



Climate change and ecology in Kazakhstan.

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In these days of April, a rather unusual, but increasingly recursive, event is taking place in Kazakhstan: floods with landslides, flooding of entire villages and small towns with consequent economic damage for the cities and the inhabitants of these areas.

Spring, with the melting of the blanket of abundant snow and ice typical of these cold geographical areas, is associated this year with unusual and abundant rainfall and the flooding of the Ural river.

The Ural river connects several highly populated urban centers along the Russian-Kazakh border and despite the presence of a dam designed to stem its excess flows, the extraordinary excess has exceeded the critical levels and the containment capacity of the dam which allowed the overflow.

In the space of a week, the Ural River, passing through the Orenburg region and southwards along its tributaries towards the Caspian Sea where it has its delta, is causing the displacement of almost 100,000 people in Kazakhstan alone.

Climate change is a global problem but if observed closely it manifests itself almost everywhere in the world not as isolated disasters, but as a recursive and proportionately more devastating announced event.

Extreme weather events occur qualitatively more unexpected not in time, but in the magnitude of the event itself.

More intense events, due to the highest seasonal and annual average monthly temperatures recorded, outside the natural recovery times and temporal absorption of excess water during spring rains from natural embankments.

The exact word in this context is "Ecology", that is, considering in the context of climate change that there is both a natural causal part but also another due to the pre-eminent interference of global human activity, as interconnected.

The ecological environment thus emerges from a cycle of adaptation of its natural recovery limits and the environment responds with forms against the human as if indirectly re-establishing a balance by expelling it from the anthropic system.

The vectors of industrialization and the reckless use of non-renewable resources cause results with increasingly unpredictable repercussions for man.

As Bob Holmes said in an article on Science "The earth without us" twenty years ago, human beings think they are losing the earth, but it is the earth that always remains surviving the living, because no devastation is truly final for the earth but it is for living beings.

It is supported by 5 major mass extinction events in the last 400 million years and the obstinacy and resilience of life, which has changed with it.

Kazakhstan is one of the countries in Central Asia, located in desert regions, most vulnerable to climate change, precisely due to the extreme temperature range from -45°C in winter and +45°C in summer.

the hydro-geological instability, although a historical legacy of the period of intensive cultivation and reckless use of water resources of the Soviet period, is also an atypical component of the current ecological state of these places in Central Asia due to the absence of plants and trees in the steppe without significant mountain plateaus that can create barriers to the freezing Siberian winds in winter and the torrid ones from Iran in summer.





What follows is extreme precipitation in spring and absent in summer which dries out the soil, making its permeability less efficient and this which creates superficial accumulation basins.

The soil, like a solid blanket, prevents the necessary absorption proportional to the intense rainfall due to the rise in seasonal temperatures.

Soil is the natural ecological agent that absorbs and stops wastewater. The geographical characteristics of this country therefore contribute to its vulnerability to climate change.

Annual precipitation in Kazakhstan is almost twice less than expected evaporation.

Based on a previous UNDP report, it was observed that Kazakhstan's average annual temperature from 1901 to 2023 increased from the average of 5.68 °C in 1901 to 8.32 °C.

The temperature is still rising and the glaciers of the northern Tien Shan (The mountains it shares with Russia, Mongolia, China and Tajikistan)

they have undergone dramatic changes such as the retreat of glaciers which are losing part of their mass.

The study found a sharp increase in the daily maximum temperature on an increasing number of days with an air temperature above 35 °C, and a decrease in the number of days with a daily minimum temperature below 0 °C. recorded the highest climate signal for the average summer temperature. Furthermore, the authors demonstrated that over the past 166 years, the temperature in southern Kazakhstan has increased at a rate of approximately 0.27 °C per decade, and over the past 30 years the rate has increased by approximately 0.44 °C per decade .

According to the analysis of temperature and precipitation data, the study concluded that over the previous 166 years the climate fluctuated between warm and cold climates, and increasingly higher temperatures and decreased precipitation contributed to the severe droughts of 1879, 1917 and 1945.

Floods and droughts

The World Bank (in 2021) clarified that Kazakhstan is vulnerable to climate-related disasters by citing some major natural catastrophic events that occurred between 1985 and 2013. Notable examples include floods (6 major events), droughts (8 major events) and parasites and diseases (6 main events). The article also highlights that floods are more frequent in the south and east of Kazakhstan, precisely those that are ecologically most vulnerable to drought and increasingly high summer temperatures,

Drought is always complementary to soil instability and ecologically responsible for floods.

That of attention to water resources and the safety of river banks, the maintenance of roads and the sewage system, the relationship with the reforestation of lands adjacent to inhabited centers and a clear plan for the conveyance and saving of aquifers as well as water intended for agriculture.

These are essentially epochal missions that require experience and large investments.

States often prefer to pay for damages rather than budget for prevention, because politically it is easier to explain to citizens that 2 billion euros are needed for damages than to spend 1 billion. for preventive safety costs in the area.





And this is true everywhere in the first world but even more so in developing countries, certainly mortifying in the so-called third world countries, where there is no prevention and no remedy after disasters.

For example, there are numerous natural disaster scenarios:

such as locust infestations which are sporadic in Kazakhstan due to rising temperatures, but are more severe in northern wheat-growing regions (World Bank and ADB 2021).

These recent disasters destroyed 200,000 hectares in 2008 (out of a total of 12.9 million hectares).

Contaminants from industry, mining, agriculture and flood waters contaminate the aquifers of water supplies and obviously have a serious impact on the quality of drinking water, which even in city water systems that do not have sufficient maintenance or investments in pipes and waste systems.

As a result, the risk of gastrointestinal diseases could increase, which already represent, not surprisingly, one of the main causes of death in Kazakhstan.



Furthermore, a UNDP report states that the direct and indirect effects of climate change in Kazakhstan could result in more than 30 adverse health effects of man.

Among the direct impacts of climate change there are natural disasters, such as earthquakes, floods, landslides, forests, fires, which represent a greater and direct risk to the lives and health of citizens. According to experts, the lack of water resources in Kazakhstan is due to natural conditions, inefficient and irreplaceable consumption of water resources and the fact that almost half of wastewater is managed as discharge without a master plan on the territory.

However, the indirect effects of the management of environmental resources and their sustainability are extremely more costly in terms of the state budget even if they are not directly attributable to the true causes that generated them.

For example, the uncontrolled and deregulated management of the disposal of urban and toxic industrial waste leads large rural areas to support the open absorption or burial of large volumes of pollutants and the creation of chemical leachate.

In a country where policies for the preservation of forest land and vegetation are already absent, the trees that play the role of containing and filtering waste water create an ecological bomb.

The increase in temperatures, which is a global phenomenon, without a natural barrier, exacerbates more intense and prolonged periods of drought which reduces the water absorption capacity and transforms the soil into an impermeable layer which repels it externally instead of absorbing and distributing it internally underground.

But Kazakhstan at the same time is already aware of these problems, especially the economic impact that ecological disruption has indirectly on the productive force of work and the health of citizens.

The problem is always the allocation of financial resources and the application of the new environmental codes on the treatment of industrial and urban waste.

The establishment of the Ministry of Water Resources recently demonstrates this, as well as the approval of the single environmental code last April 2023 and the support and participation in the EU Global Compact, the initiatives of the UNDP and the UN FCCC agency of the United Nations for sustainable development and climate change that energy diversification and a sustainable economy is an essential objective for Kazakhstan.