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**UKRAINIAN LEGISLATION FOR SAFEGUARDING
AGROECOSYSTEMS AND ENVIRONMENTAL HEALTH:
THE CHALLENGES AHEAD**

1. Introduction

Agriculture in Ukraine has evolved remarkably since the country's independence from the former Soviet Union. Notably, the transition away from a Soviet-style command economy has enabled farmers to make increasingly market-based decisions regarding crop selection and management, contributing to greater efficiency, particularly in crop-production sectors¹. The use of mineral fertilizers and plant protection chemicals has increased modestly since

¹ Ukraine: Agricultural Overview. NASA Earth Observatory, August 2014.

the year 2000. As of April 17, 2014, Ukraine had registered 5242 pesticides and agrochemicals¹ as being manufactured, sold or imported in the country. These figures reflect the heavy use of soil nutrients and plant protection agents being used in the country's agriculture. Yet, the Ukrainian agricultural industry loses more than 30% of gross crop output each year² due to pests, diseases, and weeds. To overcome the slowdown in agriculture and food production, the Ukraine government finalized in July 2015 the Strategy for Agriculture and Rural Development 2015–2020³. The overall objective of this strategy is to increase agricultural competitiveness and promote rural development in a sustainable manner in line with European Union and international standards. It seems certain that one outcome of this development will be a push for the increased usage of agricultural inputs, especially fertilizers and pesticides – in contradiction to the ecological and socio-economic objectives of sustainable rural development. In addition, in the first half of the decade Ukraine experienced rural depopulation, an economic slowdown, a 10% reduction in the number of family farms⁴, and the collapse of national gross financial output. All these factors complicate a legal consideration of sustainable development strategies⁵ relating to agriculture.

Attention must be given to the regulatory systems governing chemical use in Ukrainian agriculture, as well as to the gaps in these systems that require redress. Indeed, scientific studies conducted in Ukraine have established that nutrients and pesticides leach into the surface and groundwater, and residues remain present in the food produced and in biological organisms⁶. As a result, there is a need for greater consideration of the capacity of ecosystems to process this waste. Health risks are also a consequence of toxic chemicals that travel across various trophic levels in the food chain, and must be better taken into account. It is estimated that about 19,300 tonnes of obsolete pesticides

¹ <http://agrosience.com.ua/>

² http://www.esteri.it/mae/resource/garegemellaggi/2016/05/ua_12_enpi_he_01_16_ua_54.pdf

³ <http://minagro.gov.ua/en/system/files/Single%20and%20Comprehensive%20Strategy%20and%20Action%20Plan%20for%20agriculture%20and%20rural%20development%202015-2020.pdf>

⁴ Kuczabski, A. and Tomasz Michalski (2003), «The Process of Depopulation in the Rural Areas of Ukraine», *Quaestiones Geographicae*, 32(4).

⁵ Strochenko, N., Koblianska, Inna and Markova, Olena (2017), «Structural Transformations in Agriculture as Necessary Condition for Sustainable Rural Development in Ukraine», *Journal of Advanced Research in Law and Economics*, 8(1):237–249. Available at: <http://journals.aserspublishing.eu/jarle/article/view/1150>.

⁶ <http://www.fao.org/docrep/w2598e/w2598e07.htm>

are stored at 4,983 storage facilities belonging to agricultural enterprises in Ukraine, while 33% of these storage sites do not meet sanitary and environmental requirements¹. The Yale Environmental Performance Index of 2014 ranked Ukraine 95th out of 178 countries. This index scored the Ukraine as having a 5.44% positive change in environmental performance compared to its score 10 years ago; however, environmental performance relating to agriculture in 2016 declined considerably over the same period (– 22.46% change)². Considering rural sustainable development, trends in population change and overall business activity have also declined in rural areas when compared to urban settings³.

