Food and Agriculture Organization of the United Nations

SUPPORT FOR THE ENHANCEMENT OF NATIONAL PLANT PEST SURVEILLANCE AND PHYTOSANITARY CERTIFICATION SYSTEMS

February 2022

SDGs:

Countries:	Armenia, Belarus, Bosnia and Herzegovina, Georgia, North Macedonia, Republic of Moldova, Ukraine
Project Code:	TCP/RER/3705
FAO Contribution:	USD 405 000
Duration:	1 February 2019 – 31 December 2021
Contact Info:	FAO Regional Office for Europe and Central Asia REU-ADG-RR@fao.org

Implementing Partners

Ministry of Agriculture of Armenia; Ministry of Agrarian Policy and Food of Ukraine; Ministry of Agriculture and Food of Belarus; Ministry of Environmental Protection and Agriculture of Georgia; Ministry of Agriculture, Forestry and Water Economy of North Macedonia; Ministry of Agriculture, Regional Development and Environment of the Republic of Moldova; Ministry of Agriculture, Water Management and Forestry of Bosnia and Herzegovina.

Beneficiaries

Direct: Official institutions involved in the protection of plants from pests.

Indirect: Traders, importers and exporters of plants or plant products, and farmers involved in plant production.

Country Programming Framework (CPF) Outputs

Armenia: Output 2.2.2 – Scientific, analytic and technical capacities for risk analysis, food safety early warning and response to dangerous food safety emergencies strengthened.

Belarus: Output 1.2 – Government capacities strengthened in national phytosanitary control services.

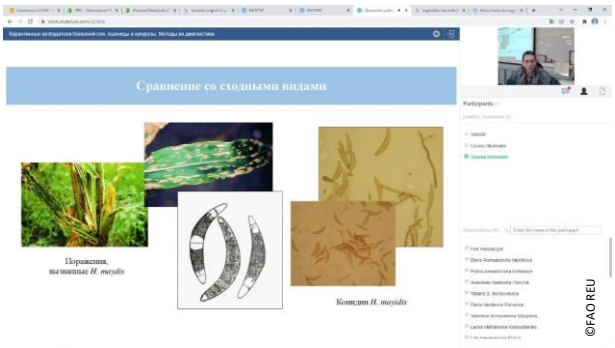
Bosnia and Herzegovina: Output 1.3 – Public and private sector organizations' capacities strengthened to design and implement national policies, strategies and regulatory frameworks supportive of inclusive and efficient agricultural and food systems development.

Georgia: Output 3.3 – Plant and pest control services improved.

North Macedonia: National Strategy for Agriculture and Rural Development (NSARD) 2014-2020: Increasing the international competitiveness of Macedonian agricultural production and agro food industry, and securing sustainable development of rural areas.

Republic of Moldova: Output 1.2 – Policy framework on internal and external market promotion of agrifood products designed.

Ukraine: Output 1.2 – Implementation framework for strengthening the national phytosanitary control services prepared.



BACKGROUND

For Armenia, Belarus, Bosnia and Herzegovina, Georgia, North Macedonia, Republic of Moldova and Ukraine, plant protection in agriculture and forestry is important for food safety and economic development. Not only do plants ensure sustainable nutrition for society, but they also support international trade in plants or plant products. As plants are hosts for many pests, international trade is inherently associated with risks of pest introduction and spread. National phytosanitary systems based on the International Plant Protection Convention (IPPC) and International Standards for Phytosanitary Measures (ISPMs) aim at reducing those risks.

Even though the ISPMs are available on the website of the IPPC, National Plant Protection Organizations (NPPOs) often have insufficient knowledge of them. In practice, this may translate into difficulties in discussions with other NPPOs, especially on trade-related issues. Moreover, as ISPMs are revised and updated, especially to reflect new scientific achievements, periodic training is necessary to keep NPPOs and their officers informed about recent developments.

