Food and Agriculture Organization of the United Nations

YEARBOOK 2023

Lifecycle Management of Pesticides and Disposal of POPs Pesticides in Central Asian countries and Türkiye

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FOREWORD

Yearbook 2023 is the third publication summarizing and highlighting the progress made under the project "Lifecycle Management of Pesticides and Disposal of POPs Pesticides in Central Asian countries and Türkiye", funded by the Global Environment Facility and managed by the Food and Agriculture Organization of the United Nations (FAO).

These yearbooks have aimed not only to illustrate annual progress and achievements but also to compile the findings that will inspire new capacity-building initiatives.

With support from national governments and local partners, many activities in recent years have addressed the multifaceted issue of reducing pesticide use and dealing with obsolete pesticides. Given the necessity of a carefully orchestrated approach, particular attention has been given to intersectoral collaboration, including with civil society organizations, the private sector and academia.

Project activities and implementations have helped build significant knowledge critical to lowering reliance on pesticides and improving the management of obsolete pesticides. This knowledge is key to replicating and scaling up activities in various countries while considering local differences and needs.

In 2023, work included well-known efforts, such as the promotion of integrated pest management and the safeguarding of obsolete pesticides, and new technical approaches, such as bio- and phytoremediation of pesticide-contaminated soils and sound disposal options in local settings. These efforts have helped project countries gain the experience and knowledge they need to conduct future trials and have strengthened them to tackle related challenges beyond the lifetime of the project.

Overall, efforts continue to focus on the proper management of obsolete pesticides and the prevention of new accumulations in the region. These steps are crucial to improving agricultural practices, enhancing resilience and reducing reliance on pesticides – all necessary components, ultimately, of the transition to a real green and sustainable agriculture.

Tania Santivanez
Agriculture Officer and Lead Technical Officer

ABBREVIATIONS

FAO	Food and Agriculture Organization of the United Nations
GEF	The Global Environment Facility
GIS	Geographical Information System
HHP	Highly Hazardous Pesticide
IPM	Integrated Pest Management
MT	Metric tonnes
NGO	Non-governmental organization
POPs	Persistent organic pollutants
PPE	Personal Protective Equipment
REA	Rapid Environmental Assessment

OVERVIEW

OVERVIEW

The Global Environment Facility (GEF)-funded and FAO-managed project "Lifecycle Management of Pesticides and Disposal of POPs Pesticides in Central Asian countries and Türkiye" addresses under the Chemical Wastes area two key topics: Disposal of obsolete pesticides and related materials and Prevention of re-accumulation of obsolete pesticides by promoting FAO's approach of better production, better nutrition, a better environment, and a better life.

The project consists of four key components:

- **Component 1:**
  Reducing releases from persistent organic pollutants (POPs) and other obsolete pesticides posing high risk to public health and the environment and improving management of related wastes.
- **Component 2:**
  Strengthening the legal, institutional and regulatory framework for pesticide lifecycle management.
- **Component 3:**
  Supporting improved agricultural practices promoting alternatives to chemical pesticides for plant protection.
- **Component 4:**
  Sharing project achievements and lessons learnt.

The yearbook series is prepared annually to share the progress achieved and most important conclusions in the project with stakeholders. This volume explains the progress made by the project countries in 2023. Continuous support and interest from the national governments and partners encouraged the enlarging multidisciplinary technical team to pursue project objectives. In 2023, the project led exceptional activities to introduce new approaches in order to address significant challenges. Overall, all these joint efforts made possible to complete many activities and achieve great success in 2023.

Regional progress in a nutshell

All project countries' representatives met in Antalya, Türkiye, from 12 to 14 June 2023 for the third Regional Project Steering Committee


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meeting and side events. In addition to facilitating project coordination, joint decision-making and regional cooperation related to the project, the meeting was an opportunity for participants to study best practices that are taking place in Türkiye. One workshop held during the meeting covered the pesticide registration system and container tracking system in Türkiye. This was followed by a visit to a pesticide retailer, where the national container tracking system was demonstrated. Another workshop focused on the integrated pest management practices that have been carried out in Türkiye within the scope of the project.

