



# HEALTH AND POLLUTION ACTION PLAN

Kyrgyz  
Republic

May 2019

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This publication has been funded by the European Union and the United States Agency for International Development.

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Kyrgyz Republic

May 2019

Completed as part of the UNIDO global project entitled  
**Mitigating Toxic Health Exposures in Low- and Middle-Income Countries**

Funded by the  
**European Union**  
and the  
**United States Agency for International Development**

# FOREWORD

**КЫРГЫЗ РЕСПУБЛИКАСЫНЫН  
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ЛЕСНОГО ХОЗЯЙСТВА  
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The negative impacts of pollution on human health have been well known since at least the start of the industrial revolution. A report published in The Lancet medical journal in October 2017 summarized the results of “The Lancet Commission on Pollution and Health”. This report reminded us forcefully of the continuing damage to our health caused by pollution, despite all the pollution mitigation efforts we have taken to date. It projected that diseases caused by pollution were responsible for an estimated 9 million premature deaths in 2015. To put that in perspective, this number constituted 16% of all deaths worldwide. The Commission further noted that pollution disproportionately kills the poor and the vulnerable. By its estimates, 9 out of every 10 pollution-related deaths occur in low-income and middle-income countries. The Commission finally noted that children are at high risk of pollution-related disease.

The Government of the Kyrgyz Republic has made health and environmental protection priority areas in its Development Program for 2018-2022 and in its Development Strategy for 2018-2040. Prevention of diseases is regarded as the key principle allowing for reduced health costs and the improvement of basic health indicators. At the same time, the Kyrgyz Republic strives to become country with a favourable environment for human life, developing in harmony with nature, preserving unique natural ecosystems, and efficiently using natural resources for climate-sustainable development. In this respect, the Government of the Kyrgyz Republic aims to introduce the principles and requirements of the green economy as well as inclusive and sustainable industrialization.

State Agency on Environment Protection and Forestry under the Government of the Kyrgyz Republic welcome this report, which will be a valuable support to improve the environmental indicators of the country; in line with the objectives set out in the National Development Strategy of the Kyrgyz Republic for 2018-2040. Two major sources of pollution with significant impacts on the health of Kyrgyz citizens – outdoor air pollution and water contamination – the report proposes, in the form of Project concepts, an extensive set of actions to be taken to reduce the health and environmental impacts from these sources.

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**To whom it may concern**

The negative impacts of pollution on human health have been well known since at least the start of the industrial revolution. A report published in The Lancet medical journal in October 2017 summarized the results of “The Lancet Commission on Pollution and Health”. This report reminded us forcefully of the continuing damage to our health caused by pollution, despite all the pollution mitigation efforts we have taken. It projected that diseases caused by pollution were responsible for an estimated 9 million premature deaths in 2015. To put that in perspective, this number constituted 16% of all deaths worldwide. The Commission further noted that pollution disproportionately kills the poor and the vulnerable. By its estimates, 9 out of every 10 pollution-related deaths occur in low-income and middle-income countries. The Commission finally noted that children are at high risk of pollution-related disease.

The Government of the Kyrgyz Republic has made health and environmental protection priority areas in its Development Program for 2018-2022 and in its Development Strategy for 2018-2040. Prevention of diseases is regarded as the key principle allowing for reduced health costs and the improvement of basic health indicators. At the same time, the Kyrgyz Republic strives to become a country with a favorable environment for human life, developing in harmony with nature, preserving unique natural ecosystems, and efficiently using natural resources for climate-sustainable development. In this respect, the Government of the Kyrgyz Republic aims to introduce the principles and requirements of the green economy and inclusive and sustainable industrialization in all stages of the policy cycle.

The Ministry of Health welcome the Health and Pollution Action Plan (HPAP) since it is focusing on two major sources of pollution with significant impacts on the health of Kyrgyz citizens - outdoor air pollution and water contamination. The report considers two Project Concepts containing an extensive set of actions to be taken to reduce the health and environmental impacts. Implementation of actions under the Project Concepts will demand to strengthening, expanding cooperation between stakeholders and in line with the objectives set out in the National Development Strategy of the Kyrgyz Republic for 2018-2040.

**Deputy Ministry of Health of the KR**

**E.M. Checheibaev**

# ACKNOWLEDGEMENTS

The Health and Pollution Action Plan (HPAP) for the Kyrgyz Republic is the result of collaborative efforts and inputs from different stakeholders including Jogorky Kenesh of the Kyrgyz Republic, Government of the Kyrgyz Republic, different ministries and agencies, regional government and municipalities, intergovernmental organizations, international financial institutions, embassies, development agencies, academia, private sector and civil society under the facilitation of the United Nations Industrial Development Organization (UNIDO).

In particular, we wish to thank Mr. Ekmat Baipakpaev, Member of the Jogorku Kenesh of the Kyrgyz Republic, and Mr. Arsen Ryspekov, Deputy Director of the State Agency for Environmental Protection and Forestry of the Kyrgyz Republic, for their crucial support. Furthermore, we wish to express our appreciation for the valuable contributions provided by Institute for Preventive Medicine under the Ministry of Health, the Department of Disease Prevention and State Sanitary and Epidemiological Surveillance under the Ministry of Health, Kyrgyz Hydromet under the Ministry of Emergency Situations, Bishkek Mayor's Office, Regional Government of Issyk-Kul Oblast, Issyk-Kul Laboratory under the State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic, the FinWaterWEI II Project in the Kyrgyz Republic, and the NGO "Move Green".

We also thank the European Union and the United States Agency for International Development for providing the financial support.

Graphic design: Adelaida Contreras

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# ABBREVIATIONS

<b>ADB</b>	Asian Development Bank
<b>ALRI</b>	Acute Lower Respiratory Illness
<b>APMP</b>	Ambient Particulate Matter Pollution
<b>CD</b>	Communicable Diseases
<b>CFU</b>	Colony Forming Units
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>COPD</b>	Chronic Obstructive Pulmonary Disease
<b>DALY</b>	Disability Adjusted Life Year
<b>DDPSES</b>	Department for Disease Prevention and State Sanitary and Epidemiological Surveillance of the Ministry of Health
<b>DFID</b>	Department for International Development of the United Kingdom
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>EIA</b>	Environmental Impact Assessment
<b>EIB</b>	European Investment Bank
<b>EU</b>	European Union
<b>EUR</b>	Euro
<b>GAHP</b>	Global Alliance on Health and Pollution
<b>GBD</b>	Global Burden of Disease
<b>GDP</b>	Gross Domestic Product
<b>GNI</b>	Gross National Income
<b>GSDR</b>	Global Sustainable Development Report
<b>HAP</b>	Household Air Pollution
<b>HIV/AIDS</b>	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
<b>HPAP</b>	Health and Pollution Action Plan
<b>IFCA</b>	Investment Facility for Central Asia
<b>IHD</b>	Ischemic Heart Disease
<b>IHME</b>	Institute for Health Metrics and Evaluation
<b>KR</b>	Kyrgyz Republic
<b>GKR</b>	Government of the Kyrgyz Republic
<b>ILO</b>	International Labour Organization

<b>LIMS</b>	Laboratory Information Management System
<b>LMO</b>	Living Modified Organisms
<b>MAC</b>	Maximum Allowable Concentration
<b>MAC<sub>aac</sub></b>	Maximum average annual concentration
<b>MAC<sub>adc</sub></b>	Maximum average daily concentration
<b>MAC<sub>msc</sub></b>	Maximum single concentration
<b>MES KR</b>	Ministry of Emergency Situations of the Kyrgyz Republic
<b>MW</b>	Megawatt
<b>NCD</b>	Non-Communicable Diseases
<b>NEHAP</b>	National Environmental Health Action Plan
<b>NGO</b>	Non-Governmental Organization
<b>NO<sub>x</sub></b>	Nitrogen Oxides
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>PM</b>	Particulate Matter
<b>SAEPF</b>	State Agency for Environmental Protection and Forestry
<b>SDGs</b>	Sustainable Development Goals
<b>SECO</b>	State Secretariat for Economic Affairs of Switzerland
<b>SER</b>	State Environmental Review
<b>SSF</b>	Shareholder's Special Fund
<b>UN</b>	United Nations
<b>UNDP</b>	United Nations Development Programme
<b>UNDP-SIWI</b>	Stockholm International Water Institute
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>UNEP</b>	United Nations Environment Programme
<b>UNICEF</b>	United Nations Children's Fund
<b>UNIDO</b>	United Nations Industrial Development Organization
<b>USD</b>	United States Dollar
<b>VOC</b>	Volatile Organic Compound
<b>WHO</b>	World Health Organization

# INTRODUCTION

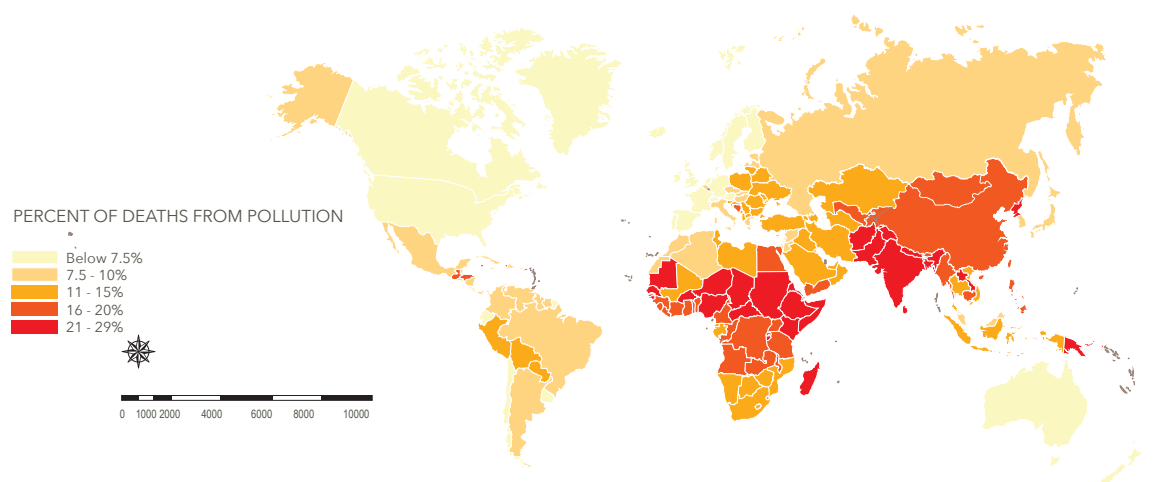


## POLLUTION AND HEALTH

The impacts of pollution on health have always been recognized, although the size of the impacts has consistently been underestimated. A recent report by the Lancet Commission on Pollution and Health<sup>1</sup> rectifies this erroneous impression and quantifies pollution's impacts on human health. The Commission finds that pollution is now one of the biggest drivers of death and disease in the world, causing 16% of all deaths globally. The overwhelming majority of the disease burden from pollution (92%) falls on people in low- and middle-income countries. Pollution's impacts are felt most acutely by communities that are poorly equipped to address the problem and recover from its impacts. Pollution has severe implications for sustainable development, exacerbates the poverty cycle, harms the environment and biodiversity, causes lifelong disability, and stagnates economic growth.

<sup>1</sup> [https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(17\)32345-0.pdf?code=lancet-site](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(17)32345-0.pdf?code=lancet-site), free account registration required.

**Figure 1.** Percentage of all deaths in 2015 that were caused by pollution International normative context



POLLUTION HAS SEVERE IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT, EXACERBATES THE POVERTY CYCLE, HARMS THE ENVIRONMENT AND BIODIVERSITY, CAUSES LIFELONG DISABILITY, AND STAGNATES ECONOMIC GROWTH”.

The linkage between pollution and health has been recognized in the 2030 Agenda for Sustainable Development. Within Goal 3, “Ensure healthy lives and promote well-being for all, at all ages”, target 3.9 aims to “by 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.”

While implementing the SDGs, the Kyrgyz Republic is a party to a multitude of international treaties and conventions relevant to the environment and health. Ratified international obligations and associated laws take priority over national legislation, provided they do not contradict the Constitution (ADB, 2018)<sup>2</sup>. Table 1 summarizes the participation of the Kyrgyz Republic in the most important international conventions related to the environment, pollution and health.

<sup>2</sup> ADB (2018). Initial Environmental Examination, KGZ: Issyk-Kul Wastewater Management Project. Project No.: 50176-002. September 2018.

**Table 1:** Participation of the Kyrgyz Republic in international conventions related to the environment, pollution and health (by year of adoption)

Convention	Adopted/in force	KR Signed/ Ratification or Accession	Main objectives
Paris Agreement	2015/2016	2016/-	Combating climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future.
WHO Framework Convention on Tobacco Control	2003/2005	2004/2006	Reducing continually and substantially the prevalence of tobacco use and exposure to tobacco smoke.
Stockholm Convention on Persistent Organic Pollutants	2001/2004	2002/2006	Eliminating or restricting the production and use of persistent organic pollutants.
Cartagena Protocol on Biosafety to the Convention on Biological Diversity	2000/2003	-/2005	Ensuring the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health.
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	1998/2004	1999/2000	Promoting shared responsibilities in relation to the importation of hazardous chemicals.
Aarhus Convention	1998/2001	-/2001	Granting public rights regarding access to information, and participation and access to justice on matters concerning the local, national and transboundary environment.
Kyoto Protocol	1997/2005	-/2003	Setting internationally binding emissions reduction targets.
United Nations Convention Combat Desertification	1994/1996	-/1997	Reversing and preventing desertification and land degradation in affected areas in order to support poverty reduction and environment sustainability.
United Nations Framework Convention on Climate Change	1992/1994	-/2000	Stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system.
United Nations Convention on Biological Diversity	1992/1993	-/1996	Conservation of biodiversity, sustainable use of its components and equitable sharing of the benefits.
Convention on EIA in a Transboundary Context	1991/1997	-/2001	Integrating environmental assessment into state plans and programs at the earliest stages – so as to help to lay the groundwork for sustainable development.
Basel Convention	1989/1992	-/1996	Controlling transboundary movements of hazardous wastes and their disposal.
Montreal Protocol on Substances that Deplete the Ozone Layer	1987/1989	-/2000	Protecting the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion.

Convention	Adopted/in force	KR Signed/ Ratification or Accession	Main objectives
Vienna Convention for the Protection of the Ozone Layer	1985/1988	-/2000	Protecting human health and the environment against adverse effects resulting from human activities which modify the ozone layer.
Convention on Long-Range Transboundary Air Pollution	1979/1983	-/2000	Protecting the human environment against air pollution and gradually reduce and prevent air pollution, including long-range transboundary air pollution.
Convention on the Conservation of Migratory Species of Wild Animals	1979/1983	-/2014	Conservation and sustainable use of migratory animals and their habitats.
Convention on International Trade in Endangered Species of Wild Fauna and Flora	1973/1975	-/2007	Ensuring that international trade does not threaten wild animals and plants.
Convention Concerning the Protection of the World Cultural and Natural Heritage	1972/1975	-/1995	Protecting cultural and natural heritage.
Ramsar Convention on Wetlands	1971/1975	-/2002	Conservation and wise use of all wetlands through local and national actions and international cooperation to achieve sustainable development.

Source: Adapted from ADB (2018), UN Treaty Collection (2018)<sup>3</sup>

## HEALTH AND ENVIRONMENT FRAMEWORK IN THE KYRGYZ REPUBLIC

This chapter provides an overview about basic legal texts governing environmental and health issues in the Kyrgyz Republic. The supreme law of the country is the “Constitution of the Kyrgyz Republic” of 1993, last amended in 2016. All laws must comply with the Constitution, and only the Parliament may amend it, change or pass laws, and ratify international agreements.

In terms of environment, the Constitution establishes that all natural resources are the exclusive property of the Kyrgyz Republic and thus common property of the people. All Kyrgyz citizens have the right to an environment favorable to life and health. While the country’s natural resources shall enjoy special protection from the State, the Constitution mandates all Kyrgyz citizens to care for the environment, flora and fauna. Based on these principles, there exists a host of legislation aimed at protecting the environment from harmful actions. The most significant general environmental legislation includes the following texts (ADB, 2018):

- *Law on Environmental Protection* of 1999, last amended in 2016, provides state policy and the general legal framework for natural resource utilization and environmental protection, including Environmental Impact Assessments (EIAs), setting environmental standards, and the legal regime for protected areas.

3 [https://treaties.un.org/pages/ParticipationStatus.aspx?clang=\\_en](https://treaties.un.org/pages/ParticipationStatus.aspx?clang=_en)



- *The Ecological Safety Concept of the Kyrgyz Republic* of 2009, last amended in 2012, establishes the basic principles of environmental policy and determines global, national and local environmental issues; priorities in the field of environmental protection at the national level as well as tools to ensure environmental safety.
- *Law on Ecological Expertise* of 1999, last amended in 2015, provides the legislative framework for the State Agency for Environmental Protection and Forestry (SAEPF under the GKR) to undertake State Environmental Reviews (SERs) and approval of EIAs.

In terms of health, the Constitution offers all citizens the right to health protection and offers the right to compensation for damage to health or property resulting from actions in the area of nature management. The Constitution also protects the health of workers by entitling them to labor conditions in which basic requirements for safety and hygiene in the workplace are met. Based on these principles, health-related legislation and legislation specific to the health of workers has been developed, which includes the following key texts:

- *Law on Public Health Care System* of 2009, last amended in 2016, aims at improving the health of the population through increasing access to public health services, promoting issues of protecting and strengthening the health of society in general.
- *Law on Occupational Safety* of 2003, last amended in 2014, provides the basis for regulation relations in the field of labor protection between employers and employees and focused on creating working conditions that meet the requirements of preserving the lives and health of employees in the process of their work.
- *Labor Code of the Kyrgyz Republic* of 2004, last amended in 2017, establishes guarantees for labor rights and freedoms of citizens, creates favorable working conditions, and protects the rights and interests of workers and employers (ILO, 2013)<sup>4</sup>.

Apart from the general environmental legislation mentioned above, there is a large body of legal texts dealing with specific issues such as air and water pollution, clean drinking water and other issues with direct relevance to public health. It is beyond the scope of this document to expand on an exclusive list. Table 2 below thus only lists the most significant selected pieces of legislation in these areas.



4 [https://www.ilo.org/dyn/legosh/en/f?p=14100:1100:0::NO::P1100\\_ISO\\_CODE3,P1100\\_SUBCODE\\_CODE,P1100\\_YEAR:KGZ,,2013](https://www.ilo.org/dyn/legosh/en/f?p=14100:1100:0::NO::P1100_ISO_CODE3,P1100_SUBCODE_CODE,P1100_YEAR:KGZ,,2013)

**Table 2:** Key national environmental legislation of the Kyrgyz Republic (by year passed)

Legislation	Year Passed/ Last Amended	Purpose/Content
Law on Industrial Safety of Hazardous Production Facilities	2016	Ensures safe operation of hazardous production facilities. Provides protection against particular hazards by mandating industrial safety requirements in line with standards regarding sanitary and epidemiological welfare, environmental protection, environmental safety, occupational safety and others.
Rules on Protection of Surface Waters of the Kyrgyz Republic	2016	Provides the legislative framework for defining, specifying standards for the quality of water bodies used for fisheries and irrigation and enforcing regulations regarding discharges to water bodies, among other things.
The Law of the Kyrgyz Republic Technical Regulation “On Safety of Drinking Water”	2011/2017	Establishes mandatory requirements for the application and execution of technical regulation objects.
Law on Public Health	2009/2016	Aimed at improving the health of the population through increasing access to public health services, promoting issues of protecting and promoting the health of society in general.
Law on State Regulation and Policy in the Field of Emission and Absorption of Greenhouse Gases	2007/2016	This law determines the basis for state regulation, the procedure for the activities, rights, duties and responsibilities of state bodies, local governments, individuals and legal entities in the sphere of emission and absorption of greenhouse gases on the territory of the Kyrgyz Republic.
Law on Access to Information	2006/2017	Provides for access to information (including on the natural environment) in view of maximum information openness, publicity and transparency on activities of state bodies and local government bodies.
Law on Protection of the Ozone Layer	2006/2016	Directed at protection of the ozone layer and prevention of adverse health effects caused by destruction of the ozone layer.
Law on Protection of Health of Citizens of the Kyrgyz Republic against Harmful Impacts of Tobacco and its use	2006/2017	Regulates main legal relationships in the field of production, and sales of tobacco and tobacco products as well as implementation of preventive activities in order to protect population of the Kyrgyz Republic against harmful impact of tobacco.
Water Code of the Kyrgyz Republic	2005/2016	Establishes a unified legal base regulating the use, protection and development of water resources to ensure sufficient and safe supply and environmental preservation.
Law on Sustainable Development of Environmental- Economic System of Issyk-Kul	2004/2017	Provides a framework to regulate the preservation, use and sustainable development of Issyk-Kul Lake, including controls on natural resource use and economic development.
Law on Production and Consumption Waste	2001/2018	Regulates waste treatment, prevents negative health impacts of waste and its treatment, and supports circular economy and waste as a resource.
Law on Sanitary and Epidemiologic Well-Being of the Population	2001/2009	Aimed at ensuring the sanitary and epidemiological welfare of the population. The law fixes state guarantees of the constitutional rights of all citizens to health protection and a favorable environment.
Law on Drinking Water	1999/2014	Regulates drinking water availability and its quality.