The main objective of this project was to enhance the capacities of the national phytosanitary systems operated by the NPPOs of the recipient countries to better prevent the risks associated with the introduction and spread of pests that can occur through international trade in plants and plant products. Among the key elements of national phytosanitary systems are surveillance systems, which enable reliable determination of the presence or absence of pests in the territories or parts of territories of countries, early detection of newly introduced pests and determination of areas of their spread within the country. Monitoring surveys are used to verify the characteristics of pest populations within countries, enabling timely reaction and the prevention of economic damage to crops.

The project built the capacities of the NPPOs in the participating countries on the identification of pests and on phytosanitary certificates through the delivery of training sessions. These were based on international standards adopted under the IPPC, which provide guidance for NPPOs around the world on the harmonization of their actions to combat plant pests for international trade in plants and plant products.

Impact

By enhancing the capacities of NPPOs in the recipient countries to implement ISPMs, the project results were expected to contribute to the creation of an enabling environment to ensure the efficient work of NPPOs that is required for sustainable and climate-resilient systems to address threats caused by plant pests to both food systems and the trade of plants and plant products.

Achievement of results

The protection of plants from pests contributes to a number of Sustainable Development Goals (SDGs), especially SDGs 1, 2, 8, 12, 13, 15 and 17. The project focused mainly on enhancing economic development by preventing the introduction and spread of pests of economic importance to, from or within the territories of the recipient countries. It supported the national capacities of these countries to detect pests in the field, properly identify them and determine the ranges of their distribution. In relation to facilitating exportation, procedures were studied for the verification of compliance of exported consignments with the phytosanitary import requirements of the importing countries and for the issuance of phytosanitary certificates, with a special focus on the innovative IPPC ePhyto Solution system for issuance and international delivery of the certificates in electronic form.

Phytosanitary systems cover a wide range of issues, all of which cannot be covered in a project with a limited scope and capacity. That being said, this project was able to address several important aspects of these systems: phytosanitary surveillance for the detection of pests in national territories, phytosanitary laboratory diagnostics for pest identification, and phytosanitary certification in export of commodities of plant origin.

The expected Outputs were fully delivered. The only major change to the original work plan was replacing the training on plant pest surveillance and phytosanitary certification with the review, translation and publication of a pest surveillance manual for inspectors of the NPPO of Republic of Moldova, which was made upon request of the country. The manual was translated into both official languages of the country (Romanian and Russian) and was printed and published on the FAO website. In addition, Output 3 was adjusted slightly, because at the inception workshop, representatives from Armenia, Belarus and Bosnia and Herzegovina stated that they were no longer interested in the development of manuals on Integrated Pest Management (IPM) as there were already several manuals of this nature available in multiple languages; therefore, the IPM manuals were only developed for North Macedonia and for Ukraine.

Implementation of work plan and budget

The implementation of the project began in March 2019, when the inception workshop was held. In the original work plan, most of the activities were to be carried out in 2019; however, the delivery of all of the training (three sessions with different scopes for each of the seven recipient countries, for a total of 21 sessions) was not feasible by the end of 2019. For that reason, a no cost extension was requested and approved.

A second no-cost extension was granted after the onset of the coronavirus disease 2019 (COVID 19) pandemic to accommodate for some of the training sessions that had to be put on hold. They were ultimately carried out online in late 2021.

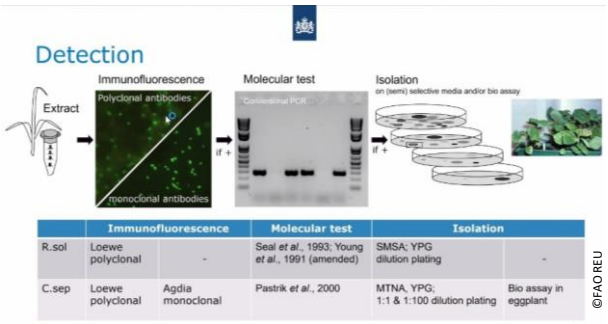
The development, review, translation and publication of the manuals for Republic of Moldova, North Macedonia and Ukraine was less affected by the pandemic, and their publication was finalized within the duration of the project.

All of the planned activities were delivered within the original budget.