Participants then visited integrated pest management trials that have been conducted for three years in local apple orchards under the project. A YouTube Shorts video is online to show this visit, experience and knowledge exchange. The country representatives also visited two facilities breeding beneficial insects used for biological pest control and pollination in greenhouses in Antalya, Türkiye.
In order to highlight the importance of comprehensive pesticide lifecycle management in reduction of pesticide use and exposure, a regional workshop was held between 18-19

September 2023 in Baku. The main aim of the workshop was to improve sound pesticide management and reduce pesticide risks, thus contributing to sustainable agriculture development in line with FAO's strategic framework. Delivering remarks during the workshop were Chairman of the Azerbaijan Food Safety Agency; Azerbaijan Minister of Agriculture; and Azerbaijan Deputy Minister of Ecology and Natural Resources.

During the workshop, country representatives learned of FAO's comprehensive approach to pesticide lifecycle management – from the production of pesticides to their transport, sale, use and eventual disposal – based on international standards and best practices.

A leaflet on pesticide lifecycle management was prepared for the regional event in English, Russian and Azerbaijani.

Attendees discussed the current practices in pesticide lifecycle management in the region, and experts were encouraged to identify gaps and challenges in national pesticide management systems. In this focus event, representatives from Azerbaijan, Kazakhstan, Kyrgyzstan and Tajikistan discussed national pesticides lifecycle management road maps with short-, mid- and long-term priorities and targets. The third day of the event was dedicated to developing a strategy for the management of obsolete pesticides in Azerbaijan and preventing their re-accumulation.

First draft of national pesticide lifecycle management road maps were developed based on workshop inputs for four countries and presented for further comments in national workshops in Tajikistan on 24 November 2023 and in Kazakhstan on 28 November 2023.


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The first pesticide exposure assessment based on desk studies, nation-wide consultations and interviews with pesticide users in Kazakhstan, Kyrgyzstan and Tajikistan was carried out together with Pesticide Action Network (PAN) UK and local partners. The assessment provided important information on dangerous pesticide use patterns by farmers. The results of the assessments were presented in the national wrap-up meetings to discuss with the national authorities. Overall, the assessments showed that it is important to promote in 2024 farmer and community trainings on appropriate application of pesticides and Personal Protective Equipment (PPE) use, and provide options to collect empty pesticide containers and alternatives to hazardous pesticides.In 2023, as part of the project's highly hazardous pesticides (HHPs) phase out strategy, alternatives to two HHPs; namely, alpha-cypermethrin and thiacloprid; were identified and shared with the project countries to promote those alternatives to create awareness in the countries for national HHP phase out initiatives.


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In the frame of the 14th HCH & Pesticide Forum, a special session was co-organised by the project on 22 February 2023 dedicated to the special challenges in the Central Asia region on contaminated soil and on solutions promoted by the project to introduce better pesticide lifecycle management. The Forum brought the opportunity to exchange and receive latest information on best options to safely manage various types of hazardous agricultural wastes. Technical support has been provided to Azerbaijan and Tajikistan for their accession to the Rotterdam Convention and to develop the national profiles of Azerbaijan and Tajikistan, which will further strengthen chemicals management in these countries. In order

to accelerate ratification of the Rotterdam Convention by the countries in the region including Azerbaijan and Tajikistan, a regional meeting was co-organised with the Rotterdam Secretariat between 4-6 July 2023 in Baku.

In the frame of the 16th Joint FAO/WHO Meeting on Pesticide Management on 6 November 2023, a presentation was delivered to explain pesticide management activities carried out by FAO Regional Office for Europe and Central Asia including in the frame of the project.

