VI. INTERNATIONAL BIOCIDAL CONGRESS
17-20 November 2022 / Asteria Kremlin Palace Hotel - Antalya

Avicenna Tajik State Medical University
Environmental health department
Public Health Faculty

"Sustainable and Integrated Pest Control in Tajikistan"

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20 November, 2022
Antalya


WHERE IS TAJIKISTAN ???
CANADA
UNITED STATES
BRAZIL
CHINA
AUSTRALIA
Antarctica

Truly IPM
True IPM
False IPM
Ultimate IPM
High IPM
Low IPM
Integrated Pest and Pollinator Management
IPM
Zero IPM
Realistic IPM
The other IPM
Conventional IPM
Bio-intensive IPM
Organic IPM
Integrated Pest Management
Field-by-field IPM
Integrated Pesticide Management
Idealistic IPM
Ecologically-based IPM
Intelligent Pesticide Management
Zero pesticide IPM
Improved Pesticide Marketing
Preventive IPM
Breeding for IPM
Area-wide IPM
Genuine IPM
Moderated IPM
Community IPM
New IPM
Compulsory IPM

HERE IS IT !!!


KAZAKHSTAN
Atyraū
(Atyrau)
Lake Balkhash
Aral
Sea
Almaty
Bishkek
KYRGYZSTAN
UZBEKISTAN
Caspian
Sea
AZERBAIJAN
Baku
TURKMENISTAN
Tashkent
Dushanbe
Kashi
CHINA
TAJIKISTAN
Ashgabat
Tabrīz
Indian
claim
1972
Line of Control
Mashhad
Tehran
Kabul
Line of
Actual
Control
AFGHANISTAN
Islamabad
Eşfahān

Introduction

- Tajikistan is a mountainous country with heights of surfaces from 300 to 7495 m.
- 93% of territory is occupied by mountains belonging to the three mountain systems - Tien Shan, Gissar-Alay and Pamir.
- In the mountain range more than 1,000 glaciers that give rise to most of the rivers flowing throughout the territory of Central Asia.
- Borders: Afghanistan-south, Uzbekistan-west, Kyrgyzstan-north and China-east.
- Tajikistan’s population belong to the Tajik ethnic group and speak the Persian language.
- Population – 8 983 210.
- Capital is Dushanbe.

Facts on agricultural sector & it's connection with economy

- Agricultural sector in Tajikistan remain major factors of economy growing which could assist to resolve the poverty problem. 21% contribution to GDP.
- Absent progress in agricultural it will be no progress in macro economy itself.
- 70% of the population live in rural areas, the majority involved in agriculture.
- Tajikistan has good climatic conditions for growing a wide range of crops.
- Necessary to create mechanism and work condition to each farmer.
- Necessary to build small industrial enterprises in rural areas, services with aim to involve work power. Many industrial develop countries 3-5% of population work in agriculture. In Tajikistan this number approximately 66,3%. Therefore, labor productivity in our agricultural sector is the lowest. In such a situation, the country will not be able to solve the problem of food independence.

Reforms on the agriculture sector

- About 75 of former collective/state farms reorganized into more than 30,000 privately-owned Dehqan farms
- All processing/input-supply enterprises privatized
- Government resolution commits Tajikistan to comprehensive sectoral reforms to give new impetus to market-oriented agriculture
- Adopted Lows

Introduction to IPM

- The Central Asia region was isolated from the rest of the world during the former Soviet Union era. Central Asia is a center of diversity for many important crops, providing excellent opportunities for IPM and sustainable agriculture.
- Government policies are moving toward diversification of agriculture to meet the challenges of local food security, environmental quality, and natural resource management.
- Tajikistan is also looking for ecologically based, environmentally friendly approaches for crop production including Integrated Pest Management (IPM) programs that rely less on chemical inputs and are sustainable.

