

Plant production, crop protection and pesticide use and legislation in the Bosnia and Herzegovina

Agricultural production in Bosnia and Herzegovina has a long tradition and is of great economic importance, but most production is still carried out in a conventional way, which involves the use of pesticides. The last few decades have seen an increased use of protective agents in plant production. As it is an extremely sensitive karst area (Herzegovina), the excessive and uncontrolled application of pesticides causes multiple negative effects on the components of the environment, which can lead to soil and water pollution, loss of biological diversity, affect the quality of food, and consequently human health. It is a fact that contamination of one area results in contamination of another. Therefore, the controlled application of pesticides and their sustainable use has become a priority of BiH policies.

The intensive use of pesticides also has negative effects on the economy, considering that through the process of natural selection due to the excessive use of pesticides over generations, resistance to pests and pathogens of agricultural crops can arise, and the effectiveness of protective means decreases. The positive environmental and economic effects of the controlled use of pesticides through the introduction of a system of alarming, education and raising the level of awareness of target groups, primarily agricultural producers, therefore has a positive effect on society as a whole.

As a potential candidate country for joining the European Union, in Bosnia and Herzegovina the process of harmonizing the national legislation with EU regulations in the field of agriculture and phytosanitary is underway. In Bosnia and Herzegovina, the field of plant health is regulated by phytosanitary regulations:

- The Law on Plant Health Protection ("Official Gazette of Bosnia and Herzegovina", No. 23/03),
- The Law on Mineral Fertilizers ("Official Gazette of Bosnia and Herzegovina", no. 46/04 and 76/11),
- The Law on Phytopharmaceuticals of Bosnia and Herzegovina ("Official Gazette of Bosnia and Herzegovina", number 49/04), the Law on Seeds and Planting Material of Agricultural Plants of Bosnia and Herzegovina ("Official Gazette of Bosnia and Herzegovina", number 3/05) and
- The Law on the Protection of New Varieties of Plants in Bosnia and Herzegovina ("Official Gazette of Bosnia and Herzegovina", no. 14/10 and 32/13).

The provisions of the Law on the Protection of Plant Health (Official Gazette of BiH, No. 23/03) regulate the health of plants, determine measures and obligations to prevent the appearance,

introduction and spread of harmful organisms on plants, plant products and other regulated objects as well as their eradication, regulate the biological protection of plants, determine the collection and exchange of data and information systems, regulate public services in the field of plant health, determine the bodies responsible for the implementation of the Law and prescribe penalties for acting contrary to the provisions of this of the Law. Also, according to this Law, the protection of plant health is the right and obligation of the competent bodies of Bosnia and Herzegovina, entities and Brčko District, natural and legal persons who provide public services in the field of plant health, and owners. In addition, the Law defines the establishment of a special body at the level of Bosnia and Herzegovina, the Administration of Bosnia and Herzegovina for the protection of plants, with the aim of ensuring plant health and performing other tasks from this Law and the application of international conventions and international agreements in the field of plant health binding for Bosnia and Herzegovina, and the inter-entity coordination of monitoring their application, which operates within the Ministry of Foreign Trade and Economic Relations of BiH.

The use of plant protection products is regulated by a special act: the Law on Phytopharmaceuticals of Bosnia and Herzegovina ("Official Gazette of Bosnia and Herzegovina", No. 3/05). This law regulates the circulation and supervision of active substances that are plant protection agents (phytopharmaceuticals - FFS), their registration, issuance of permits based on this Act, circulation, use and supervision of FFS, residues of FFS, keeping of the FFS register and the register of legal and natural persons dealing with the sale of FFS, communication of data and record keeping in connection with FFS, technical requirements for devices for the application of FFS and their components, the powers of the bodies responsible for the implementation of this Law and the supervision of its implementation, and regulations adopted on the basis of this Law. In addition, the Law stipulates that the production of plant protection products, trade for the purposes of their production, good laboratory practice, the consent procedure after prior reporting, their supervision, and the classification, packaging and labeling of plant protection products are governed by regulations on chemicals, and FFS waste and their waste packaging, as well as the state of FFS emissions into the environment are governed by environmental protection regulations. Pursuant to Article 28 of the Law on Phytopharmaceuticals of Bosnia and Herzegovina, the Administration of Plant Health Protection of Bosnia and Herzegovina publishes the List of registered plant protection products for Bosnia and Herzegovina once a year, and its changes, in accordance with changes in EU regulations, at least twice a year. In the coming period, Bosnia and Herzegovina will have to transpose the provisions of EU regulations in the field of plant protection, and it is necessary to pass the necessary by-laws that would enable the establishment of a harmonized system in the field of plant health protection, plant protection products, seeds and planting material, and the protection of new varieties of plants in Bosnia and Herzegovina, harmonized with the requirements of the European Union.

