MINISTRY OF HEALTHCARE
OF THE REPUBLIC OF KAZAKHSTAN



# ROAD MAP FOR

# SETTING UP A SYSTEM OF SOUND MANAGEMENT OF CHEMICALS IN KAZAKHSTAN

**Nur-Sultan, 2020**

# ESTABLISHMENT OF KEY ELEMENTS OF SOUND CHEMICALS MANAGEMENT SYSTEMS IN SELECTED COUNTRIES IN ESTERN EUROPE, CAUCASUS, AND CENTRAL ASIA (2018-2021)

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***The responsibility for the content of this publication lies with the authors.***

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

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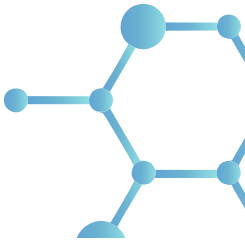
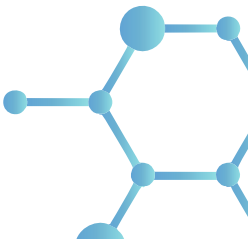


# ABBREVIATIONS

| | |
|---|---|
| CE MIA | Committee of Emergencies of the Ministry of Internal Affairs of the Republic of Kazakhstan |
| CPSP | Chemical Products Safety Passport |
| EC | Environmental Code of the Republic of Kazakhstan |
| EEU | Eurasian Economic Union |
| GHS | Globally Harmonized System of Classification and Labelling of Chemicals |
| IHR | International Health Regulations |
| LEB | Local Executive Bodies |
| | |
| MEGNR | Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan |
| MF | Ministry of Finances of the Republic of Kazakhstan |
| MH | Ministry of Health of the Republic of Kazakhstan |
| MIID | Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan |
| MLSS | Ministry of Labour and Social Security of the Republic of Kazakhstan |
| NAC | National Accreditation Center |
| NCEC | National Centre of Expertise and Certification |
| NIP | Stockholm Convention National Implementation Plan |
| OECD | Organization for Economic Co-operation and Development |
| POPs | Persistent Organic Pollutants |
| RMS | Risk Management System |
| RPET | Register of Pollutant Emissions and Transfers |
| SAICM | Strategic Approach to International Chemicals Management |
| SDGs | Sustainable Development Goals |
| TC MIID | Transport Committee of the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan |
| TR | Technical Regulations |
| WHO | World Health Organization |



# INTRODUCTION

Setting up a system of the sound management of chemicals is an important policy area of the Republic of Kazakhstan in light of the need to achieve the Sustainable Development Goals (SDGs). In one way or another, 12 out of 17 SDGs, i.e. 1, 2, 3, 4, 6, 8, 9, 11, 12, 14, 15, 17, have targets related to the sound management of chemicals and waste. Moreover, Kazakhstan is a party to multilateral international environmental agreements, which impose obligations on the country in the field of environmental protection and chemical safety.

This publication acts as a road map describing measures needed to develop a system of sound management of chemicals, including measures to ensure its sustainable functioning in the Republic of Kazakhstan.

The Road Map is being developed under the project "Establishment of key elements of national systems for sound management of chemicals in selected countries of Eastern Europe, Caucasus, and Central Asia". The Road Map reflects conclusions and recommendations of the Chemicals Management Screening Assessment in the Republic of Kazakhstan.

The recommendations spelled out in the Road Map are applicable to chemical safety authorities, local executive bodies, production facilities and other stakeholders. This Road Map will contribute to the development of the sound chemicals management system, achievement of the Sustainable Development Goals, implementation of the Concept for Transition of the Republic of Kazakhstan to Green Economy and reduced impact of hazardous chemicals on human health and the environment.

# 1 GENERAL APPROACHES TO SETTING UP SOUND CHEMICALS MANAGEMENT SYSTEM IN KAZAKHSTAN

According to the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), sound management of chemicals and waste will contribute to the achievement of the Sustainable Development Goals and improved quality of life. This applies to poverty eradication, food security and public health, sustainable urban and community development, and sustainable consumption and production.