Domestic legislation and regulation are paramount to addressing Ukraine's poor record of environmental protection, and safeguarding ecosystems and human health from pesticides and agrochemical contamination. Responding to Agenda 21, adopted at the UN Conference on Environment and Development 1992, Ukraine's parliament (the Verkhovna Rada) passed Law No. BP N.87/95-VR of 02.03.1995 on Pesticides and Agrochemicals. This law was amended in 2004, 2005, 2006, 2010, and 2015. By using methods of content analysis, observation, and the review of secondary materials, this article not only highlights the salient features of the law in the context of public health and environmental protection, but also flags gaps in the law that must be addressed.

2. Analysis of the Law of Ukraine «On Pesticides and Agrochemicals»

2.1. Scope of the Law

The Law of Ukraine «On Pesticides and Agrochemicals» treats all materials as toxic substances, although this may not be true for some chemicals and the majority of biopesticides that actually have biological (generally microbial) origin⁴. These biologically produced plant protection agents often do not cause harm to non-target plants or animals. The law emphasises the importance of introducing biological agriculture and other environmentally safe, non-chemical methods of plant protection. However, considering the definition provided in the law itself, careful differentiation between toxic pesticides and

¹ UNECE (2007), «Environmental Performance Reviews – Ukraine, Second Review, Committee on Environmental Policy», United Nations Economic Commission for Europe, New York and Geneva.

² EPI 2016: <http://epi.yale.edu/>

³ Strochenko, N., Koblianska, Inna and Markova, Olena (2017), «Structural Transformations in Agriculture as Necessary Condition for Sustainable Rural Development in Ukraine», *Journal of Advanced Research in Law and Economics*, 8(1):237–249. Available at: <http://journals.aserspublishing.eu/jarle/article/view/1150>.

⁴ Article 1.

non-toxic biopesticides needs to be made. Agrochemicals include organic, mineral and bacterial fertilizers, chemical ameliorant, and plant growth regulators. In addition, other substances are also used to enhance soil fertility and the productivity of crops, and to improve the quality of crop production. Significantly, the word 'microbial' would in fact be more appropriate than the word 'bacterial' in the definition of agrochemicals, since biofertilizers are produced not only from bacteria, but also from blue green algae as well as some fungi or mycorrhiza. Overall, the Law of Ukraine on Pesticides and Agrochemicals has been rational in putting both chemical pesticides and fertilizers together in a single legal instrument, and for being straightforward about toxicity. By contrast, countries such as India, Canada and the United States have separate laws to deal with pesticides and fertilizers. The European Union has also created completely separate regulations for pesticides, fertilizers, biocidal products, and biological fertilizers used in agriculture. This separation allows for more focused action on issues such as phosphorus sustainability considerations¹ for fertilizer production and utilization, and related aquatic eutrophication challenges associated with poor phosphorous retention on land. In light of these factors, there is currently a need to examine the status of the Ukrainian law, in terms of meeting sustainable development goals.

2.2. *Basic Principles of Ukrainian Law*

Under the Law of Ukraine on Pesticides and Agrochemicals, general priority is given to the preservation of ecosystems and the protection of public health, while specific focus is placed on the safety of ecosystems and human health during the manufacturing, testing, transport, storage and usage of pesticides and agrochemicals. Yet the critical question is whether or not the «green» or 'sustainability' aims of this law are actually reflected in practice. In a majority of countries, the laws governing pesticides and fertilizers lack such aims. Setting this ecological priority might be influenced by the Ministry of Ecology and Natural Resources, which has the mandate to administer implementation of this particular law. To reiterate, the law emphasizes the reduction of pesticide use through the introduction of biological (organic) agriculture and other environmentally safe, non-chemical methods of plant protection (e.g. biofertilizers, organic fertilizers, biopesticides, plant extracts, etc.). This may be an attempt at greening the law by suggesting a practical

¹ Cherry Myo Lwin, Sébastien M. R. Dente, Tao Wang, Toshiyuki Shimizu and Seiji Hashimoto (2017), «Material stock disparity and factors affecting stocked material use efficiency of sewer pipelines in Japan», *Resources, Conservation and Recycling*, 123: 135–142.

solution for environmental issues in the agriculture. Surprisingly, however, other than Article 3 of this law, no other reference is made to replacing pesticides or mineral fertilizers with biocidal, natural germicidal or pest killing agents, biofertilizer, organic manure or natural growth regulator. Thus, the restriction of these considerations to Article 3 of the Law of Ukraine on Pesticides and Agrochemicals limits their overall impact on the law and its subsequent applications.