Current (general) situation with IPM

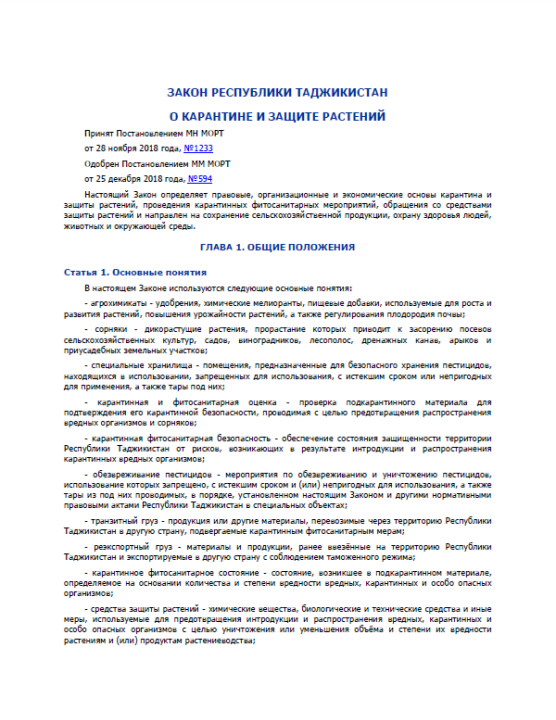
- Annually, 20—25% of crop yields are lost due to pest damage. There is a need for increased use/adoption of IPM to control agricultural pests.
- When faced with the threat of pest infestation, farmers in Tajikistan still count largely on the conventional method, the use of chemicals.
- IPM is very much a new concept to growers in Tajikistan. Relying solely on a limited range of chemical crop protection products, Tajik growers are experiencing issues controlling a number of key pests.
- Pests have already gained resistance to chemical controls.
- Increased number of pesticide-related diseases
- Pests problem tend to be, whitefly, thrips, aphid and spider mite. In a bid to improve control, growers of protected crops – such as pepper, eggplants and strawberries – are keen to adopt IPM principles.

Governmental Programs in TJ

- "The program of reforming agriculture of the Republic of Tajikistan for 2012-2020"
- "Program for the development of selection and livestock breeding in the Republic of Tajikistan for 2016-2020"
- "Development of animal husbandry and pastures"
- “Strengthening the institutions and capacity of the Ministry of Agriculture and the State Veterinary Supervision Service for policy development”

LAW OF THE REPUBLIC OF TAJIKISTAN ON QUARANTINE AND PLANTS PROTECTION

Date:	02.01.2019, #1567
Released by:	Government of the Republic of Tajikistan
Aim:	defines the legal, organizational and economic basis for quarantine and plant protection, quarantine phytosanitary measures, handling of plant protection products and is aimed at preserving agricultural products, protecting human health, animals and the environment.
Content:	8 Chapters & 37 Articles



ЗАКОН РЕСПУБЛИКИ ТАДЖИКИСТАН

О КАРАНТИНЕ И ЗАЩИТЕ РАСТЕНИЙ

Принят Постановлением МН МОРТ

от 28 ноября 2018 года, №1233

Одобрен Постановлением ММ МОРТ

от 25 декабря 2018 года, №594

Настоящий Закон определяет правовые, организационные и экономические основы карантина и защиты растений, проведения карантинных фитосанитарных мероприятий, обращения со средствами защиты растений и направлен на сохранение сельскохозяйственной продукции, охрану здоровья людей, животных и окружающей среды.

