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Joint Research for 2022 KAPEX with the Kyrgyz Republic

2023. 6.

Regulation, Laboratory Testing and Monitoring of
Pesticides entering in the Kyrgyz Republic

Korea Rural Economic Institute
Ministry of Agriculture of the Kyrgyz Republic



농림축산식품부

Tovmatov Zhalibek Shakievich | DCPPO, Ministry of Agriculture of the Kyrgyz Republic | Deputy Director

Almaz Alakunov | Manager of DCPPO, Ministry of Agriculture of the Kyrgyz Republic

Uzakbai Meirachovich Abdipaizov | Researcher, Association of Suppliers of Plant Protection Products
and Special Fertilizers

Wonkyu Cha | Head of Multilateral Cooperation & Evaluation Team, Korea Rural Economic Institute

Hyejin Jang | Researcher | Korea Rural Economic Institute

Su-Myeong Hong | Research Officer | Chemical Safety Division,
Agro-Food Safety and Crop Protection Department, NAS, RDA

제 출 문

농림축산식품부 장관 귀하

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연구 기관: 한국농촌경제연구원
연구책임자: 김 종 선 (연구위원)
연구참여자: 허 장 (명예선임연구위원)
석 현 덕 (명예선임연구위원)
차 원 규 (부연구위원)
강 민 혜 (책임사무원)
주 경 훈 (연구위원)
장 유 진 (연구위원)
장 혜 진 (연구위원)
주 영 선 (연구위원)
전 민 경 (연구조원)

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1

Introduction

1. Research Background

In April 2017, the International Association of Pesticide Action Network (PAN) published a report that presented data from 106 countries. It contained a list of 370 active ingredients of pesticides and their combinations, the use of which was prohibited in these countries. First of all, persistent organic pollutants (substances that can persist in the environment for a long time) and genotoxic drugs (causing mutations that can cause malformations or cancer) were banned. Drugs that are currently approved for use can also be harmful when their doses exceed the established safe level.

Also, it should be particularly noted that the Technical Regulations of the Eurasian Economic Union No. 039/2016 «On requirements for mineral fertilizers» and No. 041/2017 «On the safety of chemical products», which establish mandatory requirements for the application and execution in the single customs territory of the Union for mineral fertilizers and chemical products, for the assessment of conformity of crop products at the initial stage (from the field to the consumer) and

documentary confirmation of their safety, enter into force on June 2, 2021.

The Kyrgyz government is promoting organic agricultural production and crop protection food safety programs as detailed tasks of its agricultural development policy as one of the ways to secure food security through safe and high-quality food production and increase agricultural exports. In accordance with the Decree of the Government of the Kyrgyz Republic dated 11.11.2016 No. 576 «On the Ministry of Agriculture, Food Industry and Melioration of the Kyrgyz Republic», the Kyrgyz Government organized “the Department of Chemiclization, Plant Protection and Quarantine (hereinafter-DCPPQ)” as a body to handle safely pesticides and agrochemicals, protect agricultural plants from pests, diseases, and weeds, preserve and improve soil fertility.

However, there is no overall management system such as pesticide management, regulation, and monitoring at the government level, and DCPPQ also lacks human capacity to implement it. Facilities and equipment available toxicology laboratories in DCPPQ allow only the organochlorine and organophosphorus pesticides analysis, imported and used in 60~80s of the last century. Outdated laboratory equipment does not allow for determining the quality of modern pesticides and their residual amount in plant products.

The absence of toxicological laboratories equipped with modern equipment in the country will not allow domestic agricultural producers to export their grown products outside the republic in the future, and falsified and counterfeit chemical products will be delivered to the republic without control.

Therefore, This study intends to derive implications and improvement measures based on the experience of the development of the pesticide management system in Korea by identifying the current status, use, distribution system, related stakeholder analysis, related laws, systems, and related technical capabilities

2. Purpose of the Joint Research

The purpose of the research is to diagnose the problems of Kyrgyzstan's pesticide industry and system and presents the overall direction of the pesticide management regulatory systems and policies based on Korea's development experience. This will be achieved through detailed purpose as follows:

- The analysis of pesticide industry's current status in the Kyrgyz Republic, such as amount of imported pesticide by types and importing countries, a major pesticide use area, laws and regulations related to pesticide, current status and role of pesticide testing laboratories
- Review of the Pesticide management act and quality evaluation technology in Republic of Korea and implications to the Kyrgyz Republic
- Conclusion and recommendations on proposing ODA projects on strengthening the capabilities of pesticide management and quality evaluation technology in the Kyrgyz Republic.

3. Joint Research Team and Methodology

3.1. Joint research team

The research was conducted by the joint research team of the Republic of Korea - the Kyrgyz Republic from January 2023 to March 2023. Both sides formed a joint research group by recruiting experts who could analyze the current status and regulations of the pesticide industry in Korea and Kyrgyzstan. On the Korean side, experts from the Korea Rural Economic Institute and the National Agricultural

Research Institute of the Rural Development Administration participated in the joint study, while on the Kyrgyzstan side, the Plant Protection Quarantine Bureau and the Plant Protection Input and Fertilizer Import Association participated.

〈Table 1-1〉 Korea–Kyrgyzstan joint research team

No	Full Name	Position	Affiliation	Research Task
1	Mr. Tovmatov Zhalibek Shakievich	Deputy Director of DCPPO	Ministry of Agriculture of the Kyrgyz Republic	Kyrgyz team leader
2	Mr. Almaz Alakunov	Manager of DCPPO	Ministry of Agriculture of the Kyrgyz Republic	Coordinators
3	Mr. Uzakbai Meirachovich Abdipaizov	Researcher	Association of Suppliers of Plant Protection Products and Special Fertilizers	Kyrgyzstan Pesticide Export and Distribution worker, expert
4	Ms. Begimbaeva Anyara	Researcher	Association of Suppliers of Plant Protection Products and Special Fertilizers	Research assistant
5	Mr. Wonkyu Cha	Head of Multilateral Cooperation & Evaluation Team	Korea Rural Economic Institute	Korean team leader
6	Ms. Hyejin Jang	Researcher	Korea Rural Economic Institute	Research assistant
7	M. Su-Myeong Hong	Research Officer	National Academy of Agriculture Science, Rural Development Administration	Pesticide Expert in Republic of Korea

3.2. Research Methodology

3.2.1. Literature review

A literature review was conducted to collect primary data for the analysis of the pesticide industry and value chain in Korea and Kyrgyzstan. Documents related to laws, systems, regulations, and policies related to pesticides by country were collected from the Ministry of Agriculture of Kyrgyzstan, the Ministry of Agriculture, Food and Rural Affairs of Korea, and the Rural Development Administration. However, there are no official statistics on the status of the pesticide industry in

Kyrgyzstan at the national level, so reports and statistical data such as FAO, ITC, and UNDP were used.

3.2.2. Field research

The Korean joint research team visited the Ministry of Agriculture, DCPPO, Pesticide Testing Laboratories, agricultural cooperatives, Association of Pesticide importer and distributor to interview with each stakeholders and collect local data. The field research was conducted from Feb. 20 to Feb. 22, and all three Korean joint investigators participated.

〈Table 1-2〉 Field research for joint research of 2022 KAPEX, Kyrgyzstan

Date	Visit Location	Main contents
20 Feb.	Department of Chemicalization, Plant Protection and Quarantine, Ministry of Agriculture of Kyrgyz Republic	<ul style="list-style-type: none"> • Consultation of Record of Discussions (RoD) and TOR • Analysis of pesticide management system status and problems
	KOPIA Office in Kyrgyz Republic	<ul style="list-style-type: none"> • Identify rural and agricultural status and ODA situation • Understanding the status of Korea's agricultural ODA in Kyrgyzstan
	Pesticide Testing Laboratory in Chui region	<ul style="list-style-type: none"> • Identify current status of Pesticide Testing Laboratory • Interview with officials in the laboratory and collecting the data
21 Feb.	Pesticide importing and distributing companies	<ul style="list-style-type: none"> • Understanding pesticide industry status and problems • Interview with stakeholders in private sector and collecting data
	Local farmers and cooperatives in Chui region	<ul style="list-style-type: none"> • Understanding current status of pesticide use by local farmers and Interview to collect data
22 Feb.	Kyrgyz Natinal Agrarian University (KNAU)	<ul style="list-style-type: none"> • Identify the current status of pesticide-related education, manpower training and research
	Department of Chemicalization, Plant Protection and Quarantine, Ministry of Agriculture of Kyrgyz Republic	<ul style="list-style-type: none"> • Joint investigation wrap-up meeting and discussion of future research schedules

〈Table 1–3〉 Joint research methodology

Methods	targets	Contents
Literature review	Public Institutions <ul style="list-style-type: none"> • ROK: Ministry of Agriculture, Food and Rural Affairs (MAFRA), Rural Development Administration (RDA) • KYR: Ministry of Agriculture 	<ul style="list-style-type: none"> • Literature review of National Development Plan and policies related to agriculture • Pesticide import and distribution status, related laws, systems, regulations, policies, etc
	Food and Agriculture Organization (FAO), International Trade Center (ITC), United Nations Development Programmes (UNDP), etc.	<ul style="list-style-type: none"> • Statistical data analysis related to pesticide import, distribution and use
Field research	<ul style="list-style-type: none"> • Public officials, researchers in MoA and Laboratories • Director at the Department of Agriculture and Forestry, KNAU • Pesticide importers, seed producers, farmers, etc. 	<ul style="list-style-type: none"> • Investigation of pesticide management, regulation, testing, operation of MoA • Identification of human capabilities such pesticide-related professionals and education status • Investigation of pesticide import status, application, use and storage, new pesticide registration and identification of problems

2

Current Status of Pesticide Industry in the Kyrgyz Republic

1. Amount of Imported Pesticide by Types and Major Importing Countries¹⁾

Currently, pesticides and agrochemicals are not produced in Kyrgyzstan. Up to 2,500,000 liters or kilograms of pesticides are imported to the Kyrgyz Republic annually for use in agriculture. Up to 2,000,000 liters or kilograms of pesticides are imported to the Kyrgyz Republic annually from the People's Republic of China (up to 80%), from the Russian Federation up to 210,000 liters or kilograms (8.5%), from India - 206,000 liters or kilograms (8.3%), from Turkey - 58,500 liters or kilograms (up to 2.5%), and from the European Union - 33,000 liters or kilograms (1.3%) of pesticides.

Below is a list of pesticides by active substances and their quantity in liters or kilograms (the order is indicated with capital letters of the Russian alphabet).

¹⁾ Since there is no official statistical data on this chapter, data are collected through interviews with the person in charge during field investigation.

〈Table 2-1〉 List of pesticide by active substance and quantity

No	Active substances	Quantity (ℓ)	No	Active substances	Quantity (ℓ)
1	2,4-D dimethylamine salt	13,000	58	Pendimethaline	129,448
2	2,4-D 2-Ethylhexyl ester	47,000	59	Penconazole	23,445
3	2-methyl-4-chlorophenoxyacetic acid	15,000	60	Penoxsulam	32,000
4	Abamectin	58,880	61	Penoxsulam + Cyhalofop-butyl	55,008
5	Abamectin + Acetamiprid	87,164	62	Pyrimethanil	1,067
6	Abamectin + Spirodiclofen	2,000	63	Pyriproxyfen	2,541
7	Azimsulfuron	100	64	Prometryn	50,000
8	Azoxystrobin - 4 316	4,316	65	Propamocarb hydrochloride	2,023
9	Alpha-cypermethrin	20,110	66	Propamocarb + Fosetil	2,880
10	Aluminum phosphide	2,000	67	Propargite	20,508
11	Acetamiprid	99,500	68	Propyzamide	1,000
12	Benomyl	11,000	69	Propiconazole + Cyproconazole	1,000
13	Bentazone	49,000	70	Propineb	3,000
14	Bentazone + MCPA	6,000	71	Propineb + Cymoxanil	4,000
15	Beta-cipermetrin	20,000	72	Profenofos + Cypermethrin	30,000
16	Bifenazat	640	73	Rimsulfuron	5,500
17	Bifenthrin - 6 000	6,000	74	Spinosad	200
18	Haloxyfop-P-methyl	189,008	75	Spirodiclofen + Abamectin	1,000
19	Hexythiazox - 2 148	2,148	76	Spiromesifen + Abamectin	500
20	Hymexazol	3,821	77	Spirotetramat	3,112
21	Glyphosate	274,740	78	Tebuconazole	56,000
22	Deltamethrin	13,000	79	Tebuconazole + Triadimefon	2,500
23	Desmedipham + Phenmedipham + Ethofumesate	3,500	80	Tebufenpyrad	643
24	Diazinon	18,016	81	Thiamethoxam	11,000
25	Diquat	3,000	82	Thiamethoxam + Lambda-cyhalothrin	50,200
26	Dimethoate	84,504	83	Thiamethoxam + Difenconazole + Fludioxonil	6,012
27	Dinotefuran	1,000	84	Thidiazuron + Diuron	32,187
28	Difenconazole	27,500	85	Thiophanate-methy	4,220
29	Dodin	2,294	86	Thiram	3,000
30	Isoprocab + Pyridaben + Chlorpyrifos	7,000	87	Thiram + Tebuconazole	1,000
31	Imazethapyr	76,016	88	Triadimefon	3,016
32	Imidacloprid	41,000	89	Triadimefon + Imidacloprid	12,000
33	Imidacloprid + Lambda-cyhalothrin	7,250	90	Triadimefon + Lambda-cyhalothrin	1,008

No	Active substances	Quantity (ℓ)	No	Active substances	Quantity (ℓ)
34	Indoxacarb	271	91	Triazophos + Deltamethrin	3,000
35	Captan	1,092	92	Tribenuron-methyl	17,000
36	Carbendazim	1,370	93	Triflusuifuron-methyl	204
37	Kasugamycin	2,500	94	Fenoxaprop-P-ethyl + Mefenpyr-Diethyl (antidote)	4,000
38	Quinclorac	9,500	95	Fenpyroximate	4,000
39	Clodinafop-propargyl + Cloquintocet-mexil (antidote)	15,300	96	Fipronil	30,500
40	Clopyralid	1,000	97	Fluopiram + Pyrimethanil	8,800
41	Kresoxim-methyl	500	98	Fluroxypyr	6,600
42	Lambda-cyhalothrin	106,670	99	Flutriafol	5,500
43	Malathion	2,000	100	Foramsulfuron + Cyprosulfamide + Thiencarbazone-methyl + Iodosulfuron-methyl sodium salt	4,800
44	Mancozeb	3,158	101	Fosetyl-aluminium	18,010
45	Mancozeb + Dimetomorf	3,523	102	Chlorantraniliprole	6,000
46	Mancozeb + Metalaxyl	8,500	103	Copper oxychloride + Kasugamycin	2,000
47	Mancozeb + Mefenoxam	9,000	104	Copper oxychloride + Cymoxanil	14,500
48	Mesotrione + Nicosulfuron	14,000	105	Chlorpyrifos	10,000
49	Methoxyfenozide	556	106	Chlorpyrifos + Bifenhrin	13,000
50	Methomyl	16,400	107	Chlorpyrifos + Cypermethrin	147,604
51	Metribuzin	10,500	108	Chlorfenapyr	2,000
52	Metsulfuron-methyl + Tribenuron-methyl	2,200	109	Cyhalofop-butyl	23,000
53	Nicosulfuron	44,016	110	Cypermethrin	3,000
54	Nicosulfuron + Atrazin -	21,000	111	Cyprodinil	1,050
55	Nicosulfuron + Mesotrione	3,000	112	Emamectin benzoate	65,523
56	Ortho-nitrophenolate of sodium	2,417	113	Emamectin benzoate + Lufenuron	1,000
57	Oxyfluorfen	51,008	114	Emamectin benzoate + Thiamethoxam	7,500

Source: DCPQ, Internal data

2. Major Pesticide Use Area

Chemical treatments against pests and diseases of agricultural crops in the republic were carried out on an area of 132.5 thousand hectares. In 2022, according to the structure, the sown area of grain crops is 251.4 thousand hectares, of which 8.0 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 7.8 thousand hectares (3.1% of the structures).

- the sown area of legumes is 58 thousand hectares, of which 15.0 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 4.1 thousand hectares (7.0% of the structure).
- the sown area of potatoes is 74.9 thousand hectares, of which 49.5 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 40.8 thousand hectares (53.5% of the structure).
- the sown area of vegetable crops is 50.9 thousand hectares, of which 16.0 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 15.0 thousand hectares (29.4% of the structure).
- the sown area of melons is 2.8 thousand hectares, of which 4.1 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 3.5 thousand hectares (130% of the structure).
- the sown area of sugar beet is 10.4 thousand hectares, of which 3.1 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 3 thousand hectares (29% of the structure).

- the sown area of cotton is 19.2 thousand hectares, of which 29.2 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 29 thousand hectares (151% of the structure).
- the sown area of oil seeds is 10 thousand hectares, of which 0.7 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 0.6 thousand hectares (6.5% of the structure).
- the sown area of perennial grasses is 217.2 thousand hectares, of which 65.5 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 63.2 thousand hectares (29% of the structure).
- the area occupied by fruit crops is 49.9 thousand hectares, of which 33.4 thousand hectares are inhabited/infected with pests and diseases, of which chemical treatments against pests and diseases were carried out on 32.2 thousand hectares (64% of the structure).

Chemical weeding of weeds on agricultural crops was carried out on an area of 229.5 thousand hectares, including: In 2022, according to the structure, the sown area of grain crops is 302.4 thousand hectares, of which 131 thousand hectares are clogged, of which chemical weeding was carried out on 123.2 thousand hectares (40.7% of the structure);

- the sown area of corn is 107.1 thousand hectares, of which 41.0 thousand hectares are clogged, of which chemical weeding was carried out on 37.9 thousand hectares (28.1% of the structure);
- the sown area of legumes is 59.1 thousand hectares, of which 57.4 thousand hectares are clogged, of which chemical weeding was carried out on 39.8 thousand hectares (68.5% of the structure);

- the sown area of rice is 11.9 thousand hectares, of which 8.2 thousand hectares are clogged, of which chemical weeding was carried out on 7.2 thousand hectares (57.1% of the structure);
- the sown area of potatoes is 60 thousand hectares, of which 30.2 thousand hectares are clogged, of which chemical weeding was carried out on 27.3 thousand hectares (57.7% of the structure);
- the sown area of vegetable crops is 50.9 thousand hectares, of which 9.7 thousand hectares are clogged, of which chemical weeding was carried out on 8.7 thousand hectares (17.1% of the structure);
- the sown area of melons is 2.7 thousand hectares, 2.1 thousand hectares of them are clogged, of which chemical weeding was carried out on 2.0 thousand hectares (50% of the structure);
- the sown area of sugar beet is 10.9 thousand hectares, of which 6.8 thousand hectares are clogged, of which chemical weeding was carried out on 6.1 thousand hectares (55.6% of the structure);
- the sown area of cotton is 9.8 thousand hectares, of which 9.9 thousand hectares are clogged, of which chemical weeding was carried out on 9.8 thousand hectares (51.2% of the structure);
- the sown area of perennial grasses is 137.4 thousand hectares, of which 7 thousand hectares are clogged, of which chemical weeding was carried out on 2.6 thousand hectares (2% of the structure);
- the sown area of oilseeds is 9.2 thousand hectares, of which 0.5 thousand hectares are clogged, of which chemical weeding was carried out on 0.5 thousand hectares (5.4% of the structure).