The risks to implementation that were identified in the project document did not materialize, and the environmental and social risks were assessed as low and did not require active management.

As mentioned above, the risk that materialized unexpectedly was the COVID-19 pandemic and its related restrictions, which made face-to-face training sessions impossible to carry out.

Prior to the pandemic, several of the training sessions were held. For the remaining sessions, the available options were to either put them on hold while hoping for the situation to improve, or to conduct them virtually. Because of the nature of the training, which included hands-on work in a laboratory with real samples and equipment, the strong preference of all involved parties was to conduct the activities in person, so they were put on hold to see if the situation with the pandemic would improve. That did not happen, and because the duration of the project could not be further extended, the project team decided to conduct the remaining training sessions online. The training sessions on plant pest surveillance and phytosanitary certification were held in November and December 2020, and the laboratory training sessions were held in November and December 2021.



	Immunofluorescence		Molecular test	Isolation	
R.sol	Loewe polyclonal	-	Seal *et al.*, 1993; Young *et al.*, 1991 (amended)	SMSA; YPG dilution plating	-
C.sep	Loewe polyclonal	Agdia monoclonal	Pastrik *et al.*, 2000	MTNA, YPG; 1:1 & 1:100 dilution plating	Bio assay in eggplant

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SUSTAINABILITY

1. Capacity development

The protection of plants from pests relates to both internal and external aspects of national food policies. The internal aspect of plant protection is linked to ensuring food security, while the external aspect relates to international trade in plants and plant products, supporting the economic development of countries. Both aspects are at the centre of national food policies of the countries targeted by the project. Moreover, all of these countries are contracting parties to the IPPC, they all have NPPOs in place, established in line with Article IV.1 of the IPPC, as well as phytosanitary legislation that regulates matters relating to quarantine pests and to measures to prevent their introduction and spread. Relevant provisions of the Country Programming Framework (CPF) documents show the interest of governments in enhancing the capacities of NPPOs and phytosanitary systems.

The changing environment for international trade in plants and plant products, i.e. new trading partners, new categories of commodities traded, changes in the status or distribution of pests in exporting countries, or scientific and technological progress make it necessary to update national capacities. The activities under this project addressed some of the needs of NPPOs in the recipient countries. In addition, national experts made new contacts with international experts recruited by FAO, or with institutions such as phytosanitary reference laboratories in the region, which may help develop international cooperation on phytosanitary matters.

The main organizational structures involved in the implementation and the main beneficiaries of the project activities were the NPPOs of the beneficiary countries, established officially in line with the provisions of Article IV.1 of the IPPC, and usually working under the national ministries responsible for agriculture, forestry and the environment. These structures are at the core of national administrations, and as such, they provide guarantees for the sustainability of the results of the project.

The key partnerships created during the implementation of the project aimed at the provision of laboratory training on methods of detection and identification of pests in samples of plants or plant products. To achieve this, FAO signed two Letters of Agreement (LoAs), with the laboratories of the Netherlands Food and Consumer Product Safety Authority (NVWA) – National Reference Centre in the Netherlands, and of the All-Russian Plant Quarantine Centre (VNIIKR) in the Russian Federation. Both laboratories are official state phytosanitary laboratories. The NVWA laboratory is one of the two official coordinating (reference) laboratories of the European Union, with the area of responsibility covering plant pathogenic bacteria, viruses, viroids and phytoplasmas. The laboratory of VNIIKR is well known and regarded as a reference laboratory in a number of countries in Eastern Europe and Central Asia.

The training sessions that were carried out under the project helped establish closer contacts between the laboratories and individual experts, which may be helpful in future cooperation on phytosanitary diagnostics.

The project document did not include an exit strategy. It addressed several items that form important parts of the national phytosanitary systems of the recipient countries. It may be expected that the countries, through their NPPOs, will review their procedures relating to plant pest surveillance or phytosanitary certification, and make adjustments as needed. The project did not, however, assume the responsibility of reviewing national procedures or amending them. The laboratory diagnostics training aimed to increase the capacity of staff and to create links between national and international laboratory experts.