ГЛАВА 1. ОБЩИЕ ПОЛОЖЕНИЯ

Статья 1. Основные понятия

В настоящем Законе используются следующие основные понятия:

- агрохимикаты - удобрения, химические мелиоранты, пищевые добавки, используемые для роста и развития растений, повышения урожайности растений, а также регулирования плодородия почвы;

- сорняки - дикорастущие растения, прорастание которых приводит к засорению посевов сельскохозяйственных культур, садов, виноградников, лесополос, дренажных канав, арыков и приусадебных земельных участков;

- специальные хранилища - помещения, предназначенные для безопасного хранения пестицидов, находящихся в использовании, запрещенных для использования, с истекшим сроком или непригодных для применения, а также тары под них;

- Карантинная и фитосанитарная оценка - проверка подкарантинного материала для подтверждения его карантинной безопасности, проводимая с целью предотвращения распространения вредных организмов и сорняков;

- карантинная фитосанитарная безопасность - обеспечение состояния защищенности территории Республики Таджикистан от рисков, возникающих в результате интродукции и распространения карантинных вредных организмов;

- обезвреживание пестицидов - мероприятия по обезвреживанию и уничтожению пестицидов, использование которых запрещено, с истекшим сроком и (или) непригодных для использования, а также тары из под них проводимых, в порядке, установленном настоящим Законом и другими нормативными правовыми актами Республики Таджикистан в специальных объектах;

- транзитный груз - продукция или другие материалы, перевозимые через территорию Республики Таджикистан в другую страну, подвергаемые карантинным фитосанитарным мерам;

- реэкспортный груз - материалы и продукции, ранее ввезённые на территорию Республики Таджикистан и экспортируемые в другую страну с соблюдением таможенного режима;

- карантинное фитосанитарное состояние - состояние, возникшее в подкарантинном материале, определяемое на основании количества и степени вредности вредных, Карантинных и особо опасных организмов;

- средства защиты растений - химические вещества, биологические и технические средства и иные меры, используемые для предотвращения интродукции и распространения вредных, карантинных и особо опасных организмов с целью уничтожения или уменьшения объёма и степени их вредности растениям и (или) продуктам растениеводства;

LAW OF THE REPUBLIC OF TAJIKISTAN ON QUARANTINE AND PLANTS PROTECTION

CHAPTER 1.	General provisions
CHAPTER 2.	State administration in the field of quarantine and protection plants
CHAPTER 3.	Plant protection and quarantine system
CHAPTER 4.	Pesticides and agrochemicals and handling
CHAPTER 5.	Accounting, reporting and scientific support in the field of quarantine and plant protection
CHAPTER 6.	State control in the field of quarantine and protection plants
CHAPTER 7.	International cooperation in the field of quarantine and plant protection
CHAPTER 8.	Final provisions

LAW OF THE REPUBLIC OF TAJIKISTAN ON QUARANTINE AND PLANTS PROTECTION

Article 2. Legislation of the Republic of Tajikistan on quarantine and plant protection

The law is based on the Constitution of the Republic of Tajikistan and consists of this Law, other normative legal acts of the Republic of Tajikistan and international legal acts recognized by Tajikistan.

Article 30. Directions of state control in the field of quarantine and plant protection

State control in the field of quarantine and plant protection consists of:

1. state quarantine phytosanitary control
2. state control of the handling of pesticides and agrochemicals.

State quarantine phytosanitary control is carried out in the form of assessment, verification, neutralization, as well as other forms established by the regulatory legal acts of the Republic of Tajikistan.

Committee for Food Safety under the Government of the Republic of Tajikistan

Objective:

- is the central executive body of state power that performs special executive, controlling, licensing and other functions established in the field of veterinary medicine, phytosanitary and plant quarantine, plant protection, seed production and breeding.

Утверждено
постановлением Правительства
Республики Таджикистан
от 29 декабря 2017 года, № 595

Положение о Комитете продовольственной безопасности при Правительстве Республики Таджикистан

ГЛАВА 1. ОБЩИЕ ПОЛОЖЕНИЯ

1. Комитет продовольственной безопасности при Правительстве Республики Таджикистан (далее - Комитет) является центральным исполнительным органом государственной власти, выполняющим специальные исполнительные, контролирующие, разрешительные и другие функции, установленные в области ветеринарии, фитосанитарии и карантина растений, защиты растений, семеноводства и племенного дела.