2.3. Registration of Pesticides & Agrochemicals

Under Article 7 of the Law of Ukraine on Pesticides and Agrochemicals, registration of pesticides and agrochemicals is based on relevant documentation concerning the safety of chemicals or products and test reports of epidemiological and toxicological examination, including the occurrence of residual quantities of pesticides and agrochemicals in agricultural products, feed, food, soil, water and air. Through the registration of pesticides and agrochemicals before their entry into the country, the law not only authorizes state executive bodies to protect the environment from potential harmful effects, but also attempts to protect farmers' economic interests and health. Part 3 of Article 7 categorically stipulates the safer use of pesticides and agrochemicals in agricultural fields. Interestingly, the registration process assumes that state executive bodies and other state functionaries will be competent and compliant regarding sanitary and epidemiological expertise, and in methodologies for determining residual amounts of pesticides and agrochemicals in agricultural products, feed, food, soil, water and air. The intent of the law through amendments has been to ensure that toxic chemicals do not enter the land or agroecosystem without prior tests and toxicological analysis.

Even after registration, pesticides and agrochemicals are subject to periodic testing for residues in soil, agricultural produce or ecological pathways. The authorities are required to administer governmental control over use of materials, pursuant to the procedures established by the State. If any pesticide or agrochemical is found to be lethal or toxic, or to surpass permissible levels resulting in danger to the environment or public health, the substance is subject to a ban from usage or sale. Hence, registration is part of State control over pesticides and agrochemicals. This approach requires the implementation of sanitary measures such as laboratory testing, quality examination, inspection, certification and approval. Notably, the epidemiological/performance effectiveness of pesticides and agrochemicals have been taken into account in the process of registration. It actually ensures the crop failure due to ineffectiveness of pesticides and agrochemicals. Consequently, the economic

losses of farmers and agronomic losses of crops may be avoided. The list of pesticides and agrochemicals permitted for use and trade is maintained by following a procedure established by the State. The law, therefore, appears to have emphasized adequately the environmental hazards that might result from use and handling of chemicals.

2.4. Registration & Licensing of Manufacturing Units

The production of pesticides and agrochemicals requires mandatory certification under Article 8 of the Law of Ukraine on Pesticides and Agrochemicals. However, the procedures and standards in place to monitor the manufacturing processes, design and implementation are relatively weak. On one hand, a great deal of consideration has been given to the quality of technical operations in order to protect the occupational health of people working directly with pesticides and agrochemicals. Provisions have also been added to prevent the possibility of chemical disasters, exposure of the populace, and unseen environmental pollution. However, the Law lacks elaborate procedural guidelines for such precautions to be taken. The utmost care and precaution must be taken during the manufacturing of toxic pesticides, insecticides, fungicides and herbicides, keeping in mind that chemical pesticide manufacturing units are prone to industrial disasters. Mishaps in pesticide manufacturing factories in the past must be considered. India's Bhopal disaster of 1984 involved the leakage of methyl isocyanate gas from Dow Chemicals' Union Carbide factory, killing 900,000 people overnight¹. Bhopal has been equated with the Ukraine's Chernobyl nuclear disaster. Other similar industrial accidents² are the Feyzin Explosion in France (1966), Flixborough in the UK (1974), Seveso in Italy (1976), the San Juanico LPG Disaster in Mexico City (1984), Schweisshalle in Switzerland (1986), the Baia Mare Cyanide Spill in Romania (2000), the Enschede Fireworks in the Netherlands (2000), the Grande Paroisse Fertilizer Plant Explosion of France (2001), and the Texas City Refinery Explosion in the USA (2005). Thus, comprehensive standards and monitoring mechanisms must be clearly defined in the law in order to cover the design, processes, methods, control and implementation of pesticide and agrochemical manufacturing.

