in edible products of animal origin or drinking water, or present elsewhere in the environment as a result of the use of plant protection products, including metabolites of these preparations and products resulting from their decomposition or reaction.

Rodenticide is a plant protection product designed to control rodents as plant pests.

Zoocide is a plant protection product designed to control animal pests of plants.

Overview of abbreviations used:

AISF	Association for Integrated Systems of Fruit-Growing
BRI	Bee Research Institute
CAAS	Czech Academy of Agricultural Sciences
CAFIA	Czech Agriculture and Food Inspection Authority
CCPA	Czech Crop Protection Association
CEI	Czech Environmental Inspectorate
CHMI	Czech Hydrometeorological Institute
CISTA	Central Institute for Supervising and Testing in Agriculture (in the text “Institute“)
CR	Czech Republic
CWG	Coordination Working Group for the preparation of the National Action Plan
ECPA	European Crop Protection Association
EEA	European Environment Agency
EP	European Parliament
EPPO	European and Mediterranean Plant Protection Organization
EQS	Environmental Quality Standard
EU	European Union
EUROSTAT	Statistical Office of the European Union
GAEC	Good Agricultural and Environmental Conditions
ICD	International Statistical Classification of Diseases and Associated Health
IHIS	Institute of Health Information and Statistics of the Czech Republic
IP	Integrated Production
IPP	Integrated Plant Protection
MoA	Ministry of Agriculture
MoE	Ministry of Environment
MoH	Ministry of Health
MRL	Maximum Residue Limit
MS	EU Member State
NAP	National Action Plan on the Safe Use of Pesticides in the CR
NIPH	National Institute of Public Health
SPZs	Source Protection Zones
SVA	State Veterinary Administration
TIC	Toxicological Information Centre

Annex no. 1a

Comparison of the amount of detected residues of active substances of plant protection products and their metabolites in agricultural products under the controls of the Czech Agriculture and Food Inspection Authority (CAFIA) in the Czech Republic in 2012–2016[20]

a) Summary overview:

Years	**2012**	**2013**	**2014**	**2015**	**2016**
Total number of samples analysed	1017	872	839	852	911
Number of monitored pesticides (including metabolites)	405	410	421	423	444
Total number of samples with residue finding	668	521	532	528	574
Of which: **CR samples total / positive**	**245/136**	**245/123**	**243/131**	**217/114**	**236/131**
CR % positive samples	**55.5**	**50.2**	**53.9**	**52.5**	**55.5**
EU samples total / positive	570/403	476/295	434/291	490/325	508/339
EU % positive samples	70.7	62.0	67.1	66.3	66.7
Third countries samples total / positive	166/117	125/93	120/94	105/75	139/93
Third countries % positive samples	70.5	74.4	78.3	71.4	66.9
Country of origin not listed – total samples	36	26	42	40	28
Number of samples with exceeded Maximum Residue Limit (MRL)	**7**	**4**	**5**	**6**	**12**
Of which: CR samples	**3**	**0**	**1**	**3**	**4**
EU samples	4	2	2	2	3
Third countries samples	0	2	1	1	5

[20] Source: Czech Agriculture and Food Inspection Authority Records (http://www.szpi.gov.cz/fullTextSearch.aspx?nid=11386&searchNow=1&as_q=Zpr%C3%A1va+o+v%C3%BDsledc%C3%ADch+pl%C3%A1novan%C3%A9+kontroly+cizorod%C3%BDch+l%C3%A1tek+o+potravin%C3%A1ch).