2. Gender equality

None of the activities of the project directly addressed the needs and priorities of individuals, but those of official institutions bound by national laws to operate in the area of protecting plants from pests.

Institutional capacities were enhanced through project activities, where participants were individual officers. During project activities, equal opportunities for the participation of men and women were ensured. Gender balance was achieved in training sessions on plant pest surveillance and phytosanitary certification, where 50.7 percent of participants were women and 49.3 percent were men. It was not achieved in the laboratory training sessions, where 85.4 percent of the participants were women and 14.6 percent were men. This was due to the fact that vast majority of staff employed in national phytosanitary laboratories were women.

Private or legal persons who are clients of plant protection institutions are the indirect beneficiaries of the capacity-development activities that took place under the project. In the case of NPPOs, the clients include traders, importers and exporters of plants or plant products, but also farmers involved in plant production. These social groups were not directly targeted by the project activities; however, they can benefit from its results through better quality of the services offered to them by their respective NPPO. Gender balance and benefits for men and women, in that respect, will depend on the involvement of men or women in the economic activities in these sectors in particular countries, which could not, however, be targeted or addressed by the project.

3. Environmental sustainability

Plant pests affect a large number of cultivated and wild species, both of which are vulnerable and need protection from pests to maintain their value to the economy or to the environment. Phytosanitary systems are applicable to pests threatening all categories of plants, including agricultural crops, plants in forestry, plants grown in public areas and private gardens, and water plants. Moreover, plant pests can infest not only living plants, but also certain plant products, e.g. wood or products made of wood or bamboo. The management of forestry pests usually lies with national agencies separate from NPPOs, which generally cooperate with the NPPOs. Enhanced capacities of NPPOs should help improve the efficiency of the cooperation with forestry agencies, and with other partners involved in the protection and maintenance of plant resources in the environment.

4. Technological sustainability

The project supported the use of modern technologies in phytosanitary laboratories to detect and identify plant pests. These technologies included molecular diagnostic methods based on the analysis of the deoxyribonucleic acid (DNA) present in tested samples. Interest in these technologies showed that, in many laboratories, even though they have relevant laboratory equipment, experience in using it was limited. During training sessions, participants had the opportunity to learn more about the diagnostic methods used in laboratories and to benefit from the knowledge of more experienced experts.

All project activities contributed to the enhancement of knowledge, capacities or good practices in the beneficiary countries. The training activities focused on plant pest surveillance, phytosanitary certification and phytosanitary laboratory diagnostics. Each area is part of national phytosanitary systems operated by the contracting parties to the IPPC and their NPPOs.

Training on surveillance enhanced knowledge and practical implementation of guidance provided by ISPM No. 6 *Surveillance*. The training on phytosanitary certification provided an opportunity to review and discuss guidance and principles provided by ISPM 7 *Phytosanitary certification systems* and ISPM 12 *Phytosanitary certificates*, as well as the practical organization of the phytosanitary certification process. They also laid foundations for better understanding and possible implementation in the recipient countries of the IPPC ePhyto Solution system, which is a global information technology (IT) system that allows countries to generate and send electronic phytosanitary certificates for exported consignments, from exporting to importing countries. The laboratory training not only allowed for the presentation and detailed discussion of innovative laboratory methods of detection and identification of pests (e.g. serological or molecular methods), but also for establishing contacts between laboratory experts in the reference laboratories and recipient countries.

All of the countries targeted by the project have been operating national phytosanitary systems for years. Because of rapid scientific progress, national systems should be periodically reviewed and modernized. Moreover, international standards for phytosanitary measures are revised, too, based on enhanced scientific knowledge or new standards. Information on new standards or their revisions is available on the International Phytosanitary Portal, but harmonized implementation of the standards is not easily achieved without the exchange of knowledge and experience among countries. In Europe and Central Asia, the European and Mediterranean Plant Protection Organization (EPPO) is the regional forum for cooperation among experts from 51 member countries. The EPPO's working groups and panels provide fora for discussion on different areas of plant protection and related technical areas, and they are open for experts from all member states. Moreover, certain coordination and cooperation mechanisms are provided by the European Union for its Member States, and a Coordinating Council on Plant Quarantine functions within the Commonwealth of Independent States. Furthermore, membership in global bodies under the IPPC (such as the Standards Committee, Implementation and Capacity Development Committee, Expert Working Groups and Technical Panels) is open to experts from all contracting parties. Additionally, FAO REU supports the organization of meetings in the region, such as IPPC Regional Workshops and other, which provide information and foster the exchange of experience among countries.

