

Chemicals

1. Assessment of chemical risks

1.1 Mechanisms for systematic evaluation, classification, and labeling of chemicals (GHS)

In order to harmonize the classification and labeling of chemicals, which differs from country to country, and in turn to achieve safe control of chemicals and alleviate technological barriers to trade, the World Summit on Sustainable Development (WSSD) has encouraged nations to adopt the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) between 2002 and 2008. The major agenda includes classifying chemicals into 16 categories with regard to the level of physical hazard, 10 categories with regard to the level of health hazard, and one category with regard to the level of environmental hazard, and labeling the container and packing and marking the Safety Data Sheet (SDS) accordingly.

Korea has been participating in the process of establishing the GHS discussed by OECD since 1997, and has been promoting the research project for the domestic adoption of the GHS system since 2004. Through this project, a classification and labeling plan for approximately 2,500 simple-substance poisonous materials and 1,500 compound-substance poisonous chemicals has been prepared, and education and publicity information about the GHS system has been continuously provided to poisonous material traders and importers. This year, the classification and labeling plan prepared thus far will be reviewed, and a research project is ongoing to classify and label 1,000 compound substances.

GHS was nationally incorporated by the amendment (2006.9.25) of the “Industrial Safety and Health Act,” and through two amendments (2006.12.12, 2008.1.10) of the “Standard for Classification and Labeling of Chemicals and Safety and Health Resources of Substances (Ministry of Labor Notice No. 2008-29),” concrete standards have been established. Furthermore, GHS execution has been prepared by amending the “Hazardous Chemicals Management Act”(2007.12.27) and by preparing the “Regulation on Classification Standard and Indication Method of Poisonous Materials (National Institute of Environmental Research Notice No. 2008-26)(2008.7.8).

Major amendments include the further specialization of the chemical classification standards from 15 to 27 categories, and the unification and organization of warning sign elements such as naming, letter drawing, signal words, hazard/danger expressions, prevention guidelines, and providers, and the hazard/danger contents of the warning signs to be stated on MSDS (Material Safety Data Sheet); however, due to the time frame required for worldwide enforcement and adoption by small-to-medium sized companies, the existing standards for chemical classification and labeling and MSDS construction are allowed to be used or applied concurrently until 2010.6.30 (2013.6.30 for medications including two or more chemicals). However, in the case of poisonous materials, according to the “Hazardous

Chemicals Management Act”, GHS has been used since 2008.7.1., but considering the time required for businesses to adopt the new law, a grace period of 3 years was given on simple-substances, while one of 5 years was given on compound-substances.

Since the introduction of GHS, the Republic of Korea has provided various supports to allow for the smooth settlement of the system and for the systematic distribution of information to workplaces. From 2007 to 2009, about 3,000 copies of explanatory resources about GHS / MSDS and 200,000 guide leaflets were produced and distributed, presentations on GHS were held 41 times to a combined audience of 4,235 people at the major industrial districts and petroleum chemical districts across the country, and a special course for GHS / MSDS was opened and has since produced 403 GHS / MSDS specialists.

In addition, 6,314 of the 50,000 pieces of MSDS data have been updated according to GHS standards from 2007 to 2008, and 5,000 more are due in 2009. This information development project shall continue until 2012, which in turn will greatly assist in the security of GHS classification information for workplaces.

Along with this, concerning compound substances, the MSDS Editing program was developed and supplied in order to allow the easy preparation of MSDS to GHS standards by utilizing information on ingredients at workstations in the workplace.

On the other hand, the cooperation of the relevant authorities has been required for the enforcement of the GHS system. Accordingly, these authorities have been operating a government-joint GHS promotion committee since 2005, and have been making efforts to share and harmonize the opinions among departments about GHS adoption and practice. Currently, the major task of the committee is to unify the GHS classification/labeling of duplicate materials at each department.

In addition, according to an agreement made at the 8th Tripartite Environmental Ministers Meeting (TEMM) among China, Japan, and Korea, comparative research on actual GHS practices is being conducted, and when this project is completed in Sept. 2009, analytic results on comparative results and differences among the three countries shall be deducted, which will be of great help for the three countries, among which a large volume of trade in chemicals occurs.