List of pests and diseases observed on crops in the Kyrgyz Republic are as follows;

〈Table 2-2〉 Major pests and crop diseases in the Kyrgyz Republic

Crops	Diseases and Pests	Crops	Diseases and Pests
Grain ears	<ul style="list-style-type: none"> • ZabrustenebrioidesGoeze. • LemamelanopusL. • Haplothrips tritici Kurd. • SchizaphisgraminaRond. • Eurygaster integriceps Put. • OscinellafrilL. • Erysiphe graminis DC. f. tritici Em. Marchal. • Helminthosporium sativum P., K. Et B. • Septoria tritici Rob. et Desm. • Puccinia triticina Eriks.,Puccinia striiformis West. • Ustilago tritici Jens.,Tilletia caries Tul. • Tilletia laevis Kuehn. 	Vegetable crops	<ul style="list-style-type: none"> • Pieris brassicae L. • Plutella maculipennis Curt. • Brevicoryne brassicae L. • PhyllotretaundulataKutsch. • Leptinotarsa decemlineata Say • Thrips tabaci Lind. • Tetranychus urticae Koch. • Delia antiqua и Eumerus strigatus • Peronospora destructor Casp. • Erysiphe cichoracearum DC. f. cucurbitacearum Pot. • Xanthomonas vesicatoria Dows. • Phytoftora infestans De By.
Corn	<ul style="list-style-type: none"> • Helicoverpa armigera Hb. • Ustilago zeae (Link) 	Potato	<ul style="list-style-type: none"> • Leptinotarsa decemlineata Say • Phytophthora infestans DeBy. • Corynebacterium sepedonicum Scap. et Burkh.
Sugar beet	<ul style="list-style-type: none"> • Chaetocnema concinna March. • Lixus sybtilis Sturm. • Tetranychus urticae Koch. • Peronospora schachtii Fckl. • Erysiphe communis Grev. f. betae Poteb • Pythium debaryanum Hesse. • p. Fusarium Link., • Rhizoctonia solani Kuehn., • Bacillus betae Busse, Migula, Bac. lecerans • Migula. 	Perennial herbs	<ul style="list-style-type: none"> • Phytonomus variabilis Hbst. • Sitona longulusGyll. • Sitona humeralis Steph., S. Inops Gyll. • Tychius flavus Beck. • Bruchophagus roddi Guss. • Adelphocoris lineolatus Goeze. • Lygus pratensis L. • Peronospora aestivalis Syd. • Pseudopesisa medicaginis Sacc.
Beans	<ul style="list-style-type: none"> • Hylemyia cilicrura и л и Delia platura • Acyrthosiphon pisum Harr. • Etiella zinckenella Tr. • SitonahumeralisSteph. • Tetranychus urticae • Acanthoscelidies obtectus Say. • Colletotrichum Lindemuthianum Br. et Cav • FusariumgibbosumApp. • XanthomonasphaseoliDowson. • Erisyphe communis Crev. • Bean yellow mosaic virus (Phaseolus virus 2 Smith) 	Tobacco:	<ul style="list-style-type: none"> • Thrips tabaci Lind. • MyzodespersicaeSulz. • Potato streak virus Y) • Pseudomonastabacum (Wolf.& Foster) Stevens.
Cotton	<ul style="list-style-type: none"> • HelicoverpaarmigeraHb. • Aphis gossypii Glov. • Tetranychus urticae Koch. • Ostrinia nubilalis 	Fruit crops	<ul style="list-style-type: none"> • CarpocapsapomonellaL. • Archips rosana L. • Spilonota jcellana F. • AphispomiDeg

Crops	Diseases and Pests	Crops	Diseases and Pests
	<ul style="list-style-type: none"> • Rhizoctonia solani Kuehn. • Xanthomonas malvacearum Dowson. • Verticillium dahliae Kleb. 		<ul style="list-style-type: none"> • Schizotetranychus pruni Oud. • Panonychus ulmi Koch. • Parthenolecanium corni Bouche. • Ocneria dispar L. • Coleophorahemerobiella Scop. • Yponomeuta malinellus • Lepidosaphes ulmi • Caliroa limacine • Venturia inaequalis Wint. • Podosphera leucotricha (Ell. et Ev.) Salm. • Monilinia fructigena Honey.

Source: DCP PQ, Internal data

3. Pesticide Laws and Regulations

3.1. Law of the Kyrgyz Republic on Chemicalization and Plant Protection (25 Jan. 1999. No.12)

Law of the Kyrgyz Republic on Chemicalization and Plant Protection, legislated on 25 January, 1999. No.12, (As amended by the Laws of the Kyrgyz Republic dated June 28, 2003 No. 122, July 16, 2012 No. 116, March 20, 2020 No. 28) determines the general legal, economic, ecological, social and organizational bases of chemicalization and protection of plants in the interests of protecting public health, animals, the environment, preventing or eliminating the consequences of pollution of soil, plant and animal products. It consists of a total of 7 chapters, and the main contents of each chapter are as follows.

〈Table 2–3〉 Main contents by Chapter of Law on Chemicalization and Plant Protection

Chapter	Articles
1. General Provisions	Article 1. Terms and definitions Article 2. Legislation of the Kyrgyz Republic on chemicalization and protection of plants Article 3. Trade ability of pesticides and agrochemicals
2. State management in the field of plant chemicalization and protection, supervision and control of safe treatment of pesticides and agrochemicals	Article 4. State administration in the field of chemicalization and plant protection Article 5. Registration tests of pesticides and agrochemicals Article 6. Examination of the results of registration tests of pesticides and agrochemicals Article 7. Principles of examination of results of registration tests of pesticides and agrochemicals Article 8. State registration of pesticides and agrochemicals Article 9. Standardization and certification of pesticides and agrochemicals Article 10. State Supervision and Control Bodies for Safe Treatment of Pesticides and Agrochemicals Article 11. Officials who supervise and control the safe treatment of pesticides, agrochemicals, phytosanitary and agrochemical conditions
3. General requirements for the safe handling of pesticides and agrochemicals	Article 12. Development of new pesticides and agrochemicals Article 13. Information on safe handling of pesticides and agrochemicals Article 14. Production of pesticides and agrochemicals Article 15. Importation into the Kyrgyz Republic and exportation of pesticides and agrochemicals from the Kyrgyz Republic Article 16. Transportation and storage of pesticides and agrochemicals Article 17. Realization of pesticides and agrochemicals Article 18. Application of pesticides and agrochemicals Article 19. Disposal, destruction and burial of unsuitable and/or prohibited pesticides and agrochemicals, containers thereof
4. Obligations and responsibility for violation of the legislation of the Kyrgyz Republic in the field of chemicalization and plant protection	Article 20. Duties and Responsibilities of State Supervisors in the Field of Plant Chemicals and Protection Article 21. Duties of crop producers
5. Responsibility for violation of the legislation of the Kyrgyz Republic on chemicalization and plant protection	Article 22. Liability for Violation of this Law Article 23. Measures of Administrative Responsibility Applied by State Inspectors for Plant Chemicals and Protection Article 24. Extraordinary Anti-Epiphytic Commissions Article 25. Quarantine Article 26. Financing of State Service of Chemicals and Plant Protection
6. International treaties of the Kyrgyz Republic on chemicalization and plant protection	Article 27. International treaties
7. Final Provisions	Article 28. Procedure for Enforcement of this Law

Kyrgyzstan's pesticide management law is it, and regulations to enforce it include *Regulation on the Instructions for Safe Use, Storage of Pesticide in Agriculture*, and *Regulation on Registration Tests and State Registration of Pesticides and Agrochemicals*.

3.2. Decree on the Instructions for Safe Use, Storage of Pesticides in Agriculture (5 Jul. 2011. No. 361)

The decree on the instructions for the safe use, and storage of pesticides in agriculture, was approved on 5th July 2011. No. 361, is to establish general rules for occupational safety and health, industrial sanitation, fire safety, and environmental protection during the storage, use, and transportation of pesticides and is mandatory for all individuals and legal entities engaged in the manufacture, sale, and use of pesticides and agrochemicals. This decree stipulates the toxicity standards of pesticides not only for the human body but also for the air, working environment, space, etc, and includes guidelines for the subjects that can be handled accordingly.

〈Table 2-4〉 Main contents by Chapter of Decree 5st July. 2011. No. 361.

Chapter	Articles
1. General Provisions	<ul style="list-style-type: none"> • The purpose of the decree • Hazard classes condition to living organism and environmental objects
2. General rules for organizing work using pesticides	<ul style="list-style-type: none"> • Obligation to notify for the pesticide user • Periodic toxicity examination of related workers • Work essentials for Pesticide relate workers and safety rule • Rules when carrying out work with pesticides in the field • Carrying out chemical treatment by drone or small aircraft • Pesticide purchase
3. Safety rules for pesticide storage and dispensing	<ul style="list-style-type: none"> • Warehouse organization • Pesticide storage organization • Packing design rules • Responsibilities of a storekeeper
4. Safety rules for working with	<ul style="list-style-type: none"> • 4.1. before starting the work session, all dusting and spraying equipment must be completely repaired, completed and checked for readiness

Chapter	Articles
<p>machinery and equipment for plant protection</p>	<ul style="list-style-type: none"> • 4.2. Pesticide handling machines should have brief notices warning of the dangers of working without personal protective equipment. • Machines for working with pesticides must be equipped with a tank with a capacity of at least 5 liters for washing the hands of service personnel. • 4.3. The main components of sprayers and other equipment must be subject to survey and hydraulic testing at operating pressure with tapping of welded seams (annually and before the start of operation). The test results are recorded in the passport of the tested equipment. • 4.4. In case of minor breakdowns during the operation of the machine and equipment, it is necessary to suspend spraying and carry out repair work in personal protective equipment. • In case of serious breakdowns, machines and devices are freed from pesticides, neutralized and delivered to a repair point. After repair, their operation is checked in operating modes. • 4.5. During the operation of the mechanisms of machines and devices, it is prohibited: • 4.6. Moving and rotating parts of tractors and machines must be protected by a casing. • 4.7. Refueling of machines must be carried out only when they are completely stopped and in a specially equipped place. • 4.8. It is forbidden to use machines, mechanisms, knapsack equipment and other chemical protection devices for other household needs.
<p>5. Safety rules for spraying, dusting and the use of aerosols</p>	<p>39–42. Required documents, conditions, etc. for pesticide re-registration</p>
<p>6. Safety rules for dressing seeds, their transportation and sowing 7. Safety rules for the manufacture and use of poisoned baits 8. Safety rules for fumigation of premises and soil and wet disinfestation of warehouses 9. Personal protective equipment when working with pesticides 10. Safety Rules for Disposal of Vehicles, Equipment, Tanks, Premises and Clothing 11. Safety rules for pesticides in greenhouses</p>	

In addition, as an attachment, guidance on environmental toxicity hazard ratings, conditions for prohibiting the use of pesticides, first aid measures for poisons, safety and emergency equipment, etc. is included.

3.3. Regulation on Registration Tests and State Registration of Pesticides and Agrochemicals in the Kyrgyz Republic (1 Jul. 2013. No. 390)

Regulation on Registration Test and State Registration of Pesticides and Agrochemicals in the Kyrgyz Republic (No. 390), approved 1st July 2013 in accordance with the laws of the Kyrgyz Republic “On chemicalization and plant protection” and “On regulatory legal acts of the Kyrgyz Republic”, guided by Article 17 of the constitutional Law. The main contents of each chapter in the regulation are shown in the table below.

〈Table 2–5〉 Main contents by Chapter of Regulation 1st July. 2013. No. 390.

Chapter	Articles
1. General Provisions	1. The purpose of the regulation 2–3. Responsible body for registration and testing pesticides and agrochemicals (DCPPQ) 4–5. Registration process
2. Terms and Definitions	6. Basic concepts in the regulation : agrochemicals, biological formulation for plant protection, vegetation period, state registration of pesticide, etc.
3. Pesticide registration testing	7. The purpose of pesticide test for registration 8–9. Responsible department and role, and submit duration (the application must be submitted before March 30) 10. Task procedure to registration in DCPPQ 11–22. Pesticide registration process, registration conditions, total period, documents to be submitted, etc.
4. State registration of pesticides and agrochemicals	23–27. Criteria and conditions for the use of pesticides 28–35. Pesticide use guidelines, safety test deadlines, recommendation for pesticide use, the validity period of the state registration, etc. 36–37. Condition for using a pesticide that has recieved temporary registration 38. Denial grounds of pesticide state registration
5. Re-registration of pesticides	39–42. Required documents, conditions, etc. for pesticide re-registration

In addition, reports and application forms, ΔPesticide testing result report for registration to assess the biological and economic effectiveness, ΔApplication for the pesticide registration, ΔAgrochemical registration application, ΔPacking label form of product and company are attached to this regulation.

4. Import and Application Procedures

4.1. Responsible Agency for Imported Pesticide Application

4.1.1 The Department of Chemicalization, Plant Protection and Quarantine (DCPPQ)

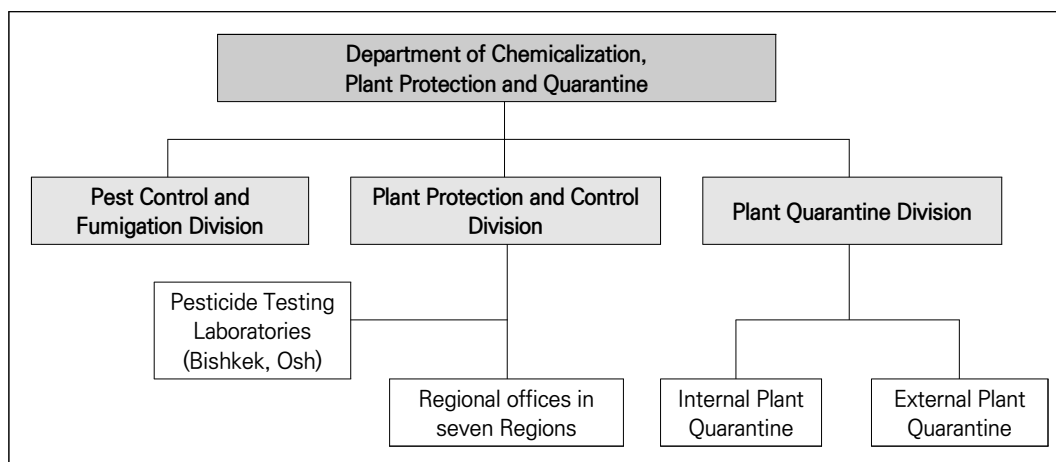
First, In the DCPPQ, there is a Division for Pest Control and Fumigation, which is directly engaged in chemical treatment within the framework of state measures to combat especially dangerous pests (locusts and the American white butterfly) and provides services for chemical treatment against harmful organisms for farmers. There are 5 specialists working in the department all the time. During chemical treatments, the Department hires up to 15 seasonal workers.

The structure of the Department has a Plant Protection and Control Division, which directly deals with pesticide issues (registration, import permit, control, license of pesticides). More than 70 specialists who are responsible for chemicalization and plant protection work in 7 regions of the republic. Also, the Department has 2 toxicological laboratories, where 8 specialists work (4 specialists in each laboratory).

There are 2 Divisions in plant quarantine in the Department (the Division of External Quarantine - 5 specialists and the Division of Internal Plant Quarantine - 5 specialists). There are about 150 specialists working in the regions who are responsible for plant quarantine.

Import/export of pesticides and agrochemicals to/from the Kyrgyz Republic is carried out in the presence of a registration certificate of state registration of a pesticide and (or) agrochemicals issued by the DCPPQ.

〈Figure 2-1〉 Organization chart of DCP PQ



4.2. Document lists submitted to the Ministry of Agriculture when requesting pesticide imports

Regulations on registration tests and state registration of pesticides and agrochemicals in the Kyrgyz Republic, approved by the Government Resolution No. 390 dated 01.07.2013, establishes rules and procedures concerning registration tests and state registration of pesticides and agrochemicals in the Kyrgyz Republic. The State Catalog of pesticides and agrochemicals approved for use in the Kyrgyz Republic for 2011-2019, approved by the Government Resolution No. 704 dated 4.11.2011.

Catalog of pesticides and agrochemicals approved for use in the Kyrgyz Republic, approved by the Order of the Minister of Agriculture, dated 31.03.2018 No. 33 (supplement).

In accordance with the Government of the Kyrgyz Republic dated 20.04.2021 No. 156, plant protection products (pesticides) restricted to movement across the customs border of the EAEU when imported according to item 2.2 of the Unified List

approved by the Decision of the EEC Board dated 21.04.2015 No. 30, are imported into the territory of the Kyrgyz Republic on the basis of a license issued by the Ministry of Economy and Commerce of the Kyrgyz Republic, according to the expert opinion of the Ministry of Agriculture of the Kyrgyz Republic - organization of the expert. According to Article 42, the report list to pesticide registration is as below.

〈Box 1〉 REPORT on the results of registration trials to assess the biological and economic effectiveness of the pesticide

1. Pesticide (trade name), formulation, registrant country, active ingredient (according to ISO), purpose (phytosanitary).
2. Place of testing.
3. Culture, variety. Age of plantings, planting scheme.
4. Soil (type, mechanical composition, humus content. pH).
5. Agricultural technology (predecessor, tillage, sowing dates, seeding rate, row spacing, crop care measures).
6. Harmful organisms (indicate specific harmful objects against which the product is being tested).
7. Experience options.
8. Type of experiment (field – small plot, production), area of experimental plots, number of repetitions.
9. Timing (development phase of agricultural crops and pests) and methods of application of the drug (solid treatments, barrier treatments, low-volume, ultra-low-volume spraying, use in the form of poison baits, fumigation of storage facilities, etc.).
10. Sprayer type, working fluid consumption rate.
11. Peculiarities of weather conditions of the current year (precipitation, temperature and air humidity) (bring in comparison with long-term data).
12. Methodology for the registration of harmful organisms.
13. Methodology for accounting for the harvest.
14. Biological and economic efficiency (given in the form of tables).
15. Observed side effects of the pesticide, including on non-target objects (indicate types), note the effect on the skin, respiratory organs of those working with the drug, other negative effects (if noted).
16. The content of residual quantities of the test drug in agricultural products and environmental objects.
17. Discussion of the results of the experiment, specific conclusions about the biological and economic efficiency of the tested pesticide.
18. Proposals on the expediency of registering a pesticide at tested consumption rates or on continuing registration trials in order to clarify them, as well as on the regulations for the use of a drug recommended for registration.

4.3. Work process after applying for pesticide import

4.3.1. Issue of import license

The import permit process starts from around March to August each year, and the procedure have to follow the Government Resolution No. 390 dated 01.07.2013. Regarding to the Resolution, the due date of application for import license is by March 30th, and it should be submitted;

- a brief dossier on the pesticide;
- standards for the content of declared pesticides in crop products and environmental object;
- methods for determining the residual amounts of declared pesticides in crop products and environmental objects.

The application contains information such as <box 2>, such as the applicant's personal information, pesticide manufacturing company, and transaction period.