Annex no. 1b

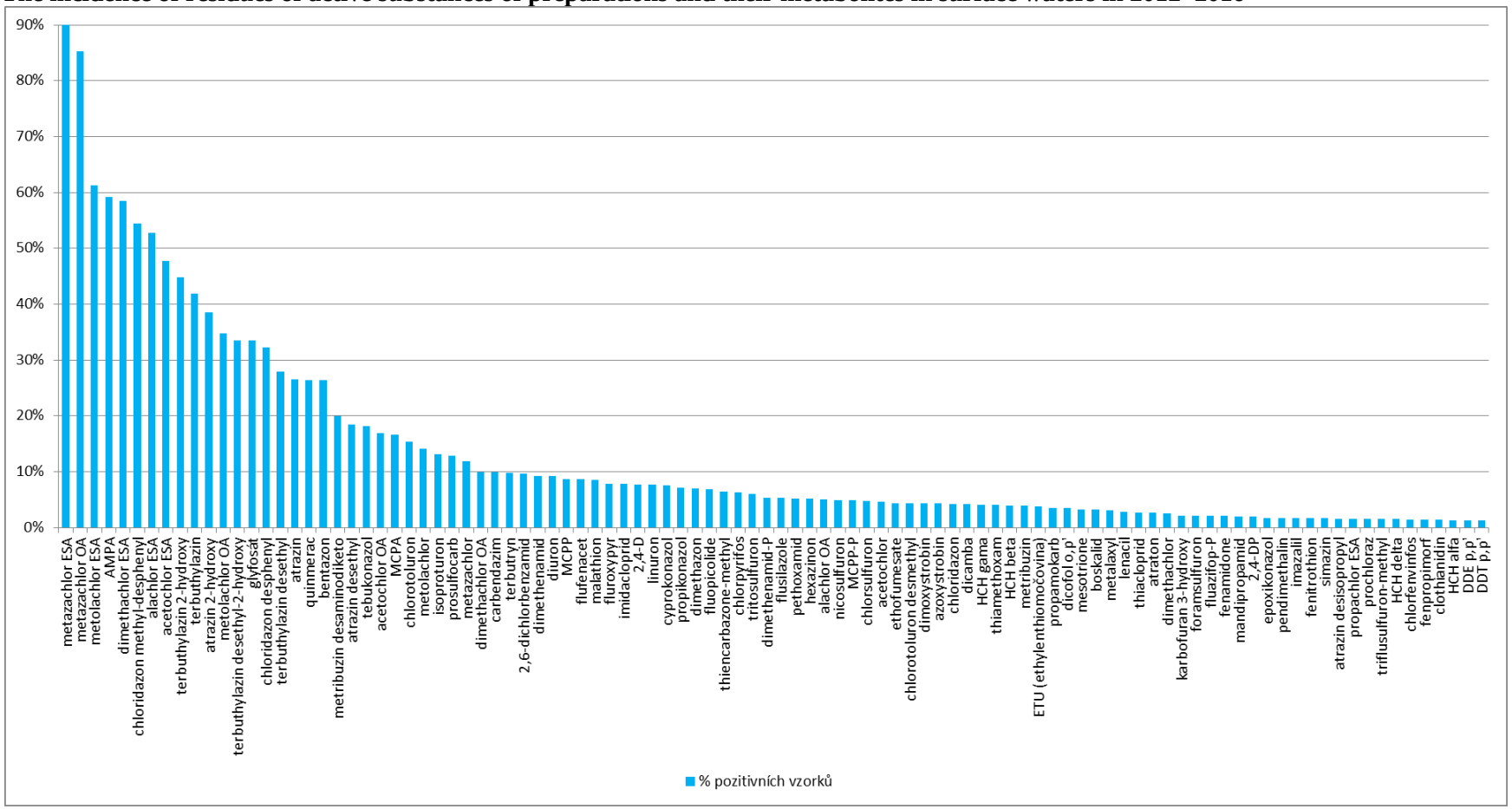
b) Overview according to selected commodities of plant origin:

Years		2012	2013	2014	2015	2016
Commodity	**Origin + number of samples analysed total / with positive / with over-limit occurrence of residues**					
Baby food	Total / over-limit occurrence of residues	12/ 0	12/0	12/0	8/0	15/0
Vegetables	Total / over-limit occurrence of residues	456/5	386/1	374/3	387/3	405/6
	CR total/positive/ over-limit occurrence of residues	**91/58/2**	**98/62/0**	**101/61/1**	**70/38/2**	**88/55/2**
	EU total/ over-limit occurrence of residues	317/3	265/0	252/2	293/1	286/3
	Third countries total/ over-limit occurrence of residues	48/0	23/1	21/0	24/0	31/1
Fruit	Total/ over-limit occurrence of residues	276/0	244/0	229/1	237/0	255/4
	CR: total/positive/ over-limit occurrence of residues	**19/16/0**	**27/26/0**	**24/22/0**	**36/33/0**	**34/25/1**
	EU: total/ over-limit occurrence of residues	163/0	136/0	130/0	135/0	147/0
	Third countries: total/ over-limit occurrence of residues	94/0	80/0	75/1	65/0	74/3
Potatoes	Total/over-limit occurrence of residues	51/0	49/0	49/0	50/1	51/0
Cereals *(incl. rice)*	Total/over-limit occurrence of residues	92/0	87/0	90/0	88/0	91/0

Notes:
The number of samples is usually calculated from the percentage data reported by the CAFIA.
To simplify the overview, only the numbers of samples with over-limit occurrence of residues are reported in the table, except for the data on the vegetables and fruit commodities originating in the CR.