Legislation	Year Passed/ Last Amended	Purpose/Content
Law on the Radiation Safety of the Population of the Kyrgyz Republic	1999/2014	Determines legal relations in the field of ensuring radiation safety of the population and environmental protection against harmful effects of sources of ionizing radiation.
Law on the Protection of Ambient Air	1999/2005	Regulates ambient air quality (including standards), and air quality management.
Law on Subsoil	1997/2018	Governs relationships arising between the government and individuals, legal entities, or other states while using subsoil.
Law on Water Resources	1994/2016	Regulates the use and protection of water resources. Prevents negative impacts on water resources, e.g., by regulating the quantity and quality of water released into the environment and by providing for water protection zones where activities are prohibited that can negatively impact water quality.
Technical Regulations on Drinking Water	2011/2017	Establishes mandatory requirements for the application and execution of technical regulation objects.

**Source:** Adapted from ADB (2018), own research

# HEALTH AND POLLUTION ACTION PLAN (HPAP) PROCESS IN THE KYRGYZ REPUBLIC: ACTIVITIES AND TIMELINE



Along the international guidance of the Global Alliance on Health and Pollution, the HPAP process focused on five primary sources of pollution which can have significant impacts on human health:

- 1) Outdoor air pollution
- 2) Indoor air pollution
- 3) Unsafe water and inadequate sanitation,
- 4) Chemical contamination of soil
- 5) Occupational exposures to pollutants

A basic objective of the HPAP process is to help achieving real action and measurable outcomes for some of the high priority challenges; for instance, the top 2-3 priorities as collectively identified by the main stakeholders working on the health



“THE SUPPORT OF THE NATIONAL, REGIONAL AND LOCAL GOVERNMENTAL INSTITUTIONS WAS EXPRESSED AT ALL INSTANCES. IN ADDITION, SEVERAL INSTITUTIONS PROVIDED DETAILED INPUTS TO THE DEVELOPMENT OF THE HPAP, WHICH WERE RECEIVED WITH GRATITUDE”.

and pollution nexus. Here, the consultative and analytical process through which stakeholders prioritized issues based on pollution challenges and their associated health impacts is described. In addition, for the chosen priority pollution issues from among the five listed above, brief recommended actions, program and project proposals that would reduce the impacts on public health are summarized.

From the start, the HPAP process in the Kyrgyz Republic consisted of a close cooperation between national, regional and local governmental institutions and UNIDO. Several bilateral meetings were held in the year 2018 with national stakeholders. These meetings served the purpose of introducing the HPAP process to Kyrgyz stakeholders and to receive feedback and information/data for the further implementation of the HPAP project in the Kyrgyz Republic. More importantly,

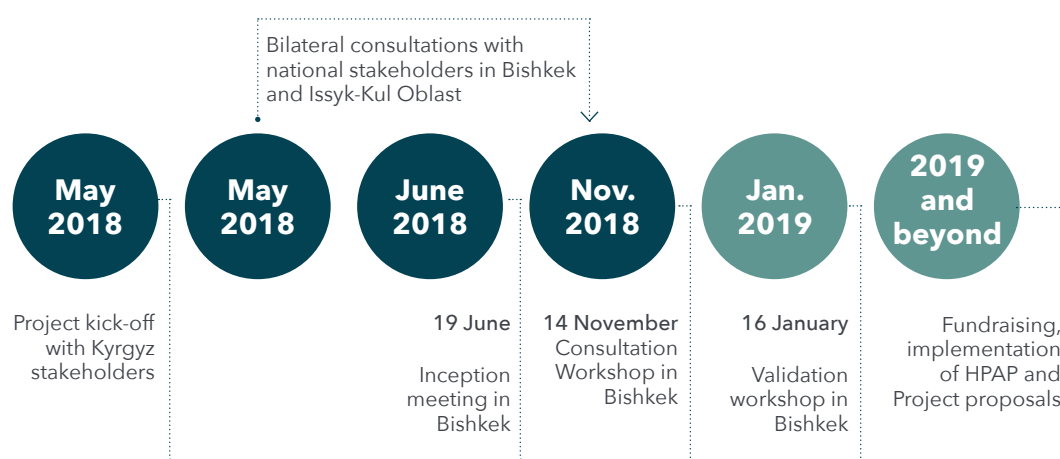
the meetings helped to ensure that the HPAP evolved as a bottom-up process, reflecting local ownership and local priorities. The support of the national, regional and local governmental institutions was expressed at all instances. In addition, several institutions provided detailed inputs to the development of the HPAP, which were received with gratitude.

In particular, UNIDO consulted with the following institutions related to national, regional and local governments:

Jogorku Kenesh of the Kyrgyz Republic	The Parliament of the Kyrgyz Republic
Ministry of Health of the Kyrgyz Republic	Institute of Preventive Medicine, MoH KR
Non-communicable Diseases Unit of the Department of Diseases Control and State Sanitary-Epidemiological Supervision of the MoH KR	Ministry of Transport and Roads of the KR
Ministry of Agriculture, Processing Industry and Melioration of the KR	State Agency for Environment Protection and Forestry under the GKR
Issyk-Kul Laboratory under the SAEPF under the GKR	State Inspectorate for Ecological and Technical Safeties under the GKR
Agency on hydrometeorology (Kyrgyz Hydromet) under the Ministry of Emergency Situations, KR	Issyk-Kul Science Centre under Kyrgyz Hydromet under the MES, KR
National Statistical Committee of the KR	State Registry Service under the GKR
Government of the Kyrgyz Republic in the Issyk-Kul Oblast	State Inspection for Ecological and Technical Safety (Gosekotehinspektsiya) under the GKR, Issyk-Kul Oblast
Municipality of Bishkek	Municipality of Cholpon-Ata
Municipality of Balykchy	

The process for the development of the HPAP in the Kyrgyz Republic followed the general process outlined in Annex 2.

**Table 3:** Timetable of HPAP process in the Kyrgyz Republic





Following up on the bilateral meetings, an Inception Meeting was held on 19 June 2018 at the UN House in Bishkek. During this meeting, the HPAP project was presented to an audience of some 30 participants consisting of representatives from the Kyrgyz government, international organizations, multilateral and bilateral donors, the private sector, and civil society. In particular, the meeting served to prioritize the pollution risk factors in the Kyrgyz Republic to identify the topics for Project proposals to be included in the Kyrgyz HPAP. From the five pollution risk factors dealt with in the HPAP project, national stakeholders identified ambient air pollution and water pollution as the most pressing environmental issues with human health impacts and that could serve as models for future interventions. Consequently, this HPAP document focuses on these two issues. The stakeholders then identified locations for interventions. As a result, the Project proposals provided in this HPAP document focus exclusively on reducing ambient air pollution in Bishkek and ensuring a high level of water quality in Lake Issyk-Kul.

Following information and data collection in collaboration with staff of participating institutions, the next step of the HPAP process in the Kyrgyz Republic was a technical Consultation Workshop held in Bishkek on 14 November 2018, where national experts were given the opportunity to comment on the draft version of the HPAP and Project proposals. This meeting helped to further ensure that the HPAP documents reflected stakeholder priorities and provided maximum added-value at increasing environmental pollution, improving public health and identification of their physical location.

After incorporation of the comments provided by national stakeholders at the Consultation Workshop, the final version of the HPAP document was presented at a national Validation Workshop held on 16 January 2019 in Bishkek. This meeting also served to promote the future implementation of the Project proposals. It was attended by a broad range of stakeholders from various levels of government, international organizations, multilateral and bilateral donors, private sector and civil society.



# SUMMARY OF HEALTH IMPACTS FROM MAJOR POLLUTION CHALLENGES



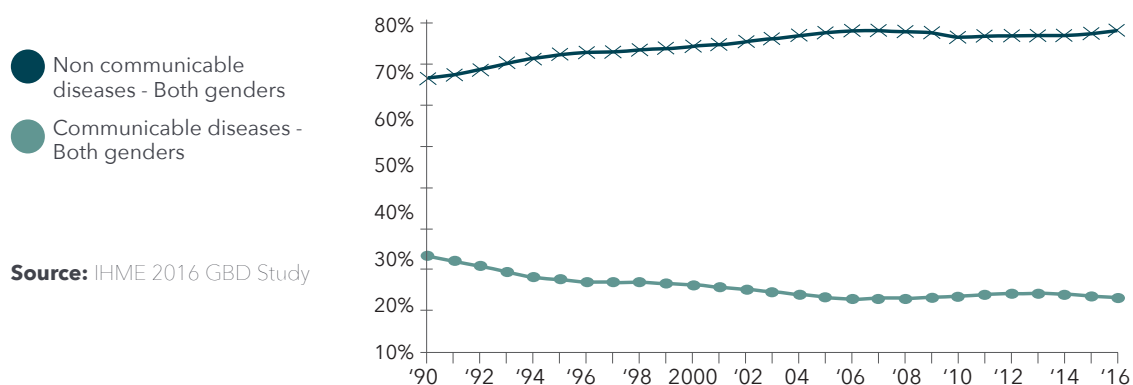
The National Health and Pollution Action Plan is based on inputs from national agencies, national and international data on pollution sources and impacts, and on an analysis of existing studies and reports describing pollution challenges in Kyrgyz Republic and the resulting burden of disease.

## POLLUTION IMPACTS DATA FROM IHME 2016 GBD STUDY

The assessment of health impacts from pollution in Kyrgyz Republic relies in part on data on deaths and Disability Adjusted Life Years (DALYs) from Global Burden of Disease studies conducted by the Institute for Health Metrics and Evaluation (IHME) and the World Health Organization (WHO) – see Annex 3.

According to the National Statistical Committee of the Kyrgyz Republic, the total number of deaths in the Kyrgyz Republic

**Figure 2:** Percentage of annual deaths attributable to communicable and non-communicable diseases (1990-2016)



“IN 2016 OVER 78% OF ALL DEATHS IN THE KYRGYZ REPUBLIC WERE CAUSED BY DISEASES SUCH AS CHRONIC OBSTRUCTIVE PULMONARY DISEASE, LUNG CANCER, ISCHEMIC HEART DISEASE, ISCHEMIC AND HEMORRHAGIC STROKE AND ALL CARDIOVASCULAR DISEASES”.

amounted to 33,475 in 2016. IHME data provides information on the types of diseases causing mortality in the Kyrgyz Republic. It shows that the share of deaths caused by non-communicable diseases (NCDs) increased substantially between 1990 and 2007 but has since levelled off at just below 80%. In 2016 over 78% of all deaths in the Kyrgyz Republic were caused by diseases such as chronic obstructive pulmonary disease, lung cancer, ischemic heart disease, ischemic and hemorrhagic stroke and all cardiovascular diseases. In fact, the top three causes of deaths of Kyrgyz citizens in 2016 are related to NCDs. Ischemic heart disease remains the number one cause of death in the Kyrgyz Republic, followed by cerebrovascular disease (often related to ischemic stroke or mini-stroke and hemorrhagic stroke) and chronic obstructive pulmonary disease (COPD) most commonly associated with tobacco smoking.

Women are statistically more likely to die of non-communicable diseases than men. In 2016, the share of NCDs responsible for deaths of women was over 83%, while it was below 75% for men.

As a consequence of the increasing relevance of NCD-related deaths, the share of deaths related to communicable, maternal, neonatal and nutritional diseases has decreased from over 23% in 1990 to just above 13% in 2016. The communicable diseases causing the highest number of deaths in the Kyrgyz Republic in the year 2016 were lower respiratory infections, neonatal preterm birth and neonatal encephalopathy.

Men are slightly more likely to die of communicable diseases than women. In 2016, the share of communicable diseases responsible for deaths of men was 14%, while it was only 12% for women.

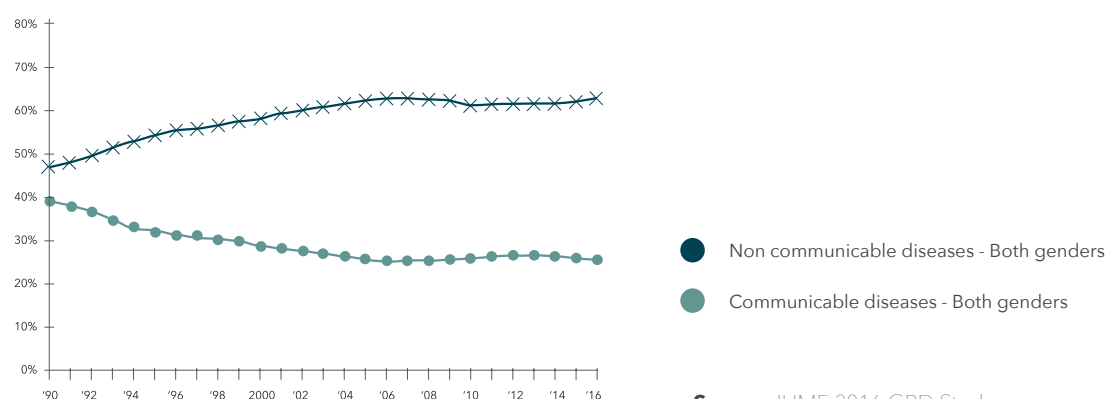
In addition to non-communicable and communicable diseases, injuries compose a third category of death causes. These include mainly road injuries and self-harm but are not included in the figures presented here.

When looking at the percentages of annual disability adjusted life years (DALYs) attributable to communicable and non-communicable diseases a similar picture arises as described above for the percentage of annual deaths. The DALY concept allows for representing the health of a population in a single number, composed of information on early mortality and disability.

Figure 3 shows that non-communicable diseases were responsible for a little less than 64% of DALYs in the Kyrgyz Republic in 2016, up from 47% in 1990. The two leading causes for DALYs relate to NCDs in the form of ischemic heart disease and cerebrovascular disease. At the same time, the share of communicable diseases responsible for DALYs has decreased from almost 40% in 1990 to just below 25% in 2016. Leading causes for DALYs related to communicable diseases include lower respiratory infection, neonatal preterm birth and neonatal encephalopathy.

The percentage of DALYs attributable to communicable diseases was quite similar for men and women in 2016. However, DALYs attributable to non-communicable diseases were substantially higher for women (over 67%) than for men (below 61%).

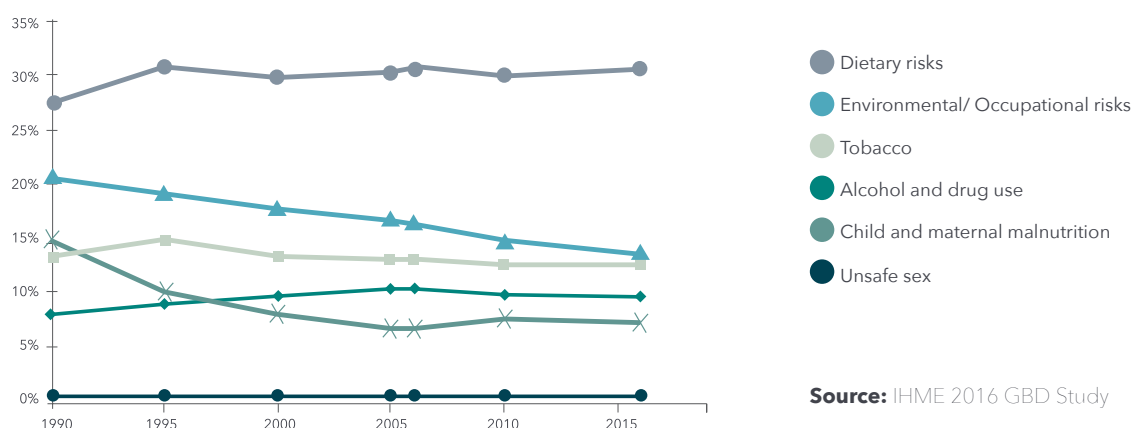
**Figure 3.** Percentage of total annual DALYs attributable to communicable and non-communicable diseases (1990-2016)



Source: IHME 2016 GBD Study

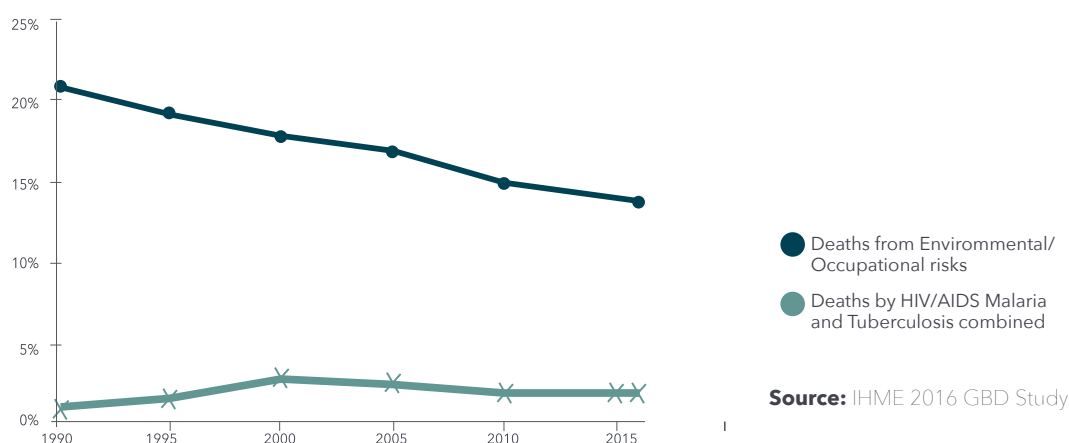
Pollution exposures contribute significantly to deaths and disabilities from non-communicable diseases. In the Kyrgyz Republic, pollution was accountable for almost 14% of all annual deaths in 2016. Figure 4 shows environmental and occupational risks are thus the second most important cause of deaths in the Kyrgyz Republic, topped only by dietary risks (31%). This means that more than 4,500 Kyrgyz citizens die each year due to pollution, more than from tobacco smoking or alcohol and drug use.

**Figure 4.** Percentage of all annual deaths in Kyrgyz Republic caused by leading risk factors






A comparison of the percentage of deaths associated with risks from environmental pollution and occupational exposure with the total number of deaths from such common infectious diseases like HIV / AIDS, malaria and tuberculosis showed that the impact of pollution is considerably higher (Figure 5). In 2016, less than 2% of all deaths in the Kyrgyz Republic were attributable to these three communicable diseases (CDs) combined, compared to the 14% of total deaths related to environmental or occupational risks. However, this is also connected with that activities focused on reduction of CDs and the fact that the Kyrgyz Republic was declared malaria-free by the WHO in November 2016 and has made considerable progress in the reduction of HIV/AIDS and tuberculosis related deaths.

**Figure 5.** Percentage of annual deaths attributable to pollution vs. HIV/AIDS, Malaria and Tuberculosis (combined)



The following table 4 summarizes the annual deaths in the Kyrgyz Republic from various sources of pollution, in total and as a percentage of all deaths, as estimated in the Global Burden of Disease study.