FAO and IPPC Secretariat officers may provide technical advice to countries on many phytosanitary issues as well. Decisions on using these cooperation opportunities are taken by the countries themselves or are coordinated through regional plant protection organizations.

5. Economic sustainability

The project did not develop new products but instead provided guidance on the enhancement of technical precision and effectivity of certain existing official activities, which may be continued to address the needs of interested individuals or public institutions.

Documents and outreach products

- **FAO.** 2020. Inspector's manual on specific pest surveys. Budapest. 58 pp.
- **FAO.** 2020. Integrated pest management of major diseases and pests in grapevine, tomato and pepper production in the Republic of North Macedonia. Budapest. 95 pp.
- **FAO.** 2020. *Menaxhimi i integruar i dëmtuesve dhe sëmundjeve kryesore tek hardhia e rrushit, speci dhe domatja në Maqedoninë e Veriut*. Budapest. 96 pp.
- **FAO.** 2020. *Интегрална заштита на виновата лоза, пиперката и доматот од позначајните штетници и болести во Северна Македонија*. Budapest. 96 pp.
- **FAO.** 2021. *Manualul inspectorului privind supravegherea organismelor dăunătoare specifice*. Budapest. 58 pp.
- **FAO.** 2021. Pests of economic importance in Ukraine. Budapest. 186 pp.
- **FAO.** 2021. *Руководство инспектора по обследованиям конкретных вредителей*. Budapest. 58 pp.
- **FAO.** 2021. *Шкідники економічного значення в Україні Посібник щодо комплексної боротьби зі шкідниками*. Budapest. 186 pp.