<Box 2> INFORMATION attached to the application for registration of the pesticide

1. Application of the registrant

- ① Registrant (name, legal and actual address, telephone, fax, E-mail).
- ② Manufacturer of the product and active substance (name, legal and actual address, telephone, fax, E-mail).
- ③ Permission for the registrant to represent the manufacturer during the registration of the pesticide in the Kyrgyz Republic.
- ④ The distinctive (trade) name of the pesticide.
- ⑤ Prescribing a pesticide.
- ⑥ Active ingredient (according to ISO, IUPAC, CAS No.):
 - ISO – an international organization that issues standards;
 - IUPAC – a system of naming chemical compounds and a description of the science of chemistry in general;
 - No. CAS – a unique numerical identifier for chemical compounds, polymers, nucleotides, amino acids, mixtures and alloys.

- ⑦ Chemical class of the active substance.
- ⑧ Concentration of the active substance (in g/l or g/kg).
- ⑨ Preparative form.

When an application is received, a test is conducted for the pesticide to be registered. However, currently, pesticide testing laboratories in Kyrgyzstan can only grasp basic information on pesticides due to aging equipment and lack of human capacity, so they are commissioned to laboratories in neighboring countries such as Kazakhstan and Russia. Registration tests are carried out depending on the crop and pest (for pesticides), in 1-3 soil-climatic zones. The period for conducting registration tests is 12-24 months (1-2 growing seasons):

- when expanding the scope of use (application); changing the recipe; changing the formulation and percentage of the active substance; when changing the manufacturer; testing of analogues; combination drugs; pesticides containing active ingredients that are already part of registered preparations - 12 months (1 full growing season);
- for pesticides containing new active ingredients - 24 months (2 full growing seasons).

The duration of the tests is determined for each drug submitted for registration, and is determined by the contract. Reports of implementing organizations on the results of registration tests of pesticides are submitted in accordance with Appendix 1 of this Regulation, and contain generalized test results with specific conclusions and clear recommendations on the possibility of registering a pesticide, application regulations and restrictions, as well as negative side effects.

If the results obtained during the registration tests of pesticides in the Kyrgyz Republic contradict the results of similar studies conducted in other states located in similar climatic zones, then in such cases repeated tests are carried out. Registration

tests of pesticides are carried out at the expense of the registrant.

Demonstration experiments can only be carried out with registered pesticides according to the regulations for use specified in the State Catalog of Pesticides and Agrochemicals Permitted for Use in the Kyrgyz Republic for 2011–2019, approved by the Decree of the Government of the Kyrgyz Republic dated November 4, 2011 No. 704.

Examination of the results of registration tests of pesticides includes:

- state ecological expertise of pesticides and agrochemicals, carried out by a specially authorized body of executive power in the field of environmental protection;
- toxicological and hygienic examination carried out by a specially authorized executive body in the field of state sanitary and epidemiological supervision;
- examination of regulations for the use of pesticides and agrochemicals, organized by a specially authorized executive body that organizes registration tests and state registration of pesticides and agrochemicals.

4.3.2. Process carried out by private companies after approval of import permission

For the state registration of pesticides, the registrant submits the following documents in the state or official language:

- application for registration, in 2 copies;
- results of registration tests of the pesticide according to Annex 1, in 2 copies;
- materials attached to the application for registration of a pesticide, in accordance with Annexes 2 and 3 to this Regulation, in 2 copies, as well as in electronic form:

- when expanding the scope of the pesticide - in accordance with Chapters 1 and 2 of Annex 2;
- when changing the trade name and manufacturer for the pesticide in accordance with Chapter 1 and subparagraphs 1 and 2 of paragraph 3 of Chapter 3 of Annex 2;
- when changing the formulation of the pesticide - in accordance with Chapters 1, 2, paragraph 3 of Chapter 3, paragraphs 2, 3 of Chapter 4 of Annex 2, Annexes 4, 5;
- for pesticides produced in the CIS and EU countries under a license agreement and containing known active substances - in accordance with chapters 1, 2, subparagraphs 1, 2 of paragraph 3 of chapter 3 of Appendix 2 and Appendix 4;
- for a combined pesticide containing known active substances - according to chapters 1, 2, point 3 of chapter 3, points 2, 3 of chapter 4 of annex 2, annexes 4 and 5;
- for pesticides based on microorganisms (microbiological preparations) with a modified titer, in case of replacement of the preparative form by a registrant - in accordance with paragraphs 1, 5, 6 of Chapter 9 of Annex 2, Annexes 4, 5;
- for a pesticide containing a new unknown active substance that is not registered in the CIS and the EU, but is included in the International reference books - according to chapters 1, 2, 3, paragraphs 1, 2, 3 of chapter 4, chapters 5-8 of Appendix 2, annexes 4, 5;
- for a pesticide containing a new unknown active substance and produced in the territory of the CIS and EU countries - according to chapters 1, 2, 3, paragraphs 1, 2, 3 of chapter 4, chapters 5-8 of Appendix 2, Appendix 4, 5;
- for a new microbiological preparation - in accordance with paragraphs 1-6 of Chapter 9, Chapter 5 of Annex 2, Annexes 4, 5 of this Regulation.

The import of pesticides is carried out by domestic companies - official distributors of manufacturers. Imports are carried out on the basis of a contract between distributors and manufacturers. The import is carried out either in whole or in part, according to the contract and invoice. Transportation of pesticides is carried out mainly by land transport by train and motor transport.

Meanwhile, other companies can import the same pesticide if it is registered in the Kyrgyz Republic, that is, the manufacturer can enter into a contract with only one supplier company (official distributor), or he can enter into a contract with several supplier companies.

4.4. Spraying method

In Kyrgyzstan, mainly ground spraying equipment is used. If a farmer/cooperative has a large area of farmland, he usually has tractor sprayers, or he hires him (tractor sprayers are used up to 40% of farmland areas in the republic). If a farmer has a small area of farmland, he usually uses manual/knapsack sprayers (about 60% of farmland is treated with such sprayers in the republic).

In recent years, some farmers have started using the services of drones and delta lets. Drone services are provided by domestic companies. In recent years, Chinese and Korean companies have started working or are working in Kyrgyzstan.

4.5. How to determine the amount of pesticide dilution and spraying

The Instruction on the safe use, storage and warehousing of pesticides in agricultural production, approved by the Government Resolution No. 361 dated 5.07.2011, establishes general rules for occupational safety and hygiene, industrial

sanitation, fire safety, environmental protection during storage, use and transportation of pesticides and is mandatory for all individuals and legal entities engaged in manufacturing activities, the sale and use of pesticides and agrochemicals.

In addition, the Kyrgyz Government established “the Catalog of Pesticides and Agrochemicals permitted for use” in 2021, containing a list of pesticides and agrochemicals permitted for use by farmers and legal entities in agriculture, including farming, forestry, communal and personal farms, as well as the main regulations for the use of pesticides established during their registration trials.

Also, in the catalog of pesticides and agrochemicals approved for use in the Kyrgyz Republic, the regulations for the use of pesticides are indicated, where the permissible multiplicity of treatments of each pesticide is indicated. Both documents are posted on the official website of the Ministry of Agriculture. The catalog is consisted of 7 columns by trade name, formulation, registration number and date of registration. The main contents of each columns are as follows.

〈Table 2-6〉 The main contents of each columns in the official pesticide use catalog

No.	Contents
1	the name of the pesticide, its formulation, active ingredient content, registrant, state registration number, registration date.
2	the application rates of pesticides (by preparation): for solid formulations – in kg/ha (for seed treaters – in kg/t), for liquid formulations – in l/ha (for seed treaters – in l/t). In other cases, the application rates given in other units of measurement are indicated next to the numerical value of the drug application rate. Herbicide application rates are given on the basis of continuous tillage, with a belt method of application, the application rate is reduced in proportion to the decrease in the cultivated area.
3	the crops on which the use of this pesticide is allowed, two crops – tomato and cucumber are indicated for both open and protected ground, even if this is not specified in this column.
4	harmful objects against which this pesticide is recommended, for desiccants and plant growth regulators – the purpose of the drug.
5	“Method, processing time, restrictions” the expressions “Consumption – 400g/l”, “Consumption – 12 l/t” means the consumption of the working solution.
6	“Waiting period, frequency of treatments”, a dash (-) or (1) can be indicated, respectively.
7	the timing of people entering the pesticide-treated areas for manual (mechanized) plant care is given in days.

〈Figure 2-2〉 Example of State Pesticide Catalog

ГЛАВА I. ИНСЕКТИЦИДЫ И АКАРИЦИДЫ						
Торговое название, препаративная форма, регистрант. Номер государственной регистрации, дата перерегистрации	Норма расхода препарата (л/га, кг/га, л/л, кг/л)	Культура, обрабатываемый объект	Вредный объект	Способ, время обработки, особенности применения	Срок ожидания (кратность обработок)	Сроки выхода для ручных и механизированных работ
1	2	3	4	5	6	7
Абамектин						
Ивергт , КЭ (18 г/л) Компания «Шанхай Агрожайна Интернешнл Трайд Ко., Лтд» I-216 05/04/12	0,3-0,6 0,5 0,5-1,5	Хлопчатник Томаты Цветочные культуры (роза, хризантема, гвоздика)	Паутинный клещ	Опрыскивание в период вегетации	14 (2) 3 (3)	3 (-)
Вертимектин , КЭ (18 г/л) Компания «Nanjing Essence Fine – Chemical Co., Ltd» I-239 16/08/13						
Вертимектрофи , КЭ (18 г/л) Компания «Lier Chemical Co., Ltd», КНР, через ОсОО «Чагылган», КР I-411 02/06/16						
Ровини , КЭ (18 г/л) Компания «Trustchem Co., Ltd» КНР, через ОсОО «Алем Агро КейДжи», КР I-437 11/01/17						
Абактин , КЭ (18 г/л) Компания «Синокем Агро Ко., Лтд», КНР, через ОсОО «Пестициды» КР I-388-1 22/03/16	0,75-1 1-1,5 0,5	Виноград Горшечные культуры защищенного грунта	Паутинные клещи Виноградный войлочный клещ Обыкновенный паутинный клещ, западный паутинный клещ, цветочный трипс	Опрыскивание в период вегетации	14(2)	3(-)
Абалон 1,8% , КЭ (18 г/л)						

3

Pesticide Management Act and Quality Evaluation Technology in Republic of Korea

1. Overview of Pesticides

1.1. Definition and Necessity of Pesticides

The definition of pesticide is described in Article 2 of the ‘Agrochemical Management Act’ as follows. Pesticides mean germs, insects, mites, nematodes, viruses, weeds, and other animals and plants (hereinafter referred to as “pests”) that harm agricultural crops (including trees and agricultural and forestry products) [animals; snails, birds or wild animals, plants; It refers to fungicides, insecticides, herbicides, and other drugs prescribed by the Ordinance of the Ministry of Agriculture and Forestry (repellents, attractants, spreaders) used for controlling moss or miscellaneous trees, and drugs used to enhance or inhibit the physiological function of crops. ‘Biopesticide’ means manufactured using live microorganisms such as fungi, bacteria, viruses, or protozoa as active ingredients, and organic or inorganic compounds produced in nature as active ingredients.

Currently, most of the crops grown for stable production of abundant food cannot be harvested normally without pesticides. Therefore, in order to stably supply high-quality agricultural products at an appropriate price every year, it is necessary to prevent damage from pests and weeds. In addition, it is the supply of excellent pesticides that made it possible to cultivate multiple varieties, which were impossible to grow due to pests or diseases or whose yield was greatly reduced. It dramatically reduces labor in rural areas and makes farming work convenient. It took 50.56 hours in 1949 to remove weeds occurring in 10a, but the time gradually decreased and in 2006 it took 18 minutes, more than 95% decreased.

As such, pesticides, which are essential agricultural materials for our agriculture, have undergone many experiments on safety as well as drug efficacy, and only drugs whose safety has been confirmed based on the data are registered and used. The probability of many candidate compounds becoming new pesticides is very low at 1:140,000, and continuous research such as drug efficacy and drug dissolution tests, toxicity tests, metabolism tests, and environmental scientific tests over a period of more than 10 years from synthesis to registration of compounds and It costs more than 300 billion won for research and development, and it is not easy to register as a new pesticide product, such as final confirmation of safety using test animals.

There are 5,850 types of pests and weeds occurring in Korea, and among them, there are about 100 types of pests and weeds that will greatly affect the quality and quantity of harvest if control is neglected. In particular, recently, according to the trend of liberalization of agricultural products, the number of diseases and pests introduced into the country from imported agricultural products is gradually increasing. The most economical and scientifically reliable means to control pests and weeds and improve the quality of agricultural products is the use of pesticides. When crops are grown without using pesticides, only 6-65% of the harvest can be produced depending on the crop.

1.2. Classifying Methods of Pesticides

These pesticides can be classified according to various methods. The first is classification according to the purpose of use.

- Disinfectants: Control agents for microorganisms (fungi, bacteria, protozoa, etc.) that cause plant diseases
- Pesticides: pest control agents
- Acaricide: A mite control agent belonging to the spider class
- Nematicides: Nematode control agents belonging to nematodes
- Herbicide: weed control agent
- Plant growth regulators: Drugs used for growth control, such as promoting or inhibiting plant growth, promoting flowering, and preventing fruit drop
- Supplements: Agents that enhance the effectiveness of fungicides, insecticides, herbicides, etc.

The second is classified according to “the formulation” of pesticides. Formulation is a form that is processed into a form suitable for practical use by adding appropriate auxiliary agents to the active ingredients of pesticides, diluted in water and sprayed, and sprayed directly after opening the packaging. It is divided into a form of direct spraying and a special form of non-spraying.

〈Table 3-1〉 Classification according to pesticide formulation type

Classification	Formulation type
Dilute Spray	<ul style="list-style-type: none"> • Powder type : soluble powder (SP), wettable powder (WP), wettable flo-dust (WF) • Granule type : soluble granule (SG), water dispersible granule (WG) • Tablet type : water dispersible tablet (WT) • Liquid type : Micro-emulsion (ME), Dispersible concentrate (DC), suspension concentrate (SC), Soluble concentrate (SL), Oil miscible liquid (OL), Emulsifiable concentrate (EC), Oil dispersion (OD), Emulsion, oil in water (EW), Suspo-emulsion (SE), Capsule suspension (CS)

Classification	Formulation type
	<ul style="list-style-type: none"> Formulations for microbial agents: Granule for microvial pesticide (GM), Aqueous concentrate or microvial pesticide (AS), Aqueous suspension for microvial pesticide (SM), Emulsifiable suspension for microvial pesticide (EM)
Direct Spray	<ul style="list-style-type: none"> Powder type : Microgranule (MG), Flo-dust (GP), Powder for seed treatment (DS), Dustable powder (DP), Driftless dust (DL), Water dispersible powder for slurry seed treatment (WS) Granule type: Fine granule (FG), granule (GR) Tablet type : Microgranule (GG), Up granule(water floating granule) (UG), Tablet for direct treatment (DT), Encapsulated granule (CG) Liquid type : Spreading oil (SO), Flowable concentrate for seed treatment (FS), Other liquid to be applied undiluted (AL)
Special Formulation	Smoke pallet (FW), Paste (PA), Vapor releasing product (VP), Pesticide containing polyetylen film (PF), Aerosol (AE), Sheet formulation (SF), Smoke generator (FU), Gas (GA)

Source: RDA, Pesticide Safety information System (<https://psis.rda.go.kr/psis/index.ps>)

Finally, as a classification according to the toxicity of pesticides, the toxicity classification of pesticides is necessary for the safety of farmers who actually use pesticides, and it is classified by the toxicity of product pesticides.

〈Table 3-2〉 Classification of acute toxicity of pesticide products to humans

Class description	LD50 for the Rat (mg/kg Body Weight)			
	Oral		Dermal	
	Solids	Liquids	Solids	Liquids
I (Extremely hazardous)	≤5	≤20	≤10	≤40
II (Highly hazardous)	5-50	20-200	10-100	40-400
III (Moderately hazardous)	5-500	200-2,000	100-1,000	400-4,000
IV (Slightly hazardous)	>500	>2,000	>1,000	>4,000

Source: RDA, Pesticide Safety information System (<https://psis.rda.go.kr/psis/index.ps>)

2. Current Status of Pesticide Industry in Republic of Korea

2.1. Overview of pesticide industry in Republic of Korea

The current state of the agricultural chemical industry in Korea is dependent on imports for most of the raw materials for agricultural chemical products, which is the reason why the competitiveness of new pesticide development is declining due to the narrow domestic market and high development costs.

* Reliance on imports of agricultural chemicals raw materials: (90 years) 39% → (00 years) 71 → (10 years) 91.1 → (21 years) 93.5

The size of the Korean agrochemical industry is 1.5 trillion won in 2017 and 1.6 trillion won as of the end of 2021. The size of the industry remains constant, and sales volume of pesticides fluctuates every year depending on climate and crop conditions. Based on shipments (amount) in 2021, fungicides accounted for 37%, insecticides 35%, herbicides 25%, and other agents such as growth regulators accounted for 3%.

* Pesticide market (shipment): (2017) 1.50 trillion → (18) 1.48 trillion → (19) 1.45 trillion → (20 years) 1.50 trillion → (21 years) 1.60 trillion

Due to the diversification of cultivated crops, the number of registered pesticides tends to increase, and the shipment of chemical pesticides continues to decrease. Although 205 companies are registered in the agricultural industry, such as agrochemical manufacturing and importing, and raw materials, 134 companies are actually conducting industrial activities. Looking at the registration status of agricultural chemicals sales businesses that can sell agricultural chemicals directly to farmers and consumers, there are 3,581 front-line merchants and 2,030 sellers that conduct consignment transactions through the agricultural material business of the Agricultural Cooperative Federation.

〈Table 3-3〉 Korea's pesticide production and shipments from 2019 to 2021

(M/T, million KRW)

Chemicals			2019		2020		2021	
			Production	Shipments	Production	Shipments	Production	Shipments
Waterworks	Fungicide	Ingredient quantity	791	816	982	915	1,120	1,052
		Amount	121,258	120,628	153,720	140,096	175,230	149,232
	Insecticide	Ingredient quantity	681	761	789	728	798	740
		Amount	59,846	73,192	79,559	71,851	79,070	71,760
	Total	Ingredient quantity	1,472	1,577	1,771	1,643	1,918	1,792
		Amount	181,104	193,820	233,279	211,947	254,300	220,992
Horticulture	Fungicide	Ingredient quantity	4,733	4,331	4,686	4,580	5,491	4,995
		Amount	411,784	378,343	455,243	401,680	480,365	446,772
	Insecticide	Ingredient quantity	4,189	4,192	3,820	3,999	4,599	4,546
		Amount	525,860	477,156	521,706	477,591	541,175	490,673
	Total	Ingredient quantity	8,922	8,523	8,506	8,579	10,090	9,541
		Amount	937,644	855,499	976,949	879,271	1,021,540	937,445
Herbicide	paddy herbicide	Ingredient quantity	1,377	1,145	1,191	1,127	1,128	1,132
		Amount	164,923	147,513	169,252	154,121	165,349	158,057
	Field crop and orchard	Ingredient quantity	4,125	4,109	3,743	4,132	4,616	4,828
		Amount	234,100	207,867	201,654	211,897	229,968	238,383
	Total	Ingredient quantity	5,502	5,254	4,934	5,259	5,744	5,960
		Amount	399,023	355,380	370,906	366,018	395,317	396,440
Others	Ingredient quantity	1,316	1,392	1,591	1,651	1,550	1,721	
	Amount	46,619	41,117	52,346	46,398	52,695	52,744	
Total	Ingredient quantity	17,212	16,746	16,802	17,132	19,302	19,014	
	Amount	1,564,390	1,445,816	1,633,480	1,503,634	1,723,852	1,607,621	

Source: https://data.mafra.go.kr/opendata/data/indexOpenDataDetail.do?data_id=20220722000000002288

2.2. Characteristics of Agricultural Chemicals Distribution Site in Korea

Looking at the changes in the Korean pesticide market in 2022, there are also market changes due to the Korean government's policy changes related to crop protection agents. First of all, the competitiveness of registered crops of pesticides is emerging as the most important criterion due to the strengthening of the PLS and the pesticide sales history management system. In this regard, the share of small-area ex officio registration drugs has expanded from 27.7% last year to 34.0% this year.