1.2 Initiatives for assessment of toxic chemicals, hazard and risk assessment

The Korean government has been actively participating in international efforts for the sustainable development and sound control of chemicals to implement Agenda 21, which has long been a major issue for the international community. The government is actively participating in the OECD chemicals management project, and since 1999 has been participating in the OECD SIDS (Screening Information Data Set), which aims to manage mass-produced chemicals that are produced and imported in amounts of 1 ton or more. The government’s contribution to this project includes executing the initial risk assessment on

36 chemical substances, which makes Korea the 7th largest contributor among OECD members. It is also participating in the Sponsorship Program that has been in operation since 2007 at the OECD manufactured nano-materials work detail, and performs and supports safety assessment for 5 substances.

In addition, the Korean government is reinforcing diverse policies in order to protect the safety of its citizens, to protect the environment from hazardous chemicals, and to harmonize its systems with the chemical management system supported by the international community. Since 1988, “Safety Tests of Existing Chemicals” have been performed for human and ecological virulence tests and hazard assessments on existing chemicals in domestic circulation, in order of priority. By 2007, safety tests on 553 kinds of chemicals were conducted, and 53 of them were designated as poisonous, and this information is shared with other OECD members by providing the data to the OECD database.

Meanwhile, to promote the reinforcement of virulence assessment and share the examination resources of new chemicals, OECD has set up at least 13 MPD virulence tests to be performed before the market circulation of chemicals, and is promoting a reporting system agreement, assessment resources sharing, and the cross-acknowledgment of new chemicals amongst member countries.

Accordingly, in an effort to introduce an advanced virulence assessment system and prepare a basis for sharing the examination resources, the Korean government expanded materials to be examined so as to meet the OECD MPD level, while taking the cost on the industry and the security of domestic GLP organizations into consideration. These were increased from the original 3 items to 6 items in 2007 (fish, water flea, and avian acute virulence added) and to 9 items in 2009 (skin stimulativeness, eye stimulativeness, and skin irritability added).

According to the Article 40 of “Industrial Safety and Health Act”, a business proprietor (or the agent that carries out the import on his/her behalf, if such an agent exists) who wishes to manufacture or import new chemicals is required to submit an examination report on virulence/risk to the Minister of Labor 45 days prior to the manufacture/import in order to prevent health hazards to workers with respect to the chemicals. In 2008, 394 virulence/risk reports were submitted to local labor offices, and protection measures, such as supplying protection equipment and installing ventilation equipment, were put in place to safeguard the health of workers.

For hazardous/risky chemicals that are frequently responsible for industrial diseases, both an assessment tool that allows self-assessment on the hazard/risk of the major handling procedures and a guideline that provides appropriate actions according to the level of hazard/risk have been provided. There are currently 18 materials that have such a guide, and 12 more are to be added.

“Hazard/Risk Assessment Standards (Ministry of Labor Notice)” was established to prepare GLP examination standards about the characteristics and physical risks of chemicals as required by MSDS, and since 2005, 72 chemicals in total have been through GLP

examination, the data for which is being provided through the Korean Occupational Safety & Health Agency's MSDS information network.

1.3 Strategies for exposure assessment and environmental monitoring

In the late 1990s, endocrine disruptors became a major international environmental issue, and with increased national attention and concern among citizens, the "Endocrine Disruptor Special Committee" was established in 1998 with the wide range of participation from the Ministry of Environment and the relevant ministries, civil experts, and NGOs. Consequently, "Endocrine Disruptor Medium/Long Term Research Project (1999)" was established and has been conducting field surveys on residual pollutants and ecology monitoring.

Residual pollutant survey aims to examine the current status of the residual amounts of dioxin, perfluorinated compounds (PFOS, PFOA), alkyl phenol, phthalate and such with respect to the environmental medium (air, water, sediment, soil) in general areas and industrial complexes. In 2007, the "5 Year Plan for Examination and Management on Endocrine Disruptor" was established, and accordingly, five relevant departments (Ministry of Environment, Ministry of Land, Transport and Maritime Affairs, Korea Food and Drug Administration, Ministry for Food, Agriculture, Forestry and Fisheries, and Rural Development Administration) have jointly conducted various projects and monitoring.

Ecological monitoring is a project that combines the examination of actual conditions such as water quality, sediment with an assessment of the impact of endocrine disruptors on the reproductive systems of fish (carp, mullet, etc.), and the internal accumulation of endocrine disruptors within them. The weight of reproductive organs, deformation, gender ratio and existence of sexually reproductive cells are examined, and by testing cells from the reproductive organs, the status of endocrine disruptor accumulation and the interrelationship with the deformation of the reproductive organs are studied.