Annex no. 2

The incidence of residues of active substances of preparations and their metabolites in surface waters in 2012–2016[21]

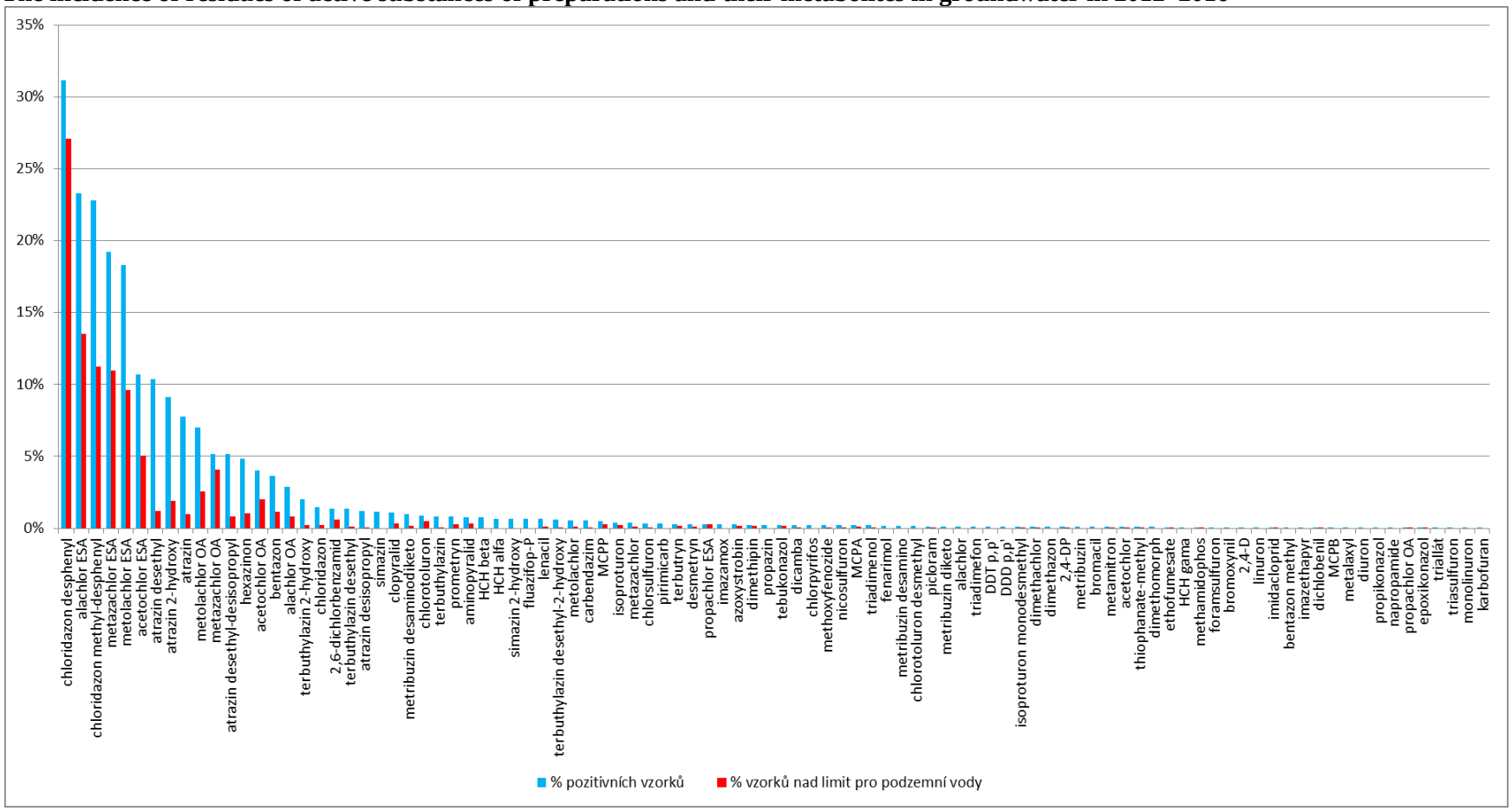


% positive samples

[21] Source: Vít Kodeš: Czech Hydrometeorological Institute, 2016.