ACHIEVEMENT OF RESULTS - LOGICAL FRAMEWORK

Expected Impact	**The project will contribute to creating an enabling environment to ensure the efficient work of NPPOs required for sustainable and climate resilient systems to address threats caused by plant pests to food systems and facilitate market and trade of agricultural products**			
Outcome	Enhanced capacities of NPPOs to implement international standards for phytosanitary measures (ISPMs) through provision of trainings and technical guides to the staff of the NPPOs			
	Indicator	– 1.1 The number of NPPO staff trained on the implementation ISPM 6 Surveillance, ISPM 7 Phytosanitary certification system and ISPM 12 Phytosanitary certificates. – 1.2 The number of NPPO laboratory staff trained on pest diagnostics. – 1.3. The number of timely developed national manuals on IPM for the most economically important pests of the key crops.		
	Baseline	– The NPPO staff are not trained on the implementation of ISPM 6, ISPM 7 and ISPM 12. – Selected aspects of pest diagnostics require training. – The national manuals on IPM are not available.		
	End Target	– 100 NPPO inspectors are trained on the implementation of ISPM 6, ISPM 7 and ISPM 12. – 60 NPPO laboratory staff trained on the selected aspects of pest diagnostics. – Five national manuals on IPM developed for: Armenia, Belarus, Bosnia and Herzegovina, North Macedonia and Ukraine.		
	Comments and follow-up action to be taken	See comments below.		
Output 1	Institutional capacity of NPPOs strengthened through the delivery of trainings on national plant pest surveillance and phytosanitary certification systems to the NPPO staff			
	Indicators		Target	Achieved
	The number of NPPO staff trained on the implementation ISPM 6 Surveillance, ISPM 7 Phytosanitary certification system and ISPM 12 Phytosanitary certificates.		100 NPPO inspectors are trained on the implementation of ISPM 6, ISPM 7 and ISPM 12.	Yes
Baseline	The NPPO staff are not trained on the implementation of ISPM 6, ISPM 7 and ISPM 12			
Comments	A total of 140 participants from the NPPOs of the beneficiary countries were trained on the implementation of ISPM 6, 7 and 12.			
Activity 1.1	A regional workshop on national plant pest surveillance and phytosanitary certification systems			
	Achieved	Yes		
	Comments	The regional workshop on national plant pest surveillance and phytosanitary certification systems was held on 5 September 2019 in Chisinau, Republic of Moldova. It was attended by representatives of all countries targeted by the project. Two experts were also present, one on phytosanitary certification and one on plant pest surveillance. They were recruited under the project to conduct training sessions in their respective areas of expertise. During the workshop, several countries presented updates on their plant pest surveillance activities and on phytosanitary certification arrangements, and a discussion followed.		
Activity 1.2	Seven national trainings on national plant pest surveillance systems and phytosanitary certification systems			
	Achieved	Yes		
	Comments	The training sessions on national plant pest surveillance systems and phytosanitary certification systems were delivered by international experts recruited under the project. The outbreak of the COVID-19 pandemic in March 2020 made it impossible to conduct in-person sessions as planned, so they were carried out online in late 2020 for Belarus and for Ukraine. The training sessions were held on the following dates: – Bosnia and Herzegovina: 11-13 December 2019 (19 participants). – North Macedonia: 16-18 December 2019 (21 participants). – Armenia: 19-21 February 2020 (21 participants). – Georgia: 24-26 February 2020 (20 participants). – Ukraine: 16-27 November 2020 (online, 29 participants). – Belarus: 30 November-11 December 2020 (online, 30 participants). In total, 71 women (50.7 percent) and 69 men (49.3 percent) were trained. Republic of Moldova requested that the training sessions be replaced with the review, translation and publication of a plant pest surveillance manual for the inspectors of their NPPO, which was developed in English under an earlier project entitled *Strengthening capacities of the national phytosanitary control services in four Eastern European countries* (TCP/RER/3503). Under this project, FAO translated and published the manual in the official languages of Republic of Moldova (https://www.fao.org/documents/card/en/c/cb2071ro [Romanian] and https://www.fao.org/documents/card/ru/c/cb2071ru [Russian]), as well as in English https://www.fao.org/documents/card/en/c/cb2071en.		