In Kazakhstan, ensuring chemical safety is one of the priorities of the Concept for Transition of the Republic of Kazakhstan to Green Economy.[1] Thus, according to the Concept, it is necessary to:

- Improve regulatory frameworks for chemicals management, align the legislation on health care, labour safety and protection, industrial safety, environmental protection, including in relation to the Register of Chemical Products, with the Law on Chemical Production Safety;
- Ensure the introduction of environmentally safe technologies and processes, including technologies of disposal of waste containing persistent organic pollutants (POPs) and other hazardous waste;
- Introduce the International System of Classification and Labelling of Chemicals;
- Improve the system of statistical reporting on and accounting of chemicals at the country level with the establishment of registers of chemical emissions and transfers at the regional and national levels.

However, to implement the Concept, it is necessary to step up the action in the area of sound management of chemicals. With the view of international challenges and national goals and objectives, it is necessary to consolidate the efforts of all stakeholders for the development of the sound chemical management system in Kazakhstan.

Taking into the account provisions of the Concept for Transition of the Republic of Kazakhstan to Green Economy and results of the Chemicals Management Screening Assessment in the Republic of Kazakhstan,[2] as well as pressing issues in the area of chemical safety in Kazakhstan, several

[1]The concept for the transition of the Republic of Kazakhstan to a "green" economy, approved by the decree of the President of the Republic of Kazakhstan dated may 30, 2013 No. 577.

[2] Screening assessment "Chemical management in the Republic of Kazakhstan", Astana, 2019

priority areas can be identified for the development of the sound chemicals management system in the country (Fig. 1).


**Fig. 1 – Priority areas of sound management of chemicals in Kazakhstan**

Intermediate goals in these areas are presented in Table 1. A more detailed description of the necessary measures in the selected areas is provided in the sections below.

**Table 1 – Key areas of development of sound chemicals management system in Kazakhstan**

| Activity areas | | | | | |
|---|---|---|---|---|---|
| Improvement of legislation | Improvement of institutional framework | Public health protection and role of health sector | Minimisation of natural and manufacturing environment pollution, consumer goods safety | Technological improvements in manufacturing industry and agriculture | Stakeholder capacity building and information sharing |
| **Intermediate goals in these areas** | | | | | |
| Aligning legislation with international requirements and ensuring regulation of key elements of management of chemicals and chemical mixtures | Active engagement of all stakeholders in addressing chemical safety issues and fruitful cooperation between various agencies, development of infrastructure for management of chemicals and chemical mixtures | Increasing health sector's role in management of chemicals and chemical mixtures to improve public health protection and reduce mortality and morbidity due to adverse effects of hazardous chemicals | Creation of non-toxic environment for people by reducing environmental pollution with chemicals | Gradual introduction of “clean manufacturing technologies” in industry and agriculture, including reduced use of hazardous chemicals and chemical mixtures, as well as use of safe alternatives | Building knowledge, skills and abilities as well as technical capacities for effective management of chemicals, including for improvement of data collection and analysis and provision of information |

**Ultimate goal:** To ensure sound management of chemicals throughout their life cycle so that to minimise significant adverse effects on human health and environment

# 2 KEY AREAS OF DEVELOPMENT OF SOUND CHEMICALS MANAGEMENT SYSTEM IN KAZAKHSTAN

## 2.1 Improvement of legislation

Various legislative and regulatory acts regulate activities aimed at ensuring chemical safety in Kazakhstan. Some documents, such as Standard No. 1185-2006 of the Republic of Kazakhstan "Chemical products safety passport. Composition, development and application procedures" and "List of standard hazard symbols used in warning labelling of chemical products"[3] have been aligned with the Globally Harmonized System of Classification and Labelling of Chemicals. However, the lack of legal standards regulating important aspects of handling chemical substances and products as well as insufficient enforcement of regulatory acts point to the need to improve the chemical management legislation in Kazakhstan.

In this area the following activities should be of priority concern:

- Improving regulatory frameworks for chemicals management taking into account international agreements, including but not limited to Globally Harmonized System of Classification and Labelling of Chemicals, Stockholm Convention on Persistent Organic Pollutants, Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Strategic Approach to International Chemicals Management, in the following regulatory acts:
  - Law on Safety of Chemical Products of July 21, 2007 No. 302-3;
  - Environmental Code of the Republic of Kazakhstan of January 9, 2007 No. 212-III;
  - Code on People's Health and Health Care System of September 18, 2009 No. 193-IV;
  - Labour Code of the Republic of Kazakhstan of November 23, 2015 No.414-V;
  - Law on Food Safety of July 21, 2007 No. 301;
  - Law on Veterinary Medicine of July 10, 2002 No. 339;
  - Law on Plant Protection of July 3, 2002 No. 331-II, etc.
- Establishing legal requirements in the area of prohibition