**Table 4.** Summary of annual deaths from Pollution in Kyrgyz Republic

Summary of Annual Deaths from Pollution in Kyrgyz Republic			
	POLLUTION TYPE	2016 Annual Deaths	As % of All Deaths
<b>AIR</b> 	Household air pollution from solid fuels	1,720	4.78
	Ambient particulate matter pollution	2,480	6.89
	<b>Total Air</b>	<b>4,032</b>	<b>11.20</b>
<b>WATER</b> 	Unsafe sanitation	120	0.33
	Unsafe water sources	108	0.30
	<b>Total Water</b>	<b>202</b>	<b>0.56</b>
<b>CHEMICALS</b> 	Lead	162	0.45
	Occupational Carcinogens	271	0.75
	<b>Total Chemicals</b>	<b>665</b>	<b>1.85</b>
<b>Total - All Pollution</b>		<b>4,919</b>	<b>13.66</b>

Source: IHME 2016 GBD Study

Table 4 shows that air pollution is by far the most important cause for pollution-related deaths in the Kyrgyz Republic. In fact, over 80% of almost 5,000 deaths from pollution in 2016 were caused by air pollution. Air pollution is also the seventh most important risk factor contributing to DALYs in 2016. Ambient particulate matter pollution is the dominant cause,

but household air pollution from solid fuels also plays an important role. The second largest cause for pollution-related deaths are chemicals, in particular occupational carcinogens and lead. Water pollution plays a minor role, both regarding unsafe sanitation and unsafe water sources.

It should be noted however, that some of these figures need to be taken with care, because IHME data only considers a limited range of environmental risks. For example, the data only includes well established pollution-disease pairs where robust estimates are available. It does not include emerging but still unquantified health effects of known pollutants, nor does it adequately characterize health effects of emerging pollutants. Similarly, soil pollution is limited to lead-acid battery recycling sites and artisanal and small-scale gold mining sites and mercury use thereof. Water pollution does not account for chemical pollution of water. It can thus be concluded that IHME data reflects a conservative estimate and that the total number of pollution-related deaths is higher than indicated by the figures in this study.

## **POLLUTION IMPACTS PROVIDED FROM AVAILABLE NATIONAL DATA**

This chapter focuses on the two environmental risk factors prioritized by Kyrgyz stakeholders during the Inception Meeting of the HPAP project held in Bishkek on 19 June 2018: ambient air pollution and water pollution. It presents data on the concentration of specific pollutants in ambient air and water, as well as the major diseases in the respective regions of the country. While no direct link can be established between individual pollutants and specific diseases based on this data, it allows for drawing general conclusions on pollution levels and the incidence of pollution related diseases.

### ***Outdoor air pollution***

As shown above, ambient air pollution has significant impacts on human health, both globally and in the Kyrgyz Republic. Official measurement of air pollutants in Bishkek by Kyrgyz Hydromet is currently limited to seven measuring points and five parameters: sulphur dioxide, nitrogen dioxide, nitrogen oxide, formaldehyde and ammonia. In addition, measurement of particulate matter ( $PM_{2.5}$  and  $PM_{10}$ ) was introduced in 2017 but is limited to one measuring point. Norms are in place for each of these parameters in the form of maximum allowable concentrations (MACs), which represent ceiling concentration targets below which significant reductions in risks for acute and chronic health effects from air pollution can be expected. Table 5 shows the MACs in place in the Kyrgyz Republic for all parameters currently measured by Kyrgyz Hydromet in Bishkek. Three different MACs can be set: maximum single concentration allowable (MAC<sub>msc</sub>), maximum average daily concentration (MAC<sub>adc</sub>), and maximum average annual concentration (MAC<sub>aac</sub>).

**Table 5.** Maximum Allowable Concentrations (MACs) for various atmospheric air pollutants in the Kyrgyz Republic (mg/m<sup>3</sup>)

Pollutant	MAC <sub>msc</sub> / MAC <sub>adc</sub> (MAC <sub>aac</sub> )
Sulphur dioxide (SO <sub>2</sub> )	0.5/0.05
Nitrogen dioxide (NO <sub>2</sub> )	0.085/0.04
Nitrogen oxide (NO)	0.4/0.06
Formaldehyde (H-CHO)	0.035/0.003
Ammonia (NH <sub>3</sub> )	0.2/0.04
Total suspended particles	0.5/0.15
Particular matter PM <sub>10</sub>	0.3/0.06 ( <b>0.04*</b> )
Particular matter PM <sub>2.5</sub>	0.16 /0.035 ( <b>0.025*</b> )

**Notes:** MAC<sub>aac</sub> - Maximum Allowable Concentration (average annual concentration); MAC<sub>adc</sub> - Maximum Allowable Concentration (average daily concentration); MAC<sub>msc</sub> - Maximum Allowable Concentration (maximum single concentration)

**Source:** Kyrgyz Hydromet under the MES KR

Table 6 shows the number of days during which the maximum allowable concentration of each pollutant was exceeded in 2017 (the last year for which the full statistical series is available), both in terms of maximum single concentration and maximum average daily concentration.

**Table 6.** Number of days during which MAC<sub>adc</sub> and MAC<sub>msc</sub> were exceeded in Bishkek per month (2017)

Pollutant	Features	Month												Year
		1	2	3	4	5	6	7	8	9	10	11	12	
Sulphur dioxide	MAC <sub>adc</sub>	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>
	MAC <sub>msc</sub>	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>
Nitrogen dioxide	MAC <sub>adc</sub>	23	23	24	24	23	25	26	26	25	26	24	25	<b>294</b>
	MAC <sub>msc</sub>	21	22	22	23	22	23	26	25	24	26	22	26	<b>282</b>
Nitrogen oxide	MAC <sub>adc</sub>	23	21	23	22	22	21	23	21	-	22	24	23	<b>245</b>
	MAC <sub>msc</sub>	0	1	0	0	0	0	0	0	0	2	2	0	<b>5</b>
Formaldehyde	MAC <sub>adc</sub>	24	22	24	24	22	21	22	16	21	25	24	23	<b>268</b>
	MAC <sub>msc</sub>	0	0	0	0	1	0	0	0	0	0	0	0	<b>1</b>
Ammonia	MAC <sub>adc</sub>	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>
	MAC <sub>msc</sub>	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>
Total Suspended Particles	MAC <sub>adc</sub>	18	10	11	11	24	17	24	21	27	21	18	19	<b>221</b>
	MAC <sub>msc</sub>	14	13	13	16	23	20	27	25	27	24	20	14	<b>236</b>
PM <sub>10</sub>	MAC <sub>adc</sub>	27	23	17	13	25	19	24	26	27	22	26	24	<b>273</b>
	MAC <sub>msc</sub>	19	15	13	12	16	12	19	17	19	21	22	20	<b>205</b>
PM <sub>2.5</sub>	MAC <sub>adc</sub>	27	19	10	0	0	0	0	0	0	6	17	24	<b>103</b>
	MAC <sub>msc</sub>	22	17	8	1	4	3	0	0	4	11	19	20	<b>109</b>



Table 6 gives an overview about air quality in Bishkek. It shows that MACs are regularly exceeded throughout the year for almost all researched pollutants. The fact that sulphur dioxide and ammonia concentrations have not exceeded indicated MACs during 2017 is surprising given the dominance of coal in Bishkek's energy mix.

One of the main pollutants is nitrogen dioxide ( $\text{NO}_2$ ), which largely results from the burning of fossil fuels. In cities, most of the nitrogen dioxide in the air comes from motor vehicle exhaust. Table 6 shows that in Bishkek, average daily concentrations of nitrogen dioxide exceed  $\text{MAC}_{\text{adc}}$  on 294 days in 2017. The maximum single concentration ( $\text{MAC}_{\text{msc}}$ ) of nitrogen dioxide was exceeded on 282 days in the same year. The highest average daily concentration of nitrogen dioxide measured in 2017 was  $0.11 \text{ mg/m}^3$ , a level almost three times the  $\text{MAC}_{\text{adc}}$  of  $0.04 \text{ mg/m}^3$ . In 2018, the highest average daily concentration of nitrogen dioxide was slightly higher at  $0.13 \text{ mg/m}^3$ .

Similar exceedances of MAC can be observed for coarse particles with a diameter less than 10 micrometers ( $\text{PM}_{10}$ ). Table 6 shows that average daily concentrations of  $\text{PM}_{10}$  exceeded  $\text{MAC}_{\text{adc}}$  on 273 days in 2017. The maximum single concentration ( $\text{MAC}_{\text{msc}}$ ) of  $\text{PM}_{10}$  was exceeded on 205 days. The highest average daily concentration of  $\text{PM}_{10}$  reached in 2017 was  $0.18 \text{ mg/m}^3$ , which corresponds to three times the  $\text{MAC}_{\text{adc}}$  of  $0.06 \text{ mg/m}^3$ . In 2018, the highest average daily concentration of  $\text{PM}_{10}$  was even higher at  $0.25 \text{ mg/m}^3$ , or more than four times the level of  $\text{MAC}_{\text{adc}}$ .

Contrary to other pollutants, exceedances of MAC of fine particles with a diameter of 2.5 micrometers or less ( $\text{PM}_{2.5}$ ) are subject to strong seasonal variations. Almost absent in summer months, exceedances peak between November and February, confirming that heating is a major contributor to air pollution in winter. The average daily concentrations of  $\text{PM}_{2.5}$  exceeded  $\text{MAC}_{\text{adc}}$  on 103 days in 2017. The maximum single concentration ( $\text{MAC}_{\text{msc}}$ ) of  $\text{PM}_{2.5}$  was exceeded on 109 days. The highest average daily concentration of  $\text{PM}_{2.5}$  reached in 2017 was  $0.077 \text{ mg/m}^3$ , which corresponds to more than twice the  $\text{MAC}_{\text{adc}}$  of  $0.035 \text{ mg/m}^3$ . In 2018, the highest average daily concentration of  $\text{PM}_{2.5}$  measured in Bishkek was  $0.095 \text{ mg/m}^3$ , or close to three times the level of  $\text{MAC}_{\text{adc}}$ .

Tables 7 and 8 summarize various categories of diseases for Bishkek, including those which can be probably affected by air pollution. Table 7 shows the incidence of selected diseases on children below the age of 14, while Table 8 focuses on adults and adolescents.

**Table 7.** Data on the incidence of selected diseases in children, Bishkek (Patients registered for the first time in their lives, children under 14)

Category of diseases	2013		2016		2017	
	absolute	per 100,000 population	absolute	per 100,000 population	absolute	per 100,000 population
Neoplasms	183	80,4	220	84,0	250	91,6
Diseases of blood, hematopoietic organs and immune mechanism disturbances	9,308	4087,9	9,312	3556,3	9,026	3305,7
Diseases of endocrine systems, nutritional disorders	5,983	2627,6	5,704	2178,4	4,829	1768,6
Mental disorders and behavioral disorders	537	235,8	910	347,5	1,138	416,8

Category of diseases	2013		2016		2017	
	absolute	per 100,000 population	absolute	per 100,000 population	absolute	per 100,000 population
Nervous system diseases	3,658	1606,5	4,333	1654,8	4,939	1808,9
Diseases of the eye and its appendages	7,240	3179,6	7,711	2944,9	10,108	3702,0
Diseases of the ear and mastoid area	8,769	3851,1	11,784	4500,4	14,126	5173,6
Diseases of the blood circulation organs	152	66,8	176	67,2	193	70,7
Diseases of the respiratory organs, of which:	76,519	33605,3	110,097	42046,5	125,883	46104,1
<i>Acute respiratory infection of upper respiratory tract</i>	60,111	26399,3	91,277	34859,0	105,791	38745,5
<i>Pneumonia</i>	1,120	491,9	1,425	544,2	1,227	449,4
<i>Acute respiratory infection of lower respiratory tract</i>	13,799	6060,2	15,132	5779,0	15,692	5747,1
<i>Allergic rhinitis (pollinosis)</i>	468	205,5	813	310,5	1,256	460,0
<i>Chronic pharyngitis, nasopharyngitis and sinusitis</i>	201	88,3	328	125,3	265	97,1
<i>Bronchial asthma</i>	57	25,0	84	32,1	98	35,9
Diseases of the digestive organs	11,884	5219,2	9,439	3604,8	10,047	3679,7
Diseases of the skin and subcutaneous tissue	6,792	2982,9	8,032	3067,5	10,045	3678,9
Diseases of the musculoskeletal system and connective tissue	4,916	2159,0	4,086	1560,5	2,679	981,2
Diseases of the urinary system, of which:	2,726	1197,2	2,428	927,3	3,567	1306,4
<i>Kidney and organs of urinary systems diseases</i>	738	324,1	711	271,5	1,005	368,1
<i>Kidney and ureteric stones</i>	3	1,3	15	5,7	46	16,8
Congenital anomalies (malformations)	1,071	470,4	1,339	511,4	1,656	606,5
Injuries and poisoning	5,308	2331,1	5,992	2288,4	5,024	1840,0

**Note:** Percentages refer to the population under 14 years of age.

**Source:** E-Health Centre, Ministry of Health of the Kyrgyz Republic

**Table 8.** Data on the incidence of selected diseases among adults and adolescents, Bishkek (patients registered for the first time in their lives, adults and adolescents)

Categories of diseases	2013		2016		2017	
	absolute	per 100,000 population	absolute	per 100,000 population	absolute	per 100,000 population
Neoplasms	2,713	400,5	3,537	499,9	3,249	452,4
Diseases of blood, hematopoietic organs and immune mechanism disturbances	5,418	799,8	4,475	632,4	3,616	503,5
Diseases of endocrine systems, nutritional disorders	6,737	994,5	6,008	849,1	5,946	827,9
Mental disorders and behavioral disorders	1,944	287,0	1,592	225,0	1,869	260,2
Nervous system diseases	5,346	789,2	4,636	655,2	5,279	735,0
Diseases of the eye and its appendages	13,086	1931,8	13,989	1977,1	17,664	2459,4
Diseases of the ear and mastoid area	10,432	1540,0	10,966	1549,8	11,359	1581,6
Diseases of the blood circulation organs, of which:	11,228	1657,5	11,381	1608,5	10,233	1424,8
<i>Hypertensive heart disease</i>	2,840	419,2	2,971	419,9	2,630	366,2
<i>Coronary artery disease</i>	1,510	222,9	1,439	203,4	1,392	193,8
Diseases of the respiratory organs, of which:	62,882	9282,7	84,281	11911,3	85,118	11851,3
<i>Acute respiratory infection of upper respiratory tract</i>	43,601	6436,4	62,327	8808,6	64,612	8996,2
<i>pneumonia</i>	1,768	261,0	2,132	301,3	1,598	222,5
<i>Acute respiratory infection of lower respiratory tract</i>	13,287	1961,4	13,437	1899,0	12,134	1689,5
<i>Allergic rhinitis (pollinosis)</i>	998	147,3	1,712	242,0	2,139	297,8
<i>Chronic pharyngitis, nasopharyngitis, sinusitis</i>	1,274	188,1	1,649	233,1	1,550	215,8
<i>Bronchial asthma</i>	140	20,7	259	36,6	245	34,1
Diseases of the digestive organs	14,762	2179,2	16,562	2340,7	16,905	2353,7
Diseases of the skin and subcutaneous tissue	10,244	1512,2	10,927	1544,3	11,500	1601,2
Diseases of the musculoskeletal system and connective tissue	13,486	1990,8	10,822	1529,5	12,893	1795,1
Diseases of the urinary system, of which:	36,401	5373,5	40,200	5681,4	42,793	5958,2
<i>Kidney and organs of urinary system diseases</i>	4,600	679,1	5,020	709,5	6,874	957,1
<i>Kidney and ureteric stones</i>	589	86,9	943	133,3	838	116,7
Congenital anomalies (malformations)	112	16,5	143	20,2	193	26,9
Injuries and poisoning	37,730	5569,7	34,281	4844,9	33,787	4704,3

Source: E-Health Centre of the Ministry of Health of the Kyrgyz Republic

Tables 7 and 8 show that the incidence of respiratory diseases is much higher in children under the age of 14 than in adults and adolescents. In fact, children are almost four times as likely to catch a disease of the respiratory organs as adults and adolescents.

Additionally, Tables 7 and 8 show that the incidence of respiratory diseases is increasing both for children and adults/adolescents. The absolute incidence of respiratory diseases in children under the age of 14 increased from 76,519 in 2013 to 125,883 in 2017. This means that while in 2013 roughly one third of all children living in Bishkek were affected by diseases of the respiratory organs, this figure increased to 46% in 2017. A similar trend can be observed in adults and adolescents living in Bishkek, albeit at lower levels. The absolute incidence of respiratory diseases in adults and adolescents increased from 62,882 in 2013 to 85,118 in 2017. This means that while in 2013 some 9% of adults and adolescents living in Bishkek were affected by diseases of the respiratory organs, this figure increased to almost 12% in 2017.

The observed increase in respiratory diseases in children, adolescents and adults may be due to air pollution. However, in order to establish the current relationship between the levels of outdoor air pollution in the city and the state of public health, special clinical and epidemiological studies are required.

## **Water pollution**

A significant public health risk is posed by unsafe water supply, either caused by the absence of piped water supply or by water supply systems which are in poor technical condition and do not meet the requirements of sanitary norms and rules. For example, according to the Development Program of the Kyrgyz Republic for the period 2018-2022, only one third of villages in the country have round the clock access to clean drinking water. In many rural settlements there is no piped water supply at all, and the population consumes irrigation water from small aqueducts called *aryks*. In addition, more than a third (34.4%) of all 1,134 water pipelines in the Kyrgyz Republic do not meet sanitary norms and rules for observing sanitary protection zones, and for the absence of disinfecting facilities and water treatment facilities. This causes both microbial and chemical pollution of tap water.

Table 9 shows the percentage of the samples of water distribution networks and open sources taken in 2017 by the Centre for Disease Prevention and Epidemiological Surveillance which do not meet hygienic standards for physical, chemical and microbiological parameters.

**Table 9.** Data on quality of drinking water in water distribution networks and open water sources by physical, chemical and microbiological indicators in the Kyrgyz Republic for 2017

Name of the area	Water distribution networks						Open water sources		
	phys. & chem. indicators			microbiological indicators			microbiological indicators		
	# samples		%	# samples		%	# samples		%
	Total	Non-conforming		Total	Non-conforming		Total	Non-conforming	
Cities									
Bishkek	5,019	3	-	5,014	6	0.1	-	-	-
Osh	784	117	14.9	658	176	26.7	37	5	13.5
Regions									
Talas	677	-	-	850	154	18.1	17	3	17.6
Issyk-Kul	2,621	27	1.0	2,663	376	14.1	63	10	15.9
Chui	2,795	27	1.0	3,088	467	15.1	77	24	31.2
Naryn	1,264	-	-	1,264	19	1.5	120	-	-
Jalal-Abad	2,114	66	3.1	2,573	260	10.1	91	14	15.4
Osh region	3,094	36	1.2	2,431	81	3.3	21	-	-
Batken	675	44	6.5	692	95	13.7	21	-	-
TOTALS	19,043	320	1.7	19,233	1,634	8.5	447	56	12.5

Source: Department for Disease Prevention and State Sanitary and Epidemiological Surveillance under the MESKR

Concerning microbiological indicators, Table 9 shows that the drinking water in the water distribution network of the city of Bishkek mostly conforms with the standards. Outside of Bishkek, the picture changes considerably. In most places, the percentage of non-compliance of drinking water quality by microbiological indicators is observed in water from open sources compared to water from distribution networks, with the exception of Osh city, where the percentage of non-compliance of drinking water in distribution networks is twice as high (26.7%) than from open sources (13.5%).

As for physical and chemical indicators in the water distribution networks, the level of conformity is generally quite good, running at a little less than 2% of all the water samples taken in the Kyrgyz Republic. There are some notable exceptions: in the City of Osh, almost 15% of all samples were non-conforming, while in the region of Batken the figure is 6.5%.