Some key FAO guidelines introducing agricultural practices relying on better ground practices, less pesticides and less dangerous pesticides had been translated into Turkish and in 2023 they became online accessible in FAO's e-library. The list of the publications along with the access links are given below:

· The International Code of Conduct on Pesticide Management;
· Guidelines on Prevention and Management of Pesticide Resistance;
· Guidance on Pest and Pesticide Management Policy Development;
· Guidelines for Personal Protection when Handling and Applying Pesticides;
· Guidelines on Good Practice for Ground Application of Pesticides;
· Guidelines on Management Options for Empty Pesticide Containers;
· Guidelines on the Organization of Schemes for Testing and Certification of Agricultural Pesticide Sprayers in Use;
· Guidelines on Highly Hazardous Pesticides;
· Agroecology in Europe and Central Asia: An overview;
· Activity book: Healthy Plants, Healthy Planet.

Further, various national news pieces on project activities were drafted in the course of the year and the project's website was kept updated. Finally, the Yearbook 2022 describing progress in each country was published in English and Russian.

AZERBAIJAN

HIGHLIGHTS OF 2023

AZERBAIJAN

Main progress in **Component 1**

Safeguarding

The safeguarding of 210.342 metric tonnes (MT) of liquid POPs and other obsolete pesticides in Azerbaijan was completed in Jangi storage facility in April 2023. Materials were repacked in 11 402 UN-approved drums in a locked store building and awaiting disposal. A video about safeguarding in Jangi facility is available on YouTube.

Disposal options

Assessment of disposal options was done and a technical assessment report was provided to the government of Azerbaijan.

A site-specific training on improvement of daily operations of Jangi facility for on-site staff at the storage facility was carried out in December 2023. To design this training, the gaps in the site conditions, capacity and needs of the site management were assessed. Overall, ten staff participated in the five-day training that was a combination of theory and practice.

Development of a Waste Management Information System for the Jangi storage facility was initiated. The system is to register delivered wastes, its storage location, safety information, and in future it will mark disposal of the volumes.

Data handling in obsolete pesticide management

Technical support including a set of training was initiated for better information management of obsolete pesticides by using a Geographical Information System (GIS). The goal is to convey fundamental methods for data management, digitalisation and spatial analysis of national inventory data on obsolete pesticides using GIS tools and methods.

Inventory

An obsolete pesticide inventory of the new territories has been requested by Azerbaijan Food Safety Institute (for 2024) and initial planning started. Also, a detailed site investigation is ongoing at a former pesticide store in Ujar. A drone map has been developed and a series of sampling and monitoring wells drilled. A Phase 2 Conceptual Site Model is under development. The site assessment work is also used for capacity building within the new governmental commission of Azerbaijan on contaminated sites.

Main progress in **Component 2**

Legal framework assessment

The Azerbaijan legal assessment report was updated in spring 2023 to include recent legislative updates.

Support for the accession to the international conventions

A regional meeting was co-organised with the Rotterdam Secretariat between 4-6 July 2023 in Baku. It is to accelerate ratification of the Rotterdam Convention by several countries, including Azerbaijan.

Additionally, a national profile needed for the ratification of the Rotterdam Convention was developed in 2023, which will further strengthen chemicals management in Azerbaijan.

Pesticide lifecycle management road map

A regional pesticide lifecycle management workshop held in Baku between 18-19 September 2023 aimed to improve sound pesticide management and reduce pesticide risks in the region.
Elaboration of pesticide lifecycle management road maps for each country was initiated during the workshop. Road map to strengthen pesticide lifecycle management in Azerbaijan is ongoing. The main objective of the road map is to facilitate re-establishment of a comprehensive, credible pesticide lifecycle management system in Azerbaijan.

Knowledge and experience exchange

A study tour was organised in January 2023 for an Azerbaijani delegation to learn more about the Turkish pesticide registration system and attached QR-code system to track pesticide containers from import/production to the end user. This was followed by a second visit in September 2023 to further discuss cooperation and activities to be undertaken.

Main progress in **Component 3**

Integrated Pest Management (IPM) promotion

Preparations were finalized to develop IPM trials in Ganja for two crops; tomatoes in greenhouse setting and apple, and in Samukh region for sunflower production in 2024 and a National Action Plan on IPM. It is also planned to conduct various awareness raising actions through the field days, and workshop in selected region for the IPM trials.

