NATIONAL ACTION PLAN TO COMBAT DUST AND SAND STORMS IN THE REPUBLIC OF KAZAKHSTAN

STRATEGIC CONCLUSIONS

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KEY TASKS:

- Expanding the use and incorporation of modern technologies and methods for combating SDS processes;
- Strengthening the strategic and institutional foundations of governance and improving the country's individual capacity to deal with SDS;
- Improving interaction between government agencies and departments, research institutes, universities, and NGOs through the enhancement of human resources;
- Increasing the impact on the mechanisms of systemic decision-making and legislation in the field of sustainable management of the SDS processes in the country;
- Strengthening cooperation between the countries of Central Asia and International Cooperation for the exchange of successful methods and modern technologies;
- Identifing specialized education and training needs.

MAIN OBJECTIVES

The National Action Plan (NAP) on prevention and mitigation of sand and dust storms (SDS) in the Republic of Kazakhstan is aimed at developing an understanding of the long-term impact of SDS, neutralizing their impact and ensuring a comprehensive and consistent implementation of policies of Kazakhstan in the field of countering SDS.

The NAP contains a comprehensive analysis of the impact of natural and climatic conditions and weather phenomena on the processes of SDS in Kazakhstan, a description of the ecological condition of the lands of the republic and its water supply, a study of the impact of BSE processes on the health of the country and national capacity to reduce the consequences of SDS, listing existing national strategies and priorities for SDS management, and analysis of the action plan for combating SDS in Kazakhstan.

WHAT IS SDS?

Sand and dust storms are common meteorological phenomena in arid and semi-arid regions of the world. Central Asia (CA), characterized by a sharply continental climate, prolonged hot summers, cold winters, a large amplitude of daily temperatures, dry air, low cloudiness and precipitation with an extremely uneven distribution throughout the year, creates conditions for the formation of SDS in the region, including in Kazakhstan.

Dust storms occur when winds blow over dry bare soil at speeds of more than 1 m/s and lift loose soil particles into the atmosphere. Sandstorms travel relatively close to the ground, while dust storms can rise to heights of several kilometers and transport particles hundreds or thousands of kilometers away. According

to experts, global dust emissions from these natural phenomena range from 1 to 3 Gt per year.

Overgrazing, secondary soil salinization, water resources depletion and irrational use of natural resources are contributing anthropogenic factors to desertification, land degradation and drought (DLDD), resulting in more frequent and severe manifestations of SDS in CA.

According to the UN, more than 2 billion people in 100 countries live on dry lands, which occupy 30% of the planet's surface. If the rate of desertification is not reduced, by 2025 every fifth inhabitant of the Earth will live on the drought-prone territory. Experts estimate that 4-10% of crop lands, 27-68% of pastures and 1-8% of forests are already significantly degraded in CA.

Regional cooperation is the only way to slow down DLDD and achieve Land Degradation Neutrality (LND). Formation and implementation of country and regional strategies to counteract the SDS formation processes will have a direct positive impact on the environment of each Central Asian country and will accelerate the sustainable development process in the region as a whole.

ADVERSE IMPACT OF SDS

According to the World Meteorological Organization, inhaling dust particles **led to 400,000 premature deaths from** cardiovascular disease among those over 30 in 2014.

The impact of SDS on health:

development of asthma, bronchitis, obstructive airway disease, coughing and wheezing

Cardiovascular disease (CVD), deep vein thrombosis and pulmonary embolism, cerebrovascular disease

viral, bacterial, and fungal infections of the lower respiratory tract

Indirect damage from SDS:

sand drifts of irrigation canals, and deterioration of surface water quality

reducing the output capacity of solar power plants

skidding of transport routes, reduced visibility due to dust

FORMATION OF SAND AND DUST STORMS IN KAZAKHSTAN

Most of the territory of Kazakhstan is in the arid zone, and is represented by steppes, semi-deserts and deserts. It is worth noting that vast areas of the country are a source of SDS.

Natural factors such as an arid climate, frequent strong winds, sparse vegetation, insufficient soil moisture, low relative air humidity, frequent recurrences of soil and atmospheric drought, and soils with light texture contribute to the formation of SDS in Kazakhstan.

Anthropogenic factors also play a significant role in the occurrence of SDS. Unsustainable agricultural activities, the grim embodiment of which is the Aral Sea tragedy, leads to secondary salinization, soil erosion, loss of humus of irrigated and arable lands. Concentrated grazing on small areas of pastures, illegal logging, withdrawal of agricultural land for non-agricultural needs - all these and other factors increase the risk of SDS occurrence.

The SDS processes are directly related to the water availability in the republic. Uneven distribution of fresh water sources across the country, outdated water supply infrastructure, geographical peculiarities, irrational water resources management, insufficient priority of water policy formation, economy oriented on raw materials - all these reduce water availability in Kazakhstan and contribute to SDS development.