Environmental risks associated with importing pesticides and agrochemicals are well addressed under Article 9, which otherwise mainly focuses on issuing licenses for related production and trade. The competent authorities of the state executive body did control this licensing system;

¹ <https://www.wired.com/2010/12/1203bhopal-disaster/>

² <http://www.psgdover.com/en/resources/top-10-accidents>

however, Regulation No. 42¹ issued on January 28, 2015, deregulated 30 economic activities in the agricultural sector. As a result, trade in pesticides and agrochemicals is no longer subject to licensing in Ukraine².

2.5. Packaging and Labelling of Pesticides & Agrochemicals

Article 10 of the Law of Ukraine on Pesticides and Agrochemicals establishes detailed standards for packaging and labeling, and for placing emphasis on compatibility and compliance in terms of the actual properties of pesticides and agrochemicals. In addition, imported pesticides and agrochemicals must be accompanied by the technology required for their disposal and recycling. This is pertinent from an environmental health context, as the disposal of pesticides is a burgeoning issue. According to a report by the United Nations Interregional Crime and Justice Research Institute (UNCRI)³, the responsible use and disposal of pesticides are important aspects of pesticide safety for human and environmental health. Moreover, the inherent risks associated with pesticides are often further compounded by the introduction of mislabeled, unregulated, and unidentified substances. These shortfalls increase the dangers to workers and consumers, affecting food crops and broader ecosystems. The problems associated with the disposal of pesticides can be extrapolated from a consideration of the FAO inventory of obsolete⁴ pesticide stocks⁵. According to FAO, on an average, an Asian country was known to have quantities of obsolete pesticides within the range of 5,000–10,000 tonnes in 1993. Unconfirmed figures from Eastern European countries also suggest that several countries hold very large quantities of these substances⁶. Indeed, during the 1990s, the total amount of obsolete pesticides in non-OECD countries exceeded 100,000 tonnes. Common types of obsolete pesticides include organochlorine (e.g. DDT, dieldrin and HCH), organophosphates, carbamates, dimethoate, fenitrothion, malathion, carbaryl and propoxur⁷.

In light of these concerns, specific technical requirements for the packaging and re-packaging of pesticides should be adopted in Ukraine – either clearly articulated in the legal framework or embedded in registration procedures in line with the FAO International Guidelines for Packaging and Storage of

¹ <http://zakon2.rada.gov.ua/laws/show/42-2015-%D0%BF>

² <http://pesticidov.net/articles/pesticidi/6776/>

³ UNCRI (2016), «Illicit Pesticides, Organized Crime and Supply Chain Integrity», United Nations Interregional Crime and Justice Research Institute (UNCRI), Torino – Italy.

⁴ The pesticides that definitely cannot be used any longer and require disposal.

⁵ <http://www.fao.org/docrep/v7460e/v7460e.htm>

⁶ Ibid.

⁷ Ibid.

Pesticides¹. Likewise, specific technical requirements should prohibit the re-packaging or decanting of pesticides into food or drink containers. If effective controls are not possible, procedures should be considered to ban re-packaging entirely, or to ensure that packaging or re-packaging only occurs on licensed premises where workers are adequately protected.