Organic school gardens

To promote an understanding among the younger generation on the risk of pesticide use and available alternatives, work started to establish four school gardens. Upon selection of the schools, four organic gardens were established in Lankaran, Salyan, Gala settlement-Baku and Agali village-Zangilan. Complementary trainings were held in summer 2023, and a school curriculum and organic school garden implementation guidelines were drafted.


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Partners in activities in 2023

- Ministry of Ecology and Natural Resources,
- Agrarian Service Agency under Ministry of Agriculture,
- Azerbaijan Food Safety Institute,
- Azerbaijan State Agrarian University coordinated by Ministry of Agriculture,
- EcoSfera.

KAZAKHSTAN

HIGHLIGHTS OF 2023

KAZAKHSTAN

Main progress in **Component 1**

Inventory

Three out of 17 oblasts had been inventoried in late 2022, whereas all other 14 oblasts were inventoried in 2023. To prepare for the 2023 inventories, six trainings were carried out for government officials, local executive bodies and non-governmental organizations (NGOs) from 14 oblasts on the FAO methodologies for obsolete pesticide inventory and Rapid Environmental Assessments (REAs). Overall 129 participants (86 women, 43 men) participated in the trainings. Currently, inventory data are analysed. Almost no stocks are left, particularly only scattered pesticides with no labels or identification marks largely, pesticide-contaminated soil remains.

Disposal options

An assessment of national disposal option was done. Technical assessment report is under evaluation.

A technical assessment of the cement kilns at Zhambyl Cement LLP was conducted to evaluate the potential for co-processing of obsolete pesticides in the kiln. The assessment revealed that with certain technical adjustments, such as modifications to the cement kiln, the co-processing of obsolete pesticides is feasible. However, achieving this requires strong political commitment and development of missing parts of national legislation, along with the necessary norms and standards.


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Contaminated soil remediation

Lab and field trials on phyto- and bio-remediation of pesticide contaminated soils (both POPs and heavy metals) were started. The first year of phyto- and bio-remediation trials on the pilot site in Saimasai village, Yenbekshikazakh district, Almaty oblast, was concluded. The most suitable microorganisms and plants, along with their optimal growth conditions, have been identified for field implementation in contaminated soil.

Container management system

Baseline assessment of empty pesticide containers and agricultural plastic waste management was undertaken and presented to the government of Kazakhstan at a national workshop on 28 November 2023.

Pesticide risk communication

Establishment of a national network on pesticide risk communication was initiated. 80 participants are involved to date, including, state authorities of the Republic of Kazakhstan, NGOs and associations in the field of environmental protection, enterprises managing waste, POPs and pesticides, consulting organizations in the field of environmental protection and academia.

39 network organisations are collaborating to date. Information on pesticides and obsolete pesticides is provided to network members

through different channels (telephone hotline, social media, mailing to 49 editorial offices). A training for government, NGOs, industry and academia was held on 22 November 2023 (female participants 73 percent, male 27 percent). The purpose of the training is to increase the capacity of members of the National Network on Chemical Safety, POPs and Obsolete Pesticides called "ToxicNet" and other stakeholders on the impact of POPs and pesticides on the environment and human health as well as on methods of sound management, handling and protection from POPs and obsolete pesticides.

Main progress in **Component 2**

Legal framework assessment

The Kazakhstan legal assessment was updated to include relevant legislation changes, which occurred in June 2023. The report was formally presented at the national workshop on 28 November 2023, and subsequently reviewed in-depth with stakeholders before being submitted to the Government.

Pesticide exposure assessment

A pesticide exposure assessment based on consultation meetings with relevant stakeholders and interviews with farmers in Kazakhstan was undertaken to better understand gender-disaggregated conditions of pesticide use and exposure at farm level in the country, identify pesticides in use linked to health impacts, to inform the national approach to pesticide lifecycle management in the country. Within the framework of the assessment, a desk research to identify relevant reports and

publications; consultation meetings and interviews among key stakeholders from 5 oblasts and Astana; and a field survey of 250 farmers in 5 oblasts and a range of cropping systems were conducted. The results were presented at national workshop in November 2023.