AGRICULTURAL RISKS OF SDS

Sand and dust storms are a source of major socio-economic impact. This impact is particularly acute for people engaged in agriculture. The short-term losses from dust storms include livestock illnesses, reduced crop yields, damage to engineering infrastructure, and reduced transportation efficiency. Economic losses from a single storm can amount to hundreds of millions of dollars. Long-term costs include soil erosion, pollution of ecosystems, chronic health problems, and desertification.

The layer of dust deposited on seedlings as a result of SDS leads to loss of plant tissue, decreased photosynthetic plant activity and increased soil erosion. This, together with other consequences of SDS, reduces the average income of the population engaged in agriculture and adversely affects the overall standard of living in the country.

Active development of agricultural production in Kazakhstan has left a mark in the form of land degradation and impoverishment of landscapes. A significant part of the country is subject to desertification, which leads to a decrease in the productivity of livestock and crop production. For 40 years of exploitation of cultivated virgin and fallow lands in Kazakhstan as a result of wind and water erosion up to 1,2 billion tons of humus have been lost.

In Kazakhstan, about 14% of all pastures have reached an extreme degree of degradation. Land degradation particularly affects poor rural farmers. A number of areas of the country may be or have already become ecological disaster zones, uninhabitable and unsuitable for agricultural use.

DESERTIFICATION IN KAZAKHSTAN

66% of Kazakhstan's territory is occupied by degraded lands

100 million hectares of the country's territory belong to anthropogenically disturbed and contaminated lands, which are the main source of SDS.

That's more than **140 million** soccer fields

$2.5 billion - annual cost of humus loss in Kazakhstan

normal seawater salinity: 35 g/l

Aral Sea salinity: 70 g/l

The dried bottom of the Aral Sea is the largest source of SDS in Central Asia

HEALTH RISKS OF SDS

Airborne dust is a serious threat to human health, especially when it contains toxic substances. Fine dust particles can carry a wide range of pollutants, spores, bacteria, viruses, fungi and allergens. Dust particles carried by winds many kilometers from the source can contribute to a wide range of diseases. People with lung or heart disease, as well as the elderly and children, are especially vulnerable.

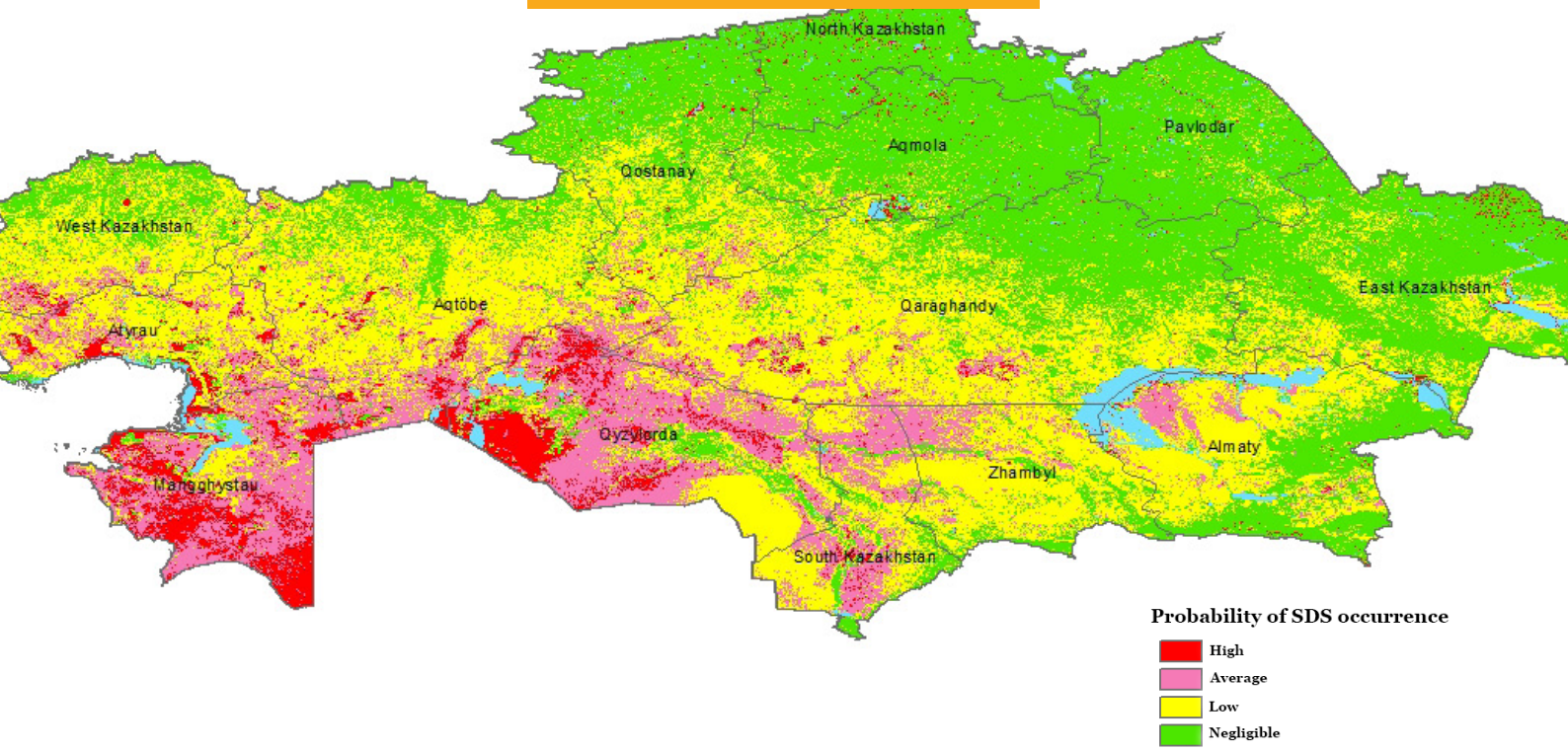
Dust particles adversely affect the respiratory system, especially in children, leading to, among other things, pulmonary dysfunction and chronic stunted growth of lung tissue. Inhalation of dust particles can cause many serious non-communicable respiratory and cardiovascular diseases, cancer, and contribute to premature death.