2.6. Transportation, Storage, Disposal and Recycling

Article 11 of the Law of Ukraine on Pesticides and Agrochemicals highlights that the transportation, storage, use, recycling, destruction and disposal of pesticides and agrochemicals must conform to the requirements established by applicable laws and sanitary regulations. This requirement is in compliance with the goals of ecosystem safety and environmental health. Certification and licensing are mandatory for personnel involved in these tasks. However, the law does not follow international standards for the transport of dangerous goods (i.e. pesticides). Furthermore, there are no clear provisions prohibiting the transport of pesticides in the same vehicles as passengers, animals, food or animal feed. In relation to storage, no differentiation is made between private, end-user or home storage and bulk/commercial storage. Record-keeping requirements for stored pesticides are also weak. Therefore, these aspects of the law require strengthening, along with provisions on special requirements for the storage of obsolete pesticide stocks.

In the context of pesticide disposal and recycling, the International Code of Conduct on Pesticides Management² may also be referred to to strengthen domestic standards. The Code promotes practices that minimize potential health and environmental risks associated with pesticides, while ensuring their effective use³. It incorporates voluntary best practice standards of Integrated Pest Management (IPM), a risk management process that seeks to improve the ecological soundness and stability, cost-effectiveness, and efficacy of vector-borne disease control.

2.7. Procedure for Application of Pesticides & Agrochemicals

In Article 12, the Law of Ukraine on Pesticides and Agrochemicals addresses procedures guiding the application of pesticides and agrochemicals. Prior to the usage or application of pesticides and agrochemicals, specific tests must be undertaken. Safeguards include determining the suitability of pesticides and agrochemicals to the specific soil-climatic zone and soil type,

¹ <http://www.bvsde.paho.org/bvstox/i/fulltext/fao12/fao12.pdf>

² <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/en/>

³ UNICRI (2016), «Illicit Pesticides, Organized Crime and Supply Chain Integrity», United Nations Interregional Crime and Justice Research Institute (UNICRI), Torino – Italy.

and verifying the agrochemical passport data¹ of cropland and the condition of crops. The regulations also indicate the need to diagnose the mineral nutrition of the plants on which these pesticides and agrochemicals would be applied, coupled with a forecast of pests and diseases in the particular agroecosystem. The government of Ukraine maintains a database of permitted pesticides and agrochemicals, and new chemicals may be added after careful examination. Notably, the law advises that precautions be taken when applying the pesticides and agrochemicals in contaminated territories.

According to the provisions of Article 13 of the Law of Ukraine on Pesticides and Agrochemicals, special attention must be paid to the use of pesticides and agrochemicals in zones where food is to be grown for babies or for dietetic² purposes. In such cases, special techniques must be employed so that enhanced sanitary requirements can be maintained for such foods. This particular provision was added by an amendment to the law in 2004. However, the law does not cite any specific standard or any special technique to follow. Nevertheless, subsidiary rules, guidelines, standards or procedures may be set by the Cabinet of Ministers of Ukraine or state executive authorities in the context of ensuring that manufacturers, suppliers, distributors, users and workers of pesticides and agrochemicals comply with the technical requirements for producing special foods.

In 2016, the Ministry of Agrarian Policy and Food approved³ the draft legal and organizational framework for the production of infant food. The Minister

¹ Announced in 2011, the State Committee of Ukraine for Regulatory Policy and Entrepreneurship agreed the draft project on agrochemical passport, which was developed by the Ministry of Agrarian Policy and Food. This draft project will apply on farmlands – in particular, arable lands, hayfields and pastures. A passport will contain data on the agrochemical characteristics of soils and the state of their pollution with toxic substances and radionuclides. This, in turn, will ensure state control over change of fertility indexes, determining conditions for the rational use of mineral, organic fertilizers in the economies and protection from contamination.

² Vitaminous, vitaminous-mineral or herb additives, individual or blended in the form of pills, tablets, and powders consumed orally with food or added to food within physiological norms for the purpose of additional, as compared to normal diet, intake of such substances. Dietetic additives also contain or include various substances or mixtures of substances including proteins, carbohydrates, amino acids, eatable oils and extracts of vegetable and animal materials that are considered necessary or beneficial for nutrition and general health of humans.