The political and institutional framework in the field of agricultural production in Bosnia and Herzegovina has a highly fragmented and complex organizational structure, with a number of institutions responsible for this area, at four administrative levels: state, entity, county and municipality.

At the state level, issues related to agricultural production fall under the jurisdiction of the Ministry of Foreign Trade and Economic Relations (MVTEO), the Sector for Agriculture, Food, Forestry and Rural Development. Given that the competence and management of agricultural production according to the Constitution of BiH is at the level of the entity and the Brčko District (Article III, paragraph 3(a)), MVTEO BiH performs tasks within the competence of BiH related to defining policies, coordinating activities and harmonizing the plans of entity authorities, as well as institutions on the international level in the field of agriculture.

Administrative organizations within the Ministry are:

- BiH Veterinary Office,
- Directorate for Plant Health Protection of Bosnia and Herzegovina,
- Office for harmonization and coordination of payment systems in agriculture, nutrition and rural development.

In order to ensure the effective development and implementation of policies in the field of food safety in Bosnia and Herzegovina, the Ministry also directs and supervises the work of the Veterinary Office of BiH and the Directorate for Plant Health Protection of BiH, and coordinates activities with the Agency for Food Safety of BiH.

The implementation of policies in the field of agricultural production is under the direct responsibility of entity institutions, primarily the Ministry of Agriculture, Forestry and Water Management of the Republic of Srpska, the Federal Ministry of Agriculture, Water Management and Forestry and the Department of Agriculture, Forestry and Water Management of Brčko District.

At the level of the Republic of Srpska, the Ministry of Agriculture, Forestry and Water Management is responsible for agricultural issues. The ministry has five departments, and the ministry also includes administrative organizations and other public institutions and companies. Most matters in the domain of agriculture and food safety are legally regulated both at the level of Bosnia and Herzegovina and at the level of Republika Srpska, where there are inconsistencies between these legal solutions.

In the Federation of BiH, part of the competence in the field of agriculture and rural development is the responsibility of public administration units at the county/cantonal level, and also municipalities, as the smallest administrative units, have part of the competence and obligations in the implementation of agricultural production policies. Therefore, in the Federation of BiH, all ten counties/cantons have established administrations responsible for issues of agriculture, veterinary medicine, forestry and water management, and within the counties/cantons, municipalities and cities have departments responsible for agriculture.

The agricultural sector is an important component in the overall economic structure of Bosnia and Herzegovina. The importance of this sector for the BiH economy can be summarized through three main features: the high participation of agriculture in the GVA structure, the high level of employment in agriculture and the significant participation in the foreign trade deficit. The agricultural sector has a share of about 8% in the creation of GDP, and agriculture is ranked as the fourth branch of the economy. Agriculture contributes to formal and informal employment of the population, especially in rural areas, given that these areas, according to the OECD classification, make up about 81% of the total area of BiH, in which, according to estimates, about 61% of the total population of BiH live. The participation of agriculture in

total employment is relatively high and amounts to about 19% of the working age population. In addition, a large number of BiH residents engage in agricultural production as an additional occupation in order to produce and secure food for their own use. Apart from the economic, the agricultural sector contributes to the development of society, and with the environmental dimension of sustainability, it has the potential for the sustainable development of rural areas in Bosnia and Herzegovina.