[3]Order of the Minister of industry and trade of the Republic of Kazakhstan dated April 2, 2008 N 115 "On approval of the List of standard hazard symbols specified in the warning marking of chemical products".

and restriction of production and use of hazardous chemical substances and their mixtures;

- Tightening enforcement of chemical safety regulations, including control of prohibited and restricted substances in consumer goods, control of compliance with legal requirements when using chemical products in the manufacturing industry and agriculture, control of illegal trafficking of hazardous chemicals;
- Integrating sound management of chemicals into national, regional and sectoral development plans and programmes;
- Ensuring ratification of Minamata Convention on Mercury;
- Speeding up implementation of conventions on chemical safety ratified by Kazakhstan, including the Stockholm Convention on Persistent Organic Pollutants, Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, conventions of the International Labour Organization;
- Strengthening regulation in the area of use of chemicals in consumer goods, including by improving the system of certification, passportization and registration of chemical products;
- Updating existing norms on the maximum allowable concentrations and emissions of hazardous chemicals in the water, air, soil, food and aligning them with the international requirements;
- Considering whether it is feasible to keep all existing registers of chemical substances and/or products and to integrate them into a single register given the current development of the Register of Chemical Substances under Technical Regulation No. 041/2017 of the Eurasian Economic Union (TR EAEU);
- Incorporating a requirement to develop and use environmentally safe alternative processes and chemicals into the legislation wherever possible;
- Tightening liability of manufacturers and importers of chemical products for violation of chemical safety regulations at the stage of production, storage, transportation, use and disposal.

Implementation of all the above-listed measures will contribute to the development of a solid regulatory framework for the safe management of chemicals throughout their life cycle, as well as to the alignment of national regulations with international standards, rules and policies.

All stakeholders, including authorised agencies, industry associations, experts and civil society, should be engaged.

## 2.2 Improvement of institutional framework

Sound management of chemicals is impossible to ensure without the participation of ministries concerned in the process of development and implementation of the chemicals management policies and coordination of efforts in related areas of chemical safety.

A mechanism fostering close and constructive cooperation between different agencies is required to ensure a comprehensive approach to addressing issues on chemicals management. It is important that the parties involved agree on how to maximize the benefits of chemicals use while eliminating or minimizing the adverse effects of hazardous substances on human health and the environment. Such a mechanism can take the form of a council/workgroup under one of the authorized agencies. It should be composed of representatives of governmental bodies, industry associations, non-governmental organizations and other stakeholders. Every ministry and department involved in the process of handling chemicals, chemical products and waste must have in place proper infrastructure enabling them to play their role in the management of chemicals.

The scope of responsibilities of governmental bodies related to the sound management of chemicals and official establishment of an interagency coordination mechanism for all authorized agencies and other stakeholders involved in the production and use of chemicals and chemical waste management must be prescribed by law.

Key thematic areas for interagency coordination and infrastructure development in the concerned agencies are presented in Table 2.

**Table 2 – Thematic areas for interagency coordination**

| Thematic area | Governmental bodies |
|---|---|
| Conceptual approaches to chemicals management | MEGNR, MIID, CE MIA |
| Classification and labelling of hazardous chemicals and their mixtures | MH, MEGNR, MIID, CE MIA |

| | |
|---|---|
| Registration of chemicals and their mixtures | MIID, CE MIA, MH, MA |
| Threshold values for chemicals | MH, MIID, CE MIA, MEGNR |
| Registers of chemicals and their mixtures | MIID, CE MIA, MA, MH |
| Risk assessment related to chemicals | MH, MEGNR, CE MIA, MIID, MLSS |
| Assessment of chemical impact on public health and the particularly vulnerable | MH, MEGNR, CE MIA, MLSS |
| Implementation of international chemical safety conventions | MEGNR, MIID, CE MIA, MH, MA, TC MIID, MF, LEB |
| State enforcement of the chemical safety legislation | MH, MEGNR, MIID, CE MIA, MLSS, MA, TC MIID |
| Chemicals management throughout their life cycle | MEGNR, MIID, CE MIA, MLSS, MH, MA, TC MIID, MF, LEB |

In this area the following activities should be of priority concern:

- Establishment of a permanent interagency mechanism;
- Identification of a unit within the health care system responsible for the management of chemicals and their mixtures;
- Identification of a unit within the environmental protection system responsible for the implementation of the Stockholm, Basel, Rotterdam and Minamata Conventions and acting as the National Focal Point for these conventions;
- Establishment of a network of institutions responsible for individual aspects of the management of chemicals and their mixtures (classification and labelling, risk evaluation, etc.);
- Evaluation of technical and other resources needed for infrastructure development in the area of management of chemicals and their mixtures;
- Updating the mandate of the National Focal Person for SAICM and international chemical safety conventions ratified by the Republic of Kazakhstan;
- Creating conditions to intensify research for justification of measures of the effective management of chemicals and their mixtures, including the provision of methodological and technical support to laboratories and research institutes, subordinate organizations of authorized agencies at the national, regional and local levels;
- Boosting interaction among governmental bodies, trade unions,

businesses and public organizations to ensure continuous training of employees, representatives of local authorities and communities in order to provide detailed information on best practices of handling, exposure reduction and recognition of signs of adverse effects on human health. (Increasing factory workers' knowledge of chemical threats and their prevention and raising public awareness of risks associated with chemical substances).

Establishment of an intersectoral interaction mechanism should ensure interagency coordination and cooperation, including for the purpose of adopting the Health in All Policies approach in the development of national policies and programmes.

Improvement of the institutional framework will help engage all stakeholders in addressing chemical safety issues and establish fruitful cooperation among various agencies.

## 2.3 Public health protection and role of health sector

According to the World Health Organization, the average mortality rate from unintentional poisoning in 2009-2014 in Kazakhstan was 2 deaths per 100,000 people.[4] Since 2008, the number of non-communicable disease cases potentially associated with environmental pollution has been increasing among children, who are more sensitive to environmental pollution than adults. In 2016, the number of children diagnosed with asthma was 2.6 times higher than in 2009. The total incidence of cancer among children increased by 60% between 2009 and 2016. The incidence of chronic bronchitis continues to be high. The number of congenital disorders has also been increasing: from 604.1 cases per 100,000 people in 2008 to 999.0 cases per 100,000 people in 2015.[5]

The above stated demonstrates the need to take urgent measures to improve public health protection strategies in Kazakhstan, first of all, to protect those employed in hazardous industries and living in contaminated areas from exposure to hazardous chemicals resulting in oncological diseases, prenatal development disorders, respiratory, endocrine, cardiovascular and urinary diseases. Increasing the role of the health sector in the sound management of chemicals and their mixtures is crucial for the protection of public health from exposure to hazardous chemicals.

[4]Fact sheets on Sustainable Development Goals: health targets. Hazardous chemicals. World Health Organization, Regional Office for Europe.

[5]Environmental Performance Reviews of Kazakhstan, Third Review, United Nations Economic Commission for Europe, 2019.

In this area the following activities should be of priority concern:

- Ensuring that health risk assessment is widely integrated into decision-making and policy planning processes;
- Conducting public health monitoring by regions taking into account the Environmental Risk Exposure Map;
- Improving the system of identification, assessment and reporting of diseases associated with chemical exposure;
- Implementing WHO Chemicals Road Map.[6]

Key measures to enhancing health sector engagement in the management of chemicals and their mixtures are summarised in Box 1.

[6]Road map to enhance health sector engagement in the Strategic Approach to International Chemicals Management towards the 2020 goal and beyond. World Health Organization, 2017.

### *Box 1. Key measures to enhance health sector engagement in sound management of chemicals and chemical mixtures in Kazakhstan*

1. Appointment of a Focal Person for chemicals and health and Road Map implementation by the Ministry of Health of Kazakhstan and establishment of the national expert network on chemicals and health.
2. Following guidelines in health care settings to promote and facilitate the use of safer alternatives and sound management of health care waste, drawing on relevant guidelines from the WHO and other international organizations.
3. Reducing the use of mercury in health care and management of mercury-contaminated waste.
4. Development and introduction of policies and programmes on strengthening and protection of public health taking into account the life cycle of hazardous chemicals, especially for the vulnerable, first of all, children.
5. Study of the relationship between chemical exposure and health outcomes at the local level, including in connection with environmental pollution, individual contaminated sites and consumer goods.
6. Ensuring access to data on health effects of chemicals (for example, data of risk assessments, population and environmental monitoring, non-communicable disease surveillance).
7. Building capacity of health specialists in endocrine-active chemicals, nanomaterials, environmentally persistent pharmaceuticals, combined exposures to multiple chemicals, gender, links to non-communicable diseases, best practices for safe chemicals management within the health sector, including occupational, patient/community and environmental impacts in health care settings.
8. Publication of articles on chemicals-related health sector issues in peer-reviewed health care, medical, toxicology and other related journals.
9. Organization of high-level briefing sessions on chemicals and health for decision-makers at the national, regional and international levels.
10. Identification of national indicators of progress in reducing the burden of disease from chemicals, aligned with global indicators where possible.
11. Documenting experiences with and effectiveness of various awareness-raising, risk-reduction actions and prevention strategies, and sharing this information with other parties.
12. Collection and management of health data and information necessary for reporting progress on SAICM and other international strategies.
13. Participation and active engagement in networks, including the WHO Chemical Risk Assessment Network and WHO INTOX network of poison centres.