In addition, the criteria for analyzing residual pesticides multi-component of agricultural products are strengthened from 320 to 464 species, PLS for pine trees in the forest sector is emerging, and the expansion of direct registration for tropical fruits and flowers is being promoted. Until now, manufactured pesticides among pesticides collected and recovered due to the expiration of the drug efficacy guarantee period were allowed to be distributed and sold again after reprocessing, while all imported pesticides were discarded, causing economic losses.

In August, the Rural Development Administration revised the "How to Inspect Pesticides and Dispose of Irregular Pesticides" to allow all imported pesticides, which were supposed to be discarded, to be reused and sold if there is no problem in quality. Amid the recent expansion of control projects using unmanned aerial vehicles and wide-area sprinklers due to the increase in agricultural productivity, attention is required to the weakness of nearby crops caused by scattering pesticides. In particular, drone control such as liquid herbicides in the middle of the capital is increasing, and drone control of horticultural crops such as cabbage, radish, garlic, onions, green onions, and corn is increasing.

In the pesticide market, large new products released every year have led the market change. On the other hand, there seems to be no market change this year because there are no large new products that stand out. In 2020, 53 new products from eight large companies showed sales of 76 billion won, leading the change in the

crop protection system market.

In particular, Dongbang Agro and Korea Samgong recorded sales of 9 billion won, respectively, leading the market change with insecticide Broflanilide. Looking at the sales of new products by company based on data from the Crop Protection Association, ▲ Dongbang Agro was the largest with 24.5 billion won in 9 items, followed by ▲ Korea Samgong with 19 billion won in 6 items. ▲ Nonghyup Chemical sold 9 billion won for 10 items, ▲ Gyeongnong sold 8.5 billion won for 10 items, ▲ ShinZeta Korea sold 6.2 billion won for 3 items, ▲ Seongbo Chemical sold 4.6 billion won for 5 items, and ▲ Farm Hannong sold 3.6 billion won for 9 items.

In 2021, sales of 31 new products from eight large companies accounted for 60 billion won. In particular, these new products, including 13 billion won for burn disease drugs, 12 billion won for insecticide Acynonapyr, and 9.5 billion won for insecticide Afidopyrofen, led the market with sales of 36.5 billion won.

By company, ▲ Gyeongnong sold the most with 13 billion won in seven items, followed by ▲ Farm Hannong with 11 billion won in three items. Next, ▲ Shingenta Korea sold 9.5 billion won for three items, ▲ Nonghyup Chemical sold 9 billion won for five items, ▲ Sungbo Chemical sold 6.5 billion won for three items, ▲ Korea Samgong sold 6 billion won for four items, and ▲ Dongbang Agro sold 5 billion won for four items. The industry pointed out that there were no special new materials and lack of pre-marketing activities for the sluggish sales of new products in 2022. It is widely believed in the industry that pre-marketing activities that usually start three years before the launch of new products are very important. However, it is analyzed that the new product released in 2022 had sluggish sales due to the lack of pre-marketing activities caused by the COVID-19 pandemic, which began at the end of 2019.²⁾

²⁾ newsAM. "Who is the main character in the crop protection market in 2023? (2022.11.01.)", (<http://www.newsam.co.kr/news/article.html?no=35000>)

3. Pesticide Control Law in Republic of Korea

3.1. Composition and history of pesticide management law

Korea's agricultural materials regulations (laws) largely include the Agricultural Pesticide Management Act, the Fertilizer Management Act, and the Act on the Promotion of Eco-Friendly Agricultural Industry and Management and Support of Organic Food. The Pesticide Management Act consists of a registration system that conducts professional evaluations by submitting effective ingredient characteristics, drug weakness, toxicity evaluation, and residual reports without restrictions on chemicals and microorganisms.

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〈Table 3-4〉 Major changes in the Pesticide Control Act

Date	Policy	Contents	Enforcement body
1957.08.28	Item Permission Act	An Act that tests and evaluates pesticides for which registration is requested and permits pesticide products	<ul style="list-style-type: none"> • National Agricultural Material Inspection Agency (test and evaluation) • MAFRA (permission and registration)
1980.12.31	Item Notification Act	An Act in which the government determines, tests, evaluates, and announces the pesticides needed in the agricultural field, and the pesticide manufacturers register and produce them	<ul style="list-style-type: none"> • National Agrochemical Research Institute (selection, testing and evaluation) • RDA (Permission and registration)
1996.12.07	Item Registration Act	When the agricultural chemicals industry requests registration, an expert evaluates it and issues a registration certificate when safety is proven.	<ul style="list-style-type: none"> • National Academy of Agricultural Science (safety testing and evaluation) • RDA (Permission and registration)

source: Korean Law Information Center (<https://www.law.go.kr/>)

The Agricultural Chemicals Control Act consists of definitions of pesticides, registration regulations for agrochemical business, contents on registration of pesticides, distribution management, and contents on penalties. It consists of a total of 6 chapters and 40 articles. The main contents are as follows.

〈Table 3-5〉 Composition and main contents of the Pesticide Control Act

Chapter	Article	Main contents
Chapter 1	1. Purpose	Description of the purpose of the Pesticides Control Act and the provisions of the Act
	2. Definitions	<ul style="list-style-type: none"> • Regulations on pesticides <ul style="list-style-type: none"> - Fungicides, insecticides, and herbicides used to control germs, insects, weeds, etc. (hereinafter referred to as "pests and pests") that harm crops - Drugs used to enhance or inhibit the physiological function of crops (growth regulators) - Other drugs prescribed by Ordinance of the Ministry of Agriculture, Food and Rural Affairs (repellent, attractant, spreader) • Manufacturing: A business that manufactures (including processing) and sells pesticides and pesticide application equipment (hereinafter, pesticides, etc) in Korea • Import business: A business that imports and sells pesticides, pesticide application equipment, and raw materials • Raw material business: A business that produces and sells raw material in Korea • Sales Business: A business that sells pesticides and pesticide application equipment other than manufacturing and import business • Control business: A business that uses pesticides to control pests or promotes or suppresses the physiological function of crops <p><u>☞ Minimization of confusion arising from legal interpretation through terminology definitions</u></p>
Chapter 2	Registration of business (Articles 3-7)	<ul style="list-style-type: none"> • Manufacturing, importing and original manufacturing: registration and change registration with the Rural Development Administration • Sales business: Registration and change registration with the head of the mayor, county, or district having jurisdiction over the location of each business • Import and export plant control business/air control business: report to the Minister of Agriculture, Food and Rural Affairs (Quarantine Headquarters/Agricultural Administration) and report changes • Succession of the registered operator's status: confirmation of disqualification, rights and obligations, succession to the effect of administrative disposition • Report of business closure: To close business, dispose of stored pesticides, etc, return, and report to the registration office • Cancellation of registration, etc.: Violation of the Agricultural Chemicals

Chapter	Article	Main contents
		<p>Control Act, disqualification, non-operation for a certain period of time after registration, etc.</p> <p><u>☞ Only registered operators can handle manufacturing, importing, and selling after registering pesticides, etc.</u></p>
Chapter 3	Registration of pesticides, etc. (Articles 8 to 17)	<p>Regulations on registration, re-registration, change registration and ex officio deregistration procedures and test institutes for manufacturing and importing agricultural chemicals, etc.</p> <ul style="list-style-type: none"> • Registration of pesticides, etc.: Registration, change registration and re-registration (every 10 years) with the Rural Development Administration • Cancellation of registration ex officio: Corresponds to reasons such as the identification of risks by international organizations, foreign governments, etc. • Recall and disposal of deregistered pesticides: including already sold pesticides, strong administrative penalties in case of violation • Pesticides subject to the Rotterdam Convention: Pesticides subject to import and export restrictions comply with the approval standards announced by the Director of Rural Development Administration • Import permission: Import and sale is possible with permission for testing and academic use and emergency control of exported agricultural products. • Designation and cancellation of testing and research institutes: Regulations, such as designation procedures of institutions conducting pesticide registration tests <p><u>☞ Prior verification of the safety and effectiveness of pesticides to be sold based on the precautionary principle</u></p>
Chapter 4	Distribution management of pesticides, etc. (Articles 18-25)	<p>Regulations on labeling of pesticides, etc., prohibition of manufacturing, importation, storage, display, sale, prohibition of false advertising, standards for safe use, standards for handling restrictions, distribution management, reporting, etc.</p> <ul style="list-style-type: none"> • Labeling: stipulates the items to be marked on the container or packaging of pesticides • Manufacture, import, storage, display, sales prohibited: Illegal pesticides such as self-inspection certificate not attached, unregistered, etc. • Prohibition of internet sales and sales of pesticides to teenagers (those under the age of 19) • Safe Use Standards/Handling Restriction Standards: Users comply with safe use standards, and handlers comply with handling restrictions • Distribution pesticide inspection: shipment after self-inspection, ex officio inspection by distribution pesticide inspection officials (Rural Development Administration/Agricultural Administration) * Pesticides that have passed pre-shipment application inspection (Agricultural Research and Extension Services) can be exempted from ex officio inspection • Record purchaser information: Mandatory record/preservation of pesticide sales/purchase information through the pesticide safety information system • Report on matters related to management of pesticides, etc.: Obligation

Chapter	Article	Main contents
		<p>to report matters required to be reported, such as pesticide shipment performance</p> <p>☞ <u>Specification of follow-up management to ensure that pesticides are safely handled and used as registered</u></p>
Chapter 5	Supplement (Articles 26-31)	<p>Regulations on objections required for pesticide registration and distribution management, fees, hearings, exclusion from application, and agenda for public officials in application of penalties</p> <ul style="list-style-type: none"> • Objection, hearing: Objection procedure in case of registration cancellation or return (written application within 30 days) • Reward for reporting: A reward is provided when a person who handles manufacturing, importing, etc. of unregistered pesticides is reported (up to 2 million won) • Exclusion from application of the law: Cases in which manufacturers and raw materials manufacturers manufacture and export pesticides and raw materials, etc. * Note: Pesticides falling under Articles 14 and 15 of the Act are not subject to exclusion • Authority delegation/consignment: Stomach cancer/consignment of some authority of the Minister of Agriculture, Food and Rural Affairs, the head of the Rural Development Administration, etc. • Agenda for public servants: Employees of test institutes/entrusted institutes apply penalties under Articles 129 to 132 of the Criminal Act (bribery, etc.) <p>☞ <u>Establish regulations necessary for application of the Agricultural Chemicals Control Act to process fair/transparent business</u></p>
Chapter 6	penalty (Articles 31-2 through 40)	<p>Regulations on the degree of punishment for law violators, the provision of both penalties, confiscation, and fines for negligence</p> <ul style="list-style-type: none"> • Imprisonment for up to 10 years or a fine of up to 100 million won: A person who causes death or injury with pesticides • Imprisonment for up to 3 years or a fine of up to 30 million won: A person who harms people with pesticides • Imprisonment for up to 3 years or a fine of up to 3 million won: Those who engage in manufacturing, etc. without registration, etc. • Imprisonment of up to 1 year or fine of up to 10 million won: Those who change without registering change in manufacturing industry, etc. • Fines of up to KRW 3 million: manufacturers who handled products in violation of the handling restriction standards, etc. • Fines of up to KRW 5 million: Users of unregistered pesticides, those who promote sales contrary to safe use standards, etc. • Fine for negligence up to KRW 1 million: Violation of safe use standards, failure to complete training for sales agents, violation of purchaser records, etc. <p>☞ <u>Encourage strict compliance with the law by punishing law violators with disadvantages</u></p>

source: Korean Law Information Center (<https://www.law.go.kr/>)

3.2. Enforcement Decree and Rules of the Pesticide Management Act, Rural Development Administration Notice

The Enforcement Decree of the Agricultural Chemicals Control Act was partially amended on November 29, 2022 and is in force from January 1, 2023, and consists of 23 articles and supplementary provisions. The main contents are about the business scope of import and export plant control business and aviation control business, items subject to exemption from submission of test reports, etc., drug testing related to item registration changes ex officio, standards for safe use of pesticides, and composition and operation of the Pesticide Damage Dispute Mediation Committee. The Enforcement Rules of the Pesticide Control Act were partially revised on December 14, 2022, and are in force as of January 1, 2023, and consist of 32 articles and supplementary provisions. The main contents are application for registration of pesticide-related industries (pesticide manufacturing, pesticide raw material production, pesticide import), application for registration of domestic manufactured items, application for items, registration of changes, re-registration, cancellation of items, notification of changes in raw materials, and registration of imported pesticides. and permit application, detailed standards for application and approval of testing and research institutes, and detailed standards for sales and advertising of pesticides.

The detailed rules set forth in the Enforcement Decree and Enforcement Rules of the Pesticide Control Act are Rural Development Administration notices, directives, and established rules, which define detailed regulations, the contents of which are as follows.

〈Box 3〉 Rural Development Administration Notice (1~14), Directive (15), Rules (16~17)

1. Criteria for registration of pesticides and raw materials
2. Criteria for designation and registration of pesticide application equipment

3. Designation and management standards for testing and research institutes for pesticides, etc.
4. Standards for safe use of pesticides, etc.
5. Criteria for Restriction on Handling of Agrochemicals, etc.
6. Labeling standards for raw materials for pesticides and pesticide application equipment
7. Criteria for Approval of Import and Export of Agrochemicals
8. Ex officio cancellation of pesticide registration and disposition of restrictions
9. Pesticide inspection methods and illegal pesticide handling tips
10. Methods of pesticide sales records, etc., and guidelines for operating the pesticide safety information system
11. Pesticides that can be sold by telecommunication or telephone solicitation
12. Guidelines for conducting training for pesticide sales managers
13. Guidelines for conducting training on the safe use of pesticides
14. Criteria for payment of rewards to those who report fraudulent and defective pesticides
15. Guidelines for implementation of pesticide price labeling system
16. Rural Development Administration Regulations on Agricultural Materials Management
17. Guidelines for review of registration documents for pesticide raw materials and pesticide application equipment.

Source: Korean Law Information Center (<https://www.law.go.kr/>)

4. Characteristics of the Korean Pesticide Registration System

4.1. Operation of Pesticide List Management System (PLS, Positive List System)

For the safe management of pesticide residues in agricultural products, the so-called PLS (positive list system), a pesticide permitted list management system, has been implemented since 2019. Under the PLS system, appropriate residue tolerance standards are established and managed for pesticides that have been registered in Korea or allow residues, but residues of 0.01mg/kg on a uniform basis for residues of unregistered or unlicensed pesticides for which residue tolerance

standards have not been established. Acceptance criteria apply. This uniform standard is a strict standard that is judged as an illegal agricultural product when misuse of pesticides in the country or use of pesticides that are not permitted in the country among imported agricultural products is usually exceeded. PLS is a system for safety management of pesticide residues among agricultural products that has been implemented since 10 years ago in advanced countries for food safety management such as the United States, Australia, Europe, Japan, and the United States.

After the announcement of the introduction plan in 2011, a roadmap has been set to implement the first in 2016, the second in 19, and the livestock products in 24. As an additional effect of the initial purpose of PLS introduction, which focuses on the safety management of imported agricultural products, it is uniformly applied to Korean farmers by the reciprocal application of imported and domestically produced agricultural products according to the international trade order. It can give immeasurable benefits of safety to farmers, and non-tariff barriers are established through the strengthened pesticide residue safety management policy for imported agricultural products, which can increase the price of imported agricultural products or expand the market for our agricultural products in limited quantities. It has an effect, but it can also have a negative effect, such as inflation.

Pesticide safety management system such as PLS has various advantages and disadvantages for each country, so it is premature to compare which method is superior, but it is divided into the Americas type that is involved in public health and the European type that leads agricultural production. Korea, Japan, Taiwan, etc. have accepted the US system and are involved in both health care and agricultural production with similar capacities.

The purpose of the PLS system, which has been implemented in earnest since 2019, is not to be simply implemented, but to supply safe food from pesticides to the public, and to induce the use of safe pesticides at the production site and to secure

an institutional device to check in advance. judged The residue tolerance standards in the production stage implemented by the Agricultural Products Quality Management Service and the pesticide safe use standards carried out at the time of pesticide registration by the Rural Development Administration meet that purpose.

Most farmers are aware of the number that the permissible standard for pesticides is 0.01mg/kg through publicity and education on the implementation of the PLS system on a large scale this year according to the Moon Jae-in government's safe food expansion policy, but only 0.01mg/kg It is an analytical term that should not be used, and there is a lack of awareness that it corresponds to the lowest detection amount.

Problems that may arise when the PLS system is implemented in earnest are that pesticides that remain in soil for a long time, such as endosulfan, may be transferred to agricultural products, or pesticides used in previous crops may remain and transfer to other crops, and air control (including drones) may occur. Pesticide contamination on subsequent crops due to continuous cropping during open-field and facility cultivation, pesticide transfer from media containing pesticides to mushrooms, or unintentional residue standards in agricultural products stored and produced for a long time The 'unintentional pesticide residue contamination problem' that can occur in excess of In order for the PLS system to be implemented smoothly, it is necessary to establish a preemptive system for improving pesticides that are customary in Korea and establishing a monitoring system for imported and domestic agricultural products.

4.2. Operation of pesticide direct registration system

The government's active measures against the full-scale implementation of PLS can be said to be prompt registration of insufficient pesticides for crops grown in

small areas, thorough education for farmers using pesticides, and prompt provision of information. For example, according to the agricultural product inspection results of the Agricultural Products Quality Management Service for the past three years, the nonconformity rate of all agricultural products increased from 3.3% before PLS implementation to 8.8% after implementation, and the nonconformity rate increased by more than 10% for small area crops. The cause of this is an absolute reason that there is a lack of registered pesticides for small-area crops corresponding to a cultivation area of less than 1,000ha and approximately 9,900,000m² according to the regulations distinguishing them in Korea. In order to supply safe agricultural products to the public and to provide suitable agricultural chemicals to farmers, the Rural Development Administration has been implementing the ex officio right registration project for agricultural chemicals for small area crops since 1998. made it possible.

The small area crop pesticide ex officio registration project can be divided into three business stages: before 2012, 2013-2017, and after the 2018 project. importance was further emphasized. Small area crops introduced and cultivated by farmers to increase income require pesticide registration as pests occur in the crop 2 to 3 years after the introduction and cultivation stage, and the Rural Development Administration conducts a registration test for the use of unregistered pesticides. Registration is made after 3 years, so it is difficult to meet the required registration of pesticides with the existing method of registering one crop after testing one crop for the need for various pesticides that can be used in the field. Introduced in 2018, group registration, which allows registration of test results for one crop to multiple crops, has been applied since 2018 and is being applied to ex officio registration tests.