The potential of agriculture in Bosnia and Herzegovina is great and is reflected in favorable agro-climatic conditions, the cultivation of a large number of different agricultural crops, high-quality and uncontaminated agricultural land, products of excellent quality and tradition, a large number of autochthonous and original products, tradition of production, knowledge and effort of agricultural producers. The most important place in plant production is the production of cereals, namely corn, which is the main crop used in livestock nutrition, and wheat as the most important bread grain, followed by the production of forage crops, then potatoes, vegetables (cucumber, tomato, pepper, cabbage), fruit (plum, apple, pear), berries (raspberry and strawberry), grapes, as well as industrial crops such as rapeseed, soybeans and tobacco. Dairy production is the leading and most important livestock production, followed by meat production such as beef, poultry, pork and sheep meat, as well as production of eggs, wool and honey. Cultivation and production of edible fish is also one of the important branches of the economy, especially when it comes to the cultivation and production of trout and carp.

However, the agricultural potential in Bosnia and Herzegovina has not yet been fully utilized. Agricultural production still has the characteristics of extensive production and is largely dependent on weather conditions. The agricultural sector in BiH has low productivity, unfavorable structure and size of farms, unsatisfactory and poor technological equipment, dependence on the import of mostly all inputs required for the production of seed material, protective agents and mineral fertilizers, as well as equipment and agricultural machinery. Also, the results of the analyzes show that agricultural production in Bosnia and Herzegovina is not, and will not be in the near future, price competitive, at least until its productivity and productivity increase. In addition, the agricultural sector in BiH, in building sustainable competitive advantages, must focus its efforts on quality improvement and the production of special (typical and traditional) high-value products, that is, products with added value. For example In the Republic of Srpska, the level of use of mineral fertilizers and pesticides is low, which in the context of achieving lower yields and income can be considered a weakness, but at the same time it is also an advantage, because large areas of the so-called "virgin land" on which no chemical means have ever been used or for a long time. Biological diversity, both plant and animal life, is still quite large.

The structure of areas sown with vegetable crops in Bosnia and Herzegovina has not changed for many years. Cereals have the largest share in the total sown areas of 58%, followed by fodder plants 26%, vegetables around 15%, and industrial plants only 1%. Cereal production is the basis of food security for the population and is the most important segment of agricultural production. Cereals are the most represented in the overall structure of

agricultural production. Of the agricultural crops, the most important is the production of wheat, as the most important bread grain, and corn, which is the basic crop for feeding livestock. In second place in terms of volume of production is the production of fodder plants. In the structure of fodder production, about 55% of the total production is green corn (for silage), followed by legumes. The production of industrial plants is also not negligible. In the structure of production of oilseeds, about 76% of production is soybean production, and about 24% of production is rapeseed production. Although tobacco in Bosnia and Herzegovina is grown on very small areas, which average around 1,700 hectares and from which around 2,300 tons of tobacco are produced annually, these areas are very important in ensuring the income of farmers in all growing areas.

Vegetable production is one of the most common and economically profitable branches of agriculture. In the structure of total sown areas, potatoes and vegetables have an average share of about 15%, with the ratio of areas sown with potatoes and those under other vegetable species being 49:51%, favoring areas sown with other vegetable species. The average domestic annual production of potatoes is about 385 thousand tons with a low average yield of about 10 tons per hectare. The average production of the most important vegetable crops is about 300 thousand tons, and cabbage and kale (23%), followed by tomatoes (16%), peppers (15%), onions (13%), cucumbers (12%) and other vegetables (22%) have the largest share in production.

Areas for fruit production in BiH amount to about 101 thousand ha, and about 24 million fruit trees have been planted on them. The average annual fruit production is about 264 thousand tons. The level of production, fruit yields and the stability of production are largely influenced by the weather conditions, which have changed significantly over the last few years, and in particular, late spring frosts and longer dry periods are becoming more frequent. In fruit production, the following are the most represented: plum (53.4%), apple (24%) and pear (10%). The production of berry fruits in Bosnia and Herzegovina has experienced a strong expansion in recent years, especially the production of raspberries and strawberries. The average production area under strawberries and raspberries is about 3 thousand hectares, on average about 10,000 tons of strawberries and about 20,000 tons of raspberries are produced.

The total area under vineyards, according to estimates, is about 3,660 hectares. About 15.3 million vines were planted on them, and the average production was about 2 kg of grapes per vine.

Today, agricultural production without pesticides is unthinkable, and protective agents together with artificial fertilizers are the most demanded products in agriculture. It is an indisputable fact that without pesticides we would lose a third of our crops every year. However, the current dependence on pesticides, as the predominant means of controlling harmful organisms, is not in accordance with the principles of sustainable development.