The above-mentioned activities will foster the strengthening of health sector capacities in order to increase public health protection and reduce mortality and morbidity from adverse effects of hazardous chemicals.

The health sector has a pivotal role to play in implementing activities in this area. Trade unions, industry associations, manufacturing facilities and non-governmental organizations should be involved as well.

## 2.4 Minimization of environmental and industrial pollution

Hazardous chemicals in the air, water, soil, food, consumer goods and work environment cause a wide range of diseases. The level of environmental pollution with hazardous chemicals in Kazakhstan is quite high. The country has contaminated sites, the amount of industrial and household waste has been constantly increasing, in agriculture there is an acute problem of disposal of obsolete and unusable pesticides and their chemical identification. Therefore, there is a need for improved measures on management and minimization of chemical concentrations in the air, water, soil and waste; safe disposal of obsolete chemicals and remediation of contaminated sites.

In this area the following activities should be of priority concern:

- Minimization of ambient air pollution through the application of environmental protection measures: use of highly efficient dust, ash and off-gas cleaning systems; conducting regular monitoring (state, production); introduction of the best available evidence-informed technologies based on the principle of minimization of emissions into the ambient air, fuel quality improvement, use of alternative sources of energy, a transition to green transport;
- Upgrade of the wastewater disposal and treatment systems to reduce discharges of untreated wastewater to the environment and improve wastewater treatment efficiency;
- Construction and reconstruction of urban rainwater systems to prevent surface and groundwater contamination;
- Improvement of methodology and procedures for assessing risks associated with the use of chemicals in the workplace and for assessing impacts on people living in contaminated areas or near sources of contamination, including assessment of path-

ways through which chemicals can enter human body and ecosystems;

- Identification of priority chemicals for monitoring, assessment and planning of preventive measures to reduce the risks of human exposure in the workplace and at home;
- Risk assessment of contaminated sites and workplaces taking into account international practices; priority should be given to the most vulnerable, including women, children, the elderly, the disabled and others;
- Improvement of solid domestic waste (SDW) segregation, including in rural areas, with mandatory separation of SDW hazardous components and prevention of their entry into landfills and waste disposal sites;
- Identification of needs for waste management, clean-up and remediation of contaminated sites as compared to the future costs of environmental degradation and addressing social and health issues without adequate solutions;
- Taking stock of previously stockpiled obsolete and banned pesticides (toxic legacy of the past) with due regard to the analysis of warehouses and disposal sites conducted by accredited laboratories;
- Improvement of the waste management system adhering to the accepted waste management hierarchy when the main priority is given to contamination prevention and maximum waste recycling with resource extraction and only then resorting to incineration (as a potentially dangerous process resulting in hazardous chemicals emission) and burial;
- Development of a single programme of research, remediation and rehabilitation of contaminated sites with the participation of MEGNR, MH, MIID, LEB, non-profit organizations and the public;
- Zoning of the territory of the Republic of Kazakhstan used for waste storage (including historical); conducting environmental damage and risk assessments to plan measures on cleaning and remediation of disturbed lands with the further achievement of social goals and addressing health problems;
- Monitoring of previously formed landfills and long-term waste storage facilities to prevent the entry of hazardous chemicals into the soil, groundwater, atmosphere with subsequent implementation of measures on their neutralization and disposal;
- Improving methods of con-

trol over production facilities involved in the collection, stockpiling and storage of chemical waste for their subsequent disposal;

- Conducting a number of studies on the use of man-made raw materials accumulated (stored) at dumps and landfills in production;
- Implementation of activities on regulation and minimization of POPs impact in Kazakhstan.