In Issyk-Kul Region, 277 water pipelines are fed by 322 sources of drinking water, 25 (8%) of which are surface sources. Of the 322 sources of drinking water supply, 38 (12%) did not comply with relevant standards. The share of samples that did not meet the standards for microbiological indicators ranged from 14% for water distribution networks to 16% for open water sources. On the other hand, conformity with physical and chemical indicators was much better, with only 1% of samples taken from the water distribution networks not complying with the standards.

Tables 10 and 11 summarize various categories of diseases for the Issyk-Kul Oblast, including those affected by water pollution. Table 10 shows the incidence of selected diseases on children below the age of 14, while Table 11 focuses on adults and adolescents.

**Table 10.** Data on the incidence of selected diseases in the Issyk-Kul region (Registered patients for the first time in their lives, children under 14 years old)

Disease category	2013		2016		2017	
	Absolute	per 100,000 population	Absolute	per 100,000 population	Absolute	per 100,000 population
Contagious and parasitic diseases, of which:	4,288	3025,2	2,454	1640,4	3,186	2090,9
<i>Intestinal infections</i>	2,011	1418,8	1,224	818,2	1,263	828,9
Neoplasms	16	11,3	35	23,4	44	28,9
Diseases of blood, hematopoietic organs and immune mechanism disturbances, of which:	2,636	1859,7	2,181	1457,9	2,535	1663,7
<i>Iron-deficiency anemia</i>	2,579	1819,5	2,139	1429,9	2,476	1624,9
Diseases of endocrine systems, nutritional disorders	744	524,9	279	186,5	185	121,4
Diseases of nervous system	649	457,9	718	480,0	1,800	1181,3
Diseases of ear and mastoid area	929	655,4	993	663,8	1,690	1109,1
Diseases of blood circulatory system	74	52,2	52	34,8	97	63,7
Diseases of respiratory organs, of which:	15,506	10939,6	27,120	18129,1	25,776	16916,3
<i>Acute respiratory infection of upper respiratory tract</i>	10,883	7678,0	21,604	14441,8	20,884	13705,8
<i>Pneumonia</i>	1,290	910,1	1,247	833,6	1,174	770,5
<i>Acute respiratory infection of lower respiratory tract</i>	2,658	1875,2	3,804	2542,9	3,150	2067,3
<i>Allergic rhinitis (pollinosis)</i>	177	124,9	135	90,2	215	141,1
<i>Bronchial asthma</i>	15	10,6	28	18,7	28	18,4
Diseases of the digestive organs	3,276	2311,2	5,680	3796,9	5,402	3545,2
Diseases of the skin and subcutaneous tissue	1,419	1001,1	2,094	1399,8	3,414	2240,5

Disease category	2013		2016		2017	
	Absolute	per 100,000 population	Absolute	per 100,000 population	Absolute	per 100,000 population
Diseases of the musculoskeletal system and connective tissues	66	46,6	165	110,3	257	168,7
Diseases of urinary system, of which:	212	149,6	618	413,1	733	481,1
<i>Diseases of the kidneys and organs of the urinary system</i>	190	134,0	482	322,2	559	366,9
<i>kidney and ureteric stones</i>	-	-	38	25,4	30	19,7
Congenital anomalies (malformations)	211	148,9	222	148,4	447	293,4
Injuries and poisoning	1,996	1408,2	1,935	1293,5	2,498	1639,4

**Note:** Percentages refer to the population under 14 years of age.

**Source:** E-Health Centre of the Ministry of Health of the Kyrgyz Republic

As shown in Table 10, an increase in cases of diseases of the digestive system and diseases of kidneys and organs of the urinary system is observed in children of the Issyk-Kul region in 2016-2017, compared with 2013. At the same time, the incidence of (acute) intestinal infections has halved over the same time period. However, it should also be noted that between 2013-2017 water-borne contagious and parasitic diseases held the third-forth place in the morbidity structure of children up to 14 years of age, after diseases of the respiratory organs and diseases of the digestive system (E-Health Centre of the Ministry of Health of the Kyrgyz Republic).

Comparing the incidence of various diseases in children with the incidence of the same diseases in adults and adolescents in the Issyk-Kul region shows that children are much more likely to contract intestinal infections, are almost equally likely to suffer from diseases of the digestive organs and are much less likely to contract diseases of the urinary system.

**Table 11.** Data on the incidence of selected diseases in adults and adolescents, Issyk-Kul region (Patients registered for the first time in their lives, adults and adolescents)

Category of diseases	2013		2016		2017	
	absolute	per 100,000 population	absolute	per 100,000 population	absolute	per 100,000 population
Contagious and parasitic diseases, of which:	2,225	708,1	1,419	438,2	1,940	592,4
<i>Intestinal infections</i>	789	251,1	308	95,1	313	95,6
Neoplasms	643	204,6	633	195,5	841	256,8



Category of diseases	2013		2016		2017	
	absolute	per 100,000 population	absolute	per 100,000 population	absolute	per 100,000 population
Diseases of blood, hematopoietic organs and immune mechanisms disturbances, of which:	1,845	587,2	2,980	920,2	2,232	681,5
<i>Iron deficiency anemia</i>	1,744	555,0	2,948	910,4	2,193	669,6
Diseases of the endocrine system, nutrition disorders	1,430	455,1	1,320	407,6	1,459	445,5
Diseases of the nervous system	2,940	935,7	2,039	629,7	2,292	699,9
Diseases of the ear and mastoid area	2,147	683,3	732	226,0	1,045	319,1
<i>Diseases of the blood circulatory system, of which:</i>	2,210	703,3	4,129	1275,1	4,256	1299,5
<i>Hypertension disease</i>	953	303,3	2,344	723,8	2,015	615,3
<i>Ischemic heart disease</i>	433	137,8	920	284,1	916	279,7
Diseases of the respiratory system, of which:	13,384	4259,5	16,929	5227,8	14,513	4431,5
<i>Acute respiratory infection of upper respiratory tract</i>	8,335	2652,7	11,991	3702,9	10,568	3226,9
<i>Pneumonia</i>	501	159,4	982	303,2	750	229,0
<i>Acute respiratory infection of lower respiratory tract</i>	2,641	840,5	2,806	866,5	2,136	652,2
<i>Allergic rhinitis (pollinosis)</i>	471	149,9	115	35,5	135	41,2
<i>Bronchial asthma</i>	44	14,0	84	25,9	65	19,8
Diseases of the digestive organs	7,576	2411,1	12,033	3715,9	13,138	4011,6
Diseases of the skin and subcutaneous tissue	4,733	1506,3	2,308	712,7	3,232	986,9
Diseases of the musculoskeletal system and connective tissue	1,053	335,1	2,460	759,7	3,380	1032,1
<i>Diseases of the urinary system, of which:</i>	5,136	1634,6	5,057	1561,6	7,623	2327,6
<i>Diseases of the kidneys and organs of urinary system</i>	1,181	375,9	2,865	884,7	2,245	685,5
<i>kidney and ureteric stones</i>	136	43,3	254	78,4	243	74,2
Congenital anomalies (malformations)	38	12,1	108	33,4	162	49,5
Injuries and poisoning	6,778	2157,1	4,887	1509,1	6,477	1977,7

Source: E-Health Centre of the Ministry of Health of the Kyrgyz Republic

As regards the incidence of selected diseases in adults and adolescents of the Issyk-Kul region, Table 11 shows a strong increase in diseases of the digestive organs between 2013 and 2017. In fact, diseases of the digestive organs held the second place in 2017 after respiratory diseases. Similarly, a larger share of the adult population has been affected by diseases of the urinary system in 2017 compared with 2013. As in the case of children, the incidence of intestinal infections has also decreased considerably in adults and adolescents.

Changes in the levels of water pollution may have an impact on the disease patterns presented above. However, in order to establish the current relationship between the levels of water pollution and the state of public health, special clinical and epidemiological studies are required.

## ECONOMIC COSTS OF POLLUTION IN THE KYRGYZ REPUBLIC

Premature deaths and diseases caused by pollution entail large economic costs, both in terms of lost productivity and in terms of national budget expenditures and health-care spending.

The key determinants of the costs of pollution-related diseases include:

- Direct medical expenditures, such as hospital, physician, and medication costs;
- Indirect health-related expenditures, such as time lost from work or school;
- Diminished economic productivity of persons affected by pollution-related diseases;
- Losses in output resulting from premature death.

The Lancet Report 2016 estimates costs for lost productivity caused by pollution-related diseases in the Kyrgyz Republic at between USD 24 million and USD 31 million in 2015. This is equivalent to 0.4-0.5% of the country's Gross Domestic Product (GDP). Total welfare damages of pollution-related diseases amount to USD 388 million, or some 6% of the Gross National Income (GNI) of the Kyrgyz Republic in the year 2015.<sup>5</sup>

As noted above, the IHME-related data represents a rather conservative estimate of the health impacts of pollution. This is also reflected in the economic costs given above. Another study by the World Health Organization (WHO) in collaboration with the Organization for Economic Co-operation and Development (OECD) published in 2015<sup>6</sup> gives a different picture. This study assesses economic costs of the health impact of air pollution in Europe. As shown above, air pollution is by far the most important cause for pollution-related deaths in the Kyrgyz Republic. It estimates premature deaths in the Kyrgyz Republic from ambient particulate matter pollution (APMP) at 2,858 in the year 2010 and from household air pollution (HAP) at 4,491 in the same year. This means that according to this study, some 7,349 Kyrgyz citizens died from air pollution in the year 2010. This resulted in economic costs of almost USD 3.6 billion, representing 24% of the Kyrgyz GDP in 2010.

One of the main determinants of the level of economic costs related to premature deaths caused by pollution is the value of a statistical life. However, notwithstanding the large differences in estimating the economic costs, it is clear that pollution has a severe impact on economies around the world. This toll is particularly high in Central Asia and Eastern Europe.

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5 The Lancet Commission on pollution and health, 2017, The Lancet 2017: Supplementary appendix, <https://www.thelancet.com/journals/lancet/article/PIIS0140-67361732345-0/fulltext?code=lancet-site#sec1>, free account registration required

6 WHO Regional Office for Europe, OECD (2015). Economic cost of the health impact of air pollution in Europe: Clean air, health and wealth. Copenhagen: WHO Regional Office for Europe.

## SUMMARY OF KEY STRATEGIC DOCUMENTS RELEVANT TO AIR POLLUTION IN BISHKEK AND WATER POLLUTION IN ISSYK-KUL OBLAST



This section covers four key strategic documents relevant to the two priority issues covered in the Project proposals of this HPAP, air pollution in Bishkek and water pollution in the Issyk-Kul Oblast. They include:

- Development Program of the Kyrgyz Republic for the Period 2018-2022: "Unity, Trust, Creation";
- National Development Strategy of the Kyrgyz Republic for 2018-2040;
- Action Plan of the State Agency for Environmental Protection and Forestry (SAEPF) on Ecological Improvement in Bishkek city for 2018-2022;
- The Issyk-Kul Ecological and Economic Sustainable Development Concept until 2020.

These documents give the basis for action planning in the priority issues identified by national stakeholders.



TWO PRIORITY  
ISSUES COVERED  
IN THE PROJECT  
CONCEPTS OF THIS  
HPAP, AIR POLLUTION  
IN BISHKEK AND  
WATER POLLUTION  
IN THE ISSYK-KUL  
OBLAST”.

### **DEVELOPMENT PROGRAM OF THE KYRGYZ REPUBLIC FOR THE PERIOD 2018-2022: “UNITY, TRUST, CREATION”**

The Development Program of the Kyrgyz Republic, adopted by the Parliament in April 2018, lists numerous key challenges to be addressed.

The program considers safety and security from threats to human health as a top priority. Prevention of diseases is regarded as the key principle allowing for reduced costs and the improvement of basic health indicators. In this regard, the government plans to update, modernize the public health care system of the Kyrgyz Republic, as well as to provide sufficient funding and competent staff. Achieving these goals will require taking into account the links between environmental pollution and public health, as outlined in this HPAP.

The program also has a strong focus on climate change and environmental

degradation caused by human activities, which can become irreversible and aggravate food security by reducing access to water and land resources. The program thus includes environmental aspects as one of a number of cross-cutting priorities which should be closely integrated into all of the program's areas.

Among the ecological aspects of development mentioned in the program is the introduction of the principles and requirements of the green economy in all stages of the policy cycle, including planning, decision-making, implementation, and monitoring. The program also aims to improve environmental data management in order to have a solid base upon which to reasonably formulate and implement development plans, as well as to make environmentally relevant decisions. In particular, the environmental impact assessment system should become a permanent component of national policy, ensuring strategic environmental assessments of plans, programs, legislative acts, economic and investment projects. This system should also contain measures to respond to existing and potential risks in the form of man-made disasters and climate change, and identify steps for mitigation and adaptation. Another environmental focus is on the rational use of natural resources through the introduction and promotion of resource-saving, low-waste and non-waste technologies. This should have a positive impact on water resources, energy resources, waste generation and other basic natural assets (forests, land, minerals etc.). The green growth of the economy will be stimulated through public procurement, which will introduce environmental sustainability as the main criterion for the selection of proposals.

In the field of transport, the program mainly focuses on the expansion of the internal network of highways and international transport corridors, but also mentions that clean air and clean transport are an integral part of the urban environment. In particular, the program notes that the urban space is not developed for cars, but for people and public transport. This may pave the way for greener transport policies in cities.

In terms of water, the government focuses on the construction and expansion of drinking water supply and sanitation systems. This will also have important benefits for public health.

The government also recognizes the importance of measures aimed at reducing the risks from uranium and other tailings, including in the country's mountainous regions.

## **NATIONAL DEVELOPMENT STRATEGY OF THE KYRGYZ REPUBLIC FOR 2018-2040**

The National Development Strategy for the years 2018-2040, adopted by the Kyrgyz Government in November 2018 and currently under negotiation in the Kyrgyz Parliament, formulates a vision for the future of the Kyrgyz Republic and defines the strategic benchmarks for the development of the country for a long-term period. The Strategy also sets priority areas for the period up to 2023, including a list of priority actions for Bishkek city and Issyk-Kul Oblast. Broadly, it reaffirms the commitment to achieve the Sustainable Development Goals (SDGs) as well as the commitment to green growth.

### ***Long-term Strategy until 2040***

The long-term elements of the Strategy contain visions on environment and health. On the environment, the Strategy envisions for the Kyrgyz Republic to become a country with

favorable environment for human life, developing in harmony with nature, preserving unique natural ecosystems and efficiently using natural resources for climate-sustainable development. Environmental sustainability with the economic growth of the country is to be achieved by minimizing negative environmental impacts, improving efficiency of requirements and incentives for environmental protection, and using reliable data to make environmentally significant decisions. In addition, natural resources should no longer be an expenditure part of the budget and should move to the revenue part.

This vision on environmental performance is to be achieved with the following elements:

- Improvement of environmental data management as the basis for environmentally sound decisions;
- Environmental education to raise awareness of ecological issues, including the preservation of natural resources;
- Green development and climate change adaptation;
- Restoration of natural environment, landscapes, ecosystems and biological diversity;
- Ensure environmental safety, including solving problems of radioactive contamination and land degradation;
- Sustainable waste management;
- Revise policy on transport sector development to reduce emissions of pollutants and greenhouse gases. This also includes the gradual transition to environmentally friendly modes of transport by using electric vehicles, bicycles, electrification of railway lines and development of bicycle infrastructure.

In terms of policy, the Strategy focuses on economic incentives by promoting the most effective measures to reduce harmful impacts on the environment, establishing economic barriers for environmentally inefficient activities, and focusing on economic activities that respect the regenerative capacity of the natural environment. It also foresees the introduction of mandatory environmental impact assessments of planned economic and other development projects.

Regarding the health sector, the Strategy aims to achieve by 2040 a health care system that is affordable, of high quality, and safe, which will be able to improve indicators regarding the health condition of Kyrgyz citizens. One particular focus is on water, aiming for high-quality water supply, water disposal and sanitation in every settlement.

### ***Mid-term objectives until 2023***

Directly relevant to this HPAP is the country's goal to reduce premature mortality caused by non-communicable diseases (NCDs). While not specifically mentioning environmental causes for NCDs, the Strategy aims to establish a system of epidemiological surveillance of NCDs leading to premature death. It also aims to develop diagnostic and preventive services in all regions. The Government sets itself concrete indicators for the next 5 years, according to which mortality rates for cardiovascular diseases should decrease by 7.7% until 2023, for cancer by 8.1% and for diabetes by 8.3%.

With respect to improving the environmental situation in the Kyrgyz Republic, mid-term objectives of the strategy include the following, which are of relevance in the control of the five sources of pollution covered by the HPAP:



- Large scale implementation of energy efficiency and energy savings programmes;
- Increasing the capacity of electricity generation from renewable energy sources by 10% over the next five years, or by 385 MW;
- Linking households in 60 settlements and in 20 residential areas of Bishkek to natural gas system;
- Full supply of clean drinking water;
- Construction and rehabilitation of wastewater systems in seven regional and 26 district centers;
- Reduction of CO<sub>2</sub> emissions by all economic actors and citizens;
- Expansion of green planting area, for example, by expanding mountain forests from 5.6% to 6% of the Kyrgyz territory;
- Rehabilitation of territories affected by uranium tailings and introduction of national radiation safety system;
- Rational water resources management;
- Development of infrastructure for waste disposal and recycling;
- Development of “master plans” for 20 cities, including plans for transport infrastructure.

Additional elements with relevance to the HPAP and its Project proposals include the creation of modern information and communication infrastructure, as well as tourism development – including the development of a specialized ski tourism cluster in the city of Karakol.

The National Development Strategy also covers practical steps for regional development, including for Bishkek city and Issyk-Kul Oblast.

### ***Regional development: Bishkek city***

Of particular relevance for Bishkek are the plans to improve transport infrastructure, as well as the renovation of housing and communal services. Concrete planned measures include:

- Reduction of technical losses of energy companies to 11.6% by 2023;
- Natural gas linkages for 15 residential areas and the commissioning of 1 modern gas compressor station;
- Rehabilitation of urban wastewater system;
- Creating a (sanitary) landfill site based on new technologies;
- Road traffic infrastructure renovation;
- Construction of a plant for assembly and production of electric vehicles.

### ***Regional development: Issyk-Kul region***

The focus of the medium-term regional development plan of Issyk-Kul region focuses on tourism, and in particular on the development of transport infrastructure as well as other service infrastructure. Concrete planned measures include:



- Reduction of technical losses of energy companies to 11.2% by the end of 2023;
- Construction and rehabilitation of drinking water supply systems in 41 villages;
- Construction and rehabilitation of drinking water supply and sewerage systems in the cities of Balykchy, Karakol and Cholpon-Ata;
- Increasing mountain forest coverage;
- Creating new (sanitary) landfill sites based on new technologies in the cities of Karakol and Cholpon-Ata.

## **ACTION PLAN OF THE SAEPF UNDER THE GKR ON ECOLOGICAL IMPROVEMENT IN BISHKEK FOR 2018-2022**

Work on safeguarding the environment in Bishkek is guided by a list of 33 priority measures which was adopted by the Kyrgyz Government in June 2018. The list is the result of an interagency working group lead by the State Agency for Environmental Protection and Forestry (SAEPF). It proposes various activities aimed at improving air quality, *inter alia* through better air quality monitoring and through reduced emissions of pollutants from the transport sector.

Some of the concrete actions proposed for the transport sector include the following:

- Development of a draft legal act on exercising state control over the protection of atmospheric air from emissions of pollutants by vehicles;
- Rehabilitation and expansion of stationary and mobile air quality monitoring systems;
- Reduction of import duties for electric vehicles and hybrid vehicles (implemented in July 2018);
- Expansion of cycling lanes;
- Increase tax rates/fees on older vehicles;
- Construction of a ring road and bypass roads around the city;
- Optimization of number of minibuses on urban routes, replacement by larger capacity buses fueled by natural gas, upgrading of trolley bus fleet;
- Development of an information campaign on measures to improve environmental situation in the city.