Despite these efforts, it is still impossible to shake off the reality of a lack of registered pesticides in the field. According to a recent survey by the Rural Development Administration, more than 20,000 pesticides for various small-area crops need to be additionally registered. In education and publicity for farmers, the

Rural Development Administration has been continuously conducting education that only registered legal pesticides can be used for pesticide sellers, who are the primary pesticide supply route. However, the problem is that the level of realism of farmers using pesticides in the field does not correspond to this, and effective awareness-raising methods to solve this problem, pesticides that can be legally used in crops grown by farmers in the palm of your hand, and information on where to purchase the pesticides A delivery method should be provided.

〈Table 3-6〉 Pesticide Residue Criteria Reinforced by the PLS System

System Types		Negative List System (NPS)	Positive List System (PLS)
Pesticide use standards		Substances other than regulated substances can be used unlimitedly in principle	Substances other than permitted substances are prohibited in principle
	set MRL	Fits below MRL criteria	Fits below MRL criteria
Pesticide Residue Inspection Criteria	not set MRL	1st place: below Codex criteria	Suitable below 0.01mg/kg (Delete the application criteria of the first, second, and third order)
		2nd place: Below the minimum standard for similar agricultural products	
		3rd place: Below the minimum standard of the pesticide (suitable below 0.05 mg/kg)	

Source: Ministry of Food and Drug Safety Official website. Positive List System (<https://impfood.mfds.go.kr/CFBEE06F01>)

5. Korean Pesticide Registration Process and Submission Test Report

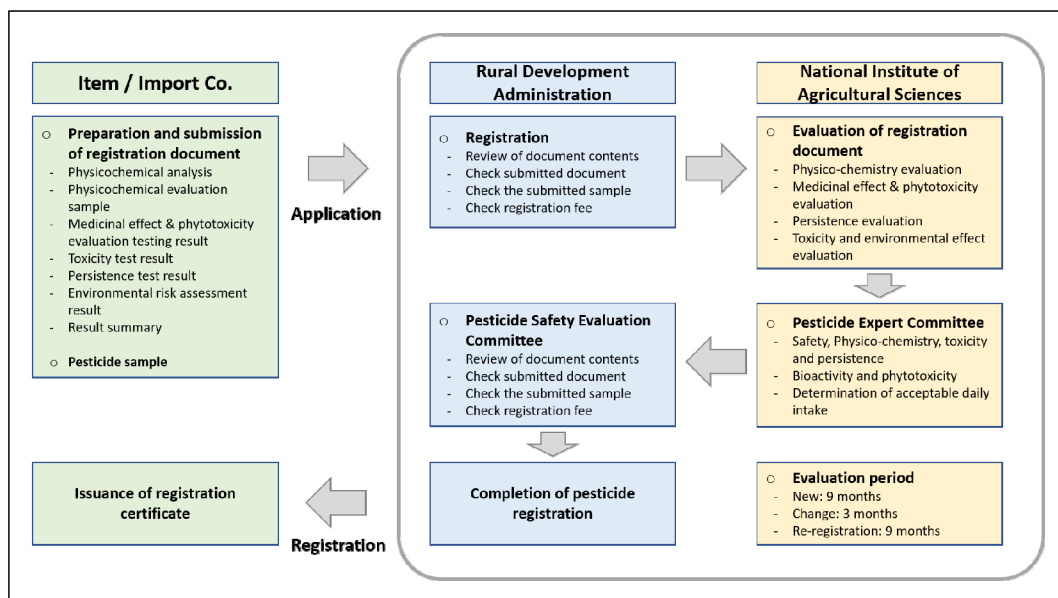
5.1. Pesticide registration procedure

In Korea, in order to register pesticides, the Rural Development Administration is requested to register them with the Agricultural Research and Development Administration, along with biochemical analysis, medicinal efficacy and weakness, phosphorus and ecotoxicity, and crop and soil residual test reports. The Agricultural

Safety Review Committee, the Standards Committee, and the Item Management Subcommittee review the pesticide registration data received by the Rural Development Administration's National Agricultural Research Institute.

The period for reviewing all test studies for pesticide registration shall be 9 months for new items, 3 months for changed items, and 9 months for re-registered items. The Rural Development Administration, the register, shall respond to the registration applicant within the specified period. According to the pesticide registration evaluation system, the test report for registration is divided into the original registration field and the product registration field.

〈Figure 3-1〉 Pesticide registration procedure



Source: RDA, Pesticide Safety information System (<https://psis.rda.go.kr/psis/index.ps>)

5.2. Test report to be submitted when registering pesticides

Details of the test reports to be submitted at the time of registration of the original and product for pesticide registration, as well as the evaluation and conformity

criteria are as shown in the table below. In principle, pesticide registration in Korea is a system that registers pesticide products (forms of pesticides), and if pesticide raw materials, which are active ingredients, are not registered, it is common to register pesticide raw materials or pesticide products at the same time.

There is a difference between reports required to be submitted in the original registration and product registration, and in the fields of human axis toxicity and environmental toxicity, a tier system is applied and evaluated. In this case, in order to further evaluate the safety of the product (original) when the basic toxicity exceeds the allowable limit, the test report, including the results, is evaluated after the next stage of toxicity test, and registration is allowed when there is no risk.

<Table 3-7> Test report to be submitted when registering pesticide raw materials

Field	Type	Examination report
Chemistry	New material	① Application for registration of original substance ② Physical and chemical analysis report ③ Manufacturing process diagram ④ Standards for main components ⑤ Abstract of original substance ⑥ Certificate of supply ⑦ Raw substance sample ⑧ Physical and chemical analysis results such as density ⑨ Physical risk report
	Change Registration	① Original product registration application form ② Physicochemical analysis report ③ Manufacturing process chart ④ Main component specifications ⑤ Original product abstract ⑥ Certificate of supply ⑦ Original product sample
	Imported finished product	① Original product registration application form ② Physicochemical analysis report ③ Manufacturing process chart ④ Main component specifications ⑤ Original product abstract ⑥ Certificate of supply ⑦ Original product sample ※ If the original product is registered, attach only the original product registration certificate
human axotoxicity	Chemical pesticides	① Acute oral toxicity ② Acute dermal toxicity

Field	Type	Examination report
		③ Acute inhalation toxicity ④ Skin irritation ⑤ eye mucous membrane irritation ⑥ Skin sensitization ⑦ Acute neurotoxicity ⑧ Acute late-onset neurotoxin ⑨ Repeated administration for 90 days, oral toxicity ⑩ Repeated administration on the 21st or 28th day dermal toxicity ⑪ Repeated inhalation toxicity for 90 days ⑫ 90 days repeated oral neurotoxicity ⑬ 28-day repeated dose oral delayed neurotoxicity ⑭ Chronic repeated dose oral toxicity ⑮ Carcinogenicity ⑯ Reproductive toxicity ⑰ Teratological toxicity ⑱ Genotoxicity (reverse mutation, chromosomal abnormality, micronucleus) ⑲ Metabolism in the animal body
	Microbial pesticides	Step 1: ① Acute oral toxicity / pathogenicity ② Acute inhalation toxicity ③ Acute respiratory toxicity / pathogenicity ④ Acute intravenous toxicity/pathogenicity ⑤ Immunotoxicity ⑥ Cell culture Step 2: ① Repeated administration oral toxicity ② Genotoxicity Step 3: ① Reproductive fertility ② Chronic repeated administration oral toxicity ③ Carcinogenicity ④ Genotoxicity ⑤ Exposure to occupational diseases
	Natural plant protection	Step 1: ① Acute oral toxicity ② Acute dermal toxicity ③ Acute inhalation toxicity ④ Eye irritation ⑤ Skin sensitization ⑥ 90 days repeated dose oral toxicity ⑦ 21 days repeated dose dermal toxicity ⑧ 90 days repeated dose inhalation toxicity ⑨ genotoxicity ⑩ teratogenic toxicity ⑪ immunotoxicity ⑫ exposure to occupational diseases Step 2: ① Genotoxicity (micronucleus) ② Immune response Step 3: ① Chronic repeated oral dose toxicity ② Carcinogenicity
	Ecotoxicity	Step 1: ① Acute toxicity to fish (freshwater fish) ② Acute toxicity to daphnia ③ Growth inhibition of green algae ④ Acute toxicity to algae (oral, feeding) ⑤ Acute toxicity to earthworms ⑥ Acute toxicity to bees ⑦ Bioaccumulative potential to fish ⑧ Acute toxicity to natural enemies or silkworms Step 2: ① Life death toxicity for fish ② Acute toxicity for daphnia ③ Acute toxicity for algae reproduction ④ Acute toxicity for earthworms

Source: Korean Law Information Center (<https://www.law.go.kr/>)

〈Table 3-8〉 Test report to be submitted when registering pesticide products

Field	Type	Examination report
Chemistry	New material	① Pesticide abstract ② Physical and chemical report (active ingredient, physical properties) ③ Manufacturing process chart ④ Manufacturing prescription ⑤ Time change report

Field	Type	Examination report
		⑥ Original agent supply certificate ⑦ Registered sample ⑧ Material safety and health data ⑨ Specifications for applicable instruments or devices (limited to pesticide applications) ⑩ Low-temperature stability ⑪ Hazards (explosive, corrosive, oxidizing, flammable, water-soluble)
	Change Registration	① Pesticide abstract ② physicochemical report (low temperature stability, etc.) ③ manufacturing prescription (existing, new) ④ temporal change report ⑤ registered sample ⑥ material safety data sheet
	Imported finished product	Physicochemical analysis report of original substance if original substance is not registered ① Pesticide abstract ② Physical and chemical report ③ Manufacturing process chart ④ Manufacturing prescription ⑤ Certificate of supply of raw material ⑥ Registration sample ⑦ Certificate of change over time ⑧ Material safety data sheet
Human axotoxicity	Chemical pesticides	① Acute oral toxicity ② Acute dermal toxicity ③ Acute inhalation toxicity ④ Skin irritation ⑤ Eye irritation ⑥ Skin sensitization
	Microbial pesticides	Step 1: ① Acute oral toxicity / pathogenicity ② Acute dermal toxicity ③ Skin irritation ④ Eye irritation ⑤ Skin sensitization Step 2: ① Worker's disease exposure
	Natural plant protection	① Acute oral toxicity ② Acute dermal toxicity ③ Acute inhalation toxicity ④ Eye mucous membrane irritation ⑤ Skin irritation ⑥ Skin sensitization ⑦ Worker's disease exposure
Ecotoxicity		Step 1: ① Acute toxicity to fish (freshwater fish, loach) ② Acute toxicity to Daphnia Step 2: ① Outdoor packaging of loach ② Residual toxicity on bee fronds ③ Silkworm venom ④ Natural red flag outdoors Step 3 : ① Daphnia simulated ecosystem ② Algae outdoor ③ Algae enrichment ④ Earthworm outdoor ⑤ Bee outdoor ⑥ Natural enemy outdoor
Crop residue	Chemical pesticides	① Metabolism test in crops, persistence test in the relevant crop (including metabolites) ② Storage stability test ③ Analysis method (standard product)
	Microbial pesticides	① Microbial propagation test in crops ② Crop persistence test (in case of toxic persistence)
	Natural plant protection	① Crop persistence test (if there is a risk in human toxicity)

Field	Type	Examination report
Environmental residue	Chemical pesticides	① Soil persistence test (indoor, field; 2 types of soil; including metabolites) ② Water persistence test ③ Hydrolysis test ④ Water photolysis test ⑤ Aqueous degradability test
	Microbial pesticides	① Persistence test in soil and water (viability, viability, proliferation), ② Separation method ③ Dissemination (if there is a risk)
	Natural plant protection	① Persistence test in soil and water (viability, viability, proliferative ability) ② Separation method (if there is a risk)
Medicinal effect		① Fungicide, insecticide: (new) 3 packages (expanded) 2 packages ② Herbicide: (new) 5 packages (expanded) 4 packages ③ Growth regulator: 2 packages
chemical injury		① Fungicides, pesticides: (registration test) 3 new packages (expansion of application) 2 packages → separate drug toxicity test for each variety, possible harm of mixed use, damage to surrounding crops, ② Herbicide: (registration test) 5 new packages (expansion of application) 4 packages, Regional adaptability test: by 5 zones, Subsequent crop drug toxicity test: by concentration → separate drug toxicity test by variety ③ Growth regulator: 2 package tests

Source: Korean Law Information Center (<https://www.law.go.kr/>)

〈Table 3-9〉 Test report evaluation

Registration target	Field	Evaluation contents	Expert committee
Raw material	Chemistry	Whether or not it contains more than the standard for harmful ingredients regulated at home and abroad Whether safety evaluation is necessary because it contains more than the standard value set by international organizations, etc. * (When adding a supply line) Sub-component safety evaluation (When registering a new original system) Sub-component safety evaluation	safety expert committee
	Human axotoxicity	- LD50 (oral, dermal), skin irritation index (PII), eye irritation index (AOI), sensitization factor (SCI), no action dose (NOAEL) * (Calculation and notification) Classification of Acute Reference Exposure (ARfD), Acceptable Daily Intake (ADI), Allowable Agricultural Worker Exposure (AOEL), Toxicity Grade (I, II, III, IV), Toxicity (GHS)	Criteria Expert Committee
	Ecotoxicity	- LC50 or EC50 (carp, daphnia, green algae, algae, earthworms, bees) No observed effect level (NOEL)	safety expert committee
Products	Chemistry	Active ingredients, harmfulness of subsidiary materials, physicochemical properties, hazards (flammability, water resistance, Explosive, oxidizing, corrosive), change over time (guarantee period of efficacy), low temperature stability	safety expert committee

Registration target	Field	Evaluation contents	Expert committee
	Human axotoxicity	risk assessment ① Carcinogenicity (MOE) ② Consumers, workers (re-entry of agricultural workers) warning statements (handling restriction standards)	Criteria Expert Committee
	Ecotoxicity	risk assessment ① PEC (Environmental Alcohol Concentration) ② TER (Toxic Exposure Ratio) ③ HQ (Hazard Index) Warning Statement (Handling Restriction Criteria) Toxicity level (I, II, III,)	safety expert committee
	Crop residue	Pesticide Safe Use Criteria (PHI) Recommended Residue Criteria Theoretical Pesticide Intake Residue Analysis Method	safety expert committee
	Environmental residue	Soil half-life Moisture half-life Interim Residue Limit in water quality Residue analysis method	safety expert committee
	Medicinal effect	Control value, significance test (contrast) Reliability such as test timing and method	Item Management Expert Committee
	Chemical injury	Weak standard amount, doubled amount, poor mixing ability, weak later crops, weak neighboring crops, weak local adaptability	Item Management Expert Committee

Source: Korean Law Information Center (<https://www.law.go.kr/>)

5.3. Reasons for cancellation when registering pesticides

1) Case in entering incorrect information

- ① In case of incorrect information
- ② If metabolome information is different from the facts
- ③ If the contents of the test result and the submitted report are different
- ④ If there is a difference between the test report and the test result
- ⑤ In case the original substance requested for registration is under risk assessment
- ⑥ If the manufacturer and importer's related information is incorrectly entered

⑦ If the information of the person entitled to registration is entered incorrectly

2) Case in insufficient medicinal properties of the product

① Germicides and insecticides: medicinal effects above control drugs

- Germicides: 60%(virus), 70%(exogeneous blight, blight hard to control), 80%(general blight, bakanae disease), 90%(seeddisinfection, pre-treatment), 100%(plant quarantine)
- Insecticides: 70%(harmful animal), 80%(exogeneous or new harmful insects), 90% (general or new harmful insects), 100%(plant quarantine)

② Herbicides: more effective than control drugs

- Herbicides for rice farming: 80%+ (Annual weeds 90%+, Perennials 80%+)
- Herbicides for field farming: annual + perennial 80%+

③ Growth regulator, spreading agent: drug efficacy higher than that of the control drug

④ Natural pesticide: 50%+ control effect compared to non-treatment

3) In case of chemical injury

① Germicides and insecticides

- Chemical injury (6th level): standard amount or lower, double amount 1 or less
- Test method: weakness evaluation, combined use (more than 10 species), neighboring crops

② Herbicide

- Chemical injury (6th level): standard amount or lower, double amount 3 or less

- Test method: Impact assessment on subsequent crops, regional adaptability (2 repetitions in 5 regions), impact test on irrigation water in rural areas

③ Growth regulator, spreading agent

- Chemical injury(6th level): standard amount or lower, double amount 2 or less

④ Natural pesticides: In accordance with the standards for general pesticides

4) Case in risk to human and livestock

① acute toxicity

- Pesticides with I (deadly toxicity), II (high toxicity) cannot be registered, but can be registered if necessary for quarantine

② Skin and eye irritation

- Cannot be registered if experimental animal is dead
- In case of manufactured product, it cannot be registered if the irritation level is severe, while for spraying liquid, it cannot be registered if the irritation level is mild

* Level of irritation: none, mild, medium, severe

③ Others

- A pesticide cannot be registered if the comprehensive review concludes that its safety is not guaranteed. Pesticides determined as hazardous by international organizations: 85 kinds

5) When there is a risk of developing hazards to aquatic organisms

① acute toxicity

- Pesticide with toxicity can not be registered as pesticide for rice farming

- When loach package test's accumulative mortality is 30%+, the pesticide cannot be registered for rice farming
- 6) When pesticide residues in crops are feared to pose a risk to human livestock
- Pesticides whose acceptable residue limit does not exist
 - Registration is considered after residue limit is set.
 - When the theological acceptable residue exceeds the daily acceptable intake
- 7) When there is a concern about the risk of soil and environmental residues
- Pesticides whose half-life in soil is 180 days or longer
 - Safety in terms of soil accumulates, following crop, environmental ecosystem should be secured.
- 8) When pesticides are concerned about harm to drinking water and aquatic ecosystems
- Registration is allowed when the 7th day aquatic concentration is:
 - Not more than LC50(48 hours) for carp,
 - Not more than the level allowed for discharge into environment
 - Not more than the level for drinking water $\times 10$, or
 - When the underwater half-life is not over 7 days
- 9) When the name of the pesticide causes misunderstanding between the medicinal effect and the original product
- 10) Others
- Excessive daily intake (ADI)

- When the residual amount in the body is too high when agricultural workers spray pesticides
- When it is determined that the mechanism of action is the same to prevent the occurrence of resistance

6. Contents of Laws Related to Imported Pesticides

6.1. Pesticide Import Regulations

The import business of agrochemical products in Korea must be registered with the Rural Development Administration as prescribed by the Ordinance of the Ministry of Agriculture, Food and Rural Affairs pursuant to Article 3, Paragraph 1 of the Agricultural Chemicals Management Act, no different from domestic agrochemical manufacturing or raw material business.

Article 3 (Registration of Business)

Any person who intends to engage in manufacturing, technical concentrate, or importation business shall file for registration with the Administrator of the Rural Development Administration, as prescribed by Ordinance of the Ministry of Agriculture, Food and Rural Affairs. The same shall also apply to any intended modification of important matters prescribed by Ordinance of the Ministry of Agriculture, Food and Rural Affairs in registration. (Amended on May 8, 2009; Jul. 25, 2011; Mar. 23, 2013)

The details of import business registration are detailed in Article 3 of the Enforcement Rule of the Pesticide Control Act.

Enforcement Rule of the Pesticide Control Act

Article 3 (Application for registration of manufacturing business, raw material business or import business, etc.)

