

# PROSPECTS FOR THE USE OF PESTICIDES IN AGRICULTURE

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## INTRODUCTION

The wide use of pesticides in agriculture and their high durability made them ubiquitous in the natural environment. Pesticides are used not only in agriculture. About 230 active substances used in the EU are also present in other biological products such as mosquito sprays, flea and tick repellents, tree preservatives and mold paints. Some of them take a long time to decay, even those that were discontinued 40 years ago, such as DDT and its breakdown products, are still found in agricultural crops. Due to the high persistence of pesticides, as well as their potential threat to the environment, the incidence of society has increased and the contamination of water and soil with their decomposition products has increased. In recent years, consumers have paid increasing attention to the potential health effects of synthetic chemicals in food production. Concern for food safety issues has significant pressure on pesticide producers in Europe and around the world, not only by consumers but also by various committees and community organizations in the US and Europe, to reduce pesticide residue levels in farm food, where synthetic plant protection products are used. Very strong correlations between pesticide exposure and the incidence of leukemia, skin cancer, prostate cancer, lung cancer and neurodegenerative diseases were noted. Hence there is a need for smart alternatives and more sustainable practices in food production to cope with the continued growth of the human population and the careless depletion of global resources.

## MATERIAL AND METHODS

Secondary and primary data were collected and the FAO and GUS statistical data on the total use of pesticides in Polish agriculture in selected crops were analyzed. Due to the lack of information from secondary sources on the behavior of farmers, a representative (primary) survey was conducted among agricultural producers in 12 district in Poland in 2017-2019. The selection of regions was carried out randomly, in layers. The first layer consisted of voivodships (one voivodship from each of the 6 microregion's in Poland). Then, in each voivodship, two district were drawn, which allowed for field research in a diversified area. Agri-environmental indicator - the average consumption of pesticides (in active substance) per area of the cultivated land was calculated in accordance with the methodology of the Accounting Systems SEEA CF and SEEA AFF.

## RESULTS

Agricultural pests cause 20-40% of disease, and weeds cause about 20% loss in global plant production each year (FAO, 2020). The studies assessed the effect of pesticide residues in agriculture. The position of Poland in the classification in terms of the production volume of agricultural products in the European Union in 2019 is shown in Figure 1. The use of pesticides per agricultural area in 2015-2019 in European countries is illustrated in Figure 2. Poland is in the group of countries with a small amount of pesticide residues (1-2.99 kg/ha/year). The same group includes countries such as the Czech Republic, Austria, Slovakia, Hungary, Ukraine, Romania, Bulgaria, Macedonia, Greece. The countries with the highest pesticide use per area unit are: the Netherlands, Belgium, Italy (7 to > 9 kg/ha/year). Potential risks and the effects of pesticides on soil and plants were also determined to demonstrate complex interactions.