## **THE ISSYK-KUL ECOLOGICAL AND ECONOMIC SUSTAINABLE DEVELOPMENT CONCEPT UNTIL 2020**

Although this Development Concept was adopted by presidential decree in February 2009, its general approach as well as its objectives still hold true today. The concept recognizes the natural uniqueness of Lake Issyk-Kul as the foundation for sustainable development of the "Issyk-Kul Ecological and Economic System". Maintaining the high quality of Lake Issyk-Kul is thus seen as the main condition for Issyk-Kul ecosystem conservation.

The overall target of the Concept is the creation of an effective management system for the Issyk-Kul Ecological and Economic System. To achieve this target, the Concept outlines several tasks that should be fulfilled:

- Improvement of the current legislation on the use of natural resources and environmental protection;
- Improvement of the lake's environmental management system by regulating prohibited and permitted activities associated with the use of natural resources;
- Introduction of economic mechanism for environmental management;
- Introduction of innovative and clean technologies;
- Institutional and human capacity building.

Given the importance of the tourism sector around Lake Issyk-Kul, the Concept makes concrete proposals on how the ecological impact of increasing tourist numbers (from 700,000 in 2010 to a projected 1.1 million in 2025) can be minimized:

- Reconstruction, modernization and construction of environmental and engineering infrastructure;
- Bringing the development of the tourism industry in line with international requirements for the protection of biodiversity;
- Ensuring an integrated approach to the development of the tourism industry;
- Better distribution of tourism establishments around the lake to avoid pollution "hot spots";
- Provision of the entire tourist complex with centralized sewerage systems with biological wastewater treatment and construction of toilets at beach areas;
- Prohibition of all watercraft operating on gasoline and diesel;
- Provision of all car parks with systems for capturing and collecting leaked oil products;
- Ensuring adequate quality of roads.

## **ONGOING PROJECTS RELEVANT TO HEALTH AND POLLUTION IN THE KYRGYZ REPUBLIC**

This section provides a brief overview about some of the projects financed by international institutions in the Kyrgyz Republic, ongoing as of November 2018. The projects included in this list were selected according to their relevance to health and pollution action planning. The vast majority of ongoing projects focusses on the water sector, and in particular on the improvement of wastewater services and clean water supplies. Ongoing activities related to air pollution mainly focus on household heating. One large project also focusses on uranium legacy sites, aimed at remediating some of the most dangerous sites left by uranium production.

The Project proposals presented in the next section have been selected based on the priorities identified by national stakeholders at the Inception Meeting held in Bishkek on 19 June 2018, as well as on the list of ongoing projects presented below. In order to avoid duplication of efforts, the project proposals focus on topics not already addressed by other donors.

**Table 12.** Ongoing projects relevant to health and pollution in the Kyrgyz Republic (as of 15 November 2018)

Donor	Budget	Project Title	Description	Duration
<i>Water quality-related</i>				
ADB	\$36,520,000	Issyk-Kul Wastewater Management Project	The project will improve wastewater services and strengthen the sustainability of the water supply and sanitation (WSS) utilities in Balykchy and Karakol.	2019-2024
ADB	\$21,400,000	Naryn Rural Water Supply and Sanitation Program	The project will improve water supply and sanitation services in Naryn Oblast.	2019-2026 (still at concept stage)
EBRD, SECO	€11,800,000	Bishkek Water and Wastewater Project	Improvement of water and wastewater systems	2009-2018
EBRD, SECO	€17,310,000	Bishkek Water and Wastewater Project II	Improvement of water and wastewater systems	2016-2021
EBRD, SECO	€18,240,000	Osh and Jalalabad Water and Wastewater	Improvement of water and wastewater systems	2011-2018
EBRD, EIB, EU (IFCA)	€10,515,000	Osh Water Project Phase II	Improvement of water and wastewater systems	2016-2020
EBRD, SECO	€6,550,000	Kant Water and Wastewater Project	Improvement of water and wastewater systems	2013-2018
EBRD, SECO	€6,300,000	Naryn Water and Wastewater Project	Improvement of water and wastewater systems	2016-2020
EBRD, EIB, EU (IFCA)	€6,320,000	Kara-Suu Water Project	Improvement of water and wastewater systems	2016-2020
EBRD, SSF, EU (IFCA)	€6,190,000	Tokmok Water Project	Improvement of water and wastewater systems	2014-2020
EBRD, EIB, EU (IFCA)	€6,200,000	Cholpon-Ata Water Project	Improvement of water and wastewater systems	2016-2020
EBRD, EIB, EU (IFCA)	€7,000,000	Kyzyl-Kiya Water Project	Improvement of water and wastewater systems	2016-2020
EBRD, EIB, EU (IFCA)	€11,000,000	Uzgen Water Project	Improvement of water and wastewater systems	2017-2021
EBRD, EIB, EU (IFCA)	€6,400,000	Toktogul Water Project	Improvement of water and wastewater systems	2017-2021
EBRD, EU (IFCA)	€6,650,000	Maili-Suu Water Project	Improvement of water and wastewater systems	2017-2021
EBRD	€2,100,000	Balykchy Water Project	Improvement of water and wastewater systems	2017-2021
World Bank	\$28,000,000	Sustainable Rural Water Supply and Sanitation Project in Osh, Issyk Kul and Chui oblasts		2013-2018

Donor	Budget	Project Title	Description	Duration
World Bank	\$43,200,000	Sustainable Rural Water Supply and Sanitation Development Project - Additional Financing 2017-2025 in Osh, Issyk Kul and Chui oblasts		2013-2018
World Bank	\$14,400,000	Urban Development Project in Kerban, Sulukta, Balykchy		2016-2020
UNDP-SIWI	\$300,000		Rural and urban communities have better access to sanitation and hygiene services through better enabling framework and capacity	2015-2018
UNICEF	\$4,300,000	Strengthening Maternal and Child Health Care Systems	WASH part: Renovation works at selected 10 hospitals in Bishkek, Batken, Osh and Jalal Abad	2016-2020
Mercy Corps	\$200,000	Handwashing in Schools	Increasing number of handwashing stations and hot water reservoirs at public schools, training and age appropriate visual training materials on WASH topics	2017-2019
Mercy Corps	\$285,360	Use of Portable Water Technologies in School	Increase access to safe drinking water through improved water supply in schools. Increase knowledge of students in schools on the importance of safe drinking water and improved nutrition practices through intensive training and engagement of teachers and key school officials. Improve water and nutrition promotion through awareness-raising campaign in schools and surrounding communities.	2018-2019

*Air quality-related (indoor and outdoor air)\**

ADB		Electric Vehicle Strategy and Action Plan	Support to the government in preparation of the Electric Vehicle Strategy and Action Plan, and development of business models for E-Vehicle sector.	2018
Multidonors TF (World Bank)	\$350,000	Efficient heating technologies for households	Support improved access to more efficient heating technologies for households without access to district heating; assist with the development of clean and efficient stoves	2018
World Bank, SECO	\$50,000,000	HSIP: Heat Supply Improvement Project	3 components: C1 - Improving supply efficiency and quality of the DH system in Bishkek; C2 - Piloting clean and efficient household stoves; and C3- Demonstrating the benefits of energy efficiency improvements in public buildings	2023

Donor	Budget	Project Title	Description	Duration
<i>Related to soil contamination</i>				
EU	€15,000,000	Environment Remediation Account	To pool donor funds to assist the Kyrgyz Republic, Tajikistan and Uzbekistan to remediate some of the most dangerous sites left by uranium production in these countries.	2017-2022
<i>Other</i>				
SECO	CHF 4,510,000	Effective management and prevention of non-communicable diseases	Train doctors in family medicine right from the start of their studies and offer them attractive career prospects, as well as improve access to the health centers in rural areas.	2018-2021

\* Listed here are those energy-related projects with the most direct relationship to air quality improvements. Other ongoing energy-related projects could also indirectly improve air quality if, through improved energy efficiency, increased use of renewable energy, technology upgrades or other means, they reduce the amounts of air contaminants being emitted.

## PROJECT PROPOSALS

### REDUCING HARMFUL POLLUTANTS FROM TRANSPORT IN BISHKEK



#### PROJECT SUMMARY

Outdoor air pollution is the biggest environmental risk to health in the Kyrgyz Republic. Air pollutants like ground-level ozone and particulate matter are responsible for various diseases. Chronic obstructive pulmonary disease, ischemic heart disease, acute lower respiratory illness and lung cancer are the most common causes of air pollution related deaths. People living in urban areas are the most vulnerable, this is why this project proposal focusses on the Kyrgyz capital Bishkek. The focus on the transport sector was chosen due to the fact that it accounts for 60-87% of outdoor air pollution in Bishkek.

There are some 1.2 million motor vehicles registered in the Kyrgyz Republic, some 390,000 of which are registered in Bishkek alone. Commuters into the city add another 90,000 vehicles each day. This means that there are around 480,000 vehicles in



**Project title:** Reducing harmful pollutants from transport in Bishkek

**Location(s):** Bishkek, Kyrgyz Republic

**Planned start date:** 2019

**Duration:** 4 years

**Government coordinating agency and Executing agency/cooperating agency:** State Agency for Environmental Protection and Forestry (SAEPF under the GKR)

**Budget (in EUR):** 6,989,000

“OUTDOOR AIR POLLUTION IS THE BIGGEST ENVIRONMENTAL RISK TO HEALTH IN THE KYRGYZ REPUBLIC. AIR POLLUTANTS LIKE GROUND-LEVEL OZONE AND PARTICULATE MATTER ARE RESPONSIBLE FOR VARIOUS DISEASES”.

Bishkek each day in a city with a population of around 1.2 million people. The vast majority of these vehicles are old and run on low-quality fuel.

In addition, there is currently no requirement for inspection and certification of cars. Relevant legislation was abolished in 2012, amongst others because of concerns about the potential it created for corruption. In the absence of comprehensive inspection and maintenance requirements, cars can be used without restrictions regarding their safety or environmental performance.

In order to improve the air quality in Bishkek, this project proposal focusses on three main outputs. First, it aims to modernize the existing air quality monitoring network in Bishkek and to expand it both in terms of measuring stations and pollutants measured. A second focus of this project proposal is to develop an integrated, sustainable and long-term transport strategy for the city

which will be the strategic basis for future investments in modernizing transport. Changes in legislation, investment in infrastructure and procurement of equipment would then need to be aligned with the results of this transport strategy. Finally, the project proposal prioritizes the reintroduction of a comprehensive and mandatory periodic inspection and maintenance system for motor vehicles registered in the country. Based on the development of up-to-date standards, this will allow for improving the environmental performance of existing vehicles and for removing the most polluting vehicles from the streets of Bishkek.

## RELEVANT BACKGROUND

Outdoor air pollution is the biggest environmental risk to health in the Kyrgyz Republic. Each year, it causes more than 2,500 premature deaths, and almost USD 1.4 billion in health-related costs (WHO/OECD, 2015)<sup>7</sup>. Diseases such as chronic obstructive pulmonary disease (COPD), ischemic heart disease (IHD), acute lower respiratory illness (ALRI) and lung cancer are most commonly responsible for air pollution related deaths. COPD is mainly caused by ground-level ozone, formed by a reaction between nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) in the presence of sunlight. IHD, ALRI and lung cancer, on the other hand, are caused by the inhalation of fine particles or particulate matter (PM) (Piqueras & Vizenor, 2016)<sup>8</sup>. People in urban areas are particularly exposed to these pollutants. There is particularly heavy exposure in the capital, Bishkek. This is why this proposal focuses on this city.

Reliable data on the concentration of specific air pollutants in Bishkek is scarce. What data there is, is scattered because measuring points are dispersed. In addition, these measuring points do not measure the concentration of some of the most dangerous pollutants. Specifically, official measurement of air pollutants in Bishkek is currently limited to seven measuring points and five parameters: sulfur dioxide, nitrogen dioxide, nitrogen oxide, formaldehyde and ammonia. Measurement of particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) was only introduced in 2017 and is limited to one measuring point. Data provided by Kyrgyz Hydromet suggests that Maximum Allowable Concentrations (MACs) are regularly exceeded throughout the year for almost all pollutants, with the exception of sulphur dioxide and ammonia. For example, the average daily concentrations of nitrogen dioxide, PM<sub>10</sub> and PM<sub>2.5</sub> exceeded MAC<sub>adc</sub> on 294, 273 and 103 days, respectively, in the year 2017. Areas where concentrations of different pollutants are highest include the center of the city near the main roads.

Various sources are responsible for air pollution in Bishkek, including transport, heating, and the burning of waste at disposal sites. The transport sector is estimated to be responsible for the majority of the city's air pollution. The SAEPF under the GKR (2016) reports that up to 87% of air pollution is caused by mobile sources<sup>9</sup>, while the NGO MoveGreen puts this figure at around 60%<sup>10</sup> in the cold months of the year. That is why this proposal focuses on transport, in full recognition of the existence of other polluting sources.

7 WHO Regional Office for Europe, OECD (2015). Economic cost of the health impact of air pollution in Europe: Clean air, health and wealth. Copenhagen.

8 Piqueras, P., Vizenor, A. (2016). The rapidly growing death toll attributed to air pollution: A global responsibility. Policy Brief for GSDR - 2016 Update.

9 State Agency for Environmental Protection and Forestry under the GKR (2016). National Report on the Condition of the Environment of the Kyrgyz Republic for 2011-2014. Bishkek.

10 Data kindly provided in writing by MoveGreen upon request.

There are some 1.2 million vehicles registered in the country. As of June 2018, 391,450 private vehicles were registered in Bishkek alone (State Registry Service, 2018)<sup>11</sup>, in addition to 4,071 minibuses, 180 buses, 133 trolleybuses and 12 private buses (Ministry of Transport and Roads, 2018)<sup>12</sup>. There are also some 90,000 vehicles commuting into the city each day, bringing the number of vehicles present within the city limits up to close to half a million. The vast majority of these vehicles are old, run on low-quality fuel, and do not undergo any technical inspections. Most cars run on gasoline, some on diesel, very few are hybrid or electric. The import tariff rate of cars imported into the country is determined by their age. Since 2014, there is a threshold of 11 years, above which import duties become prohibitively high. Furthermore, there is currently no comprehensive requirement for inspection and certification of cars<sup>13</sup>. Relevant legislation was abolished in 2012, amongst others because of concerns about the potential it created for corruption. In the absence of comprehensive inspection and maintenance requirements, cars can be used without restrictions regarding their safety or environmental performance.

There has been a rapid rise in the number of cars in Bishkek, a rise which is mirrored in a strong increase in lung diseases. Between 2013 and 2017, the occurrence of lung diseases in Bishkek increased from 150,000 to 220,000, or by 49% (National Statistics Committee, 2018)<sup>14</sup>. Children and the elderly are particularly affected. For example, the Ministry of Health of the Kyrgyz Republic (2018)<sup>15</sup> reports an almost three times higher incidence of respiratory diseases per 100,000 inhabitants for children under the age of 14 than for adults or adolescents.

The Kyrgyz Government is addressing the issue of pollution from the transport sector. The program "Trust, Unity, Creation" recognizes that clean air and clean transport are an integral part of the urban environment. The "National Development Strategy of the Kyrgyz Republic for 2018-2040", approved in November 2018 also includes several actions on transport, such as:

- Improved environmental data management;
- Shifting to more environmentally friendly modes of transport by using electric vehicles and electrification of railway lines; and
- Developing "master plans" for 20 cities (including Bishkek) for transport infrastructure.

In addition, the State Agency for Environmental Protection and Forestry (SAEPF under the GKR) is implementing an Action Plan on "Ecological Improvement in Bishkek for 2018-2022". This plan covers 33 activities, some of which aim to reduce pollution of the transport sector, such as:

- Development of a draft legal act on exercising state control over the protection of atmospheric air from emissions of pollutants by vehicles;

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11 Data kindly provided in writing by the State Registry Service of the KR upon request.

12 Data kindly provided in writing by the Ministry of Transport and Roads of the KR upon request.

13 According to the Law on Traffic No. 52 of 20 April 1998 only the following motorized vehicles need to undergo regular inspection: 1) vehicles used for business activities (e.g., taxis, cargo, dangerous goods); and 2) special/specialized vehicles (e.g., ambulance cars, fire trucks, garbage removal trucks, car tow trucks, vehicles for the transport of long loads, agricultural tractors and forestry, self-propelled special technological machines and vehicles for transportation of cash proceeds and valuable goods).

14 National Statistical Committee of the Kyrgyz Republic (2018). Environment in the Kyrgyz Republic 2013-2017. Bishkek.

15 Data kindly provided in writing by the Non-Infectious Diseases and State Sanitary Supervision Unit, Ministry of Health of the Kyrgyz Republic, upon request.

- Rehabilitation and expansion of air quality monitoring systems, including the acquisition of eight more atmospheric air pollution monitoring stations for Bishkek;
- Reduction of import duties for electric vehicles and hybrid vehicles (implemented in July 2018);
- Separate lanes for public transport in selected areas;
- Expansion of cycling lanes;
- Creation of business-friendly conditions for renting/selling electric gyro scooters and bicycles;
- Improvement of the video monitoring system of the road network providing for announcements on radio and television about alternative routes avoiding traffic jams;
- Increase in tax rates/fees on older vehicles;
- Construction of a ring road and bypass roads around the city;
- Optimization of the number of minibuses on urban routes, replacement by larger capacity buses fueled by natural gas, upgrading of the trolley bus fleet;
- Development of an information campaign on measures to improve the environmental situation in the city

This proposal has been developed in full recognition of these objectives and is aimed at assisting the Kyrgyz Government in implementing its priority actions on greening the transport sector.

## PROJECT DESCRIPTION

### ***A. Project beneficiaries***

Outdoor air pollution in Bishkek affects all citizens living and working there. While all of Bishkek's citizens will ultimately benefit from cleaner air, the highest benefits will be for people living and working in the central areas of Bishkek where concentrations of pollutants are highest.

In addition, children and the elderly are particularly affected by outdoor air pollution. It follows that children and elderly will benefit disproportionately from improved outdoor air quality.

A third group of ultimate beneficiaries are the Kyrgyz citizens at large. Such a strategy may serve as a blueprint for other cities in the country. In addition, the development of a long-term transport strategy for Bishkek will ensure high efficiency of investments in infrastructure and equipment, thus contributing to an optimal allocation of government spending. This will also help donor institutions to invest their money more effectively.

In addition to these groups of ultimate beneficiaries there are a host of other persons and groups who will directly benefit from the project through capacity building, skills development, training and education. These include in particular employees of Kyrgyz Hydromet under the MES KR (the government entity responsible nationally for the monitoring of air quality),

who will benefit from additional air quality measuring equipment in Bishkek and the build-up of related expertise. They also include officials of the Bishkek mayor's office, who will advance in their strategic approach to transport policy. The introduction of a comprehensive mandatory periodic inspection and maintenance system for cars and other vehicles will also benefit all the public institutions involved, by improving their capacities to regulate the operations of such a system. In addition, private companies undertaking the inspection and maintenance of vehicles can expect increased business at higher value aimed at providing better safety and health for their customers.

## ***B. Overall project objective***

The overall project objective is to contribute to the improvement of the outdoor air quality in Bishkek by reducing pollutants harmful to human health from the transport sector.

## ***C. Intervention strategy***

The human and economic costs of outdoor air pollution by transport are currently not properly reflected in Kyrgyz policies. "If you cannot measure it, you cannot manage it" is an often-cited proverb in policy-making. A comprehensive clean air policy thus requires more comprehensive measurement and more reliable data. This is the starting point taken in this proposal. The first aim of the project is thus to modernize the existing air quality monitoring network in Bishkek and to expand it both in terms of measuring stations and pollutants measured. The activities under this output are closely aligned with the SAEPF's Action Plan on Ecological Improvement in Bishkek for 2018-2022.

However, improving the air quality in Bishkek must go beyond just better measurement. A clear and long-term strategy for making the transport sector more sustainable is required to streamline investments in infrastructure and equipment. The second focus of the proposed project is thus to develop an integrated, sustainable and long-term transport strategy for the city of Bishkek, taking full account of existing strategies as included, for example, in the National Development Strategy of the Kyrgyz Republic for 2018-2040 and in the SAEPF's Action Plan on Ecological Improvement in Bishkek for 2018-2022. The new transport strategy will be the strategic basis for future investments in cleaner transport. Changes in legislation, investment in infrastructure and procurement of equipment would then need to be aligned with the expected results of this transport strategy.