Pesticide application and PPE use

Many different activities were performed ranging from conducting a baseline survey of pesticide use, including registered pesticides and fertilizers in Kazakhstan, analysis of the current situation regarding the use of PPE and spraying operations to carrying out workshops and field days in 2023.
During a one-day workshop in March 2023, 28 participants mainly farmers and representatives of interested NGOs attended to improve their knowledge on the use of PPE, correct spraying practices and spraying equipment, trainings on pesticide application, and demonstration tests.
40 farmers attended in a two-day field day at orchards, as well as tomato and cabbage fields in September to demonstrate better spraying practices and proper use of PPE in order to reduce pesticide risks.

In addition to these, 50 farmers were interviewed to understand to what extent they use PPE during chemical treatments. According to the study, only 10 percent of respondents use a full set of PPE. 50 percent of surveyed farmers use only respirators and gloves, ignoring the use of protective suits


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and goggles. It is found out that 10 percent of the farmers suffered from pesticide poisoning due to non-compliance with safety practices.

Promotion of alternatives to HHPs

Development of a National Action Plan for promotion of alternatives to HHPs started in 2023. In addition, alternatives to two Active Ingredients namely, alpha-cypermethrin and thiacloprid were identified in cotton and apple production, respectively, for all project countries including Kazakhstan.

Pesticide lifecycle management road map

The pesticide lifecycle management road map was drafted in collaboration with governmental bodies and research institutions. It was then introduced and extensively discussed with stakeholders during the national workshop held on 26 November 2023.

Main progress in **Component 3**

IPM promotion

IPM field trials started in 2023 in cabbage, tomato and apple. IPM trials have been conducted with the aim to identify alternatives to HHPs, decrease treatment frequency, and enhance economic viability in selected crops. Previously, the farm applied over 20 treatments per season, and even up to 30 percent of production loss can happen. Implementing IPM and organic protection systems for tomato, cabbage, and apple trees yielded notable efficacy against pests and diseases. These systems preserved beneficial insect species, leading to a reduction in pest populations. Surveys revealed a stark contrast: while useful insect species were scarce in the chemical field, the integrated and organic approaches, employing biological preparations, fostered populations of lacewings, aphidius and ladybugs, thereby promoting eco-friendly protective measures. The phytosanitary and ecological conditions of vegetable crops (tomato, cabbage) and apple trees markedly improved, resulting in the production of environmentally friendly, high-quality products and significant yield increases. In the IPM pilot sites, the use of pesticides was reduced by 70 percent in apple orchards, 40 percent in cabbage and 25 percent in tomato.

Moreover, various trainings, workshops and field days were conducted for farmers and students related to the trial sites on IPM and proper use of pesticides in order to demonstrate the results of the trials, to promote sustainable intensification, and alternatives to HHPs (such as pheromone traps, dispensers, weather stations, forecasting and signalling system, light traps, bio-pesticides, so on) for 243 participants.

Partners in activities in 2023

- Ministry of Ecology and Natural Resources
- Public foundation “Karaganda Regional Environmental Museum”
- Public foundation “Human Health Institute”
- Association of legal entities “Association Ecoforum of Kazakhstan”
- Public Foundation “The Center: Cooperation for Sustainable Development”
- Institute of Plant Protection and Quarantine named after Zh. Zhiembayev
- Institute of Biology and Biotechnology

KYRGYZSTAN

HIGHLIGHTS OF 2023

KYRGYZSTAN

Main progress in **Component 1**

Safeguarding

Work has been initiated to build central stores for obsolete pesticides in the North and the South of the country. Once the stores are build obsolete pesticides from 26 sites across the country shall be safeguarded and centralized at the two stores.

In addition, it is planned to repackage about 100 tons of obsolete pesticides and soils located in the village of Erkin. Repackaging will be carried out jointly with the Ministry of Defense. A detailed inspection of the warehouse was carried out. The packaging and containers were checked for leaks/destruction of materials. The volume for repackaging has been determined. A list of necessary materials for repackaging has been developed.