³ The Ministry of Agrarian Policy and Food of Ukraine, together with the Ministry of Justice of Ukraine, held a conciliation session on December 18, 2015 with the aim of settling the differences in the Draft Law of Ukraine «On Infant Food». The Ministry of Justice of Ukraine agreed to the method of accepting its comments and suggestions to the bill.

of Agrarian Policy and Food of Ukraine stated that the legal and organizational framework for the production of baby food should be improved through the adjustment and harmonization of national legislation with the EU norms, establishing the basic requirements for food safety and quality. According to the Ministry of Agrarian Policy and Food, the Draft Law on «Infant Food» stipulates the following amendments:

- Removing the provisions that required manufacturers of raw materials for baby food to obtain the status of special raw materials zone, and other provisions regulated by other laws;
- Determining the current requirements for quality and safety of raw materials used for the production of baby food, and the requirements for turnover and labelling of baby foods;
- Defining afresh the terms («raw material», «infant food producer», «the quality of infant food»); and
- Introducing the respective amendments to, *inter alia*, the Law of Ukraine «On Pesticides and Agrochemicals» with the aim of harmonizing this legislation with the revised Law of Ukraine «On Infant Food».

2.8. Occupation Health of Workers

Under Article 21 of the Law of Ukraine on Pesticides and Agrochemicals, the State guarantees occupational health to workers who work directly with the production, transportation, trade, use, disposal, and destruction of pesticides and agrochemicals. The law further reiterates that those working directly with pesticides and hazardous chemicals be eligible for a pension, additional leave, and reduced working hours in accordance with applicable law. Article 21 also refers to those categories of employees who have benefits approved by the Cabinet of Ministers of Ukraine. Notably, employers must comply with standards set for the safety measures and equipment necessary to work with pesticides and agrochemicals.

3. The Challenges Ahead

3.1. The Quest for Coordinated Efforts

In 2014, a draft Law on the Preservation and Protection of Soil Fertility was submitted by the government for public discussion. The purpose of the draft law is to strengthen state control over soil quality, and shift the responsibility of soil surveying from agricultural producers to state agencies. The draft law appears to give soil a separate legal status and protection, and establishes rules for high farming standards, the prevention of soil degradation and mitigation of the environmental and economic risks associated with the improper or environmentally unsafe use of land. The law also mandates the agrochemical

certification of land. Agrochemical passports¹ would be a prerequisite for transferring land ownership or leasing agricultural land². The primary question that arises is whether or not this law will supplement or overlap the Law of Ukraine «On Pesticides and Agrochemicals».

Another example is Law No. 425-VII on the «Production and Circulation of Organic Agricultural Products and Raw Materials», which was approved in September 2013. This law sets out the legal and economic bases for production and turnover of organic agricultural products and raw materials, and it aims to facilitate the proper functioning of the market for organic products and raw materials, and to ensure consumer confidence in products and raw materials marked as organic. The law clearly defines organic products, which protects organic producers from unfair competition³. However, this law has not yet been implemented, as its rules are still being developed and approved. In addition, there are overlapping clauses with the Law of Ukraine «On Pesticides and Agrochemicals». For example, Article 18 of the Law «On Pesticides and Agrochemicals» and Articles 9 and 10 of the Law «On the Production and Circulation of Organic Agricultural Products and Raw Materials» both deal with raw materials in agriculture. As a result, it is necessary to coordinate efforts to deal with pesticides and agrochemicals.

Moreover, scholars have flagged issues concerning the effectiveness of these laws. For instance, the law enforcement system is reportedly burdened with many regulatory responsibilities and a limited capacity for enforcement⁴. Citing the example of environmental protection, Buzogany (2011)⁵ notes that streamlining thousands of regulations remains challenging as the involvement of several agencies in environmental policy leads to

¹ These certificates have already been delivered on some land. State engineering and technological centres under MAPF monitor the quality of the soil through physical, agrochemical, and eco-toxicological indicators to protect soil fertility. Nearly five million ha underwent agrochemical certification in 2011 and agricultural producers received 94000 agrochemical passports for their land (FAO, 2012).