In addition, the absence of a comprehensive mandatory periodic inspection and maintenance scheme for passenger vehicles is leading to a deteriorating quality of vehicles on the streets of Bishkek. Not only does this pose a risk to the safety of passengers, it also leads to increasing emissions as cars get older. As a third element, the proposed project thus prioritizes the reintroduction of an inspection and maintenance system for all vehicles registered in the Kyrgyz Republic. Based on the development of up-to-date standards, this will allow for improving the environmental performance of existing cars and for removing the most polluting vehicles from the streets of Bishkek (and other cities). In the medium term this will lead to reduced concentrations of air pollutants and therefore to improved health of citizens in Bishkek and other areas of high population density in the Kyrgyz Republic.

## ***D. Implementation partnership(s)***

Institutions mentioned below are potential partners to be closely involved in the activities planned under this project. They are divided into national partners and international partners

(including donors). The list does not represent a commitment to include all institutions, nor is it exclusive. For example, any stakeholder defined by the partner country may qualify for becoming a project partner.

### *National partners*

Name	Description	Potential role
State Agency for Environmental Protection and Forestry (SAEPF under the GKR)	In charge of 33-point action plan on "Ecological Improvement in Bishkek" for 2018-2022, including activities to reduce pollution from the transport sector	Overall project lead, in a coordinating role
Hydrometeorological Agency of the Ministry of Emergency Situations (Kyrgyz Hydromet)	Responsible for official air quality measurements in Bishkek and four other Kyrgyz cities	Lead in improvement of air quality monitoring network
Bishkek Mayor's Office, Department of City Transport	Responsible for local implementation of national objectives for urban municipal transport, city policy on transit traffic and for the development of road infrastructure	Lead in development of transport strategy for the City of Bishkek
Ministry of Internal Affairs of the KR	The Department of Road Traffic Safety was in charge of the mandatory vehicle inspection and maintenance scheme until it was abolished in 2012	Co-lead in improvement of inspection and maintenance of motor vehicles in the country as a whole
Ministry of Transport and Roads of the KR	Plays key role in national policy interventions such as a mandatory inspection and maintenance system	Co-lead in improvement of inspection and maintenance of motor vehicles in the country as a whole
Ministry of Health of the KR	Provides expertise and data on habitat quality, diseases and health status of the population. Monitoring and evaluation of the health impacts of environmental pollution.	Project counterpart, key role in result monitoring ensuring and measuring positive impact of project activities on public health
State Inspectorate for Ecological and Technical Safety under the GKR	Controls implementation of legislation in the areas of environmental protection and technical safety	Project counterpart, particular focus on revision of standards and improvement of inspection and maintenance of motor vehicles
State Registration Service under the GKR	Responsible for the registration of all imported vehicles into Kyrgyzstan	Project counterpart, key role in improvement of inspection and maintenance of motor vehicles
MoveGreen	Local environmental NGO, instrumental in the publication of independent air quality data in Bishkek	Project counterpart, key role in improving air quality monitoring network in Bishkek

### *International Partners (including donors)*

Name	Description	Potential role
Asian Development Bank (ADB)	Transport sector constitutes the largest sector in ADB's project portfolio in the Kyrgyz Republic	Donor
European Bank for Reconstruction and Development (EBRD)	Already active in providing sustainable transport solutions in Bishkek	Donor
World Bank	Has implemented various transport related projects in the Kyrgyz Republic, including on reliable mobility in Bishkek	Donor
Department for International Development (DFID)	DFID has been working on greening transport in Bishkek together with the Bishkek Mayor's Office	Donor
OECD	Currently working on Green Public Transport Investment Programme in the Kyrgyz Republic	Donor
World Health Organization (WHO)	Linking pollution and health is one of the core competencies of the WHO	Project counterpart
UNIDO	Supporting SMEs in the development of new businesses is one of UNIDO's core competencies. Assist SAEPF in its coordinating role, if requested	Project counterpart, can work with the Ministry of Industry to ensure that viable SMEs are established which can offer car owners the necessary vehicle inspection services and also support SAEPF in its coordinating role, if requested.
TÜVTÜRK	This company is responsible for periodic vehicle inspections in Turkey. The system was introduced in 2007, with TÜVTÜRK winning a 20-year monopoly status to be the sole provider of international quality vehicle inspection and certification services within the whole territory of Turkey in 2009, and can serve as a role model for the Kyrgyz Republic	Project counterpart, potential sub-contract for detailed analysis of the Turkish experience regarding the fight against corruption in Turkish vehicles emissions testing system and factors that have enabled the successful establishment and operations of the vehicle inspection system in Turkey—for important lessons learned.
Finnish Meteorological Institute	Provides expertise on air quality measurement; previous project experience in Bishkek.	Project counterpart
Environment Agency Austria	Provides expertise on air pollution, drawing on numerous related projects in Europe and in Central Asia	Project counterpart



## E. Project results/outputs

The project's overall objective will be reached by successfully completing the following outputs:

- Improvement of the air quality monitoring network in the city of Bishkek
- Development of an integrated, sustainable and long-term transport strategy for the city of Bishkek
- Improving inspection and maintenance of motor vehicles in the Kyrgyz Republic

## F. Key project activities

The project activities presented below are the result of an inclusive stakeholder process over several months, which included numerous government institutions, donor institutions, NGOs and the private sector. For more information on this stakeholder process, please refer to the main part of the HPAP document.

Activities	Locations	Duration	Potential lead partner(s)
Output 1: The air quality monitoring network in Bishkek has been improved			
1.1. Assess current status of air quality monitoring network and standards (e.g. MAC), including needs assessment for future investment	Bishkek	12 months	Kyrgyz Hydromet under the MES KR
1.2. Procure equipment where necessary to increase number of (stationary and mobile) monitoring stations and to refurbish existing stations to increase number of pollutants measured	Bishkek	24 months	
1.3. Develop capacity and train local staff to ensure that existing and new equipment is optimally used	Bishkek	24 months	
1.4. Ensure financial sustainability of monitoring system (e.g., by ensuring sufficient budgetary allocations)	Bishkek	18 months	
Output 2: An integrated, sustainable and long-term transport strategy has been developed for Bishkek			
2.1. Hold stakeholder consultations, including national and municipal government institutions, transport experts from research and academia, civil society, resident population, private sector, international organizations, donor community etc.	Bishkek	18 months	Bishkek mayor's office
2.2. Organize up to three study visits by representative group of local stakeholders	Potential case studies:  - Vienna  - Moscow  - Ankara  - Latvia	12 months	

Activities	Locations	Duration	Potential lead partner(s)
2.3. Draft the transport strategy for Bishkek, including a detailed implementation plan, and present it for validation at large public event in Bishkek	Bishkek	24 months	Bishkek mayor's office
2.4. Establish and run first two meetings of a formal interagency working group tasked with coordinating the implementation of the transport strategy based on a detailed implementation plan	Bishkek	18 months	

**Output 3:** Inspection and maintenance of motor vehicles in the Kyrgyz Republic has been improved

3.1. Assess optimal vehicle emissions standards in light of latest health and environment data as well as emissions abatement technologies	Bishkek	12 months	Ministry of Internal Affairs of the KR in cooperation with Ministry of Transport and Roads of the KR
3.2. Introduce updated vehicle emissions standards based on necessary legal and regulatory amendments	Kyrgyz Republic	21 months	
3.3. Undertake a detailed analysis of the Turkish experience regarding the fight against corruption in Turkish vehicles emissions testing system as well as success factors that have enabled the successful implementation of the inspections system	Bishkek, Istanbul	8 months	
3.4. Support the national government in the reintroduction of a national mandatory periodic motor vehicle inspection system, based on international experience, including a public communication strategy	Kyrgyz Republic	30 months	
3.5. Develop strategy, legislation and competent authorities to enforce standards and inspection stickers, based on international experience	Kyrgyz Republic	30 months	

## G. Gender mainstreaming

The project's approach to gender mainstreaming considerations will be described in detail during the project design phase, based inter alia on the gender policies of the partner institutions. A full gender analysis will be undertaken, aiming at an equal representation of women in all stages of the project.

This analysis will start with an overview about the gender related health impacts of outdoor air pollution. It will highlight how women and men will be differently impacted by the actions undertaken in this project. The gender analysis will also include a plan on gender sensitive recruitment. This means that gender aspects will always be considered when recruiting project staff, consultants and other experts. At public events, a gender balance of speakers and participants will be supported.

Where capacity building and training activities are foreseen, gender mainstreaming will play a significant role in the selection of participants. This will also be the case for the selection of participants in the study visits.

The results of the gender mainstreaming considerations will be reported on a regular basis.

## H. Project financing and indicative budget

Budget line	EUR				
	Total	Year 1	Year 2	Year 3	Year 4
<b>Project staff:</b>					
- International	<b>756,000</b>	189,000	189,000	189,000	189,000
- National	<b>96,000</b>	24,000	24,000	24,000	24,000
- Project Assistant	<b>168,000</b>	42,000	42,000	42,000	42,000
<b>Project consultants:</b>					
- International	<b>1,530,000</b>		350,000	670,000	510,000
- National	<b>283,500</b>	18,000	61,500	109,500	94,500
<b>Sub-contracts</b>	<b>1,800,000</b>	600,000	900,000	300,000	
<b>Study visits</b>	<b>67,500</b>	22,500	45,000		
<b>Meetings</b>	<b>69,000</b>	13,000	19,000	12,000	25,000
<b>Equipment</b>	<b>2,000,000</b>		500,000	1,500,000	
<b>Monitoring &amp; Evaluation</b>	<b>69,000</b>		23,000	11,500	34,500
<b>Other direct costs</b>	<b>150,000</b>	25,000	40,000	60,000	25,000
<b>Total</b>	<b>6,989,000</b>	<b>933,500</b>	<b>2,193,500</b>	<b>2,918,000</b>	<b>944,000</b>

## I. Sustainability of project results

Local ownership of the project development, implementation and results is a key element in ensuring the sustainability of the project. The involvement of a large number of Kyrgyz stakeholders from different backgrounds already in the early development of this extended project proposal is reflected in the outputs and activities laid out above. The support of various government agencies for the HPAP and this project proposal has repeatedly been secured and provides a good basis for collaboration with potential donors and other implementing partners.

To ensure the sustainability of the integrated Bishkek transport strategy proposed above, it is suggested to establish a formal interagency working group coordinating the implementation of the strategy based on a detailed implementation plan. Such a formal interagency working group aims to ensure accountability of its members (and its potential lead institution) to safeguard the strategy's implementation.

In addition to the institutional aspects, the project proposal also includes financial considerations aimed at ensuring the financial sustainability of the proposed actions. For example, an upscaled air quality monitoring system in Bishkek will also require a larger budget to support it in the long-term. Ensuring this financial support will be a key element of the intervention strategy. The same holds true in the development of the mandatory periodic vehicle inspection system.

## J. Risks to project implementation

<i>Project assumptions</i>	<i>Risk of failure</i>	<i>Mitigation action(s)</i>
Strong government commitment	<b>Low.</b>  The Kyrgyz Government representatives have been closely involved in the development of this proposal and have repeatedly voiced their support for the HPAP process and the activities proposed above.	Strong involvement of government institutions as lead partners of all outputs and activities of the project.
Financial sustainability of project results	<b>High.</b>  Classified as a lower middle income country by the World Bank, budgetary constraints need to be taken into consideration.	Ensuring financial sustainability is key to all activities proposed in this proposal. Various options for providing sufficient long-term financial sources (including from the private sector) will be considered together with all partners from the beginning.
Introduction of a mandatory periodic vehicle inspection system	<b>High.</b>  Resistance to additional costs by citizens are to be expected.	The introduction of such a system must be accompanied by a well-designed communication strategy explaining the benefits for safety, health and the economy. Social hardships need to be considered and addressed.
Gender mainstreaming	<b>Medium.</b>  While gender balance remains an issue, the stakeholder consultations held during the development of this project proposal have shown a significant level of involvement of women.	A detailed gender analysis conducted in the project design phase will develop strategies to ensure gender mainstreaming in all phases of the project.

## K. Monitoring, reporting and evaluation

There will be a regular reporting process institutionalized in the project. The framework for this process will be developed by monitoring and evaluation experts. It will include short monthly progress reporting, and detailed bi-annual reports. These will be prepared by the project coordinators and presented to donors to ensure the highest level of transparency as well as to ensure that the project is implemented according to plan (e.g. in terms of activities, finance, gender mainstreaming etc.). A project steering committee, with members from the lead and participating organizations and the donor(s), will be established within the inception phase of the project and undertake annual reviews throughout the project cycle. In addition, an evaluation will be conducted midterm and at the end of the project.

## L. Communication and visibility

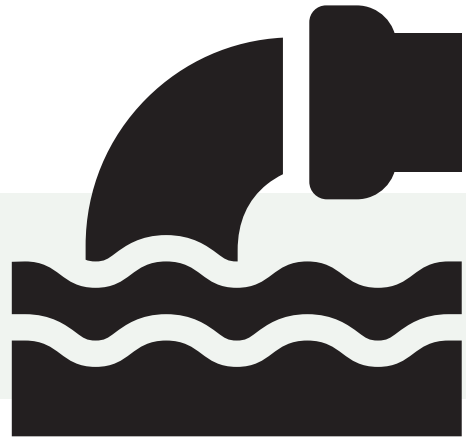
Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing factsheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events, and education/awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). At all workshops and training courses participants will be made aware of the donor financing. Their logos, along with those of major partners and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.



# PROJECT PROPOSALS

## UPGRADING WATER QUALITY MONITORING OF LAKE ISSYK-KUL



### PROJECT SUMMARY

Clean and safe water resources are key to public health and to the future sustainable development of the Issyk-Kul region. Clean water is not just indispensable for the livelihood of local citizens, it is also the basis for the large tourism industry around Lake Issyk-Kul. Given projected increases in the number of tourists in the region, the stress on water resources is likely to increase, with potentially adverse health effects on the local population, tourists, the environment and the economy at large.

This project thus aims to improve and modernize water quality monitoring of Lake Issyk-Kul and its main tributaries in order to provide for sound environmental decision-making with positive effects on health indicators. In a first step, the project will help stakeholders develop an integrated roadmap to ensure state-of-the-art monitoring of the lake's water quality. Secondly, the project aims to help relevant government offices to revise the methodologies and standards,



<b>Project title:</b>	Upgrading water quality monitoring of Lake Issyk-Kul
<b>Location(s):</b>	Issyk-Kul Oblast, Kyrgyz Republic
<b>Planned start date:</b>	2019
<b>Duration:</b>	3 years
<b>Government coordinating agency and Executing agency/cooperating agency:</b>	State Agency for Environmental Protection and Forestry (SAEPF) ) under the Government of the Kyrgyz Republic
<b>Budget (in EUR):</b>	3,031,300

“CLEAN WATER IS NOT JUST INDISPENSABLE FOR THE LIVELIHOOD OF LOCAL CITIZENS, IT IS ALSO THE BASIS FOR THE LARGE TOURISM INDUSTRY AROUND LAKE ISSYK-KUL”.

and will ensure full-capacity use of available laboratory equipment by means of training and capacity building of relevant stakeholders. This stage of the project also aims at assist with aligning monitoring processes with the ongoing national digital transformation by improving and maintaining an already existing and validated Laboratory Information Management System (LIMS). Thirdly, the project aims to ensure the sustainability of the Issyk-Kul water quality monitoring system, by a) promoting better inter-institutional cooperation to join up resources and capacities available within the national authorities whose mandates include water quality issues; and b) by ensuring financial viability of the monitoring system through policy advice on how to assure a steady stream of income to cover costs of monitoring and concrete recommendations for their implementation.



## RELEVANT BACKGROUND

Lake Issyk-Kul is the second largest mountain lake in the world, stretching some 182km in length and 60km in width. It is situated in the north-eastern part of the Kyrgyz Republic, at an altitude of just above 1,600m. The lake reaches a maximum depth of 668m.



**Sources:** Rus-Atlas.ru, Google Maps (2018)

Issyk-Kul is a so-called endorheic lake, meaning that it has several sources of inflow, but no outlet. This lack of outlets is responsible for the slight salinity of the lake, which make its water unsuitable for drinking or irrigation. According to Kyrgyz Hydromet under the MES KR, about 30% of the lake's inflow comes from the 118 rivers and stream which enter the lake. Another 30% comes from rain falling onto the lake. The remaining 40% comes from underwater sources, including hot springs at the bottom of the lake.

The lake is of great economic importance for the region, in particular as one of the main tourist attractions of the country. Almost 800,000 tourists visited the lake, shoreline, and surroundings in 2017. This number compares to 463,900 residents living in the entire Issyk-Kul Oblast. The northern shore is particularly developed for mass tourism. Cholpon-Ata and its neighboring villages Bos-Teri and Kara-Oi attract some 300,000 tourists each summer season; this lasts about 2-3 months, from mid-June to mid-September. A healthy environmental status of the lake is thus essential for tourism-related economic activities, incomes, and jobs in the region.

While the lake is mainly used for recreational purposes, there is also a small fishing industry, which declined significantly after the break-up of the Soviet Union. Since the lake is oligotrophic (low in nutrients), productivity is low and demand for fish around the lake outweighs supply. There are international efforts to increase output, for example by building new fish hatcheries and aqua feed production facilities. Reviving the fishing industry in Lake Issyk-Kul and its surroundings can create jobs and growth but requires clean water from the lake and its tributaries.



In addition, the water carried by the lake's tributaries is also used for drinking and other household purposes – particularly in the more remote rural settlements. Ensuring clean water in the rivers used for these purposes will thus have direct health benefits for the local populations.

Monitoring of lake water quality in 2015 and 2016 in the context of a project financed with the support of the Republic of Finland showed the following results:

The lake is oligotrophic with low organic matter content (0.06-0.67 MAC);

- Ammonia nitrogen is mostly detected in the coastal parts of the lake at a range of 1.7-2.2 MAC. It is below detection limits in the deeper waters of the lake;
- Content of other nutrients is generally insignificant but higher in the coastal parts of the lake. For example, the content of nitrate nitrogen reached 1.8-7.8 of the MAC in the area of the Balykchy shipyard;
- Pollution with petroleum products is significant both in the coastal zone and throughout the lake area. Concentrations fluctuate between 1.4 and 2.6 of the MAC;
- Concentrations of heavy metal salts in the lake water are within acceptable limits.

The tourism sector (including private resorts and hotels) is the largest direct contributor to water pollution in the lake itself. It does so in two main ways: on the one hand through increased production of sewerage and detergents in summer, on the other hand through increased water consumption affecting the self-purification capability of the lake due to reduced river water inflow. In particular, improperly processed wastewaters result in increased nitrogen pollution in the lake. This is a problem throughout the year, but particularly so in the tourist season when wastewater quantities reach their highest levels.

While agriculture contributed some 80% to the water pollution in Lake Issyk-Kul in Soviet Union times, it is not the main source of pollution anymore due to the collapse of the Soviet economy and the resulting changes that have since occurred in the Kyrgyz economy. However, some installations from those times still affect the lake today. In particular, the high concentrations of ammonia nitrogen and nitrite nitrogen in the shoreline area of Balykchy can be traced back to old fertilizer warehouses which are not properly supervised and cause mineral fertilizers to be washed into the lake by storm water runoff.

Another main pollutant is oil hydrocarbons caused by waterborne transport. In the area of Balykchy town, this pollution could also be caused by the local petroleum storage depot.

Several entities are involved in water quality measuring. However, there is no united joint measuring program that includes information exchange between all of these entities in view of a proper assessment of Issyk-Kul lake water quality. The activities of each institution are summarized in the table below.