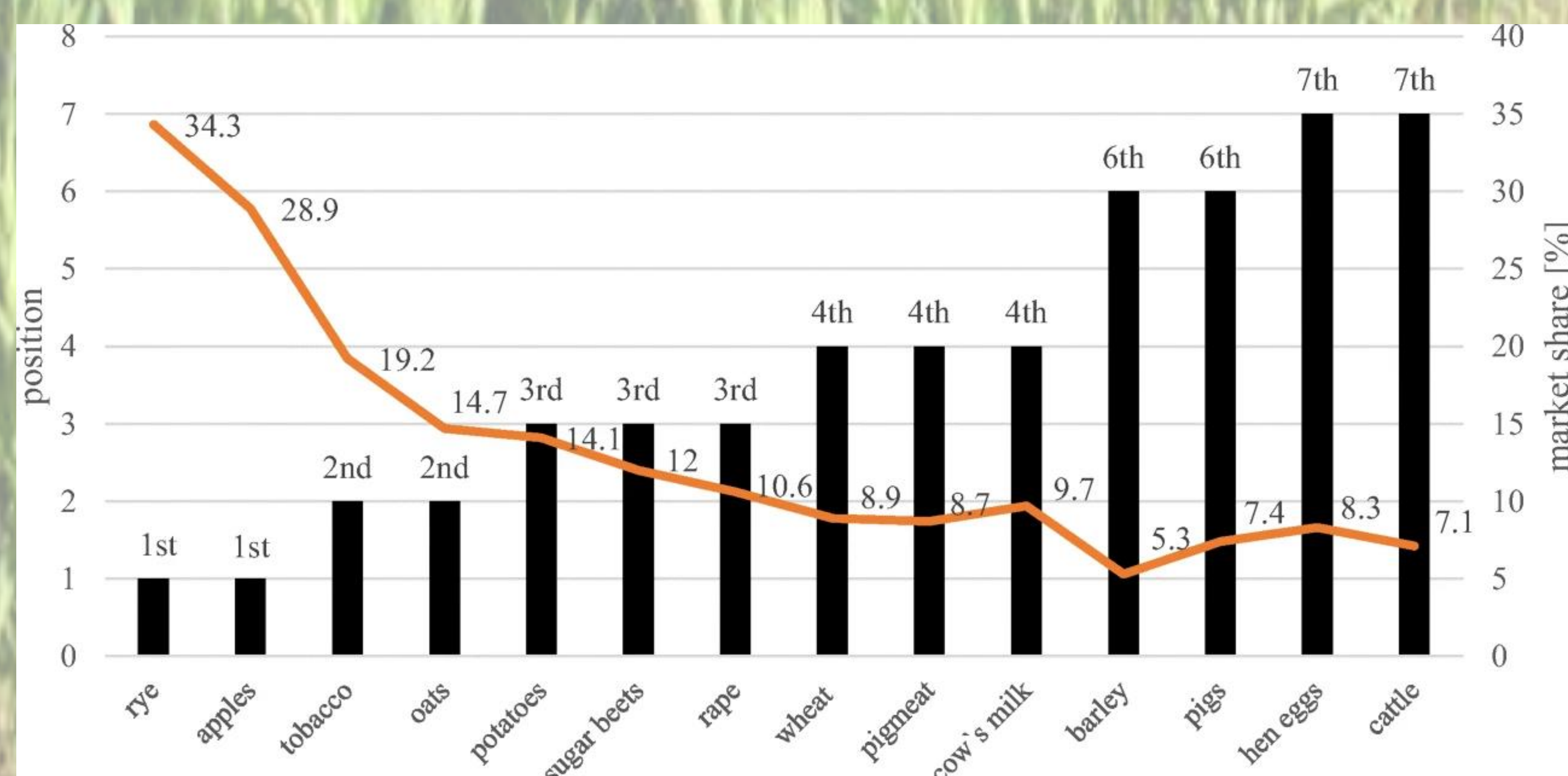


Figure 1. Poland's position in the classification in terms of the production volume of agricultural products in the European Union in 2019. Source: our research, FAO

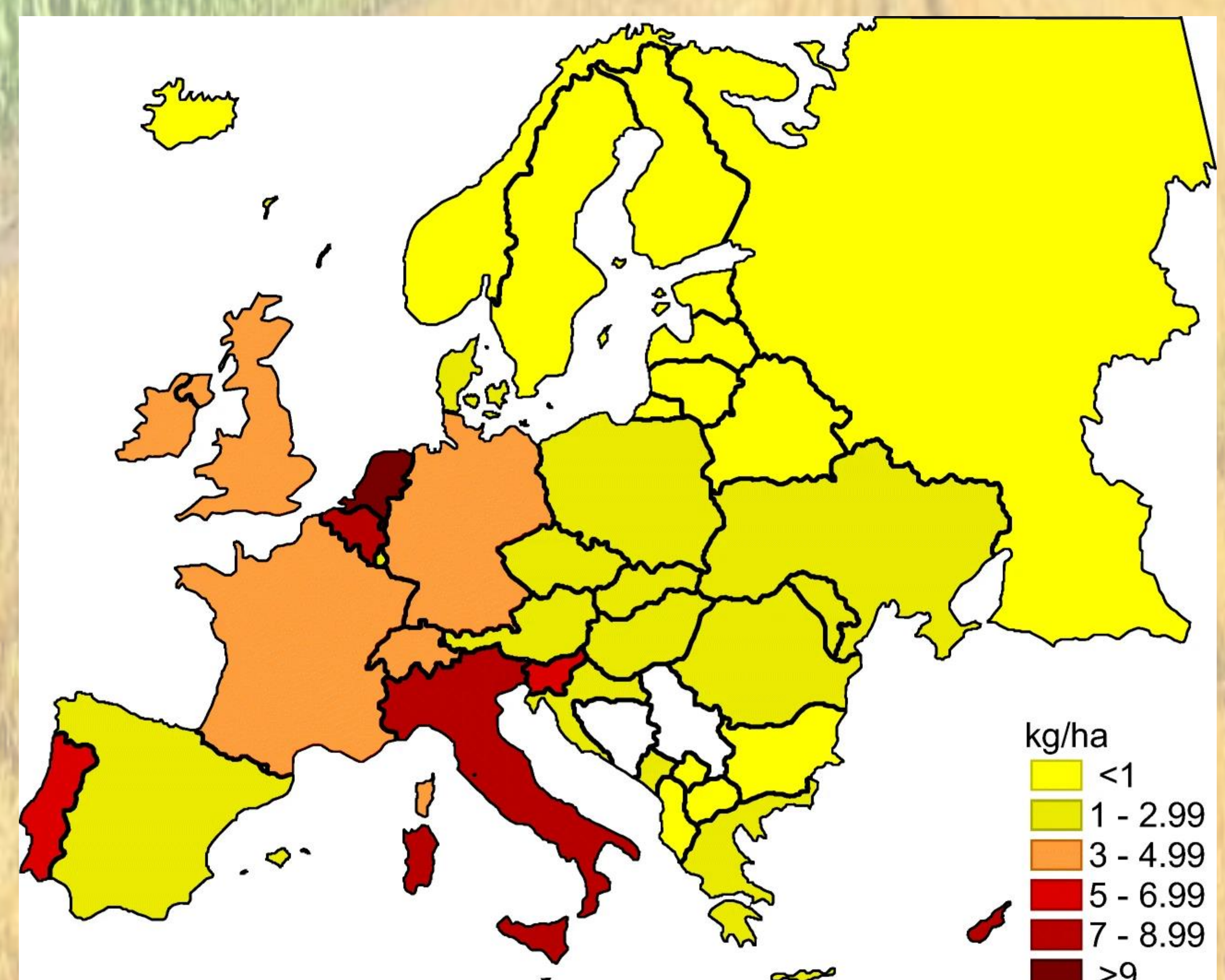


Figure 2. Use of pesticides per agricultural area in 2015-2019 in European countries. Source: FAO

## CONCLUSIONS

The opportunities and risks of pesticide use were assessed to show the potential of alternative reduce diseases, pests, and weeds control options for sustainable development. Agriculture presents the best option for farmers to apply artificial intelligence techniques integrated with modern information and communication technology to eliminate harmful diseases and insect pests. As a consequence, it will allow to increase the yield of cultivated plants. The possibility of using it in the biological protection of microorganisms such as bacteria, yeast and filamentous fungi helps to reduce crop losses.

## REFERENCES

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