² UCAB (2014), «Doing Business in Ukraine 2014», Ukrainian Agribusiness Club.

³ OECD (2015), «Sector Competitiveness Strategy for Ukraine – Phase III: Review of Agricultural Investment Policies of Ukraine, Project Report, December 2015». Organization for Economic Cooperation and Development, http://www.oecd.org/globalrelations/Agricultural_Investment_Policies_Ukraine_ENG.pdf

⁴ <https://euipe.europa.eu/ohimportal/documents/11370/0/Report+on+the+protection+and+enforcement+of+intellectual+property+rights+in+third+countries>

⁵ Buzogany, A. (2011), «Shades of Green: Selective Spill-Over and Environmental Policy Convergence between Ukraine and the EU», Presentation to the European Consortium for Political Research (ECPR) General Conference, Reykjavik, August 2011.

fragmented implementation. The multiplicity of institutions and the need for their efforts to be complementary could also be source of complexity. The Ministry of Ecology and Natural Resources is the main actor concerned with the promulgation and enforcement of the Law «On Pesticides and Agrochemicals»; yet the Ministry of Agrarian Policy and Food of Ukraine also has a considerable interest in this sector, as does the Verkhovna Rada, the Cabinet of Ministers, the Health Ministry, and the Ministry of Economic Development and Trade of Ukraine.

3.2. Improvement of Pesticide Regulation based on the Model of the European Union

In addition to the reformist record of Ukrainian law concerning the protection of the environment and public health, Regulation No. 1107/2009 and Directive No. 2009/128/EC of the European Union should be followed as a model for further improvements. In particular, several innovative ideas from the EU Regulation/Directive are mentioned hereunder:

- A National Action Plan can set quantitative objectives, targets, measures, timetables and indicators to reduce the risks and impacts of pesticide use on human health and the environment. Within this Plan, the development and introduction of integrated pest management and alternative approaches or techniques to reduce dependency on the use of pesticides may be used.

- During the sale of pesticides, the traders should give the end-user specific safety instructions for the protection of human health and the environment. For non-professional users, who generally do not have the same level of education and training, recommendations should be given by sellers on the safe handling and storage of pesticides, as well as on disposal of the packaging.

- The State should launch research programmes aimed at determining the impacts of pesticide use on human health and the environment.

- Since aerial spraying of pesticides has the potential to cause significant adverse impacts on human health and the environment (particularly from spray drift), aerial spraying should generally be prohibited.

- Particular attention should be paid to avoiding surface and groundwater pollution by taking appropriate measures, such as the establishment of buffer and safeguard zones or planting hedges along surface waters to reduce exposure of water bodies to spray drift, drain flow and run-off.

- The use of pesticides in areas meant for the collection of drinking water; on or along transport routes, such as railway lines; or on sealed or very permeable surfaces can lead to higher risks of pollution of the aquatic

environment. In such areas, pesticide use should therefore be reduced as far as possible, or abolished where appropriate.

— Farmers should be encouraged to follow crop and sector-specific guidelines with respect to integrated pest management. This would reduce pesticide use and contribute to the further reduction of risks to human health and the environment as well as dependency on pesticides.

In addition to the above inferences drawn from EU regulations on pesticides, several suggestions are embedded in the analysis part (section 2) of this article. Accordingly, appropriate measures should be taken to improve this legislation.