Institution	Main activities	Measurement specificities
State Agency for Environmental Protection and Forestry (SAEPF under the GKR)	Officially and regularly implements shoreline monitoring (water sampling and water quality measuring by physical and chemical parameters) according to an approved annual work plan. Since 2018, measurements are taken three times a year (before, during and after the tourist season), at 20 measuring points located in areas intensively affected by anthropogenic activities.	In general, SAEPF under the GKR is responsible for measuring specific pollutants such as oil hydrocarbons, phenols and heavy metals.  Specifically, SAEPF under the GKR measures temperature, dissolved oxygen, pH, BOD5, conductivity, ammonia nitrogen, nitrate nitrogen, nitrite nitrogen, oil hydrocarbons, detergents (synthetic surfactants), heavy metals (copper, zinc, cadmium, lead, chromium), suspended solids, phenols.
Kyrgyz Hydromet under the MES	From 1966 to 1991, the mandate of Kyrgyz Hydromet under the MES included systematic hydrochemical observations. Today, Issyk-Kul water quality monitoring is not included in its work plan supported by the state budget. However, in 2015-2018, it was involved in Issyk-Kul deep water quality monitoring (sampling from various water horizons with following water quality measuring by physical and chemical parameters) under the KGZ-Water/Issyk-Kul Project.	In general, Kyrgyz Hydromet under the MES has mainly dealt with the chemical composition (mineralization) and main pollutants such as ammonia nitrogen, nitrate nitrogen, nitrite nitrogen.  Specifically, Kyrgyz Hydromet under the MES KR has measured transparency, colour, conductivity, temperature, mineralization, sulphate, dissolved oxygen, pH, BOD5, ammonia nitrogen, nitrate nitrogen, nitrite nitrogen.
Department for Disease Prevention and State Sanitary and Epidemiological Surveillance of the Ministry of Health (DDPSSES)  Centers for Diseases Prevention and State Sanitary Epidemiological Surveillance (CDPSSES) of Karakol town, Balakchy town, Issyk-Kul, Ton, Jeti-Ojuz, Aksuu, Tup raions	The Issyk-Kul subdivision of DDPSSES are the Karakol, Balykchy city Center for Diseases Prevention and State Sanitary Surveillanc, rayon CDPSSES (Issyk-Kul, Ton, Jeti-Ojuz, Aksuu, Tup).  DDPSSES take lake water sampling from the lake to analyze for microbiological parameters according to the approved annual work plans covering the recreational season. Sampling points are located in the areas with intensive anthropogenic load during the recreational season (rest houses, sanatoriums, public beaches and other authorized recreation areas).	Subdivision of DDPSSES is responsible for microbiological analyses.  Specifically, make water analysis of the lake.  Common coliform bacteria, thermotolerant coliform bacteria, coliphages (in plaque-forming units), cholera vibrio
State Committee on Industry, Energy and Subsoil use of the KR	Responsible for monitoring of underground waters. Has its own accredited laboratory.	
State Inspectorate on Ecological and Technical Safety under the GKR	Responsible for state supervision and control over environmental safety. It has no water laboratory of its own. It cooperates with SAEPF under the GKR on issues regarding water quality/safety.	

The SAEPF under the GKR runs an Environmental Monitoring Unit based in Cholpon-Ata which takes regular measurements of the lake's water quality. According to this laboratory, levels of sewerage pollution are high but still below current water quality standards. The

laboratory has modern equipment for conducting these analyses, but some equipment requires more expertise and training than the laboratory currently has available for them to be used to full capacity. In addition, some of the equipment can only be maintained or repaired in the manufacturing countries, increasing the operational costs and downtimes.

In the period 2015-2018 Kyrgyz Hydromet under the MES KR conducted chemical analyses once a year at 30 measuring points, mostly in deep waters. These analyses were conducted with old equipment and with methodologies dating from Soviet times. In addition, the agency lacks funds (e.g. for gasoline for boat) to undertake such measurements more frequently.

Hydrobiological indicators are not part of the water quality assessment of any of the public authorities. They characterize the quality of water as a habitat for organisms living in water. The Government recognizes that there is a need to increase the capacity for including hydrobiological tests in the regular monitoring of the lake.

Ministry of Health of the KR; subdivisions DDPSES (SDPSES in two cities and 5 rayons of Issyk-Kul oblast) performs laboratory monitoring of the water quality of water areas of cultural and domestic water use at least twice before the beginning of the swimming season and at least twice a month during the swimming season, common coliform bacteria, thermotolerant coliform bacteria, coliphages (in plaque forming units) and for cholera vibrio according to the order of MoH KR #604 from 17.08.2018. (from June to September).

Independent of the various tests and analyses required to measure the water quality of Lake Issyk-Kul, there is a general need to update water quality standards and methodologies. Developed during Soviet times for all surface waters of the country, the current standards cover all important pollutants (including “modern” pollutants such as detergents) but do not consider the specificities of Lake Issyk-Kul (e.g., its altitude, its salinity, its depth, the fact that it is an endorheic lake, that it never freezes etc.). Levels of the Maximum Allowable Concentration (MAC) of specific pollutants thus need to be revised, given the use of the lake and its specificities.

Finally, given the Kyrgyz Republic’s Digital Transformation Program (“Taza Koom”) the modernization of laboratories will have to go beyond better equipment, standards and methodologies. The introduction of a Laboratory Information Management System (LIMS) in all involved laboratories will improve laboratory data collection, analysis and reporting in view of increasing the efficiency, precision and communication of the daily work. Such a system (“DigiLab”) is already in use at the SAEPF’s Issyk-Kul Laboratory and should be upgraded for more extensive use in other laboratories.

## PROJECT DESCRIPTION

### *A. Project beneficiaries*

Safeguarding water quality of Lake Issyk-Kul ultimately benefits all the people living around the lake and – in the case of tourists – visiting the lake to enjoy its environment, by minimizing any impacts on their health from polluted lake water.

Furthermore, by detecting pollutants more comprehensively, a better water quality monitoring system will also contribute to reducing contamination of tributary rivers and the people dependent on the water they carry.

Safeguarding the lake's water quality also has economic benefits for the local population. In particular, protecting the tourists from health impacts of polluted lake water will help to protect and promote all tourism-related enterprises and the people directly and indirectly working for tourism. Since tourism is a major sector of the Kyrgyz economy, this will also have benefits for the whole economy.

Lake water safeguard can also be the basis for a revived fisheries industry, which can create additional growth and jobs in the region.

Finally, the whole of the Issyk-Kul Oblast will profit from the water quality monitoring roadmap, which will enable local investors and international donors interested in clean water resources to spend their money more effectively, increase investment security and thus also potentially increase investment activity.

As regards other beneficiaries, especially those institutions and laboratories dealing with water quality monitoring, they will benefit from increased capacity to use existing equipment to its full potential. Where additional equipment is required, this may create further employment opportunities for local or national experts. The more widespread application of the existing Laboratory Information Management System (LIMS) will increase the efficiency of the laboratories' day-to-day work. Similarly, the establishment of an inter-institutional entity on implementing the water quality roadmap will benefit the involved institutions by providing a space for increased cooperation, for exploiting synergies and for avoiding duplication of efforts.

## ***B. Overall project objective***

The overall project objective is to modernize and upgrade water quality measurement of Lake Issyk-Kul and its main tributaries, thus providing more transparency about the state of the lake's water resources.

## ***C. Intervention strategy***

A state-of-the-art monitoring system is the first and most fundamental building block in ensuring the protection of the lake's water quality, by providing transparent information about that quality. Such information is required for improved environmental decision-making in the region. In turn, this will ensure the health of all people dependent on clean water resources in the region, locals as well as tourists, as well as the "economic health" of all those economic activities dependent on clean lake water. With this in mind, the project's intervention strategy has been designed around three groups of activities, whose aim is to put in place such a state-of-the-art monitoring system.

First, the project aims to help stakeholders develop a water quality monitoring roadmap for Lake Issyk-Kul based on inclusive stakeholder consultations and considering experiences of water quality monitoring systems of other water bodies with similarities to the lake. This roadmap will provide for a modern, comprehensive and streamlined system of water quality monitoring of Lake Issyk-Kul. It will identify the short- and medium-term investment needs for laboratory modernization, it will provide the basis for revised water quality standards and methodologies, and it will ensure optimal coordination and information sharing between all involved institutions thus exploiting synergies and avoiding duplication of efforts.

Second, the project will assist stakeholders in modernizing and upgrading water quality monitoring methodologies, including through the revision of water quality standards

considering both international standards and the specificities of Lake Issyk-Kul. This is important to ensure that the standards adopted and methodologies used reflect the latest understanding of the impacts of water pollution on human health in a local context. A further important result of this cluster of activities is to ensure that modern equipment currently owned by the (SAEPF) Issyk-Kul Laboratory but being under-used will be optimally employed through capacity building and training of local staff.

Third, the project will help analyze economic mechanisms for ensuring the financial sustainability of a state-of-the-art water quality monitoring system for Lake Issyk-Kul. Potential options that will be studied include additional budget allocations or a “nature conservation contribution” from the tourism sector.

A second very important building block in ensuring the protection of the lake’s water quality is adequate capacity to treat wastewater entering the lake to the required discharge standards. While the state of the wastewater treatment facilities around the lake is indeed a major issue of concern, this project will focus only on monitoring due to the fact that the Kyrgyz Government is currently already engaged with multiple donors (including ADB and EBRD) in the modernization of these facilities. The project team will nevertheless liaise closely with the entities involved in these projects, to ensure that there is coherence between the monitoring system being proposed here and these other efforts.

#### ***D. Implementation partnership(s)***

Institutions mentioned below are potential partners to be closely involved in the activities planned under this project. They are divided into national partners and international partners (including donors). The list does not represent a commitment to include all institutions, nor is it exclusive. For example, any additional stakeholder proposed by the Kyrgyz Government or potential donors may qualify for becoming a project partner.

##### ***National partners***

<b><i>Name</i></b>	<b><i>Description</i></b>	<b><i>Potential role</i></b>
State Agency for Environmental Protection and Forestry (SAEPF) under the GKR	Runs the Environmental Monitoring Unit in Cholpon-Ata which provides chemical analyses of lake water quality	Overall project lead; lead in development of water quality monitoring roadmap, in development of revised standards and methodologies, as well as in ensuring long-term financial sustainability of monitoring
Hydrometeorological Agency of the Ministry of Emergency Situations of the KR (Kyrgyz Hydromet)	Owens the scientific research vessel “Moltur” specially designed for Issyk-Kul water quality monitoring	Project counterpart; particular role in development of water quality monitoring roadmap and in development of revised standards and methodologies
Regional Government of Issyk-Kul Oblast	Responsible for regional legislation and strategies, including the sustainable development concept of the region	Lead in developing strategy aimed at ensuring financial sustainability of monitoring system

<b>Name</b>	<b>Description</b>	<b>Potential role</b>
Ministry of Health Department for Disease Prevention and State Sanitary and Epidemiological Surveillance, (DDPSSES)	Provides expertise and data on Issyk-Kul lake water quality for microbiological parameters.	Project counterpart. Key role in developing a roadmap of water monitoring for microbiological safety of Issyk-Kul lake.
Centers for Diseases Prevention and State Sanitary Epidemiological Surveillance (CDPSSES) of Karakol town, Balakchy town, Issyk-Kul, Ton, Jeti-Ojuz, Aksuu, Tup raions	Issyk-Kul lake water quality monitoring and data on health status of the population.	
State Inspectorate for Ecological and Technical Safety under the GKR	Controls implementation of environmental legislation	Project counterpart

### *International Partners (including donors)*

<b>Name</b>	<b>Description</b>	<b>Potential role</b>
Asian Development Bank (ADB)	One of the major donors in the Issyk-Kul Oblast, e.g., financing the improvement of wastewater management systems in Balykchy and Karakol	Donor
European Bank for Reconstruction and Development (EBRD)	Active donor in Issyk-Kul Oblast on issues such as wastewater treatment, water supply and resort improvement	Donor
World Bank	Active donor in Issyk-Kul Oblast on a variety of issues, including water related projects focusing on water quality of rivers, rural water supply, and sanitation services	Donor
Republic of Finland	Finnish development cooperation funds have sponsored FinWater WEI I & II, aimed at enhancing water security in the Kyrgyz Republic, Tajikistan and the related region through equitable and integrated management of water resources	Donor
World Health Organization (WHO)	Linking pollution and health is one of the core competencies of the WHO	Project counterpart
United Nations Economic Commission for Europe (UNECE)	Involved in activities on water resources management. Among other things, is an implementing partner of FinWater WEI II	Project counterpart
OECD	Strong expertise in economic instruments for water resources management in the Kyrgyz Republic	Project counterpart, particular focus on financial sustainability of monitoring system.
OSCE	Supports activities of the Aarhus Centers, including the establishment and operation of the Issyk-Kul Aarhus Centre, different awareness raising campaigns in Issyk-Kul Oblast and shoreline cleaning activities	Project counterpart

Name	Description	Potential role
Finnish Environment Agency	Lead of FinWater WEI II project	Project counterpart, particularly in development of monitoring strategy and revision of standards/ methodologies.
Environment Agency Austria	Experienced partner in water management projects	Project counterpart

## E. Project results/outputs

The project's overall objective will be reached by successfully completing the following outputs:

- A roadmap for a modern, comprehensive and streamlined water quality monitoring system of Lake Issyk-Kul has been developed;
- Water quality standards and monitoring methodologies have been revised and existing equipment is used to full capacity;
- Long-term financial sustainability of monitoring has been ensured, including maintenance, calibration and keeping of operational status.

## F. Key project activities

The project activities presented below are the result of an inclusive stakeholder process over several months, which included numerous government institutions, donor institutions, NGOs and the private sector. For more information on this stakeholder process, please refer to the main part of the HPAP document.

Activities	Locations	Duration	Potential lead partner
<b>Output 1:</b> A roadmap for a modern, comprehensive and streamlined water quality monitoring system of Lake Issyk-Kul has been developed			
1.1. Hold stakeholder consultations, promoting inter-institutional dialogue between all government institutions involved in water quality issues	National, Issyk-Kul Oblast, Bishkek	12 months	SAEPF under the GKR in cooperation with Kyrgyz Hydromet under the MES KR and MoH KR
1.2. Organize up to three study visits looking into the question of how monitoring is done in comparable surroundings	Potential case studies: - Austrian lakes - Finnish lakes	6 months	
1.3. Conduct a needs assessment comparing existing resources (instruments, staff, funding) with required future resources, to ensure state-of-the-art water quality monitoring	Issyk-Kul Oblast, Bishkek	12 months	
1.4. Draft a roadmap, including a detailed implementation plan. Present roadmap at a local event	Karakol, Cholpon-Ata, Issyk-Kul Oblast at large	18 months	
1.5. Establish a formal interagency working group tasked with coordinating the implementation of the water quality monitoring roadmap based on a detailed implementation plan	Karakol, Bishkek	12 months	



Activities	Locations	Duration	Potential lead partner
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**Output 2:** Water quality standards and monitoring methodologies have been revised and existing equipment is used to full capacity

2.1. Assess and revise water quality standards (e.g. MAC), considering latest international standards but also taking into account the lake's specificities	National	12 months	SAEPF under the GKR in cooperation with Kyrgyz Hydromet under the MES KR, and MoH KR
2.2. Provide capacity building and practical training of local staff to ensure full-scale use of existing equipment	Cholpon-Ata, Issyk-Kul Oblast	18 months	
2.3. In view of national digital transformation, improve and maintain "DigiLab" software, an already existing Laboratory Information Management System (LIMS)	National	18 months	

**Output 3:** Long-term financial sustainability of monitoring has been ensured, including maintenance, calibration and keeping of operational status

3.1. Hold stakeholder policy consultations assessing options for establishing regular flow of finance, e.g. through additional budget contributions or regional "nature conservation contribution" from the tourism sector	Issyk-Kul Oblast	6 months	SAEPF under the GKR in cooperation with Issyk-Kul Oblast government, and MoH KR
3.2. Conduct an economic assessment of key policy options, including a Regional Impact Assessment of a potential "nature conservation contribution"	Possibly outsourced to international consultants	18 months	
3.3. Deliver policy options and guidance in implementing measures by means of capacity building and training	Issyk-Kul Oblast	18 months	

## G. Gender mainstreaming

The project's approach to gender mainstreaming considerations will be described in detail during the project design phase, based *inter alia* on the gender policies of the partner institutions. A full gender analysis will be undertaken, aiming at an equal representation of women in all stages of the project.

This analysis will start with an overview of the gender related health impacts of Lake Issyk-Kul water pollution. It will highlight how women and men will be differently impacted by the actions undertaken in this project. The gender analysis will also include a plan on gender sensitive recruitment. This means that gender aspects will always be considered when recruiting project staff, consultants and other experts. At public events, a gender balance of speakers and participants will be supported.

Where capacity building and training activities are foreseen, gender mainstreaming will play a significant role in the selection of participants. This will also be the case for the selection of participants in the study visits.

The results of the gender mainstreaming considerations will be reported on a regular basis.



## H.- Project financing and indicative budget

Budget line	EUR			
	Total	Year 1	Year 2	Year 3
Project staff:				
• International	567,000	189,000	189,000	189,000
• National	72,000	24,000	24,000	24,000
• Project Assistant	126,000	42,000	42,000	42,000
Project consultants:				
• International	540,000	120,000	180,000	240,000
• National	126,000	45,000	27,000	54,000
Sub-contracts	1,250,004	300,000	641,670	308,311
Study visits	67,500	22,500	45,000	
Meetings	66,000	30,000	17,000	19,000
Equipment	47,819		47,819	
Monitoring & Evaluation	69,000		34,500	34,500
Other direct costs	100,000	20,000	40,000	40,000
<b>Total</b>	<b>3,031,300</b>	<b>792,500</b>	<b>1,287,989</b>	<b>950,811</b>

## I. Sustainability of project results

Local ownership of the project development, implementation and results is a key element in ensuring the sustainability of the project. The involvement of a large number of Kyrgyz stakeholders from different backgrounds already in the early development of this project proposal is reflected in the outputs and activities laid out above. The support of various government agencies for the HPAP and this project proposal has repeatedly been secured and provides a good basis for collaboration with potential donors and other implementing partners.

To ensure the sustainability of the water quality monitoring roadmap proposed above, it is suggested to establish a formal interagency working group coordinating the implementation of the strategy based on a detailed implementation plan. Such a formal interagency working group aims to ensure accountability of its members (and its potential lead institution) to safeguard the strategy's implementation.

In addition to the institutional aspects, the project includes a specific output aimed at securing appropriate long-term financial contributions in order to guarantee operational status of the modernized and upgraded water quality monitoring system for Lake Issyk-Kul.

## J. Risks to project implementation

Project assumptions	Risk of failure	Mitigation action(s)
Strong government commitment	<b>Low.</b> The national and regional Governments have been closely involved in the development of this proposal.	Strong involvement of government institutions in all activities of the project.

<i><b>Project assumptions</b></i>	<i><b>Risk of failure</b></i>	<i><b>Mitigation action(s)</b></i>
Financial sustainability of project results	<b>High.</b> Classified as a lower middle income country by the World Bank, budgetary constraints need to be taken into consideration.	Various options for providing sufficient long-term financial sources (including from the private sector) will be considered together with all partners from the beginning of the project.
Introduction of a “nature conservation contribution” from the tourism sector	<b>High.</b> Resistance to additional costs are to be expected by the tourism industry and tourists themselves. In addition, the majority of tourists stay in entities not legally registered.	Representatives of the tourism sector must be closely involved in the introduction of such a contribution. Informal sector needs to be addressed. A well-designed communication strategy needs to explain long-term benefits for health, environment and economy.
Gender mainstreaming	<b>Medium.</b> While gender balance remains an issue, the stakeholder consultations held during the development of this project proposal have shown a significant level of involvement of women.	A detailed gender analysis conducted in the project design phase will develop strategies to ensure gender mainstreaming in all phases of the project.