Dust often causes eye and skin conditions and infections such as meningitis. Dust can exacerbate other chronic diseases. The most problematic regions of Kazakhstan in terms of natural and anthropogenic factors are considered to be the Aral Sea region, the Caspian Sea region and the Ili-Balkhash region. Extreme natural conditions of these arid zones and negative consequences of unsustainable agricultural activities increase the probability of chronic diseases among the local population. Here, as well as in other regions of the republic, SDS are an additional cause of deterioration of the population's health.

Sand and dust storms annually transport up to 75 million tons of dust from the dried bottom of the Aral Sea. Genitourinary diseases and cancer are becoming increasingly common in the Aral Sea region. In the Pre-Caspian region there is a high mortality rate associated with air pollution. Both regions have high rates of congenital anomalies and neoplasms, an increase in diseases of the endocrine, nervous

and digestive systems, as well as circulatory diseases. A significant decrease in anthropometric indicators was found in children of these environmentally disadvantaged areas.

SDS SOURCES IN KAZAKHSTAN



SUSTAINABLE LAND MANAGEMENT AND SDS PROGRAMS

Kazakhstan has developed strategic measures to combat desertification by 2025. The issues of sustainable land management (SLM) are included in the processes of planning and national budget development. The concept of the country's transition to a "green economy" considers desertification as a cause for concern and declares a commitment to the principles of "green" agriculture.

Kazakhstan has a well-developed legislation system relevant to SLM, but most of them are not instruments for direct action, and their implementation requires development of a number of by-laws.

Barriers to the implementation of SLM include insufficient implementation of existing measures at the local level, bureaucratic delays, limited access of most farmers to lending resources, remoteness from markets, narrow opportunities to apply the latest scientific advances, low professional skills of people engaged in agriculture, and lack of effective economic incentives for farmers.

Existing state support mechanisms for agriculture cover a small fraction of agricultural producers. In addition, government subsidies carry the risk of supporting unsustainable use of land and water resources and serving as a barrier to new, more sustainable and adaptive practices.

There are no separate national policies and strategies on combating SDS in Kazakhstan - such policies are included in the documents on combating desertification and environmental protection, and appear in the programs on the implementation of international obligations of the country. In matters of environmental protection the republic cooperates with international and non-governmental organizations and financial institutions.

NATIONAL ACTION PLAN

Combatting Sand and Dust Storms in Kazakhstan, taking care of preservation of natural resources is a national task, which can be successfully implemented only with the direct and active participation of legislative and executive bodies, non-governmental organizations and the local population.

The goal of the NAP is to increase insti-

tutional capacity to implement effective and sustainable management of sand and dust storms in Kazakhstan. The plan will strengthen the cooperation between organizations and local communities to reduce the negative impact of the SDS and will serve as a basis for joint work at the sub-regional level.

In the context of international and regional cooperation, this document will be Kazakhstan's main tool for fulfilling its obligations under the UNCCD and UNFCCC conventions.

Remark:

The NAP on prevention and mitigation of the consequences of SDS in the Republic of Kazakhstan was developed by the staff of the Institute of Ecology and Sustainable Development (IESD) – a research, educational non-profit institution, whose activities are aimed at ensuring sustainable development of environmental and economic spheres of Kazakhstan, rational use and reproduction of natural resources of the country.

IESD cooperates with the UNCCD Secretariat for more than 20 years. During this time, the staff of the Institute has conducted extensive work on the study of desertification and land degradation and the development of methods to combat these problems. In this way, IESD has made a significant contribution to the achievement of the Sustainable Development Goals in Kazakhstan.