2. Комитет осуществляет свою деятельность на основании Конституции Республики Таджикистан, нормативных правовых актов Республики Таджикистан и международно-правовых актов, признанных Республикой Таджикистан, а также настоящего Положения.

3. Комитет осуществляет свою деятельность во взаимодействии с центральными исполнительными органами государственной власти, местными исполнительными органами государственной власти, организациями, ведомствами, общественными и международными организациями

4. Комитет является юридическим лицом, имеет печать с изображением Государственного герба Республики Таджикистан и своим наименованием на государственном языке, печати, штампы и бланки установленного образца, гербовые бланки, а также открытый в соответствии с законодательством Республики Таджикистан расчетный счёт.

ГЛАВА 2. ПОЛНОМОЧИЯ КОМИТЕТА

5. В области ветеринарии:

- разработка и утверждение стандартов, положений, инструкций и рекомендаций по вопросам ветеринарии;

- защита территории республики от заноса возбудителей карантинных болезней животных;

- определение порядка проведения ветеринарно-санитарной экспертизы, сертификации животноводческой продукции и сырья, биологических средств и ветеринарных препаратов;

- контроль ветеринарно-санитарного состояния пунктов торговли животными на рынках, ярмарках, аукционах и выставках животных;

- организация контроля импорта, экспорта, производства, использования, переработки, хранения, купли-продажи, транзита продукции и сырья животного происхождения, с целью предупреждения возникновения и распространения особо опасных болезней животных и зооантропонозов;

- внедрение научно - технических достижений области ветеринарии;

List of institutions and organizations of the system of the Food Security Committee under the Government of the Republic of Tajikistan

- Centers for ensuring food security in cities and regions
- National Center for Food Security Diagnostics
- Republican Anti-Epizootic Center Food security checkpoints at the border and transport
- Republican Fumigation Squad
- State unitary enterprise "Tajikzoovetservis“
- Public institution magazine "Food Security"

Statistics

Comprehensive information
on chemical treatment against pests and diseases of gardens and vineyards in 2022

Gardens					Vineyards				
The total area of the gardens	Pests		Diseases		Total area of vineyards	Pests		**Diseases**	
	Covered field (area)	Field processing	Covered field (area)	Field processing		Covered field (area)	Field processing	Covered field (area)	**Field processing**
136159,2	**21734**	**20729**	**14292**	**13523**	**30169,2**	**6444**	**6099**	**5500**	**5230**

Comprehensive information
on the use of biological methods against pest's agricultural crops in 2022

Use of beneficial insects	**Including**		
	Trichogram	Gabbrobracon	Goldilocks
75083	**29343**	**34799**	**10941**

Implementation of IPM in regard with cotton

In Tajikistan, an integrated plant protection system has been introduced in cotton growing, which provides for the maximum use of biological methods against cotton pests.

- The share of the biological method exceeded 40 percent.
- More than 125 biological laboratories and biofactories have been created and are successfully operating, breeding entomophages (beneficial insects) to combat cotton pests.

Initially, parasitic and predatory insects - entomophages were used in the practice of the biomethod, in recent years pathogenic microorganisms - pathogens of insect diseases: bacteria, fungi, viruses have been used.

Implementation of IPM in regard with wheat

A variety of pests contribute to yield loss in wheat in Tajikistan. The major insect pests include Sunn pest. In northern Tajikistan, Sunn pest is the single most damaging insect. Both nymphs and adults cause damage to plants and reduce yields by feeding on leaves, stems, and grains.

In central and southern Tajikistan, cereal leaf beetle is the key insect pest. Both adults and larvae feed on wheat leaves, and larvae feeding can damage the flag leaf, leading to 20% yield losses.

Implementation of IPM in regard with wheat

A number of IPM options for the management of Sunn pest have been developed:

- deployment of genetic resistance,
- entomopathogenic fungi,
- egg parasitoids.

On larger mechanized farms, weed control in wheat is typically accomplished by:

- a combination of tillage,
- herbicides
- fallow techniques.