3.3. *Integration of Biopesticides and Biofertilizers*

As mentioned in the analysis of this article, Article 3 of the Law «On Pesticides and Agrochemicals» refers to reducing the use of chemical pesticides and mineral fertilizers by replacing them with biopesticides, biofertilizers, organic substances, and other environmentally safe products. However, the law lacks adequate provisions in this respect; the adequate integration of biological products having biocidal or fertility effects is essential in order to make the objective of reduced chemical pesticide and mineral fertilizer use operational. A good example of such integration is India's Fertilizer (Control) Order 1985¹, in which biofertilizers, organic fertilizers and non-edible de-oiled cake fertilizers are incorporated as added categories of fertilizers. By making the appropriate amendments, the standards, registration procedure, production norms, application methods, testing protocols, and biosafety measures have been proposed in the Indian law for biofertilizers, organic fertilizers and cake fertilizers along with the mineral fertilizers.

It may also be possible to adopt new legislation on biocidal products, biofertilizers, and organic fertilizers in line with EU Regulation No. 528/2012 of 22 May 2012. This particular EU regulation on biocidal products guides EU member states in a bid to protect agroecosystems and environmental health from the indiscriminate use of harmful pesticides. The purpose of this EU regulation is to improve the free movement of biocidal products within the Union while ensuring a high level of protection of both human and animal health and the environment. Particular attention should be paid to the protection of vulnerable groups, which includes rural populations as well as pregnant women and children. This Regulation should be underpinned by the 'precautionary principle' to ensure that the manufacturing and making

¹ http://ncof.dacnet.nic.in/Training_manuals/Training_manuals.../BF_and_OF_in_FCO.pdf

available on the market of biocidal products do not result in harmful effects on human or animal health or unacceptable effects on the environment¹.

In a nutshell, it is important to shift the focus from conventional chemical-based soil fertility agents and toxic pesticides to environmentally safe biological products for plant protection, soil fertility management, and human health.

4. Conclusion

Together, around 67,000 different crop pest species – including plant pathogens, weeds, invertebrates and some vertebrate species – are responsible for about a 40% reduction in the world's crop yield². One way to increase food availability is to improve the management of pests. Yet, the unsustainable application of chemical fertilizers and plant protection chemicals has caused a steady decline in soil and crop productivity the world over. This trend is different in Ukraine, however. First of all, the agricultural use of pesticides and agrochemicals in Ukraine has considerably declined in post-independence period. Secondly, the progressive Law of Ukraine «On Pesticides and Agrochemicals» has taken measures based upon the precautionary principle to preserve the agroecosystems and environmental health of the country. This law has successfully established ecological and public health safeguards relating to crop fields and occupational practices. But the reality of implementation may be different, and merits are subject to further investigation. Particular consideration must be given on how the applications of this Law affect rural people and communities on the frontlines of agricultural production. One option to help reverse declining prosperity in rural Ukraine is to promote small business approaches to farmer-led collaborate and cooperative assessments of local pesticide and agrochemical use³.

Agricultural practices must evolve to sustainably meet growing local and global demand for food without irreversibly damaging the world's agroecosystems and natural resources (especially soil). Critically, this must occur while also maintaining food security, even in the context of climatic changes. Simply put, rising food yields must be decoupled from the unsustainable use of water, energy, fertilizers, chemicals, and land. Investing

¹ https://www.echa.europa.eu/documents/10162/17158507/consolidated_bpr_en.pdf

² Oerke, E. C., Dehne, H. W., Schoenbeck, F. and Weber, A. (1994). Crop production and crop protection: Estimated losses in major food and cash crops. Amsterdam, Netherlands: Elsevier Science Publishers B. V.

³ Kuczabski, A. and Tomasz Michalski (2003), «The Process of Depopulation in the Rural Areas of Ukraine», *Quaestiones Geographicae*, 32(4).

in sustainable agriculture is one of the most effective ways to simultaneously achieve the sustainable development goals (SDGs) on poverty and hunger, nutrition and health, education, economic and social growth, peace and security, and the environmental preservation. The Law of Ukraine «On Pesticides and Agrochemicals» and its amendments addresses the objectives of the SDGs. However, the law must also be harmonized with relevant European Union regulations and other international standards, while addressing the specific context of Ukraine and the sustainable development of rural and agrarian communities.



Зміст

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