Contaminated soil remediation

Trials have been undertaken in 2021-2022 on a former agricultural airfield near to the village of Chym-Korgon which is called Phase 1. The trials showed good initial results confirmed by germination trials. Also, some initial trials were done to extract bacteria which could be used for remediating soils contaminated with heavy metals. Based on these results, it was decided to continue with Phase 2 of the trials in 2023. The overall objective is to implement trials on bacterial bio-remediation and phyto-remediation of soils polluted by POPs as well as laboratory trials on remediation of soils polluted by heavy metal pesticides in order to have a better understanding of the potentials and limitations of the methods, develop an overall approach and recommendations for scaling up.


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Main progress in **Component 2**

Pesticide exposure assessment

A pesticide exposure assessment based on consultation meetings with relevant stakeholders and interviews with farmers in Kyrgyzstan was undertaken to better understand gender-disaggregated conditions of pesticide use and exposure at farm level in the country, identify pesticides in use linked to health impacts and inform the national approach to pesticide lifecycle management in the country. Within the framework of the assessment, a desk research to identify relevant reports and publications; consultation meetings and interviews among key stakeholders from 5 oblasts and Bishkek; and a field survey of 250 farmers in 5 oblasts and a range of cropping systems were conducted. The results were presented at a national workshop in December 2023.

Pesticide lifecycle management road map

In 2023, with support of the Department of Chemicalization, Plant Protection and Quarantine under the Ministry of Agriculture of the Kyrgyz Republic, a draft pesticide lifecycle management road map has been developed. The road map includes an overview of all existing gaps and challenges identified throughout the whole pesticides lifecycle in Kyrgyzstan. For each gap and challenge the road map proposes short-, mid- and long-term solutions.

Pesticide registration system

As the Kyrgyz Republic plans to develop an electronic registration and sellers licensing system, a pesticides and agrochemicals management system gap analysis report has been prepared in 2023. The aim of the gap analysis is to study the needs for the pesticides and agrochemicals management system in Kyrgyzstan and to analyze the efficiency of the existing business processes for import of pesticides, custom clearance and distribution across Kyrgyzstan. Through a series of activities, the assessment of the existing infrastructure and policies was done, while gaps were identified along with proposed solutions.

It is anticipated that the pesticides and agrochemicals management system will act as a centralized platform for data collection, processing, monitoring, reporting and analysis.

It will contribute to the transparent tracking of pesticides registration, laboratory inspections, pesticides import, their distribution across Kyrgyzstan, and will be equipped with the necessary validations to alert on banned and extremely dangerous types of pesticides crossing the Kyrgyz border as well as on expiration dates of the items in the warehouses. These tools should work towards minimizing the risk of expired or banned pesticides to be used as well as will minimize the transportation of contraband products across Kyrgyzstan.

Main progress in **Component 3**

Capacity building on reducing pesticide use

In 2023, capacity of more than 100 regional specialists of the Department of Chemicalization, Plant Protection and Quarantine under the Ministry of Agriculture of the Kyrgyz Republic has been strengthened. Based on the developed criteria, 107 regional employees of the same department were selected for training. Trainings focused on reducing pesticides usage by appropriate use of pesticide and pest surveillance to enhance evidence-based decision-making processes on plant protection based on IPM. Relevant training materials have been developed. In addition, trainings for private agronomists have been organized online, mainly on integrated plant protection, preparation, application and storage of pesticides and monitoring of pests, diseases and weeds.

Partners in activities in 2023

- Ministry of Water Resources, Agriculture and Processing Industry of the Kyrgyz Republic
- Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic
- Ministry of Emergency Situations
- Kyrgyz Turkish Manas University

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TAJIKISTAN

HIGHLIGHTS OF 2023

TAJIKISTAN

Main progress in **Component 1**

Safeguarding and remediation

Construction of a store annex with a capacity to store up to 1 000 MT of obsolete pesticides at Tajikistan's Vakhsh landfill was completed in April 2023 to improve infrastructure at landfill. Inauguration ceremony took place on 8 April 2023.