Plant protection is an important part of food health safety, and therefore it is necessary to carry out regular activities to prevent the introduction and spread of harmful organisms. According to the estimates of relevant international organizations, under the conditions of modern agricultural production, for various reasons, 35% of the world's food production does

not reach the consumer, an additional 20% perishes in the storage process, and without the appropriate application of plant protection products, the losses would be much greater. The Food Safety Agency of Bosnia and Herzegovina recommended the use of plant protection products that are approved for use in accordance with the current regulations in Bosnia and Herzegovina and good agricultural practice (GAP) and called for consistent adherence to the current regulations and good agricultural practice, which includes the nationally recommended, permitted or registered safe use of these products in real conditions, at any stage of production, storage, transportation, distribution and processing of food.

At the national level, monitoring of pesticide residues in plants and plant products, in accordance with the Law on Phytopharmaceuticals of Bosnia and Herzegovina, is carried out by the Administration of Plant Health Protection of Bosnia and Herzegovina. Supervision over the correctness of food products, including pesticide residues in food, is carried out by the Food Safety Agency of Bosnia and Herzegovina. The goal of pesticide monitoring is to establish the amount of pesticide residues in food and to check compliance with the prescribed MDK/MRO values. In this way, an insight is gained to what extent pesticide residues that exceed MDK/MRO represent a risk for people who consume food that contains that level of pesticide residues. Monitoring of pesticide residues in products of plant origin is carried out using the multiresidual method of analysis by gas chromatography - mass spectrometry.

Agricultural counseling is of great importance for reducing the risk of pesticide pollution and their sustainable use. In BiH, there is room for improvement of advisory services, and the main problems in this sector are insufficient budgetary support, a small number of advisors in the field, and the lack of interest of agricultural producers. On the other hand, the improvement of the situation in the controlled use of pesticides is significantly conditioned by the existence of effective advisory assistance. The task of these services in the future must be to strengthen their primary role, to transfer knowledge from the field of plant protection to the agricultural producer. Therefore, the establishment of an effective system of advisory services and their professional and institutional strengthening is one of the priorities for the development of the agricultural sector in Bosnia and Herzegovina. It is necessary to encourage programs and projects aimed at improving professional and advisory assistance to agricultural producers in plant production and effective transfer of knowledge in all areas related to the development of agricultural production and its competitive ability:

- improvement of existing services in crop production: improvement of the system for monitoring agroclimatic conditions in a larger number of locations and predicting the appearance of harmful plant organisms, as well as ensuring a sufficient number of baits for monitoring the appearance of pests;
- strengthening of agricultural consultancy - ensuring a sufficient number of employees who will work on reporting and forecasting tasks, as well as continuous education of employees;
- improvement of an effective network for the transfer of knowledge and innovations in plant production to agricultural producers;

The development of integrated agriculture, as a foundation for the controlled use of pesticides, is based on knowledge, and it is necessary to strengthen the educational, research and analytical components of development. In the coming period, integrated production will increasingly be based on the introduction of acceptable and new plant protection methods and techniques. It is necessary to encourage research and development projects, as well as professional training, and to strengthen all forms of cooperation between agricultural producers, staff of professional services and the professional public in general, as well as representatives of the academic community.

- encouragement of inter-sectoral and inter-institutional cooperation for the purpose of exchange of knowledge and experience, and development and application of new non-chemical methods of plant protection;
- education of agricultural producers, local governments and consumers about the advantages of applying new non-chemical methods of protection;
- encouraging projects and research activities on the application of new methods in our area;
- the continuation of strengthening the infrastructure and personnel capacities for the implementation of the research program and the application of new methods.

In the field of phytosanitary policy, the country has not yet adopted key national laws, especially on plant health and official controls. The adoption of national quarantine pest control programs for all agricultural crops and forests remains important, not only for potatoes exported to the EU. The country has not yet harmonized its national legislation with the EU acquis on the rules for the approval of plant protection products in commercial form and for their placing on the market, use and control. Reforms are still needed in order for Bosnia and Herzegovina to issue plant passports, adopt OECD seed schemes and establish national reference laboratories that carry out phytosanitary checks.

References:

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