- ① In accordance with Article 3 (1) of the Act, a person who intends to register a manufacturing business, raw material business or import business must attach the following documents to the application for registration (registration of change) in Attached Form 1 to the location of the manufacturing site (repackaging in the case of import business) facilities or storage facilities) must be submitted (including submission through information and communications networks) to the Administrator of the Rural Development Administration through the Special Mayor, Metropolitan City Mayor, Provincial Governor, or Special Self-Governing Province Governor (hereinafter referred to as "Mayor/Do Governor") having jurisdiction over the facility or storage facility. do. In this case, the mayor/provincial governor shall confirm whether the location of the manufacturing site meets the criteria for factory location under Article 8 of the 「Industrial Cluster Revitalization and Factory Establishment Act」. (Amended 1999. 8. 23., 2008. 7. 28., 2010. 10. 13., 2012. 2. 3., 2019. 11. 14., 2022. 12. 14.)
1. Business plan
 2. Documents stating the name, resident registration number and address of the representative and executives (applicable only to corporations)
 3. Documents indicating specifications and facility capabilities of facilities and equipment
 4. Documents proving the ownership or right to use of the site and building (applicable only to cases where the documents in each subparagraph of Article 5-3 cannot be confirmed)
 5. Documents proving the qualifications of the person in charge of self-inspection
 6. Documents proving the sales manager's qualifications (applicable only to manufacturing and importing businesses)
 7. Documents proving the qualifications of the raw material handling manager in accordance with Attached Table 1, Subparagraph 2, Item A 2) and Subparagraph 3, Item A, 2) of the same table (prohibited substances or toxic substances under the Chemical Substances Control Act Applicable only when handling the corresponding original product)
- ② When there is an application under Paragraph 1, the Rural Development Administration examines whether or not the registration standards in Attached Table 1 are met, and if deemed suitable, issues a registration certificate in Attached Form No. 2 to the applicant (Issuance through information and communication network (including), and the fact must be entered in the registration ledger of attached form 3. (Amended 1999. 5. 24., 2008. 7. 28.)
- ③ The registration ledger under Paragraph 2 shall be prepared and managed electronically, except for special reasons in which electronic processing is impossible. (Newly established on July 28, 2008)
- ④ The Administrator of the Rural Development Administration may build and operate an information system to prepare and manage the register electronically pursuant to paragraph (2). (Newly established on February 3, 2012)

Source: Korean Law Information Center (<https://www.law.go.kr/>)

If you look at the matters related to pesticide registration stipulated in the Agricultural Chemicals Control Act, test reports and evaluation criteria required for registration of imported pesticide products are also applied and identical to those of domestically manufactured pesticide products, evaluated, and approved after evaluating risks and harms.

Article 8 (Registration of Items Manufactured in Republic of Korea)

- (1) Where a manufacturer intends to manufacture pesticides in the Republic of Korea and sell them in the Republic of Korea, he or she shall file for registration of each item with the Administrator of the Rural Development Administration: Provided, That the foregoing shall not apply where he or she manufactures an item registered by another manufacturer after being entrusted therewith. <Amended on Jun. 15, 2021>
- (2) Any person who intends to file for registration pursuant to paragraph (1) shall submit an application for registration stating the following to the Administrator of the Rural Development Administration, along with results of the test on the effect, harmfulness, toxicity, and residues of the relevant pesticide product that has been conducted by a testing and research institute designated pursuant to Article 17-4 (1) (hereinafter referred to as "test report") and with samples of such pesticide product: Provided, That where he or she files for registration of biopesticides or other items prescribed by Presidential Decree, he or she may be wholly or partially exempt from submitting the test report as prescribed by Ordinance of the Ministry of Agriculture, Food and Rural Affairs: <Amended on Jul. 25, 2011; Mar. 23, 2013>



Article 17 (Registration of Imported Pesticides)

- (1) When an importer intends to import and sell pesticides or technical concentrates, he or she shall file for registration of each type of items of pesticides or technical concentrates with the Administrator of the Rural Development Administration. <Amended on Jul. 25, 2011>
- (2) Deleted. <Jul. 25, 2011>
- (3) In the case of filing for registration of pesticides or technical concentrates pursuant to paragraph (1), the corresponding provisions classified as follows shall apply mutatis mutandis. In such cases, "manufacturing business" or "technical concentrates business" shall be construed as "importation business", "manufacturer" or "technical concentrate supplier" as "importer", "pesticides" as "imported pesticides", and "technical concentrates" as "imported technical concentrates", respectively: <Amended on Jul. 25, 2011>

Source: Korean Law Information Center (<https://www.law.go.kr/>)

6.2. Korean pesticide importers and imported pesticide products

As of December 2022, 117 agrochemical importers in Korea are registered, and domestic agrochemical product manufacturers are also importing agrochemicals for the supply and demand of various products or the smooth supply of raw materials for the production of agrochemical products, among which companies located in the metropolitan area are There are 76 companies, accounting for 65% of all registered companies.

〈Table 3-10〉 Distribution of pesticide importers by region

Seoul	Kyeong -ki	Chung -buk	Gyeong -buk	Gyeong -nam	Incheon	Daegu	Jeon -buk	Kang -won	Jeon -nam	Chung -nam	Dae -jeon	Ulsan	Total
39	37	13	5	5	4	3	3	2	2	2	1	1	117

Source: RDA, Pesticide Safety information System (<https://psis.rda.go.kr/psis/index.ps>)

Looking at the registration status of agricultural chemicals announced by the Rural Development Administration in December 2022, there are 323 imported items out of a total of 2,142 items, and the ratio reaches 15%. The total number of registered items is 3,476, and the number of registered imported items is 609, accounting for 17.5%. In the agrochemical industry, the registration of agrochemical products is recognized as intellectual property rights, and agrochemical products that are promising in the future or that have not been distributed due to production suspension maintain their registered status, so there is a difference between the number of products produced and distributed and the number of registered products.

〈Table 3-11〉 Registration Status of Pesticide Manufactured (Imported) Items
(End of December 2022)

Type		manufactured item		imported items		Total	
		number of items	number of registrations	number of items	number of registrations	number of items	number of registrations
germicide	waterworks	121	236	12	18	133	254
	horticulture	460	790	117	216	577	1,006
	subtotal	581	1,026	129	234	710	1,260
insecticide	waterworks	94	182	8	12	102	194
	horticulture	433	704	101	216	534	920
	subtotal	527	886	109	228	636	1,114
herbicide	waterworks	419	479	14	16	433	495
	horticulture	139	276	43	91	182	367
	subtotal	558	755	57	107	615	862
raw medicine	waterworks	2	4	1	1	3	5
	horticulture	43	74	16	26	59	100
	subtotal	45	78	17	27	62	105
fungicide	waterworks	81	83	1	1	82	84
	horticulture	20	22	4	4	24	26
	subtotal	101	105	5	5	106	110
repellent	waterworks	2	2	-	-	2	2
	subtotal	2	2	0	0	2	2
others	waterworks	3	8	-	-	3	8
	horticulture	2	7	6	8	8	15
	subtotal	5	15	6	8	11	23
total		1,819	2,867	323	609	2,142	3,476

Source: RDA, Pesticide Safety information System (<https://psis.rda.go.kr/psis/index.ps>)

7. Quality inspection of Agricultural Chemicals Imported (Distributed) in Korea

7.1. Quality Inspection Regulations for Imported and Distributed Pesticides

In accordance with Article 24 of the Agricultural Chemicals Control Act, state and local government officials can inspect stored products, facilities, and equipment,

such as record information or production products, raw materials, and imported products related to pesticide products and related equipment, and to inspect materials You can collect the samples you need. Importers of agrochemical products must perform self-inspection on imported agrochemicals before shipment, and agrochemicals that have passed the inspection attach a self-inspection certificate prescribed by Ordinance of the Ministry of Agriculture, Food and Rural Affairs, and submit the report to the Director of Rural Development Administration. When a manufacturer or importer requests an inspection of agrochemicals, etc. prior to shipment, the Administrator of the Rural Development Administration shall inspect the agrochemicals, etc.

If the Minister of Agriculture, Food and Rural Affairs or the head of the Rural Development Administration deems it necessary for quality control of shipped pesticides, etc, he/she may have the relevant public officials inspect the pesticides, etc. Quality inspections of pesticides and crackdowns on defective or illegal pesticides are conducted. Accordingly, if it is deemed necessary to take safety measures to prevent harm to pesticides, etc. or technical concentrates that have violated the order, the pesticides, etc. or technical concentrates shall be sealed, and then the violators shall be dealt with as prescribed by Ordinance of the Ministry of Agriculture, Food and Rural Affairs. Collecting or discarding, and in case the corrective order is not fulfilled, the pesticide, etc. or technical concentrate must be sealed and then collected or discarded. In this case, the cost is to be borne by the violator.

7.2. Sample Evaluation Items and Criteria for Pesticide Inspection

- (Inspection population) The population of self-inspection and application inspection is organized according to the inspection standards, but the application

inspection is loaded so that the exact number of each population can be checked and samples can be randomly collected.

- (Collection and Compensation) The number of items to be collected for inspection is subject to Annex Table 3 of the Enforcement Rules of the 「Pesticide Management Act」, and the number of items to be collected for biological inspection is in accordance with the number of items to be displayed in the test standards and methods set by the Director of Rural Development Administration.
- For publicly announced products, two individual packages of pesticides with a single package exceeding the collection amount are collected, and pesticides with less than the collection amount are collected in individual packages equivalent to the collection amount, and special (large) packaging pesticides and raw materials are unpacked. After extracting the collected amount by mixing the sample to be homogeneous, the public official of the Rural Development Administration and the observer who conducts the inspection seal it after sealing it with their joint signature.
 - In addition, the Director of Rural Development Administration collects agricultural chemicals, raw materials or raw materials subject to regulation of harmful substances ex officio to confirm whether harmful substances contained in pesticides, raw materials, or raw materials exceed the standards and the harmful ingredient inspection items of the manufacturer (importer) company. can be inspected.

〈Table 3-12〉 Amount of samples to be submitted for pesticide quality inspection

Formulation form	Sample amount [mℓ(g)]
Emulsions (liquid formulations insoluble in water), Liquid formulation	200
Emulsifier (乳濁劑: a solution added to disperse a substance that is poorly soluble in a solvent into a solvent), Maturity agent (微濁製: A fine form of solution added to disperse a substance that is poorly soluble in a solvent in a solvent)	
Dispersible liquid formulation	
Mobile liquid formulation	
Water soluble powder	
water dispersible for slurry seed treatment	
Wettable Powder	
Granules (including materials with water surface floatability), great granule	
capsule suspension	
Dustable Powder, Powder for Dry Seed Treatment	
Flo-dust, Microgranule, fine granule	
High-density mulch (covering form formulation)	
Other new formulation forms or special pesticides	
Pesticide application equipment products	
Raw formulation	50

Source: RDA, Pesticide Safety information System (<https://psis.rda.go.kr/psis/index.ps>)

1. If the main ingredient is a mixture of two or more types, 100mℓ (g) must be added in addition to the sample amount for each type of preparation.
2. When submitting a sample of a new substance, the standard product required for analysis must be submitted together.
3. In case the raw material is a highly active pesticide (referring to a preparation with less than 3% active ingredient), it may be submitted after reducing the amount.

〈Table 3-13〉 Classification criteria and inspection items by formulation type of pesticides

Formulation type	Classification criteria	Inspection items
Emulsifiable Concentrate (EC)	Pesticide that emulsifies when diluted in water as a liquid	<ul style="list-style-type: none"> • Active Ingredient • Emulsification
Soluble Concentrate (SL) (Including SR)	Pesticide that dissolves when diluted in water as a liquid	<ul style="list-style-type: none"> • Active Ingredient (surface tension in case of SR) • Water solubility
Suspension Concentrate (SC)	Agrochemicals that are hydrated when diluted in water as a liquid or crystalline liquid	<ul style="list-style-type: none"> • Active Ingredient • Water solubility • Fineness
Wettable Powder (WP)	Pesticide that hydrates when diluted in water as a powder	<ul style="list-style-type: none"> • Active Ingredient • Water solubility • Fineness
Water Soluble Powder (SP)	Pesticides that dissolve when diluted in water as powder or tablets	<ul style="list-style-type: none"> • Active Ingredient • Water solubility

Formulation type	Classification criteria	Inspection items
Oil dispersion (OD)	Pesticide that is hydrated and emulsified when diluted in water as a formulation in which active ingredients are suspended in oil	<ul style="list-style-type: none"> • Active Ingredient • Emulsification • Hydration • Fineness
Emulsifiable powder (EP)	Pesticide that emulsifies when diluted in water as a powder	<ul style="list-style-type: none"> • Active Ingredient • Emulsification
Dustable Powder (DP)	Agrochemicals used in their original state as powder	<ul style="list-style-type: none"> • Active Ingredient • Fineness
Powder for Dry Seed Treatment (DS)	Pesticides that are inquiry processed as powder	<ul style="list-style-type: none"> • Active Ingredient • Fineness
Flo-dust (GP)	Pesticide used in its original state as a fine powder	<ul style="list-style-type: none"> • Active ingredient • Fineness • Weight • Dispersibility • Granularity
Driftless dust (DL)	Pesticide used in its original state as powder with low scattering amount	<ul style="list-style-type: none"> • Active ingredient • Fineness • Granularity • Weight
Granule (GR)	Pesticides used in their original state as granules	<ul style="list-style-type: none"> • Active Ingredient • (Capofuran granules include particle size)
Microgranule (MG)	Pesticides used in their original state as microgranules	<ul style="list-style-type: none"> • Active ingredient • Granularity • Weight • Moisture
Paste (PA)	Agrochemicals diluted in water or used in their original state as liquid or viscous liquid	<ul style="list-style-type: none"> • Active Ingredient
Gas (GA)	Pesticides that generate gas to kill and sterilize pesticides	<ul style="list-style-type: none"> • Active Ingredient
Smoking Generator (FU)	Pesticides used in a smoke state by heating	<ul style="list-style-type: none"> • Active Ingredient • Fumes
Aerosol (AE)	Pesticides used in free aerosol state	<ul style="list-style-type: none"> • Active Ingredient
Encapsulated Granule (CG)	Agrochemicals used in their original form as capsules	<ul style="list-style-type: none"> • Active Ingredient
Fine granule (FG)	Pesticide used in its original state as a fine-grained phase	<ul style="list-style-type: none"> • Active Ingredient
Smoke pallet (FW)	Pesticide used in smoke state by heating in granular form	<ul style="list-style-type: none"> • Active Ingredient • Fumes
Wettable flo-dust (WF)	Pesticides that are diluted in water as fine powder or used in their original state	<ul style="list-style-type: none"> • Active Ingredient • Hydration • Fineness • Hranularity • Weight • Dispersibility
Water dispersible granule (WG)	Pesticide used diluted in water in granular form	<ul style="list-style-type: none"> • Active Ingredient • Hydration

Formulation type	Classification criteria	Inspection items
Emulsion, oil in water (EW)	Pesticide that emulsifies when diluted in water as a liquid or viscous liquid	<ul style="list-style-type: none"> • Active Ingredient • Emulsification
Capsule suspension (CS)	Agrochemicals that are hydrated when diluted in water as a microcapsule formulation	<ul style="list-style-type: none"> • Active Ingredient • Fineness
Suspo-emulsion (SE)	Agrochemicals that are hydrated or emulsified when diluted in water as a liquid or viscous core	<ul style="list-style-type: none"> • Active Ingredient • Emulsification • Hydration • Fineness
Dispersible concentrate (DC)	Pesticide dispersed in water as a colloidal formulation	<ul style="list-style-type: none"> • Active Ingredient • Dispersibility in water
Spreading oil (SO)	As a liquid, pesticide that spreads on water surface when used in its original state	<ul style="list-style-type: none"> • Active Ingredient
Water dispersible powder for slurry seed treatment (WS)	Agrochemicals used as suspensions by hydration prior to application to seeds as powder	<ul style="list-style-type: none"> • Active Ingredient • Hydration
Micro-emulsion (ME)	Agrochemicals that are finely emulsified when diluted in water as a liquid or viscous liquid	<ul style="list-style-type: none"> • Active Ingredient • Emulsification
Flowable concentrate for seed treatment (FS)	Agrochemicals in liquid or viscous liquid form used as undiluted solutions or as suspensions after being hydrated prior to seed treatment	<ul style="list-style-type: none"> • Active Ingredient • Hydration
Up granule(water floating granule) (UG)	Pesticides that rise to the surface of the water and spread during water treatment as a granular form	<ul style="list-style-type: none"> • Active Ingredient
Pesticide containing polyetylen film (PF)	Vinyl pesticide used for soil mulching by mixing pesticide with synthetic resin	<ul style="list-style-type: none"> • Active Ingredient • Vinyl thickness
Sheet formulation (SF)	Agrochemicals used by mixing or coating synthetic resin with pesticides and burying them or installing them in facilities	<ul style="list-style-type: none"> • Active Ingredient
Oil miscible liquid (OL)	Liquid in which active ingredients are dissolved in oil, and is a pesticide used by diluting the stock solution directly or in an organic solvent.	<ul style="list-style-type: none"> • Active Ingredient
soluble granule (SG)	Pesticides that dissolve when diluted in water as granules	<ul style="list-style-type: none"> • Active Ingredient • Hydration
Other liquid to be applied undiluted (AL)	Pesticide used in its original state without dilution as a liquid	<ul style="list-style-type: none"> • Active Ingredient
Tablet for direct treatment (DT)	Agricultural chemicals that are dispersed and diffused by direct treatment in water as a tablet phase	<ul style="list-style-type: none"> • Active Ingredient
Vapor releasing product (VP)	Pesticide used by adding water as a powder to generate gas	<ul style="list-style-type: none"> • Active Ingredient
Aqueous concentrate or microbial pesticide (AS)	Microbial pesticides that are used by diluting microbial culture stock solution in water without going through additional manufacturing steps or by formulating cultured microorganisms in liquid form and diluting them in water	<ul style="list-style-type: none"> • Active Ingredient • Fineness

Formulation type	Classification criteria	Inspection items
Emulsifiable suspension for microvial pesticide (EM)	Microbial pesticide that is diluted in water and formulated into a liquid form by mixing the culture stock solution or cultured microorganisms with oils	<ul style="list-style-type: none"> • Active Ingredient • Fineness
Aqueous suspension for microvial pesticide (SM)	Microbial pesticide that is diluted in water and formulated into a liquid form by mixing the culture stock solution or cultured microorganisms with water	<ul style="list-style-type: none"> • Active Ingredient • Fineness
Granule for microvial pesticide (GM)	Formulation in which the microbial culture solution is mixed or adsorbed to a solid substance, and is not applicable to powders, granules, or wettable powders.	<ul style="list-style-type: none"> • Active Ingredient
Microgranule (GG),	Pesticides whose medicinal effects are expressed as they float and spread in granular form	<ul style="list-style-type: none"> • Active Ingredient • Diffusivity
water dispersible tablet (WT)	Pesticides that hydrate when diluted in water in tablet form	<ul style="list-style-type: none"> • Active Ingredient • Hydration
A mixed formulation of CS & SC (ZC)	Agrochemicals that are mixed by making a capsule suspension encapsulating one active ingredient and another active ingredient into a hydrating liquid	<ul style="list-style-type: none"> • Active Ingredient • Hydration • Fineness
Gas emitting device (GD)	A device that reacts two or more substances in an enclosed space to generate active ingredients of pesticides in gaseous state (pesticide application equipment)	<ul style="list-style-type: none"> • Active Ingredient
Material for gas releasing (RM)	Materials that release active ingredients of pesticides adsorbed on carriers (pesticide application equipment)	<ul style="list-style-type: none"> • Active Ingredient
Raw materials	Substances in which active ingredients of pesticides are concentrated	<ul style="list-style-type: none"> • Active Ingredient • Subcomponent
Inerts	Substances other than the original drug in the manufacturing prescription	<ul style="list-style-type: none"> • Input ratio of manufacturing prescription and whether other substances are contained
Volume		<ul style="list-style-type: none"> • Indicated capacity per object

Source: Korean Law Information Center (<https://www.law.go.kr/>)

〈Table 3-14〉 Harmful Ingredients Inspection List Included in Agrochemical Products

Harmful Ingredients	Inspection target Pesticide (raw materials)
Hydrazine	Malic hydrazide raw material, malic hydrazide choline salt raw material
Perchloro ethylene (PCE)	Oxyfluorophene
N-nitroso-di-n-propylamine (NDPA)	Trifluralin original drug
DDT's flexible compound	Dicofol original drug
Ethylene thiourea (ETU)	Imported products containing the original Mancozeb,
Hexachlorobenzene (HCB)	Metiram or Mancozeb
Asbestos	Chlorothalonil raw material
	Talc, cermiculite, sepiolite, serpentine

Source: Korean Law Information Center (<https://www.law.go.kr/>)

As a result of the inspection of the pesticides and raw materials subject to the above harmful ingredient regulation, if the harmful ingredients exceed the criteria, the Rural Development Administration will suspend shipment of the pesticides in question and all pesticides manufactured (including manufactured and imported) from the raw materials, and All pesticides shipped out are subject to collection by the relevant company, and the manufacturing (importing) company manufactures (including the case of manufacturing and importing) the relevant raw material and its raw material if the harmful ingredient exceeds the judgment as a result of the self-inspection.