In addition, the impact assessment is performed every three years on the peripheral areas of POPs-exhausting facilities over a certain size to examine the status of dioxin pollution in the environment and to grasp the pollution level around the major exhaustion origins. According to the POPs management law, the POPs survey network is operated to analyze the interrelationship between the exhaustion facilities and the environment of the surrounding area, and the survey points are being expanded to accumulate reliable POPs monitoring data for dioxin, PCBs (Polychlorinated Biphenyls), HCB (Hexachlrobenzen), etc.

1.4 Information exchange and cooperation, data-quality assurance, application of assessment criteria, and linkages to risk management activities

In order to collectively assess the impact of chemicals on human health and environment, it is imperative to conduct risk management based on risk assessment. In 2002, the government established the Framework Plan on risk management for substances likely to be risky, and a total of 106 substances were designated as likely to be risky. Accordingly, 17

substances including major risky materials (Pb, Hg, Cd, As, Cr, Ni, Bz) went through risk assessment through environmental monitoring and risk assessment in phases. In 2007, a combined risk assessment project taskforce was established to consider the medium transfer of risky materials, and policies to prepare a systematic basis for risk management are being promoted, such as the guidelines for combined risk assessment, exposure assessment, and local area risk assessment.

In addition, for the hazardous elements that are potentially responsible for serious health problems, an allowance standard system was introduced in July 2007 that keeps the exposure level at the workplaces under the allowance standards at all times, thus providing preemptive measures instead of post-treatment. In this regard, the “Enforcement Decree on Industrial Safety and Health Act (2008.8.21)” included 13 hazardous materials, such as normal hexane and trichloroethylene, as objects of the allowance standards, and the “Decree on Industrial Safety and Health Act (2008.9.18)” were prepared for the allowance standards for each hazardous material.

2. Sound management of toxic chemicals

2.1 Progress within the larger framework of Strategic Approach to International Chemicals Management (SAICM) (National Implementation)

For the effective implementation of SAICM, the Republic of Korea set the Ministry of Environment as the National Focal Point in 2006, and created and has since been operating the “SAICM Implementation Consultation Committee,” where government organizations, industry, experts, NGOs and related stakeholders discuss the action plans for national implementation of SAICM.

In February 2009, the “Chemicals Management Advancement Plan” was established, reflecting domestic chemical management policies. The major agenda of this plan is to expand the production of information on chemicals, strengthen hazard/risk assessment of chemicals, and introduce a “Green Chemical System” that encourages the production of chemical products that are free of toxic emissions and are energy-efficient.

The “Green Chemical System” encourages the expansion of the national “Green Growth” paradigm that achieves the twin domestic needs of environmental preservation and economic development, and is thought to be catalytic to the implementation of SAICM, which promotes the sustainable management of chemicals.

In addition, the Republic of Korea has been actively participating in the international efforts for chemicals management. First, it actively supported the implementation of SAICM in developing countries by providing the Quick Start Program (QSP) trust fund towards the end of 2006. We have been actively participating in international discussions regarding “Globally Harmonized System of Classification and Labeling of Chemicals (GHS)”, and

held the “Third WHO International Conference on Children's Health and the Environment” in Busan in June 2009 jointly with the World Health Organization (WHO) for an international discussion on hazardous chemicals and their impact on children’s health.

Third WHO International Conference on Children's Health and the Environment

Overview

- Title: Third WHO International Conference on Children's Health and the Environment
- Organizer: World Health Organization (WHO)
- Sponsor: Ministry of Environment, Ministry for Health, Welfare and Family Affairs, Busan Metropolitan Government
- Date: 2009.6.8 (Mon) ~ 6.10 (Wed)
- Theme: Healthy Environment, Healthy Children
- Side-events: 12 Pre-workshops (6.7), The Third Busan Eco-Festival for Kids, Carbon Offset Fund-raising

Major Discussion Points and Outcome

- **Children’s environmental health issues:** impact on health from early exposure to environmental hazards, climate change, urbanization, nanotechnology, asbestos, residual toxic materials, hazardous waste, school hygiene, long-term cohort research, etc.
- **Examples of policy changes** from research results, and plan for international cooperation to reflect technical knowledge in policies and put these into practice
 - ※ **the enactment of the Environmental Health Act (Republic of Korea)**, the strategies to support children’s environmental health (United Kingdom)
- Display of **194 posters** on 26 themes (e.g. heavy metals, climate change)
- **Adoption of “Busan Declaration”**, synthesizing the views of the participants
 - ※ the **Carbon Offset Fund** collected during three days (total of 506,444 Korean Won) was **delivered to WHO to support children’s environmental health and climate change-related programs**