<table>
<tr><td rowspan="3">Output 2</td><td colspan="3">Diagnostic capacity of phytosanitary laboratories NPPOs strengthened through the delivery of trainings on pest diagnostics to the staff of the NPPO laboratories</td></tr>
<tr><td>Indicators</td><td>Target</td><td>Achieved</td></tr>
<tr><td>The number of NPPO laboratory staff trained on pest diagnostics.</td><td>60 NPPO laboratory staff trained on the selected aspects of pest diagnostics.</td><td>Yes</td></tr>
<tr><td>Baseline</td><td colspan="3">Selected aspects of pest diagnostics require training.</td></tr>
<tr><td>Comments</td><td colspan="3">82 NPPO laboratory staff were trained on selected aspects of phytosanitary diagnostics.</td></tr>
<tr><td rowspan="3">Activity 2.1</td><td colspan="3">Identification of key areas related to pest diagnostics needing improvements</td></tr>
<tr><td>Achieved</td><td colspan="2">Yes</td></tr>
<tr><td>Comments</td><td colspan="2">Throughout implementation, all recipient countries identified specific items of interest in the area of phytosanitary laboratory diagnostics. More than 100 pests or pest groups were identified as training needs, with different (morphological or molecular) diagnostic methods also being identified for some of the pests. As covering such high numbers of pests was impossible, the topics on pest detection and identification that were most urgent were covered.</td></tr>
<tr><td rowspan="3">Activity 2.2</td><td colspan="3">Seven national trainings on laboratory diagnostics</td></tr>
<tr><td>Achieved</td><td colspan="2">Yes</td></tr>
<tr><td>Comments</td><td colspan="2">Laboratory training was delivered by two service providers under LoAs. The sessions in Armenia, Bosnia and Herzegovina, Georgia, North Macedonia, Republic of Moldova and Ukraine were delivered by the National Reference Laboratory of the NVWA in Wageningen, the Netherlands. Belarus requested that their training be delivered by the laboratory of the VNIIKR.
The training sessions were conducted on the following dates:
– Bosnia and Herzegovina: 26-28 November 2019 (9 participants).
– North Macedonia: 17-19 December 2019 (7 participants).
– Republic of Moldova: 25-27 February 2020 (7 participants).
– Georgia: 22-23 November 2021 (online) (6 participants).
– Ukraine: 1 and 6 December 2021 (online) (21 participants).
– Armenia: 2 and 7 December 2021 (online) (6 participants).
– Belarus: 6-10 December 2021 (online) (26 participants).
In total, 70 women (85.4 percent) and 12 men (14.6 percent) were trained. The participants were laboratory experts employed in national phytosanitary laboratories of the recipient countries.
The topics covered during the training differed and were agreed with phytosanitary laboratory experts from the participating countries. The following were covered:
– Armenia: Laboratory diagnosis of Ralstonia solanacearum and Xylella fastidiosa, ELISA test for the detection of viruses, especially Plum Pox Virus;
– Belarus: Detection and identification of nematodes and pathogenic fungi in phytosanitary laboratory diagnostics;
– Bosnia and Herzegovina: Molecular methods to detect Xylella fastidiosa and Plum pox virus;
– Georgia: DNA barcoding in phytosanitary diagnostics;
– Republic of Moldova: DNA extraction of bacteria in different matrices, molecular detection and identification of Xylella fastidiosa by real-time PCR assay;
– North Macedonia: Molecular methods to detect Xylella fastidiosa (real-time PCR) and Plum pox virus (conventional RT-PCR); and
– Ukraine: Laboratory diagnosis of Ralstonia solanacearum and Xylella fastidiosa and ELISA test for the detection of viruses.</td></tr>
</table>

Output 3	Technical guides on integrated pest management for the most economically important pests of key crops in individual recipient countries are developed and available		
	Indicators	Target	Achieved
	The number of timely developed national manuals on IPM for the most economically important pests of the key crops.	Five national manuals on IPM developed for: Armenia, Belarus, Bosnia and Herzegovina, Macedonia and Ukraine.	Yes
Baseline	The national manuals on IPM are not available.		
Comments	During the inception workshop, Armenia, Belarus and Bosnia and Herzegovina stated that they were no longer interested in manuals on IPM. Thus, the IPM manuals were only developed for North Macedonia and for Ukraine. For North Macedonia, the manual was published in English, Macedonian and Albanian, while for Ukraine, the manual was published in English and Ukrainian.		
Activity 3.1	Identification of the most economically important pests of the key crops of the recipient countries		
	Achieved	Yes	
	Comments	The crops and respective pests of economic importance were selected by experts in each country. In Ukraine, 47 economically important insect pests of seven key crops (potato, sunflower, maize, soybean, rapeseed, sugar beet, and cereals) were selected. In North Macedonia, 24 pests (fifteen pathogens and nine insect pests) of three major crops (grapevine, pepper and tomato) were considered the most economically important.	
Activity 3.2	Development, translation and distribution of manuals on IPM of the pests identified by the recipient countries		
	Achieved	Yes	
	Comments	Two manuals on IPM were developed, one for North Macedonia and one for Ukraine. The manuals were developed in English by selected national experts and then translated into the official national languages of the countries. Printed copies were delivered to plant protection experts in the recipient countries. The manuals were published online by FAO. The IPM manual for North Macedonia is available in English (https://www.fao.org/documents/card/en/c/cb0814en), Macedonian (https://www.fao.org/documents/card/en/c/cb0814mk) and Albanian (https://www.fao.org/documents/card/en/c/cb0814sq). The IPM manual for Ukraine is available in English (https://www.fao.org/documents/card/en/c/cb3909en) and Ukrainian (https://www.fao.org/documents/card/en/c/cb3909uk).	

Partnerships and Outreach
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