〈Table 3-15〉 Criteria for pesticide product inspection

Testing list	target pesticide (raw)	criteria	
1. Active materials	A. Chemical testable pesticides	Enforcement Rule Attached Table 2.9. a. Same as the allowable range of active ingredient content in (1)	
	B. Potency and Bioassay Pesticides	Blasticidin-S	Must be 80~130% of the indicated potency
		polyoxyn ratio	Must be 90~150% of the indicated potency
		polyoxyndi	Must be 90~150% of the indicated potency
		BT (bioassay)	Must be 85~200% of the indicated potency
		Natural plant protection agent using live microorganisms as active ingredient	Must be up to 100 times above the display standard
	C. Raw materials	Active materials	Must be more than registration standard
subcomponent		Must be within the range of self-guaranteed management standards	
2. Inerts	Registered pesticides	1. The input ratio for each member must be same as the permissible range of active ingredient content in No. 9 (a) (1) 2. Must be the same as the substance in the manufacturing prescription	
3. Emulsification	EC, EP, EW, ME, OD, SE	When emulsified, there must be no oily or coagulated matter and it should be uniform	
4. Water solubility	SL, SP, Lime-sulphur mixture, SG	Must dissolve completely when received. However, in the case of aqueous and granular aqueous solvents, up to 2% of insoluble substances can be allowed in 200 mesh.	
5. Hydration	WP, WF, WS, WT, ZC, OD, SE	Suspension should be homogeneous when hydrated	
6. Fineness (grain size)	(Liquid) WP, OD	Must pass more than 98% in 325 mesh (more than 90% in the case of microbial pesticides)	

Testing list	target pesticide (raw)	criteria	
	DP, DS	Must pass 98% or more in 250 mesh	
	GP (hydration)	It must pass more than 99% in 325 mesh, and the average particle diameter must be less than 5.5 microns	
	MG	Must pass more than 90% at 150 mesh, and less than 15% less than 10 microns	
	DL	Must pass more than 95% at 250 mesh, and less than 25% less than 10 microns	
	CS, SE, SM, CS(Liquid)	Must pass 98% or more in 200 mesh	
	Carbofuran granules	Must pass less than 0.5% in 80 mesh	
	SX	Must pass 90% or more in 325 mesh	
	EM	Must pass 90% or more in 325 mesh	
7. Surface tension	SR	Must be less than 40 dyne/cm at 15 degrees	
8. Fumes	FU, FW	Must be fully smoked and not extinguished.	
9. Weight	MG	Must be greater than or equal to 0.75	
	DL	Must be 0.7 or more and 1.1 or less	
	GP (hydration)	Must be less than 0.20	
10. Dispersibility	GP (hydration)	Must be over 60	
11. Dispersibility in water	DC	When dispersed in water, the dispersed particles must be uniform	
12. Moisture	MG	Must be less than 3%	
13. Harmful ingredients	Malic hydrazide raw material	Hydrazine should be less than 1mg/kg	
	Malic hydrazide choline salt raw material	Hydrazine should be less than 1mg/kg	
	Oxyfluorophene	PCE must be less than 200mg/kg	
	Trifluralin raw material	NDPA must be less than 0.5mg/kg	
	Dicofol raw material	DDT related compounds should be less than 0.1%	
	Mancozeb raw material	ETU must be less than 0.5%	
	Imported products containing the original Mancozeb, Metiram or Mancozeb	Original ingredient content rate	ETU Content
		≥ 75%	≤ 0.45%
		66~74%	≤ 0.4%
		58~65%	≤ 0.35%
48~57%	≤ 0.3%		
Chlorothalonil raw material	HCB must be less than 0.05%		
Talc, cermiculite, sepiolite, serpentine	Asbestos must not be detected		
14. Film thickness	PF	Must be more than 0.03mm	
15. Diffusivity	GG	Particles must be suspended and diffused on the water surface	
16. Volume	Registered pesticides	The capacity of each object must be 98% or more of the indicated capacity	

Source: Korean Law Information Center (<https://www.law.go.kr/>)

〈Table 3-16〉 Permissible scope and penalty points for biopesticides (microbial pesticides)

Target Pesticide	Acceptable range		Penalty			Note (formula)
	lower limit	higher limit	1	2	3	
Blasticidin-S	≥80%	≤130%	within 10%	more than 10%, within 20%	>20%	*substandard
Polyoxynbi	≥90%	≤150%	within 15%	more than 15%, within 20%	>20%	$\frac{\text{acceptable lower limit} - \text{analysis value}}{\text{acceptable lower limit}} \times 100$
Polyoxyndi	≥90%	≤150%	within 15%	more than 15%, within 20%	>20%	*excess
BT (bioassay)	≥85%	≤130%	more than 15%, within 30%	more than 15%, within 30%	>30%	$\frac{\text{acceptable lower limit} - \text{analysis value}}{\text{acceptable lower limit}} \times 100$
A biopesticide that uses living microorganisms as an active ingredient	more than registration standard	less than registration standard	within 102	more than 102, less than 103	>103	*substandard $\frac{\text{registration standard}}{\text{analysis value}}$
			more than 102, less than 103	more than 103, below 104	>104	*excess $\frac{\text{analysis value}}{\text{registration standard}}$

Source: Korean Law Information Center (<https://www.law.go.kr/>)

〈Table 3-17〉 Scope of fraudulent and substandard pesticides

Cases	Judgment Criteria
Fraudulent pesticide (original formulation)	1. Unregistered or unlicensed products
	2. Unmarked or counterfeit products
	3. Repacked or divided packaging products
	4. Original formulations such as similar pesticides that fall under the definition of pesticides
Substandard pesticide (original formulation)	1. Products whose efficacy warranty period has expired
	2. Products whose packaging is damaged and difficult to identify
	3. Same population of pesticide items that fail quality inspection results
	4. Products without self-inspection certificate attached

Source: Korean Law Information Center (<https://www.law.go.kr/>)

7.3. Criteria for Administrative Disposition of Illegal and Defective Pesticide Distribution

Administrative punishment standards for violations by producing and distributing illegal and substandard pesticides are divided into general standards and individual standards. The general standards are as follows.

In cases where there are two or more violations, and each of the applicable disposition standards is different, the heavier disposition standard is followed, and if both or more disposition standards are business suspension, Heavy disposal standards are weighted within the range of 1/2 of the disposal standards. Administrative disposition standards according to the number of violations are applied when administrative dispositions have been received for the same violation in the last two years.

In this case, the standard application date shall be based on the date of administrative disposition for the violation and the date on which the violation committed after the disposition is re-discovered. In the case of an aggravated imposition, the order of application of the aggravated disposition shall be the order next to the order of imposition before the violation. If the degree of violation is minor or it is recognized that there are other special reasons, the disposition may be reduced. However, this is not the case if it is found to be illegal or defective pesticide, etc. and is disposed of.

〈Table 3-18〉 Standards for Individual Penalty for Quality Inspection of Pesticide Distribution or Imported Products

Violation	Target	Administrative Disposition Criteria		
		1 st time	2 nd times	3 rd or more
In case of no register the change	<ul style="list-style-type: none"> • manufacturer • original manufacturer • importer 	warning	1 month of business suspension	3 months of business suspension

Violation	Target	Administrative Disposition Criteria		
		1 st time	2 nd times	3 rd or more
In case of no report the change	<ul style="list-style-type: none"> import and export plant pest controller, etc 	warning	1 month of business suspension	3 months of business suspension
In the case of manufacturing, importing, or selling pesticides, etc. or raw materials that have not been registered	<ul style="list-style-type: none"> manufacturer original manufacturer importer 	cancel registration		
Violation of changes in registered matters, cancellation of registration, or dispositions restricting manufacturing/exporting/importing or supply (including recall/disposal orders)				
a. In the case of manufacturing/importing an item subject to a disposition of change in registration without changing it	<ul style="list-style-type: none"> manufacturer importer 	3 months of suspension of manufacturing/import of the relevant item	6 months of suspension of manufacturing/import of the relevant item	cancel registration
b. In case of manufacturing/importing an item subject to registration cancellation	<ul style="list-style-type: none"> manufacturer importer 	cancel registration		
c. In the case of manufacturing/importing or supplying an item subject to a disposition to restrict manufacturing/importing or supplying	<ul style="list-style-type: none"> manufacturer importer 	6 months of suspension of manufacturing/import of the relevant item	1 year of suspension of manufacturing/import of the relevant item	cancel registration
In case of violation in import/export bans/restrictions or compliance	<ul style="list-style-type: none"> manufacturer importer 	6 months of suspension of manufacturing/import of the relevant item	1 year of suspension of manufacture and import of the relevant item/original formulation	cancel registration
In case pesticides, etc. or raw materials are not labeled	<ul style="list-style-type: none"> manufacturer original manufacturer importer 	warning	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for 6 months	1 year of business suspension
In case the indication of pesticides, etc. or raw materials is false	<ul style="list-style-type: none"> manufacturer original manufacturer 	1 year of suspension of manufacture and import of the relevant	6 months of business suspension	cancel registration

Violation	Target	Administrative Disposition Criteria		
		1 st time	2 nd times	3 rd or more
	• importer	item/original formulation		
In the case of storing, displaying, or selling the following pesticides, etc.				
Registered pesticides	• manufacturer • importer • vendor	cancel registration		
Unlabeled pesticides, etc. or raw materials	• manufacturer • original manufacturer • importer	warning	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for 6 months	1 year of business suspension
	• vendor	warning	1 month of business suspension	cancel registration
Pesticides, etc. or raw materials falsely indicated by forgery or alteration of labeling	• manufacturer • original manufacturer • importer	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for one year	6 months of business suspension	cancel registration
	• vendor	cancel registration		
Pesticides, etc. or concentrates that are difficult to recognize because the indications on the containers or packaging of pesticides, etc. are damaged	• manufacturer • original manufacturer • importer	warning	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for 3 months	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for 1 year
	• vendor	warning	1 month of business suspension	3 months of business suspension
Pesticides, etc. whose effectiveness has expired	• manufacturer • importer	1 year of suspension of manufacturing, importing and sales of relevant items/products	6 months of business suspension	cancel registration
	• vendor	warning	3 months of business suspension	cancel registration
Repackaged or divided	• manufacturer	1 year of suspension of	6 months of	cancel

Violation	Target	Administrative Disposition Criteria		
		1 st time	2 nd times	3 rd or more
packaged pesticides	• importer	manufacturing, importing and sales of relevant items/products	business suspension	registration
	• vendor	cancel registration		
Pesticides, etc. for which a self-inspection certificate is not attached	• manufacturer • importer	warning	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for 3 months	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for 1 year
	• vendor	warning	1 month of business suspension	
In case of manufacturing, producing, importing, storing, displaying or selling agrochemicals, etc. or technical concentrates falling under any of the subparagraphs of the same paragraph in violation of Article 21 (2) of the Act	• manufacturer • original manufacturer • importer • vendor	cancel registration		3 months of business suspension
In the case of false or exaggerated advertisement or advertisement without following the advertisement method under the same Article	• manufacturer • importer	warning	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for 3 months	3 months of business suspension
	• vendor	warning	3 months of business suspension	cancel registration
In case of using or handling agricultural chemicals, etc. in violation of the standards for safe use or restriction of handling of agricultural chemicals, etc.	• manufacturer • importer	warning	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for 3 months	Suspension of manufacturing, importing, and selling of the relevant item, original product, and product for 1 year

Violation	Target	Administrative Disposition Criteria		
		1 st time	2 nd times	3 rd or more
	<ul style="list-style-type: none"> • vendor • import and export plant pest controller, etc 	warning	3 months of business suspension	<ul style="list-style-type: none"> • cancel registration • 2 years of business suspension
In case of that the quality of the inspected pesticide, etc. is found to be poor	<ul style="list-style-type: none"> • manufacturer • importer 	Application of disposition standards according to penalty points		

Source: RDA Notice No. 2018-8 April 26, 2018.

7.4. Active ingredient analysis method of imported and distributed pesticides

The detailed analysis method for active ingredients of pesticides was finally changed and implemented on March 8, 2022, and the inspection method for each inspection item is 150 fungicides, 128 pesticides, 113 herbicides, 29 live aids, 10 spreading agents, and 7 attractants. A total of 437 active ingredient analysis methods are announced and applied to the quality control of pesticide products.

The detailed analysis method is listed by serial number, common name, Korean name, and analysis method, and is prescribed as a notification by the head of the Rural Development Administration. When a new analysis method is developed due to development, when the legal justification, risk, and accessible universality of reagents and analytical equipment that can be used for analysis are recognized with the person in charge of quality control at the Rural Development Administration, legal justification through the notification of change in the analysis method by the head of the Rural Development Administration is recognized.

In the case of microbial pesticides or natural product-extracted pesticides, the analysis method notified as microbial activity titer test, microbial inhibition agent size measurement method, or titration method in the past has been changed to GLC

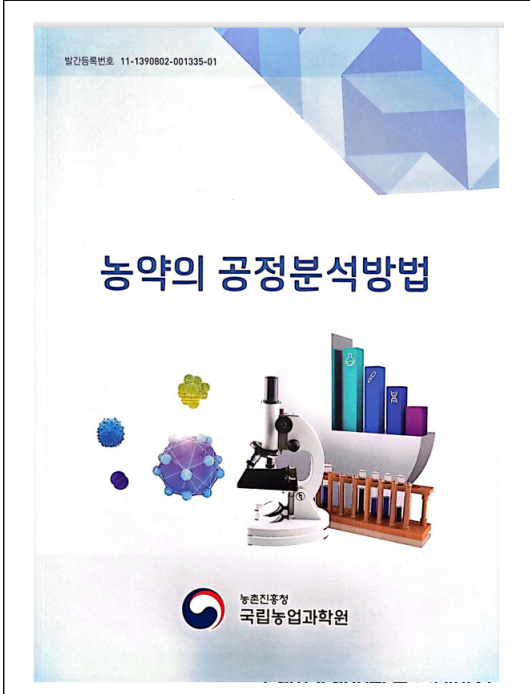
or HPLC analysis method, which saves time and costs and can measure small fluctuations. It has been announced as a process analysis method, and as an additional development direction, it should be improved to a gas (or liquid) mass chromatography method that can simultaneously analyze harmful trace components or impurities.

〈Table 3-19〉 Example list of detailed analysis methods for active ingredients of pesticides (disinfectants)

No	Ingredients (English)	Ingredients (Korean)	Analysis methods
1-1-1	Acibenzolar-S-methyl	아시벤졸라-에스-메틸	HPLC
1-1-2	Amisulbrom	아미설브롬	HPLC
1-1-12	Benomyl	베노밀	HPLC
1-1-13	Benthiavalcarb-isopropyl	벤티아발리카르바이소프로필	HPLC
1-1-14	Bitertanol	비터타놀	HPLC
1-1-15	Blad	블라드	spectrophotometry
1-1-16	Blasticidin-S	블라스티시딘-에스	Titer
1-1-17	Bordeaux mixture	보르도혼합액	titration
1-1-18	Boscalid	보스칼리드	HPLC
1-1-19	Captan	캡탄	GLC
1-1-20	Carbendazim	카벤다짐	HPLC
1-1-21	Carboxin	카복신	GLC
1-1-22	Carpropamid	카프로파미드	HPLC
1-1-23	Chlorothalonil	클로로탈로닐	GLC
1-1-24	Copper hydroxide	코퍼하이드록사이드	적정
1-1-25	Copper oxychloride	코퍼옥시클로라이드	적정
1-1-26	Copper sulfate basic	코퍼설페이트베이식	적정
1-1-27	Cyazofamid	사이아조파미드	HPLC
1-1-28	Cyflufenamid	사이플루페나미드	HPLC
1-1-29	Cymoxanil	사이목사닐	HPLC
1-1-30	Cyproconazole	사이프로코나졸	HPLC
1-1-31	Cyprodinil	사이프로디닐	HPLC
1-1-32	Dazomet	다조멧	HPLC
1-1-33	Diethofencarb	디에토펜카브	GLC
1-1-34	Difenoconazole	디페노코나졸	GLC
1-1-34-1	Difenoconazole(EC)	디페노코나졸(유제)	HPLC
1-1-34-2	Difenoconazole(WG)	디페노코나졸(입상수화제)	HPLC
1-1-35	Dimethomorph	디메토모르프	HPLC
1-1-36	Diniconazole	디니코나졸	GLC
1-1-37	Dinocap	디노캡	spectrophotometry
1-1-38	Dithianon	디티아논	HPLC

An example of the product process analysis method is as follows, and product inspection of pesticides produced, imported, and distributed according to this method must be conducted, and the results must be attached and reported.

〈Figure 3-3〉 Pesticide process analysis method (book cover) and Analysis method for active ingredients of pesticides (example)



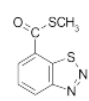
분석 품목 번호 1-1-1

아시벤졸라-메스-메틸(Azobenzolar-S-methyl)

3-methyl benzo[1,2,3]thiadiazole-7-carbothioate

1. 용학명

2. 구조식



$C_9H_8N_2OS_2$ (분자량: 210.3)

3. 성질

가. 용. 상: 백외지색 분말, 약한 타는 냄새
 나. 끓는점: 122.0℃
 다. 증기압: 0.44 MPa (20℃)
 라. 용해성: 물 7.7 mg/L, 메탄올 4.2 g/L, 이세론 28 g/L, 디클로로메탄 160 g/L
 리. 안정성(가열): 20℃, pH 9에서 안정기 3.6시간, pH 7.0/4.2/3.0, pH 9/8에서 13.4시간

4. 분석법 개요

디노프를 부틸 프탈레이트(*n*-butyl phthalate, DNBP)를 내부표준물질로 하여 역액크로마토그래피(HPLC)로 분리 측정한다.