In addition to that, a tender has been published in December 2023 to build a series of soil cells at Vakhsh landfill able to hold 4 600 m^3 of contaminated soil. Once the soil cells are are established at the Vahkhs landfill, an obsolete pesticides mini-landfill located in at Jamoat Panj of Jayhoon district will be excavated and materials brought to Vakhsh landfill for safe storage.

In a separate activity, a detailed site assessment is under development for another mini-landfill named Bagara in Vakhsh district.

Inventory

20 REAs were conducted in the Khatlon and Sugd regions and districts of Republican subordination in October 2023 to contribute to a national mini-landfill inventory undertaken by the government of Tajikistan.

Pesticide risk communication

Four awareness raising seminars on risks posed by obsolete pesticides were held between 10-24 November 2023 in three regions of Tajikistan and in Dushanbe.

Main progress in **Component 2**

Support for the accession to the international conventions

A regional meeting was co-organised with the Rotterdam Secretariat between 4-6 July 2023 in Baku. It is to accelerate ratification of the Rotterdam Convention by several countries, including Tajikistan. The national profile needed for the ratification of the Rotterdam Convention was developed in 2023. Work on preparing ratification of the Rotterdam Convention was finalized. As competent authority, the Committee of Environmental Protection under Government of the Republic of Tajikistan submitted the package of relevant documents to initiate the ratification to the Ministry of Foreign Affairs of Tajikistan.

Pesticide exposure assessment

A pesticide exposure assessment based on consultation meetings with relevant stakeholders and interviews with farmers in Tajikistan was undertaken to better understand gender-disaggregated conditions of pesticide use and exposure at farm level in the country, identify pesticides in use linked to health impacts and inform the national approach to pesticide lifecycle management in the country. Within the framework of the assessment, a desk research to identify relevant reports and publications; consultation meetings and interviews among key stakeholders from 3 oblasts and Dushanbe; and field survey of 250 farmers in 3 oblasts and a range of cropping systems were conducted. The results were presented at a national workshop in November 2023.

HHP phase out

The initial draft of a HHP Risk Reduction Plan was developed for Tajikistan. In addition, alternatives to two Active Ingredients namely, alpha-cypermethrin and thiacloprid were identified in cotton and apple production, respectively, for all project countries including Tajikistan.

Main progress in **Component 3**

IPM promotion

IPM trials on tomato in Tursunzoda city, potato in Lakhsh district and apricot in Isfara distict were conducted during the agricultural season 2023. The IPM trials will continue in 2024 and based on the two years field data obtained, the project will publish results of the trials in a scientific reference journal and broadcast them in Tajikistan. In addition, the State Enterprise "Plant Protection and Agricultural Chemicals" of the Ministry of Agriculture of the Republic of Tajikistan developed a national action plan on IPM for the period 2025-2030.

Partners in activities in 2023

- The Committee of Environmental Protection under Government of the Republic of Tajikistan
- The State Enterprise "Plant Protection and Agricultural Chemicals" of the Ministry of Agriculture of the Republic of Tajikistan
- Dekhkan Farm and Farmer Association
- Public organization “Peshsaf”
- Public organization “Komebihoi Dier”