Farmers also use crop rotation practices with a leguminous crop as a means of breaking weed cycles. On small holdings, weed control is almost exclusively accomplished via manual weeding.

Issues with IPM in regard with wheat

Current pest management practices in wheat vary throughout Tajikistan and are influenced by farm size and landscape context, as well as farmer access to information and inputs.

While Tajik farmers understand the need for fertilizer use in wheat,

- Fertilizers are expensive
- Farmers often lack the capital to purchase and apply them at optimal levels.
- Pesticides (herbicides, insecticides, and fungicides) considered expensive
- Farmers confidence in their use is not universal, as diluted or even counterfeit products are sometimes suspected.
- Pesticide application equipment is limited and farmers frequently spray even large fields using backpack sprayers.

International partners in agriculture & IPM

- United Nations Agencies
- Food and Agriculture Organization (FAO)
- World Food Program (WFP)
- UN Development Program (UNDP)
- UNICEF
- World Heath Organization (WHO)
- UN Environmental Fund (UNEF)
- World Bank Group
- International Bank for Reconstruction and Development (IBRD)
- International Development Association IDA)
- International Finance Corporation (IFC)
- Asian Development Bank
- European Bank for Reconstruction and Development (EBRD)
- Islamic Development Bank (IDB)
- European Union (European Commission, EuropeAID, ECHO)
- Canadian International Development Agency (CIDA)
- Department for International Development – United Kingdom (DFID)
- German Gesellschaft für Technische Zusammenarbeit (GTZ)
- Swedish International Development Agency (SIDA)

Influence of international projects on pest control in Tajikistan

- Project: Integrated Pest Management Collaborative Research Support Program (IPM CRSP) in Central Asia (TJ, KG, UZ).
- By : Scientists from Michigan State University, the University of California-Davis, and the International Center for Agricultural Research in the Dry Areas (ICARDA) funded by USAID Mission in TJ.
- Duration: 1 phase (2005-2009), 2 phase (2010-2014).
- Aim: collaborative research to address key constraints to IPM implementation and development of IPM packages for wheat, potato, and tomato in Tajikistan.

(IPM CRSP) in Central Asia (TJ, KG, UZ)

It focused on three components.

1. It aimed at enhancing the efficiency and product lines of biolaboratories in the three target countries: Kyrgyzstan, Tajikistan and Uzbekistan.
2. Enhancing biological control of pests through landscape ecology/habitat management, and strengthening IPM outreach and education, were additional key areas of work.
3. Through training, networking and institutional capacity-building, the program helped to increase the use of ecologically-based IPM practices in research, teaching and outreach/extension programs in Central Asia.

Project bulletin entitled
“Pests and Diseases of Wheat and Methods of Control (in Tajik)

Journal of Integrated Pest Management (2016) 7(1): 11; 1–9
doi: 10.1093/jipm/pmw010
Case Studies

OXFORD

Demonstration of an Integrated Pest Management Program for Wheat in Tajikistan

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Abstract

Wheat is an important food security crop in central Asia but frequently suffers severe damage and yield losses from insect pests, pathogens, and weeds. With funding from the United States Agency for International Development, a team of scientists from three U.S. land-grant universities in collaboration with the International Center for Agricultural Research in Dry Areas and local institutions implemented an integrated pest management (IPM) demonstration program in three regions of Tajikistan from 2011 to 2014. An IPM package was developed and demonstrated in farmer fields using a combination of crop and pest management techniques including cultural practices, host plant resistance, biological control, and chemical approaches. The results from four years of demonstration/research indicated that the IPM package plots almost universally had lower pest abundance and damage and higher yields and were more profitable than the farmer practice plots. Wheat stripe rust infestation ranged from 30% to over 80% in farmer practice plots, while generally remaining below 10% in the IPM package plots. Overall yield varied among sites and years but was always at least 30% to as much as 69% greater in IPM package plots. More than 1,500 local farmers—40% women—were trained through farmer field schools and field days held at the IPM demonstration sites. In addition, students from local agricultural universities participated in on-site data collection. The IPM information generated by the project was widely disseminated to stakeholders through peer-reviewed scientific publications, bulletins and pamphlets in local languages, and via Tajik national television.