### *Box 2. Activities on management and minimization of exposure to POPs*

1. Improvement of legislative regulation of unintentionally produced POPs, industrial POPs and POP pesticides, including improvement of the Handling Rules of Persistent Organic Pollutants and Wastes Containing them.
2. Identification of benefits and preferences for businesses temporarily storing PCB-containing equipment.
3. Restriction and prohibition of business activities on POP-contaminated and other sites.
4. Thoroughly taking stock of obsolete pesticides; construction of warehouses for temporary storage of pesticide waste and repackaging of obsolete pesticides.
5. Destruction of POP pesticide waste.
6. Improvement of stocktaking of PCB-containing equipment, streamlining reporting on PCB-containing equipment to the authorised environmental protection agency and improvement of PCB-containing equipment and waste monitoring at production facilities.
7. Increasing the number of accredited laboratories with equipment, measuring devices, measurement procedures, state standard samples enabling them to identify POPs included in the state register.
8. Strengthening state control over POPs handling.
9. Provision of personnel training on PCB management in companies and supervisory bodies.
10. Setting up temporary storage facilities for PCB-containing equipment.
11. Monitoring and keeping an annual register of dioxin and furan emissions.
12. Analysis of existing industrial off-gas cleaning systems and providing recommendations on the best available technologies and best environmental practices (BAT and BEP) to reduce emissions of dioxin and furan and other unintentionally produced POPs.
13. Interventions to reduce emissions of unintentionally produced POPs, including those of dioxin and furan.
14. Thorough stocktaking of contaminated regions is needed to pinpoint the contaminated area, sites, pollutants and their concentrations, and subsequently analyse environmental hazards and assess treatment needs.
15. Taking measures to clean POP-contaminated sites.
16. Improvement of the reporting on hazardous chemicals, including POPs.

The ultimate goal of these measures should be a reduction in human and environmental exposure to hazardous chemicals in the air, water, and soil.

An authorized environmental protection agency and its subordinate organization responsible for the coordination of activities related to the implementation of the Stockholm Convention on Persistent Organic Pollutants and Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal should be actively engaged in these activities. Moreover, local executive bodies are to play an important role in minimization of waste and obsolete chemicals and remediation of contaminated sites. International organizations may be involved to provide technical and financial support for the implementation of necessary activities.

## 2.5 Technical and technological improvements in manufacturing industry and agriculture

Chemical production and use have been constantly increasing. Over the last five years, the output of chemical products grew by 74% (in cash equivalent) to 401,141 mln tenge in 2018. The number of businesses and manufacturing facilities has also increased in this sector. While in 2014 there were 242 companies, in 2018 the number of businesses and manufacturing facilities reached 295. In this respect improving equipment and technologies used in the manufacturing industry and agriculture is crucial.

In this area the following activities should be of priority concern:

- Taking stock of chemicals produced/used in the chemical industry;
- Conducting research on the development and introduction of environmentally safe preparations for crop and livestock cultivation;
- Developing measures for phasing out hazardous chemicals in the manufacturing industry and their replacement with alternative environmentally safe substances;
- Conducting research aimed at eliminating hazardous chemicals in consumer goods or establishing their safe thresholds and developing measures to reduce the circulation of products containing such substances on the market of Kazakhstan;
- Improving legal standards to ensure safe production and han-

ling of chemicals and products thereof, including establishment of a mandatory requirement to develop a programme for the safe handling of chemicals at manufacturing facilities;

- Tightening measures on the regulation of use and phasing out highly hazardous pesticides;
- Minimizing pesticide application to the soil and using non-chemical pest control methods;
- Tightening enforcement of industrial safety and pesticide handling regulations;
- Developing and introducing preventive and rehabilitative measures to reduce risks associated with production and use of chemicals in the workplace and their spread in the environment;
- Promoting contamination prevention and waste minimization measures, introducing "green technology" principles;
- Strengthening the system of early warning about occupational chemical hazards and precautionary measures;
- Introduction of approaches based on the best practices and best available technologies;
- Introduction of "green" criteria in the product design processes, including a transition to a circular economy;
- Development and integration of chemical safety assessment criteria into the state environmental impact assessment;
- Incorporation of "green" economy criteria into the processes of investment, credit and loan granting to launch and expand production.

Ultimately, interventions in this area should lead to a consistent reduction to the acceptable minimum in risks of exposure to hazardous chemicals used in the manufacturing industry and agriculture.