Annex no. 3

The incidence of residues of active substances of preparations and their metabolites in groundwater in 2012–2016[22]

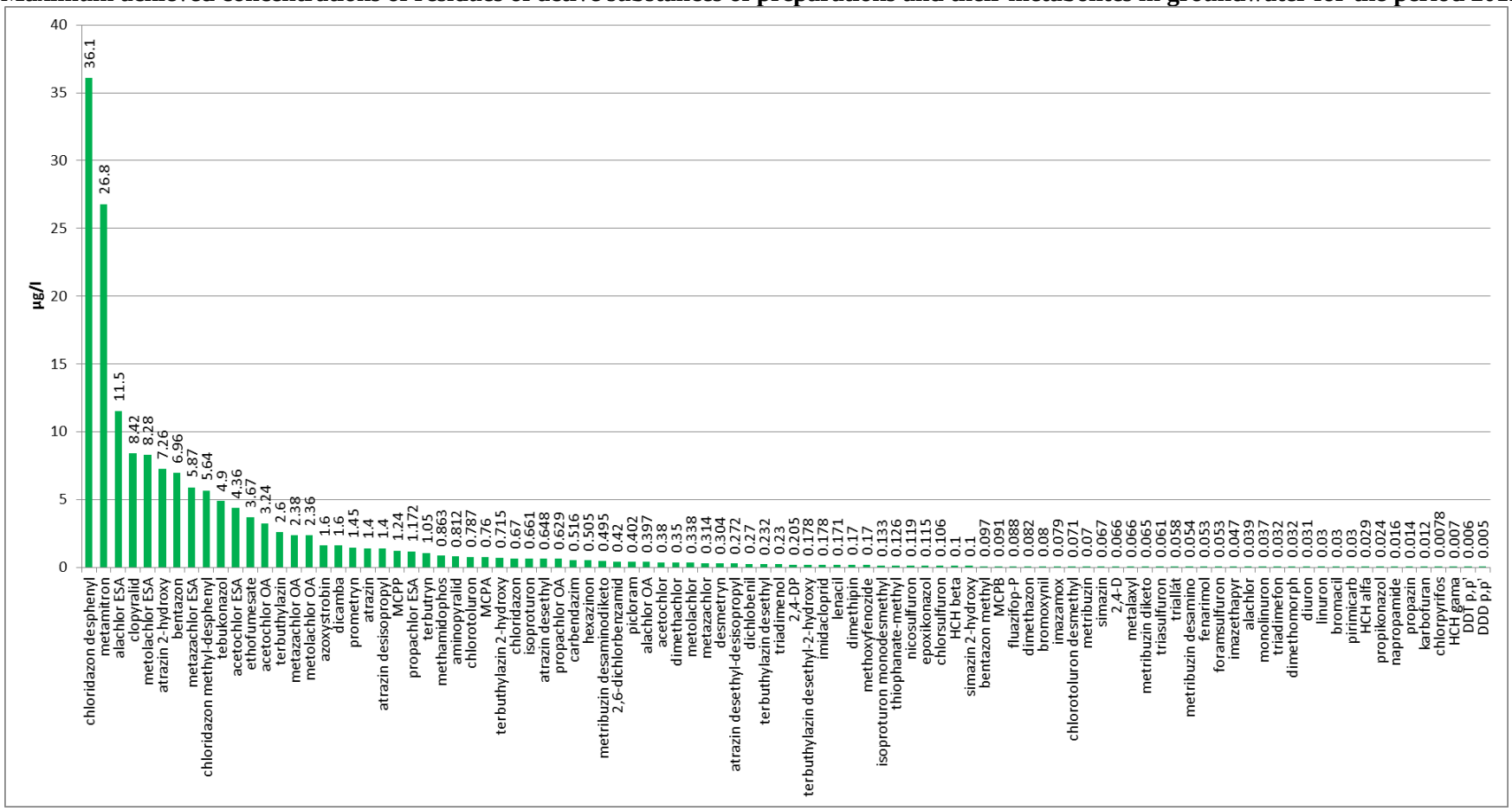


% positive samples % over-limit samples for groundwater

[22] Source: Vít Kodeš: Czech Hydrometeorological Institute, 2016.

Annex no. 4

Maximum achieved concentrations of residues of active substances of preparations and their metabolites in groundwater for the period 2012–2016[23]



[23] Source: Vít Kodeš: Czech Hydrometeorological Institute, 2016.