Major Components of “Busan Declaration”

- **Raising awareness and assessment** on the impact of environmental hazards on children’s health.
- **Incorporating children’s environmental health in national policies** (e.g. the national environmental health action plan, Fabian change, new responses to Green Growth.
- **Encouraging discussions** among diverse research groups in the area of children’s environmental health, and **constructing website and network** for research sharing
- **Active participation** from the **media**, and **establishing means of communication** between various stakeholders



2.2 Initiatives and innovations for risk reduction, particularly taking in to account the life cycle of the chemicals

The Pollutant Release and Transfer Register (PRTR) is the system in which the polluter takes note of the amount being emitted into the environment (i.e. air, water, and soil) or moved out of the site for recycling or disposal during the production/usage procedures of work sites; each site then would exert its own effort to reduce emissions.

When Republic of Korea joined OECD in 1996, it amended its “Hazardous Chemicals Management Act” to form the legal basis for the establishment of the PRTR system. In 2001, the government announced the examination results for chemical emissions for 1996, and since then it continues to make these results public annually.

The number of chemicals and types of businesses to be registered has gradually increased, with the goal of understanding the nation-wide emission of all major chemicals. Specifically, the list of examination objects has been expanded from 80 chemicals in 2 types of businesses (petroleum refinement and chemistry) in 1999 to 388 chemicals in 36 types of businesses. Moreover, to understand the actual emission at not only the manufacturing stage of the products but also at their consumption and circulation stages, 240 kinds of boiling-point pollution sources at 9 emission origins, including farms, homes, and moving sources, were examined in 2003 for the first time to determine their emission amount.

In addition, while businesses were encouraged to reduce emissions on their own through PRTR, emissions reduction were sought more actively through the conclusion of voluntary agreements (30/50 program) for emission reduction with major emission sites. The key commitment of the agreement is to achieve 30% emissions reduction by 2007 and 50% reduction by 2009, compared to 2001 level, of the materials chosen by the businesses.

We plan to actively encourage the revitalization of chemicals risk communication, in which the local community and businesses can build mutual trust through understanding further PRTR objectives and utilizing emission information and communication.

2.3 Policy measures to phase out chemicals that pose unreasonable and unmanageable risk to human health and human environment

a. Establishment of National Implementation System

In order to participate in the international effort for ozone protection, Republic of Korea joined the Vienna Convention and the Montreal Protocol in February of 1992, and enacted the “Act on Control on the production, etc. of specified substances for the protection of the Ozone Layer” for implementation of the Protocol.

The key elements of this Act include the licensing system for the production, import and export of all ozone-depleting substances controlled by the Montreal Protocol, the collection of shares from manufacturers and importers of ozone-depleting substances to fund the development of alternate substances and the promotion of their usage, and restraint orders including penalties for rule violation.

For the domestic implementation of the control on ozone-depleting substances according to the Protocol, an annual plan for consumption reduction was prepared, and as of late 2007, the reduction amount has surpassed the goals required by reducing CFCs and Halons, which will be phased out by 2010, by 87% and 70% respectively, and by reducing consumption levels for carbon tetrachloride and methyl chloroform by 94% and 50% respectively.

b. Funds for the Rationalization of the Usage of Specific Substances

To secure the resources necessary for the transition to a system that develops and uses alternate substances, a compulsory tax of US \$0.3 to \$1.5 per kg is levied on substances listed in Annexes A and B that are manufactured or imported.

The collected funds are used to support the research and development of substances to replace ozone-depleting substances and technology development for the use of alternate substances, and also to finance the cost required for transition into a system employing alternate substances. Through the fund, the early reduction of CFCs, Halons, and methyl chloroform has been catalyzed, and as of late 2008, a total of US \$59 million has been amassed, \$19 million of which has been used to support various projects.

c. Publicity Activities for Restraint from Using Ozone-Depleting Substances and Transition to Alternate Substances

For each area that uses ozone-depleting substances – refrigeration and air-conditioning, fire extinguishing, foam, solvent – information on the development of alternate substances was disseminated to the relevant stakeholders and fact sheets were distributed.

In order to raise awareness among consumers that purchase products that include ozone-depleting substances, information on the importance of ozone protection and the use of alternate products was provided, to encourage the purchase of alternate products, and newsletters, posters, calendars, and fliers are also being printed and distributed.