5. 시약 및 기구

가. 시약

- 아시벤졸라-메스-메틸 표준품
- DNBP (시약등급)
- 아세트니트릴(ACN)
- 증류수
- 인산나트륨(Na_2PO_4) (시약등급)
- 내부표준물질: 1.3% DNBP/아세트니트릴

나. 기구

- 역액크로마토그래피(HPLC)
- 검출기: UV
- 50 mL 마개달린 삼각플라스크
- 25 mL 피펫
- 초음파수조

6. 분석방법

가. 표준물질의 조제

표준품 0.05 g(±0.1 mg)을 정확한 용량 50 mL 마개달린 삼각플라스크에 넣고 내부표준물질 25 mL를 피펫을 사용하여 정확히 가한 후, 초음파수조 상에서 완전히 용해시킨다.

나. 시료용액의 조제

주성분으로써 0.05 g에 해당하는 시료를 정확한 용량 50 mL 마개달린 삼각플라스크에 넣고 내부표준물질 25 mL를 피펫을 사용하여 정확히 가한 후, 초음파수조 상에서 완전히 용해시킨다.

다. 분석조건

- μ -Bondapak C₈ (300 mm × 3.9 mm, 내경 10 μ m 또는 이와 동등한 것)
- 이동상 - 아세트니트릴 : 증류수(인산으로 pH 3.0으로 조절) = 60 : 40 (v/v)
- 검출기 파장: 245 nm
- 이동상 유량: 1 mL/min
- 주입량: 3 μ L
- 피크 순서: 유효성분 → 내부표준물질

7. 계산식

유효성분(%) = $\frac{\text{표준품의 무게} \times \text{시료의 면적비(area)} \times \text{표준품의 순도(%)}}{\text{시료의 무게} \times \text{표준품의 면적비(area)}}$

Source: RDA, Pesticide Safety information System (<https://psis.rda.go.kr/psis/index.ps>)

4

Conclusions

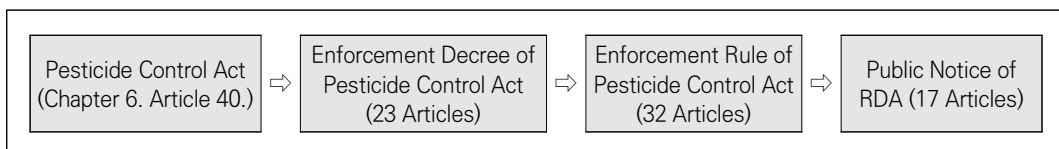
1. Conclusions and Recommendations

1.1. Strengthening Kyrgyzstan’s capacity for pesticide management and quality assessment technology

1.1.1. Strengthening the pesticide management legal system

As for pesticides, fertilizers, and agricultural auxiliary materials (including agricultural machinery), it is the duty of all countries to ensure that safe and efficient agricultural materials are supplied to farmers and agricultural production sites with authority, so even in Korea, relevant agricultural materials are strictly enforced by making relevant laws to take care of it.

〈Figure 4-1〉 Registration and Management of Pesticides in Korea



Kyrgyzstan also prepared a pesticide-related legal system from the late 1990s to the early 2010s, and announced the institution to implement it as DCP PQ in the Regulation, clarifying the responsible body. However, the organizational, human and financial capacity to implement these regulations within the Ministry of Agriculture of Kyrgyzstan is severely lacking. In particular, since the competency of pesticide testing laboratories cannot evaluate and test pesticide registration, it is necessary to have practical management skills in the field of pesticide registration management. Institutional contents should be established with the capacity that can be managed by the Ministry of Agriculture of Kyrgyzstan (the range that can be established within the next 3 to 5 years as an additional Korean capacity building project).

1.1.2. Reinforcement of pesticide quality control capability

In Kyrgyzstan, all pesticides used in agricultural fields are imported as products (in the form of preparations that can be directly diluted or directly sprayed by farmers to grow agricultural products), and the agricultural chemical industry can also be sold by importers of agricultural chemicals. A business ecosystem is formed.

Imported pesticide products are imported by obtaining permission to import pesticides by preparing the following documents from the relevant department of the Ministry of Agriculture before importation. In this process, pesticide importers present pesticide labeling methods and contents to foreign pesticide manufacturers exporting pesticides, and import and distribute them in the form of finished products.

Control of pests and weeds due to lack of efficacy in agricultural fields as there is no prior inspection on the safety of basic pesticides, such as quality control (content and formulation form, whether or not they contain harmful additives) of pesticides imported in the form of finished products from exporting countries. (Damage from

non-expression of medicinal effects, about 20% of sprayed pesticides in an interview with the head of the agricultural organization association), and various harms are occurring.

In order to recover from this problem situation, the urgent and intensive field to be carried out is through preliminary inspection (after batch-by-batch inspection) of the content of imported pesticide products, so that the content of active ingredients in the original formulation meets or exceeds the specified level submitted at the time of product registration. When the product is manufactured, it is possible to conduct customs clearance and specify the inspection items and concentration of harmful subcomponents that can be included in product manufacturing, and conduct harmful subcomponent inspections for all imported pesticides to develop chemical quality inspection capabilities that allow safe pesticide products to be imported into Kyrgyzstan. should be built.

Since the difference in prescription of pesticide products presented at the time of registration of imported pesticides is closely related to the occurrence of pesticides and the inhibition of drug efficacy in agricultural fields, when registering imported pesticides, be sure to verify the efficacy of imported pesticides against applicable crops and pests beforehand. When certain standards are met through testing, an import permit is issued, and in the preliminary inspection of imported pesticides, capabilities, facilities, and experts must be established to ensure that appropriate products produced according to the manufacturing prescription of imported pesticides are imported.

2. Proposal for Official Development Assistance (ODA) Project

2.1. Pesticide management capacity improvement support project

Policy cooperation on pesticide registration management is necessary because Kyrgyzstan's cooperative project for supporting pesticide registration management capacity is mutually related to procedural legitimacy, legislative revision, and securing the technical system of executive departments under the Ministry of Agriculture. Since there is a possibility of entailing legal reform, policy cooperation with the relevant departments of Kyrgyzstan must be prioritized.

To this end, Kyrgyzstan and Korea's pesticide registration management legal experts have identified problems in Kyrgyzstan's pesticide registration-related laws through several meetings and seminars on related topics, and since they need to be reformed into internationally harmonized laws, WHO, FAO, and CODEX related to pesticides The law should also be reviewed to improve the completeness of the Agricultural Chemicals Registration Act.

The cooperation project for agricultural chemical quality inspection capability support is to support infrastructure for inspection (analysis laboratory and equipment for quality inspection, laboratory and equipment capable of cultivating agricultural products such as greenhouses for drug efficacy and weakness testing) and public officials of the Ministry of Agriculture who are engaged in the field. As the main project is to build test capacity for Korea, it is necessary to invite training to Korea and strengthen field training of experts dispatched to Korea. At the same time as the start of the cooperative project, a physicochemical analysis laboratory and related analysis equipment, facilities for drug efficacy and weakness experiments, and It is desirable to secure a place where equipment can be installed under the

cooperation of the Kyrgyzstan government, and to construct facilities and install equipment.

〈Figure 4-2〉 Strategies for Supporting the Improvement of Agrochemical Management Capabilities in Kyrgyzstan

Reform of Pesticide Management Act	〈Policy Cooperation Project〉	
	<ul style="list-style-type: none"> • Building a foundation for policy cooperation • Consultation with pesticide registration experts and introduction of international standards • Reorganization of Kyrgyzstan laws and regulations 	<ul style="list-style-type: none"> • Mutual visits and consultations
Building pesticide quality inspection capacity	〈Technical and Facility Support Project〉	
	<ul style="list-style-type: none"> • Establishment of pre-inspection infrastructure • Capacity Building and Training of Inspection Staff • Reorganization of the system according to the chemical and drug efficacy/weakness test of agricultural chemicals products before importation 	<ul style="list-style-type: none"> • Establishment of infrastructure • Invitational training • Local training by dispatching experts

2.2. Pesticide Registration Regulations Re-organization Project

2.2.1. Physics and chemistry evaluation field

○ Main points of physical chemistry evaluation

- Content of active ingredients and harmful sub-components
- Possible impurities that may occur during the manufacture of original agricultural chemicals (active ingredients)
- Evaluation of expiration date for pesticide product quality (whether it is tested for safety over time)
- Certification of the original manufacturing company for the guarantee of smooth product production

Main review contents (imported finished product)	Revision point
1. Physicochemical analysis report and method	Must be included for quality inspection
2. Manufacturing Process Diagram	Must be included for hazard assessment
3. Manufacturing prescription	Tailored to the Kyrgyzstan situation
4. Aging change report	Must include for quality assurance

2.2.2. Human animal toxicity assessment field

○ Main points of human toxicity evaluation

- Carcinogenicity of main and sub-components of imported and distributed pesticides
- Acute and chronic toxicity of active ingredients, whether various toxicity is expressed
- Regarding newly presented (mainly carcinogenicity and reproductive toxicity) international issue toxicity
- Provisions for flexible re-registration possibility should be included

Main review contents	Revision point
1. Acute and chronic toxicity	Must be included for hazard assessment
2. Neurotoxicity, teratogenicity, and carcinogenic toxicity	Must be included for hazard assessment
3. Exposure of workers (sprayers)	Included for the safety of farmers spraying pesticides

2.2.3. Environmental toxicity evaluation field

○ Main points of environmental toxicity evaluation field

- Concern about environmental risks of main and sub-components of imported and distributed pesticides
- Harm assessment to fish, birds and bees

- Possibility of bioconcentration of sprayed pesticides on farmland and agricultural reservoirs (ponds, etc.)

Main review contents	Revision point
1. Environmental risk assessment data	Must be included for hazard assessment
2. Risk to fish, birds and bees	Must be included for environmental animal and plant hazard assessment
3. Bioaccumulative potential	Included for Ecosystem Safety Assessment

2.2.4. Residue Assessment Field

○ Main points of residue assessment field

- Assessment of crop residues and residual amount of sprayed pesticides
- Setting the maximum permissible residual amount of pesticides sprayed on crops
- Assessment of pesticide residue safety in imported or exported agricultural products
- Evaluation of environmental persistence through analysis and evaluation of pesticide residues in soil and water quality

Main review contents	Revision point
1. Residue analysis method in crops (including soil and water quality)	Must be included for risk assessment of residual pesticides and safety management of exports and imports of pesticides
2. Maximum permissible residue standard	Including pesticide residue safety assessment of agricultural products
3. Half-life in soil and water	Withholding registration of excessive environmental persistent pesticides

2.2.5. Efficacy and chemical injury evaluation field

○ Main points of efficacy and chemical injury evaluation

- Regional adaptability (must be evaluated for drug efficacy and weakness in drug dispersion areas)

- Evaluation of the possibility of weakness of drug dispersion concentration (usually 2 to 3 times) due to excess selectivity
- Possible weakness of surrounding crops

Main review contents	Revision point
1. Packaging experiments to confirm regional adaptability	Must be included to manage the efficacy of pesticides
2. Experiment with multiple or three times chemical injury	Must be included for the management of pesticides
3. Unintentional chemical injury experiment	Necessary for managing damage caused by volatilization and scattering

2.2.6. Progress schedule (example)

Contents	1st year	2nd year	3rd year	4th year	5th year
1. Review of Kyrgyzstan Pesticide Registration Management Regulations					
2. Review of references to Korea's pesticide registration regulations					
3. Revision of Kyrgyzstan Pesticide Registration Regulations					
4. Consultation on the content of the revised pesticide registration regulations					
5. Reflection of registration regulations by policy agreement					
6. Training by inviting pesticide registration regulation evaluation experts					
7. Guided visits by pesticide registration regulation evaluation experts					

In the revision of the pesticide registration regulations, it is desirable to prioritize the registration of raw materials (active ingredients) by reflecting the characteristics of Kyrgyzstan, where the entire amount of agricultural chemicals used in Kyrgyzstan is solved through the import of finished products, and to allow import permission only for products containing the registered raw materials.

Therefore, at the time of registration of the original product, evaluation should be

based on the test report produced by the foreign GLP institution, and registration should be approved when there is no concern about harmfulness. At this time, it is necessary to focus on the carcinogenicity of the raw material, the harm to farmers, and the residual analysis method in agricultural products, and to receive a registration test report adopting the raw material content analysis method that is possible with the Kyrgyzstan government's analysis capability.

For raw material content analysis methods or harmful subcomponents contained in raw materials, the content presented in the Korean Agricultural Chemicals Control Act should be preferentially adopted, and international standards should be introduced and applied flexibly.

Accurate professional evaluation of the submitted test report is required in order to accurately evaluate the foreign test report according to the import of agrochemical products, so it is necessary to invite training to Korea and dispatch Korean experts to work cooperatively.

2.3. Pesticide Quality Inspection Capability Support Project

2.3.1. Establishment of analysis laboratory and installation of analysis equipment (infrastructure investment)

Analysis equipment such as <Table 4-1> is required in the analysis laboratory to be built to quantitatively analyze the active ingredients of imported pesticide products and to prevent the import of pesticide products containing harmful sub-components (impurities) exceeding the standard.

Chromatography (GC and LC) is required to measure the content of active ingredients contained in the product and detect harmful sub-components in trace amounts, so it is judged that it is possible to support analysis without interruption in

the occurrence of malfunctions and various problems when it is built in two or more sets. It is acknowledged that in-depth analysis instrument operation training is required for procurement of equipment consumables and maintenance that can be performed on site. In addition, it is necessary to secure enough consumable parts (e.g., LC plunger, column, solvent degaser, etc.) that are frequently replaced.

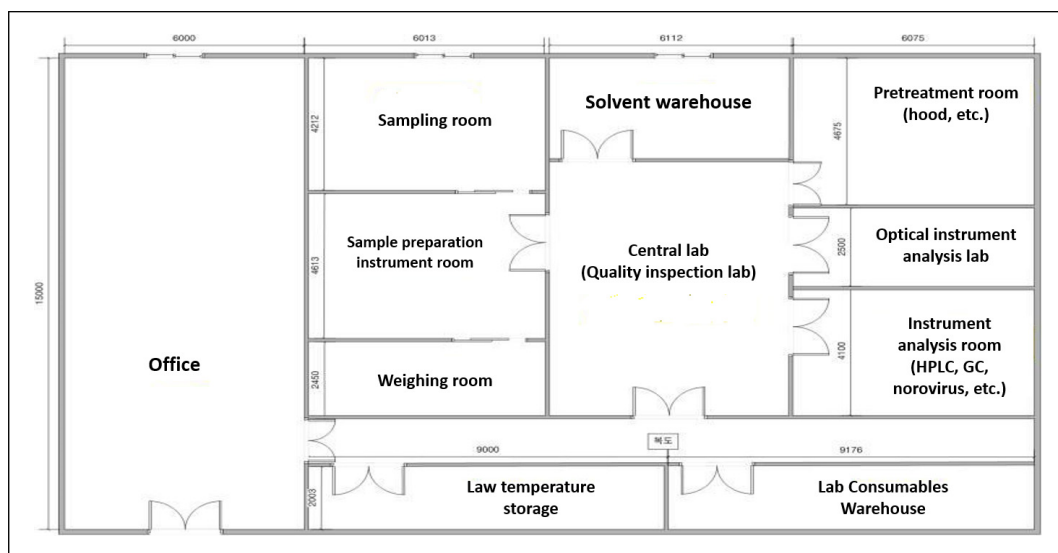
〈Table 4-1〉 Major equipment required to build an analysis laboratory for imported pesticide products

No	Equipment name	Note	No	Equipment name	Note
1	Chromatography (GC)	non-expendable	8	particle check microscope	non-expendable
2	Chromatography (LC)	non-expendable	9	bench glassware	expendable
3	precision scales	non-expendable	10	pipettes and droppers	expendable
4	power supply	non-expendable	11	FT-IR	non-expendable
5	heating mantle	expendable	12	UV/VIS spectrometer	non-expendable
6	agitator	expendable	13	thermometer	expendable
7	sampling glassware	expendable	14	Consumables such as clamps	expendable

An analysis laboratory requires a sample pretreatment room, an analysis device room, a sample refrigeration room, an analysis researcher's office, an uninterruptible power supply room, a solvent and reagent storage room, and a laboratory exhaust room of about 300m².

Since it is desirable to operate a quality inspection room by securing a space close to the Kyrgyzstan Ministry of Agriculture and allowing employees to work at all times, or by expanding and improving existing buildings, it is necessary to first consult on the establishment of a quality laboratory.

〈Figure 4-3〉 Configuration Design of Pesticide Quality Inspection Room (Example)



2.3.2. Analytical education training and dispatch of experts for analytical laboratory operation

In order for the Ministry of Agriculture of Kyrgyzstan to carry out quantitative quality inspection of active ingredients among pesticide products, in-depth training should be conducted in Korea by recommending two or more chemistry majors who can be put into practical work after training.

Regarding the basic principles of device operation and maintenance, we entrust the research institute of the analytical device company purchased for infrastructure construction to provide training on the operating principle of the device, on-site repair methods for major failures, and replacement of consumable replacement parts. Training for trace analysis of pesticide products and harmful sub-components should be conducted through consignment training for more than 6 months to the National Institute of Agricultural Sciences of the Rural Development Administration or the Agricultural Materials Quality Team of the Korea Agricultural Research and Extension Services to develop analytical skills as well as device operation skills.

In addition, in order to support the smooth operation of Kyrgyzstan's pesticide quality inspection laboratory, it is necessary to establish quality analysis technology early through the dispatch of experts who periodically visit the site to check the operation status and resolve difficulties in the field by Korean analysis experts. When an analysis expert is dispatched to the site, the quality control of pesticide analysis is tested to see if a certain level of ability is continuously maintained.

The execution of a quality control program and improvement of insufficient parts is the external reliability of the Kyrgyzstan government's ability to analyze pesticides quality. It is important to eliminate the possibility of external controversy by improving analysis, and furthermore, the Kyrgyzstan government should take the international analysis certification test and secure international analysis reliability as the final goal of competency support.

〈Table 4-2〉 Analytical equipment invitation training operation (draft)

Training period	9 months or more	Training Contents	<ul style="list-style-type: none"> • Pesticide component analysis method in products • Harmful impurity trace analysis method 	
Number of trainees and qualifications	Employees of the Ministry of Agriculture or public officials in related fields recommended by the Ministry of Agriculture who can directly work in pesticide quality inspection (2 or more)			
training goals	Understand the basic principles of HPLC, FT-IR, and UV/VIS instrument analysis used for analysis and train the ability to utilize them.			
division	Education contents		Period	Education method
analytical theory	• How analysis instruments work		1 month	Lectures
device operation	<ul style="list-style-type: none"> • GC, HPLC operation and analysis technology application practice • FT-IR operation and analysis technology application practice • UV/VIS operation and analysis technology application practice 		3 months	Lectures/ Practice
analytical practice	<ul style="list-style-type: none"> • Extraction of active ingredients from pesticide products • Standard product manufacturing method, internal standard quantification method • Agrochemical active ingredient quantification method using analysis equipment • Quantitative method for trace amounts of harmful impurities 		3 months	Lectures/ Practice
equipment maintenance	<ul style="list-style-type: none"> • Replacing consumable parts of chromatography equipment and details of major failures • Replacing consumable parts of chromatography equipment and major failures Actions 		2 months	Lectures/ Practice

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