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TÜRKİYE

HIGHLIGHTS OF 2023

TÜRKİYE

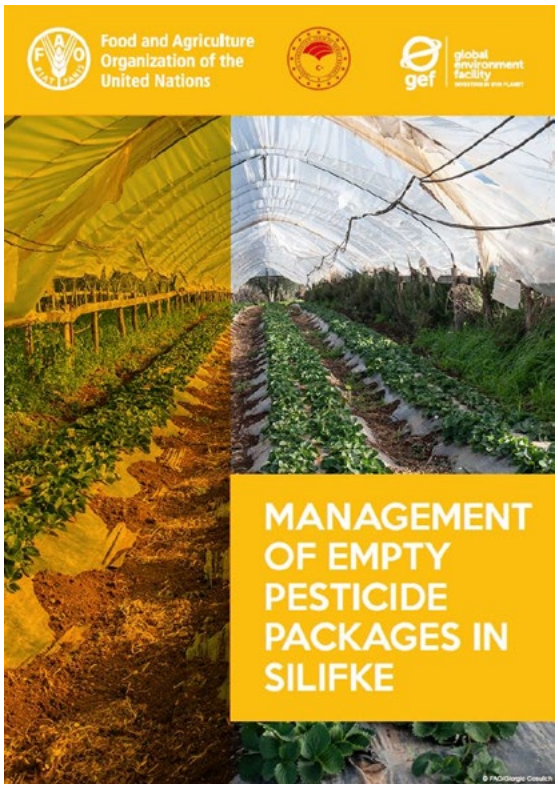
Main progress in **Component 1**

Inventory, safeguarding and disposal

An estimated 10.6 MT of obsolete pesticides were inventoried at 16 stores across the country. The stocks have been pre-centralised at 12 stores of Provincial Directorates the Ministry of Agriculture and Forestry. A tender for safeguarding and disposal of 10.6 MT of obsolete pesticides was initiated in December 2023.

Container management system

50 collection containers for empty pesticide packaging were provided for Silifke region. An inauguration meeting was held on 2 June 2023. A flyer explaining the risks related to improper disposal of empty pesticide packaging and how to use the collection containers was developed and 1 000 copies were distributed to farmers. In total, 405.8 kg of empty pesticide packaging was collected in 2023 and disposed by co-processing in a cement kiln.



Main progress in **Component 3**

IPM promotion

IPM comparison trials continued in its fourth season in 2023, this time also including the development of a holistic approach to control several pests by IPM methods. This holistic approach includes to reduce/phase out the use of chemical pesticides in apple orchards against codling moth (*Cydia pomonella*), two-spotted spider mite (*Tetranychus urticae*), San Jose Scale (*Quadraspidiotus perniciosus*) and apple scab (*Venturia inaequalis*). For this, 1 200 pheromone dispensers were used to prevent mating of apple codling.
Also, a total of 740 000 beneficial insects *Phytoseilus persimilis* were released to control *Tetranychus urticae*. In addition to the practical trials, a total of 60 farmers from other regions in Denizli (Çivril), Konya (Karaman) and Antalya (Elmalı) provinces, where apple production is intensive, visited the trial orchards in Egirdir and were trained on this holistic approach. The same field visit was organized for 20 local farmers in Ergirdir region, too. In addition, 1 000 copies of practical leaflets on apple scab inoculum and apple scab disease control were distributed. In order to raise awareness among producers, share the results and promote IPM in the region, a closing event was organized. Around

30 representatives from different stakeholder groups such as apple producers, Egirdir District Directorate, and the Fruit Research Institute of the Ministry of Agriculture and Forestry actively participated in the closing event.

Knowledge sharing regarding IPM trials

An article entitled "The Effect of Mating Disruption Pheromone Dispensers on the Control of the Codling Moth [*Cydia pomonella* L.] (Lep.: Tortricidae) in Lake District Apple Orchards" was published in Fruit Science Journal in 2023 to discuss the first two years results within the IPM implementations in Türkiye. The article can be accessed here.

Knowledge sharing regarding pest resistance in apple production

A report on “Status of pest resistance to pesticides and its management with IPM strategies in apple orchards in Türkiye” was drafted and is currently in technical review. It has been prepared to demonstrate that conventional practices, if IPM is not applied, lead to resistance problems, resulting in farmers using even more pesticides with negative impacts on human and environmental health. This review strives to give an overview on pest resistance to pesticides in apple orchards, resistance mechanisms involved, and the implications for IPM strategies to manage resistance. The aim is to show that reducing the rate of pesticide using IPM approaches tested in the region would contribute to the solution of this problem. The target audience is technical staff, producers and academicians.

Partners in activities in 2023

- Ministry of Agriculture and Forestry
- Fruit Research Institute, Egirdir-Isparta
- Silifke District Directorate of Agriculture and Forestry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