2.4 Enactment of Environmental Health Act

As health damages are occurring frequently to the residents of areas surrounding abandoned metal mines and industrial districts, and as the threat to citizens and the ecosystem is increasing due to the use of new technologies and substances, the importance of promoting environmental policies from the perspective of national health was examined, in order to consider risk assessment/management of environmentally hazardous elements and their impact on the health of residents when devising development plans. On the other hand, the health damage to citizens from environmentally hazardous elements could be studied, and the corresponding countermeasures were put in place. The government drafted the Environmental Health Act in 2008, which came into effect in March 2009 to protect the health of citizens and the ecosystems.

Accordingly, Ministry of Environment is to create a plan that includes basic policies for environmental health every ten years through consultation with the relevant ministries and the consequent review of the Environmental Health Committee. Also, the Ministry is to assess the risk of environmentally hazardous materials with respect to the health of the citizens and the ecosystems, and to devise new management measures when they exceed the risk standards set by the Ministry. In addition, it may control the application of new technologies or substances that are recognized to have high risks, and the projects that are subject to prior environmental impact review/assessment should include a criteria in its review/assessment list to assess the impact of environmental hazard elements on the health of citizens.

In addition, the accumulation of environmentally hazardous elements within an organism and the occurrence of environmental diseases are to be examined every three years, and when a risk of health damage is likely to occur due to such elements, measures can be put in place after the cause has been revealed through epidemiological examinations; and when health risk occurs or is likely to occur due to such substances, a request for a health impact investigation may be submitted to the Minister of Environment as a preemptive measure.

The exposure to environmentally hazardous substances is to be assessed for areas where children's activities take place, as set by Enforcement Decree for areas. If necessary, the use of such elements may be controlled, and those elements that may be present in products for children and jeopardize children's health may be prevented from sale or recalled, also subject to public announcement.

2.5 Policies and frameworks for prevention of accidents, preparedness and response

When an accident involving hazardous chemicals occurs, prompt and effective countermeasures are provided in "Crisis Management Manual for Hazardous Chemicals Leakage Accident," which was created in November 2005 in preparation for a more systematic crisis management system. If the scale of the accident is extraordinary and the

casualties and property damages are serious and widespread, to the extent that government action is required, the central calamity countermeasure headquarters is to be set up in the Ministry of Public Administration and Security, and the central accident countermeasure headquarters is to be established in the Ministry of Environment, and they will unfold extensive countermeasure actions to resolve the situation.

In addition, to enable the initial responses from fire departments and police departments to quickly and effectively react to chemicals accidents, “Chemical Accident Responses Information System,” was developed in April 2005 to provide in real-time the chemical property information, treatment facility information, anticipated scope of spread, guidelines for prevention and evacuation information. As of late 2008, the system was provided to 552 facilities across the country, including Environmental Offices, fire department offices, local government offices, and police department offices. The phenol leakage accident at the Kolon Gimcheon factory in March 2008 spurred the establishment of the “Chemical Information Provision System for Initial Correspondence” in three stages from 2008 to 2010, and which provides core information needed by the fire department for initial responses such as handling facility, property, and spread prevention through web-based database.

2.6 Policies aimed at reducing the risks posed by lead, mercury and cadmium and other harmful heavy metals

In June 2006 the Korean government devised integrated mercury management for health protection by reducing the risk from mercury exposure and ensuring the integral management of mercury, and has since been actively promoting them. Accordingly, the control over the production and import of mercury-containing products and scraps, usage examination, and scrapping were strengthened, and examinations on the emission amount are being performed at the major mercury emission origins, such as incineration facilities and power generation facilities. In addition, by amending the Air Atmosphere Preservation Act in 1997, the government gave an advance notice that the air emission allowance level for major mercury emission facilities shall be strengthened from 2010, and in May 2009, the government devised a plan for installing a constant mercury monitoring network.

In addition, the government has been monitoring the levels of heavy metal (e.g. mercury) concentration in the blood with respect to the vulnerable, including pregnant women, newborns and infants, and children. Furthermore, for the residents of industrial districts and abandoned mine areas, the government has prepared policies to determine a systematic basis for risk assessment, including integrated risk assessment guidelines and local risk assessment guidelines with respect to high-risk substances such as heavy metals.

Also, on a nation-wide scale, the concentration level of heavy metals such as lead, mercury, cadmium in blood and urine has been annually examined since 2006. In particular, lead is designated as a restricted substance, and its manufacture, import, sale, and usage will be controlled for use in paint on wooden toys for children under the age of 13 or for metallic accessories, starting from June 2011.