Key words: wheat, integrated pest management, Wheat stripe rust, Sunn pest, cereal leaf beetle

Wheat (*Triticum* spp.) is a staple crop in Central Asia and the most important food security crop in Tajikistan. Following the collapse of the former Soviet Union in 1991, agricultural policy in Tajikistan shifted and farmers began to grow more wheat to satisfy local food grain demand and reduce reliance on imports. Implementation of these policies resulted in an unprecedented increase in wheat cultivation from 72,000 ha in the early 1990s to over 317,000 ha by 2013 (FAO 2013). While the area under cultivation has increased, average wheat yields have remained low. For example, dryland wheat in Tajikistan averages just 1.3–1.5 t/ha, and even with irrigation, yields seldom exceed 3 t/ha. As a result, while Tajikistan has produced 780,000 metric tons of wheat annually, this is insufficient to meet annual demand, which is in excess of 1.5 million metric tons (FAO 2013).

In most rural areas of Tajikistan, farming occurs at multiple spatial scales. To provide fresh vegetables and herbs, most households maintain small kitchen gardens near the home. In addition, families also produce additional vegetable and wheat crops in small (typically 1–1.5 ha irrigated, or 2–3 ha nonirrigated) plots allocated to them at the village edge. Households also contribute labor to the village's larger-scale collective production of cotton and wheat, which occurs in the surrounding fields. Mechanical tillage, planting, and harvesting are frequently utilized on these larger fields, but weed control is still typically done by hand. Gravity-fed flood irrigation is common in north and central Tajikistan, while in the south, wheat production is mostly rain-fed. Entire households contribute to farm labor, and increasingly, women farmers are becoming the norm, as many males leave for employment in Russia during much of the wheat-growing season (Fig. 1).

The current low productivity of wheat in Tajikistan stems from a variety of economic, technological, and cultural reasons. Improved

FAO and the GoT are now carrying out a participatory planning exercise

- Requests for assistance are likely to include
- Agricultural policy
- Grain sector improvement
- Food safety, grades and standards
- Support in Reforestation and Forestry Conservation
- Support to Inland Fishery and Aquaculture Rehabilitation (production and Marketing)
- Modernizing laboratories and processing
- Veterinary and phytosanitary training
- WTO accession assistance
- Attracting private investment

Activities from FAO

- Training on improving the skills of national experts on the application of modern pest control methods and early warning systems based on agrometeorological data.
- Installation of three agrometeorological stations that provide crop-specific information along with general meteorological data as part of efforts to build a nationwide early warning system for agricultural producers.

Food and Agriculture Organization of the United Nations

Conclusion

- Develop a well-coordinated, long-term regional IPM Program in collaboration with all the stakeholders in the Central Asia region.
- Organize regular meetings of IPM specialists, policymakers, researchers, NGO personnel and other key stakeholders to develop and implement action plans relevant to the region.
- Provide in-service training programs and vocational training to university faculty focusing on ecologically-based IPM. Develop and provide training materials.
- Expedite joint R&D efforts to build capacity for research on virus diseases detection and management.
- Enhance research and extension linkages for transferring new knowledge and technologies efficiently to farmers. Include participation of NGOs and farmers associations.


Thank you for attention!

Use the following methods:

It is recommended to use the following pest control methods:

- collection of pests from plants,
- the use of covering materials,
- timely removal of waste and diseased plants,
- crop rotation,
- the use of disease-resistant varieties of crops,
- preservation or increase in the number of natural predators,
- the method of sterile insects (the introduction of sterile individuals into the population of insects in order to reduce its growth rate).