A key role in planning and coordinating technical and technological improvements in the manufacturing industry and agriculture should be assigned to an authorized industrial safety agency and authorized agricultural agency. Manufacturing companies, industry associations, producers and suppliers of pesticides and other chemical products used in agriculture as well as non-governmental organizations also play an important role in improving the handling of chemicals in the manufacturing and agricultural sector.

## 2.6 Stakeholder capacity building and information sharing

Capacity building of various stakeholders, improvement of the

system of data collection, analysis and provision of information about different aspects of chemical safety is essential and affects the efficiency of all the above-noted areas and measures.

In this area the following activities should be of priority concern:

- Enhancing information sharing on chemicals and waste management between various stakeholders;
- Widespread introduction of the International System of Classification and Labelling of Chemicals and Their Mixtures;
- Improvement of statistical reporting on and accounting of chemicals at the national level;
- Improvement of the Register of Pollutant Emissions and Transfers in the Republic of Kazakhstan, including development of regulatory requirements and methodological documents for maintaining the Register;
- Ensuring availability of the information on hazardous chemicals and materials, chemical products, development and introduction of mechanisms for communicating this information through production and consumer networks;
- Raising awareness of decision-makers, industry representatives and community leaders on harmful effects of hazardous chemicals on the environment and health and on the importance of sound management of chemicals through their life cycle;
- Strengthening technical capacity of local analytical laboratories to receive reliable operational data on contamination of surface and groundwaters, soil and ambient air in order to take remediation and preventive measures, identify and examine contaminated sites to determine the territories in need of a clean-up and restoration;
- Developing a system of consumer goods monitoring and dangerous products identification;
- Intensifying evaluation studies of soil and groundwater contamination, especially at obsolete and prohibited pesticides disposal sites, landfills and other pollution "hotspots";
- Publication of the Register of Potentially Hazardous Chemical and Biological Substances Banned from Use in the Republic of Kazakhstan in line with the Code of the Republic of Kazakhstan "On Public Health and Health Care System" and making it publicly available;
- Mandatory introduction of workers' safety sheets stipulating safe handling procedures of chemicals and mixtures in the workplace;

- Improvement of curricula and programmes of universities and colleges of medical and technical specialties to include the topic of safe handling of chemicals;
- Raising public awareness about chemical safety issues by conducting workshops and trainings, making videos, animations, infographics which can be shared on social media, public transport platforms, etc.

Activities in this area should result in increased knowledge, skills and abilities needed for the effective management of chemicals and improved data collection, analysis and information sharing to track changes in handling chemicals and to ensure timely decision-making.

All stakeholders, including authorized bodies, industry associations and expert community should be engaged. The non-governmental sector has a major role to play in awareness-raising activities.

# CONCLUSIONS

Safe management of chemicals throughout their life cycle is an important prerequisite for human health and environmental protection in the context of intensive production and the use of chemicals and their mixtures and waste generation.

Kazakhstan takes an active part in the global and regional processes of sound management of chemicals and waste. The Concept for Transition of the Republic of Kazakhstan to Green Economy sets out a number of measures needed for the development of the safe chemicals management system in Kazakhstan.

At the national level, however, there is a lack of integration of chemical safety considerations into country policies, legislative documents and chemicals management practices. Moreover, there is no single coordinating body for chemicals management, and there are low capacity and awareness of public authorities and society about chemical effects on public health and sound management of chemicals.

In this respect there is a need to boost efforts on the development of the sound chemicals management system in Kazakhstan, including in the following areas:

- Improvement of legislation;
- Improvement of the institutional framework;
- Public health protection and role of the health sector;
- Minimization of environmental and industrial pollution;
- Technical and technological improvements in the manufacturing industry and agriculture;
- Stakeholder capacity building and information sharing.

The measures proposed in this Road Map are aimed at the development of the sound chemical management system in Kazakhstan. The ultimate goal of all the activities described above is to ensure sound management of chemicals throughout their life cycle to minimize significant harmful effects on human health and the environment.

# NOTES

**Address:**

010000, Republic of Kazakhstan,
Nur-Sultan, Momyshuly st. 12/11,
Business Center «Avenue»

**Telephone:**
+7 (7172) 95-41-05

**E-mail:**

secretariat@hls.kz

www.hls.kz

НЦОЗ МЗ РК

ncph_kz

ncozmz

НЦОЗ МЗ РК