## ***K. Monitoring, reporting and evaluation***

There will be a regular reporting process institutionalized in the project. The framework for this process will be developed by monitoring and evaluation experts. It will include short monthly progress reporting, and detailed bi-annual reports. These will be prepared by the project coordinators and presented to donors to ensure the highest level of transparency as well as to ensure that the project is implemented according to plan (e.g. in terms of activities, finance, gender mainstreaming etc.). A project steering committee, with members from the lead and participating organizations and the donor(s), will be established within the inception phase of the project and undertake annual reviews throughout the project cycle. In addition, an evaluation will be conducted midterm and at the end of the project.

## ***L. Communication and visibility***

Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing factsheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events, and education/ awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). At all workshops and training courses participants will be made aware of the donor financing. Their logos, along with those of major partners and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.

# ANNEX 1

## CONTACT LIST

Contacts provided in this list participated in the national HPAP process, either during bilateral meetings or inception, consultation and validation workshops.

The list is not exhaustive.

N°	Organization	Name
<b>National representatives (government, ministries, parliament etc.)</b>		
1	Presidential Apparatus	Mr. Mayrambel Kalybaev
2	Member of the Kyrgyz Parliament, Jogorku Kenesh	Mr. Ekmat Baibakpaev
3	Government Office	Mr. Abay Alymbekov
4	Ministry of Health KR	Mr. Erkin Checheybaev
5	Ministry of Health KR	Mr. Oleg Gorin
6	Ministry of Health KR, Public Health Management Unit	Ms. Ainura Akmatova
7	Ministry of Health KR, Public Health Management Unit	Ms. Baktygul Ismailova
8	Ministry of Health, Department of Disease Prevention and State Sanitary and Epidemiological Surveillance	Ms. Babujan Arykbaeva
9	Ministry of Health, Department of Disease Prevention and State Sanitary and Epidemiological Surveillance	Mr. Tolo Isakov
10	Ministry of Health, Department of Disease Prevention and State Sanitary and Epidemiological Surveillance, Non-Communicable Diseases Unit	Ms. Gulnara Saryeva
11	Ministry of Health KR, Department of Disease Prevention and State Sanitary and Epidemiological Surveillance	Mr. Omor Kasymov
12	Institute for Preventive Medicine under the Ministry of Health KR	Ms. Anara Shahmatova
13	Institute for Preventive Medicine under the Ministry of Health KR	Ms. Ainash Sharshenova

Nº	Organization	Name
14	Institute for Preventive Medicine under the Ministry of Health KR	Mr. Kubatbek Sadyrbekov
15	State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic	Mr. Arsen Ryspekov
16	State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic	Ms. Aizada Barieva
17	State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic	Ms. Aida Syrgakova
18	State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic	Ms. Begimai Anarbek
19	State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic	Ms. Baglan Salykmambetova
20	State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic	Mr. Baatyrbek Sakiev
21	State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic	Ms. Jamal Kadoeva
22	State Inspectorate for Ecological and Technical safety under the Government of the Kyrgyz Republic	Mr. Amanturov
23	State Inspectorate for Ecological and Technical safety under the Government of the Kyrgyz Republic	Ms. Gulmira Askarbekovna
24	State Inspectorate for Ecological and Technical safety under the Government of Kyrgyz Republic	Mr. Kerimbai uulu Beknazar
25	State Inspectorate for Ecological and Technical safety under the Government of the Kyrgyz Republic	Mr. Taalaibek Asylbekov
26	State Inspectorate for Ecological and Technical safety under the Government of the Kyrgyz Republic	Mr. Talant Aisarkunovich
27	State Inspectorate for Environment and Technical safety under the Government of the Kyrgyz Republic	Mr. Maksat Omurov
28	State Inspectorate for Environment and Technical safety under the Government of the Kyrgyz Republic	Mr. Rasul Artykbaev
29	Kyrgyz Hydromet under the Ministry of Emergency Situations	Ms. Lyudmila Nishanbaeva
30	Ministry for Agriculture, Food Security and Land Reclamation, Department of Chemicalization, Protection and Quarantine of Plants	Mr. Janybek Derbishaliev
31	Ministry for Agriculture, Food Security and Land Reclamation, Department of Chemicalization, Protection and Quarantine of Plants	Mr. Vladimir Pak
32	Ministry for Agriculture, Food Security and Land Reclamation, Department for Water Resources and Land Reclamation	Mr. Bektur Mavlyanov
33	Ministry of Transport and Roads of the KR	Mr. Azimkan Dzhusubaliev
34	Ministry of Transport and Roads of the KR	Mr. Adylbek Akmatov
35	Ministry of Transport and Roads of the KR	Mr. Karatay Djangelдиеv
36	State Committee on Industry, Energy and Subsoil Use	Mr. A. Orozbekov
37	National Statistical Committee of the KR	Mr. Nikolay Chuikov
38	National Statistical Committee of the KR	Ms. Nazira Kerimalieva
39	Investment Promotion and Protection Agency of the KR	Mr. Shumkarbek Adilbek Uulu
40	State Registry Service under the GKR	Mr. Adylbek Ryskeldiev
41	State Registry Service under the GKR	Mr. Jooshbek Koenaliev

Nº	Organization	Name
<b>Regional representatives from Bishkek and Issyk-Kul region</b>		
42	Bishkek Mayor's Office	Mr. Djusupov Kubanychbek
43	Bishkek Mayor's Office	Mr. Erkin Isakov
44	Bishkek Mayor's Office	Mr. Maxim Sitnikov
45	Bishkek Mayor's Office	Mr. Ulanbek Beishenbaev
46	Bishkek Mayor's Office, Transportation Unit	Mr. Tilek Jeenbaev
47	Bishkek Mayor's Office, Communal Services Unit	Ms. Gulnara Abdyldaeva
48	"Bishkek passenger vehicle enterprise" Municipal Enterprise	Mr. Emin Bekmurotov
59	Chui-Bishkek Territorial Department of Environmental Protection under the SAEPP	Mr. Ayazbek Abdymanapovich
50	Chui-Bishkek Territorial Department of Environmental Protection under the SAEPP	Mr. Emil Umaraliev
51	Government of the Kyrgyz Republic in the Issyk-Kul region	Mr. Uzarbek Jylkybaev
52	Issyk-Kul Oblast Administration Office	Mr. Damir Monoldorov
53	State Ecological Inspection, Issyk-Kul region	Ms. Anara Bukarova
54	City water Canal, Issyk-Kul region	Mr. Kanatbek Ishembiev
55	Karakol Preventive Diseases and State Sanitary and Epidemiological Supervision Department	Ms. Raya Hafizova
56	Mayor's Office of Balykchy city, Issyk-Kul region	Mr. Alisher Tabaldiev
57	Mayor's Office of Balykchy city, Issyk-Kul region	Mr. Almaz Mambetov
58	Mayor's Office of Cholpon-Ata, Issyk-Kul region	Mr. Almaz Belekovich
59	Issyk-Kul Science Center (Kyrgyz Hydromet)	Mr. Gennadiy Shabunin
60	Issyk-Kul laboratory under the SAEPP	Ms. Olga Shestova
61	Issyk-Kul laboratory under the SAEPP	Ms. Asel Rysbekova
62	Karakol waste landfill facility, Issyk-Kul region	Mr. Almaz Abdykeev
63	Municipal enterprise "Tazalyk", Issyk-Kul region	Mr. Almaz Abdykeev
64	Municipal enterprise of Cholpon-Ata Town Vodokanal, Issyk-Kul region	Mr. Mahmud Turdakunov
65	Municipal waste water treatment facility: pumping station, settling reservoirs, Issyk-Kul region	Mr. Kanat Abdylovich
66	Wastewater treatment facility, Aksuu, Issyk-Kul region	Mr. Talantbek Eshiev
67	Water treatment facility of Jety-Oguz Resort, Issyk-Kul region	Ms. Jamilya
68	Water waste treatment facility of Balykchy, Issyk-Kul region	Mr. Bolotbek Akmatov
69	Zarya Cooperative, Aksu, Issyk-Kul region	Mr. Shakraly Aitpaev

<b>International organizations, donor community and embassies</b>		
70	Delegation of the European Union to the Kyrgyz Republic	Mr. Eduard Auer
71	Delegation of the European Union to the Kyrgyz Republic	Mr. Askar Erkebaev
72	Delegation of the European Union to the Kyrgyz Republic	Mr. Carl Frosio
73	Delegation of the European Union to the Kyrgyz Republic	Ms. Isabel Pimenta
74	Delegation of the European Union to the Kyrgyz Republic	Mr. Nicola Scaramuzzo
75	Embassy of the People's Republic of Bangladesh, Tashkent, Uzbekistan	Mr. Mosud Mannan

Nº	Organization	Name
76	Embassy of the Federal Republic of Germany	Mr. Casjen Ohnesorge
77	Embassy of the Russian Federation	Mr. Andrei Krutko
78	Embassy of the Russian Federation	Ms. Elena Arhipova
79	Embassy of the Kingdom of Saudi Arabia	Mr. Abdulrahman Said Aljoomaa
80	Embassy of the Swiss Confederation	Mr. Lucien Aegerter
81	Embassy of the Swiss Confederation	Mr. Tunzhurbek Kudabaev
82	Embassy of the Republic of Turkey	Mr. Behzat Erten
83	Embassy of the United States of America	Mr. Dominic McIntyre
84	Embassy of the United States of America	Mr. Dolon Maldybaev
85	Environment Agency Austria	Mr. Fritz Kroiss
86	Finnish Environment Institute	Mr. Ari Makela
87	FinWater Project, phase II in Kyrgyzstan	Ms. Olivia Gruzdova
88	GIZ, Regional Programme for Sustainable and Climate Sensitive Land Use for Economic Development in Central Asia	Mr. Johannes Keil
89	KfW Development Bank	Ms. Indira Moldogazieva
90	Russian-Kyrgyz Development Fund	Mr. Oleg Kudyakov
91	TIKA Kyrgyzstan	Mr. Fatih Abdi Chetin
92	USAID, Kyrgyzstan	Mr. Zaur Bostanov
93	Asian Development Bank, Kyrgyzstan	Ms. Ainagul Amanova
94	European Bank for Reconstruction and Development	Ms. Gulnara Yessentayeva
95	European Bank for Reconstruction and Development	Mr. Nurlan Jumaliev
96	Organization for Security and Cooperation in Europe	Mr. Erali Paiziev
97	UN Resident Coordinator Kyrgyzstan	Mr. Ozonnia Ojielo
98	UNICEF, Kyrgyzstan	Mr. Esen Turusbekov
99	UNIDO Kyrgyzstan	Mr. Marat Usupov
100	UNIDO Kyrgyzstan	Ms. Nurgul Baiburaeva
101	UNIDO Kyrgyzstan	Mr. Zhanybek Saatov
102	UNIDO Kyrgyzstan	Mr. Anatoliy Bolovnev
103	UNIDO Kyrgyzstan	Mr. Nurshat Karabashov
104	UNIDO Kyrgyzstan	Ms. Tursunai Usubalieva
105	UNIDO Kyrgyzstan	Ms. Asel Duisheeva
106	UNIDO Vienna Headquarters	Ms. Nilgun Tas
107	UNIDO Vienna Headquarters	Mr. Edward Clarence Smith
108	UNIDO Vienna Headquarters	Mr. Jacek Cukrowski
109	UNIDO Vienna Headquarters	Mr. Arno Behrens
110	WHO Kyrgyzstan	Dr. Tasnim Atatrah
111	World Bank Project "National water resources management, phase I"	Mr. Azamat Karypov
112	World Bank Project on improvement of agriculture productivity and nutrition	Ms. Taisiya Neronova

Nº	Organization	Name
<b>NGOs, academia and private sector</b>		
113	"Ayu" Holding	Mr. Bakhtiyar Mukhamedziev
114	"NCO" Limited and Liability Company	Mr. Carl Wieburg
115	Central-Asian Institute for Applied Geosciences (CAIAG)	Mr. Bolot Moldobekov
116	Central-Asian Institute for Applied Geosciences (CAIAG)	Mr. Elaman Mambetaliev
117	Central-Asian Institute for Applied Geosciences (CAIAG)	Ms. Jarkynai Usubalieva
118	Central-Asian Institute for Applied Geosciences (CAIAG)	Ms. Olga Kalashnikova
119	Independent Ecologist	Mr. Oleg Pecheniuk
120	Independent Ecology Expert from India	Mr. Amit Rai
121	Independent Expert	Ms. Aliya Niazalieva
122	Kumtor Gold Company, Kyrgyzstan	Mr. Ben Ferris
123	Kumtor Gold Company, Kyrgyzstan	Ms. Olga Medoeva
124	Kyrgyz National University	Ms. Dilbara Osmonbetova
125	Médecins Sans Frontières	Ms. Nazgul Samieva
126	NGO "BIOM"	Mr. Vladimir Korotenko
127	NGO "Move Green"	Ms. Baktygul Stakeeva
128	NGO "Move Green"	Ms. Bermet Djakubova
129	NGO "Move Green"	Ms. Maria Kolesnikova
130	"Pure Earth" Kyrgyzstan	Ms. Indira Zhakirova
131	Scientific Research Institute for Atmospheric Air Protection (SRI Atmosphere Joint Stock Company), Russia	Mr. Alexander Romanov
132	Independent Expert, India	Dr. Vijay Veer
133	Thermal Power Plant of Bishkek	Ms. Anjelika Jdanova
134	Thermal Power Plant of Bishkek	Mr. Andrey Voropaev
135	Thermal Power Plant of Bishkek	Ms. Svetlana Samores
136	Tian Shan Policy Center, American University of Central Asia	Mr. Bozhil Kondev
137	Tian Shan Policy Center, American University of Central Asia	Mr. Johannes Chudoba
138	TÜVTÜRK, Turkey	Mr. Can Şıram

## ANNEX 2

### ABOUT THE GLOBAL ALLIANCE ON HEALTH AND POLLUTION

The Global Alliance on Health and Pollution (GAHP). GAHP is a global collaborative body that assists low- and middle-income countries to take concrete action to reduce the impacts of pollution on health. GAHP members include more than 40 national ministries of health and environment, development banks, United Nations organizations, other bilateral and multilateral groups, universities, non-governmental organizations, and other actors working on pollution. The current GAHP Secretariat is the New York-based non-profit organization, Pure Earth (also known as the Blacksmith Institute).

More information about GAHP is available at [www.gahp.net](http://www.gahp.net).

#### ORIGIN AND DESIGN OF THE HPAP PROGRAM

The global Health and Pollution Action Plan (HPAP) program is an initiative of the GAHP. It emerged from the recommendations of the Lancet Commission on Pollution and Health and from the expertise and guidance of GAHP members. The Commission report makes six core recommendations, including:



IN ADDITION TO INCREASED FUNDING, INTERNATIONAL TECHNICAL SUPPORT FOR POLLUTION CONTROL IS NEEDED IN PRIORITIZATION AND PLANNING OF PROCESSES TO TACKLE POLLUTION WITHIN RAPIDLY INDUSTRIALIZING CITIES AND COUNTRIES; IN DEVELOPMENT OF REGULATORY AND ENFORCEMENT STRATEGIES; IN BUILDING TECHNICAL CAPACITY; AND IN DIRECT INTERVENTIONS, IN WHICH SUCH ACTIONS ARE URGENTLY NEEDED TO SAVE LIVES OR CAN SUBSTANTIALLY LEVERAGE LOCAL ACTION AND RESOURCES. FINANCING AND TECHNICAL ASSISTANCE PROGRAMMES NEED TO BE TRACKED AND MEASURED TO ASSESS THEIR COST-EFFECTIVENESS AND TO ENHANCE ACCOUNTABILITY."

GAHP has received requests from over 20 low- and middle-income country governments to facilitate research, prioritization, planning, project selection and design, and the development of funding strategies to address pollution challenges. Although GAHP is not a funding agency, the expertise and experience of its member

organizations can be highly valuable for countries where national institutions face limitations related to funding and technical capacity. In response to these requests for assistance, the GAHP developed the global HPAP program, aimed at low- and middle- income countries.

The goals of the HPAP program are to:

1. Assist governments to identify, evaluate and prioritize existing pollution challenges based on health impacts
2. Establish pollution as a priority for action within national agencies and development plans
3. Define and advance concrete interventions to reduce pollution exposures and related illnesses

The HPAP is a pollution prioritization and planning process. It differs from other planning processes in that it is structured to bring together different agencies and parties that may not frequently work closely together. It is intended to promote collaboration. It is therefore driven by national agencies – Ministries of Environment, Health, Production/Industry, Transport, Energy, Mining, Agriculture and others – with facilitation and support by GAHP. The process can be tailored to the needs of an individual country, and aims to assist governments in identifying, prioritizing and accelerating national interventions to reduce pollution-related illness and death. It is designed to develop and implement well-defined and practical outcomes, with commitments by all the participants, including international partners and donors, to undertake specific short- and medium-term actions to improve environmental health. In countries where a National Environmental Health Action Plan (NEHAP) has already been developed with the support of WHO, the HPAP is intended to support the practical implementation of the key priorities.

Depending on the national context, the scope of the HPAP can include indoor and outdoor air pollution, unsafe water and inadequate sanitation, chemical contamination of soil, and occupational exposures to pollutants.

The HPAP process is flexible and can be tailored to the needs of each country, but generally includes the following steps.

- **PHASE 1.** Collection, compilation and analysis of available information on health impacts from pollution and existing pollution management programs by the Ministries of Health, Environment and Industry/Production, with assistance of GAHP.
- **PHASE 2.** Inception meeting to prioritize pollution issues, define next steps, including roles and responsibilities of stakeholders through a participatory process.
- **PHASE 3.** Preparation of a draft Health and Pollution Action Plan describing priority pollutants, pollution sources, health impacts, cost-effective interventions to reduce exposures, resources needed and potential sources of funding by a joint National Working Group with participants from the Ministries of Health, Environment, Transportation, Agriculture, Energy, Industry, Mining and with support from GAHP.
- **PHASE 4.** Circulation of the draft Action Plan to national and international stakeholders, which are invited to provide comments. The National Working Group integrates stakeholder comments and a final Health and Pollution Action Plan is created. Stakeholders reconvene to officially endorse and validate the Action Plan and discuss next steps toward implementing suggested actions.
- **PHASE 5.** Dissemination, promotion, fund raising, implementation, monitoring and review of the HPAP through domestic and international initiatives, in collaboration with GAHP, under the guidance of a joint coordinating team between the Ministries of Health and Environment.

## ANNEX 3

### GLOBAL BURDEN OF DISEASE DATA

**Agencies such as the World Health Organization (WHO) and the Institute for Health Metrics and Evaluation (IHME)** have conducted increasingly sophisticated global burden of disease studies that use data from government agencies, universities and other research groups to reveal the rates of death and disease associated with different risk factors, including exposures to various forms of pollution. These studies show that pollution is now responsible for between nine million and thirteen million deaths annually, and is one of the leading risk factors causing premature death in the world.

The HPAP analysis relies primarily on data from the IHME Global Burden of Disease (GBD) study. The GBD quantifies health loss from hundreds of diseases, injuries, and risk factors, so that policy-makers can fully understand

**DALY**

Disability Adjusted Life Year is a measure of overall disease burden, expressed as the cumulative number of years lost due to ill-health, disability or early death.

$$= \text{YLD} + \text{YLL}$$

Years lived with Disability + Years of Life Lost



their country's health challenges – and how those challenges are shifting over time. Data from ministries of health and other research organizations are collected and analyzed by a consortium of more than 2,300 researchers in more than 130 countries. The data capture premature death and disability from more than 300 diseases and injuries in 195 countries, by age and sex, from 1990 to the present, allowing comparisons over time, across age groups, and among populations.

The GBD allows decision-makers to compare the effects of different diseases and risk factors, such as malaria versus cancer, or pollution versus malnutrition, and then use that information to make policy in their home country.

**DISABILITY ADJUSTED LIFE YEAR (DALY)**

The GBD study cites its data in the form of Disability Adjusted Life Years (DALYs). A DALY is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death. The DALY is increasingly used in the field of public health. It extends the concept of years of life lost due to premature death, to include equivalent years of healthy life lost due to poor health or disability. In so doing, mortality and morbidity are combined into a single, common metric.







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