2.7 Quality Management and Risk Assessment of Agricultural Chemicals

a. Overview

Issues related to agricultural chemicals are strictly handled by the Rural Development Administration, according to the Agrichemicals Management Act. The objective of the Pesticide Safety Evaluation Division in the Department of Agro-food Safety at the National Academy of Agricultural Science is to ensure the safe usage of agricultural chemicals through the examination of registration documents submitted by agrichemical businesses and the conducting of human/environmental risk assessments. In addition, the quality management of circulated agrichemicals and the development of OECD-level agrichemical risk assessment are in progress, including various projects such as plans to encourage the registration of environment-friendly safe agrichemicals, to establish safety management standards for registered agrichemicals, to establish detailed guidelines for the production and examination of agrichemical registration data, to determine the status of agrichemical usage for major crops, and to inspect agrichemical quality standards.

Furthermore, there are numerous ongoing research projects, including improvements to the risk assessment system for natural-substance-based biological agrichemicals, toxicity assessment of insect physiological control substances and vegetation crude extract, and the biological monitoring of agrichemical addiction.

b. Major Tasks

1. Establishing Test Standards/Methods, and Development of Registration Evaluation Methods for Agrichemicals
2. Effect/Harm/Toxicity/Persistence Assessment for Agrichemicals Pending Registration
3. Research on Safe Use Standards and Residual Allowance Standards for Agrichemicals
4. Research on Integral Assessment and Management of Physico-Chemistry and Safety of Agrichemicals
5. Quality Management and Examination/Analysis/Evaluation of Physico-Chemistry, Biological Activity of Agrichemicals

c. Recent Important Findings

Following the examination/evaluation of the data of agrichemicals pending registration, it was found that all of the 10 new requests met the registration requirements, and 333 of the 381 manufactured agrichemicals passed the requirements. The agrichemical usage examination of 6 green vegetables (bare ground/facility Chinese cabbage, facility radish, lettuce, spinach, green perilla, and Korean leek) on 160 farms in 2008 showed that agrichemical usage per unit area was 2.32 for bare ground Chinese cabbage, 1.89 for green perilla, 1.37 for facility radish, 1.31 for facility Chinese cabbage, 0.94 for Korean leek, 0.47 for spinach, and 0.25 for lettuce (unit: a.i.,kg/ha).

In order to improve the quality of agrichemicals, the level of significant content and physical property were analyzed in 20 agrichemical principals, 942 circulated agrichemicals, 140 testing agrichemicals, and 24 agrichemicals against which petitions were filed. The results indicated that 931 of the 942 circulated agrichemicals were acceptable, and 8 of the remaining 11 were short on significant content, while the other 3 were defective in terms of physical properties.

The evaluation result of the 553 of 695 on effect/harm with respect to blight was mostly acceptable, but 60 of 78 had weak effects and did not meet the test standards. In terms of the results of biological quality management on 45 items, 2 were unacceptable, and the test methods for 6 new ingredients such as trichoderma atroviridae SKT-1 were established.

Observing the OECD guidelines for defining residual agricultural chemicals, the standards for defining the residual in an environmental medium were formulated, based on which residuals were defined for each environmental medium for newly-registered 19 substances. The data on crop residual of the registered agricultural chemicals were examined, and 82 substances, 47 crops, and 187 items of residual allowance standards were prepared. According to each registered agricultural chemicals, 45 new products, 16 crops, 73 items, 155 additional products, 44 crops, 252 items, 20 changed existing products, 10 crops, 22 items, for a total of 347 items of standards for safe usage of agrichemicals were proposed. Among the indices, in order to construct an agrichemicals exposure computation system, a prediction model was created, data for domestic climate and soil, crop and agricultural chemicals were provided, and estimated environmental density was calculated for 19 newly-introduced substances.

In addition, detailed guidelines and methods for agrichemicals registration test were devised. The differences between OECD and national testing standards and methods were that in the case of the acute oral toxicity testing, OECD designates TG 420, 423, 425 to be used for testing, while nationally TG 401 is used. Moreover, for the dermal irritation test, national testing include both abrasive and non-abrasive, while OECD only performs non-abrasive, and for the ocular irritation test, differences were found in the injection method.

For pesticide risk indicator, the water system risk indicators developed by OECD such as REXTOX (Ratio of EXposure to TOXicity), ADSCOR (ADditive SCORing) and SYSCOR (SYnergistic SCORing) were compared and analyzed, and research was made to formulate a national pesticide risk indicator.

To determine the exposure level of agricultural chemicals to farmers, the operational methods of UK-POEM (UK) were analyzed, and a new exposure model was established suitable for national circumstances.