Resilient Central Asia

Strengthening Disaster Resilience and Accelerating Implementation of the Sendai Framework Programme

Укрепление устойчивости к бедствиям и ускорение выполнения Сендайской программы

National Disaster Loss Databases implementation in Central Asia
Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan

Country Disaster Risk Profile of the Republic of Kazakhstan

adpc

cima RESEARCH FOUNDATION

Funded by the European Union

UNDRR
UN Office for Disaster Risk Reduction

Description of the project

The "National Disaster Loss Databases implementation in Central Asia" project that covers Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan from July 2020 to January 2023, supports the participating countries in the development of damage and loss data and information collection, in accordance with the Sendai Framework for Disaster Risk Reduction 2015-2030 and in alignment to the requirements of the Sustainable Development Goals Agenda 2030.

The project is coordinated by the United Nations Office for Disaster Risk Reduction (UNDRR) within the framework of the "Strengthening disaster resilience and accelerating implementation of the Sendai Framework for Disaster Risk Reduction in Central Asia" initiative, funded by the European Union.

The focus of the project is the establishment of the DesInventar Sendai[1] at National Disaster Risk Reduction authorities in Central Asia. The DesInventar Sendai enables the collection of disaster losses and damages data and the analysis of such information associated to natural and technogenic hazards. The system further facilitates the countries in their reporting on Sendai Framework Targets.

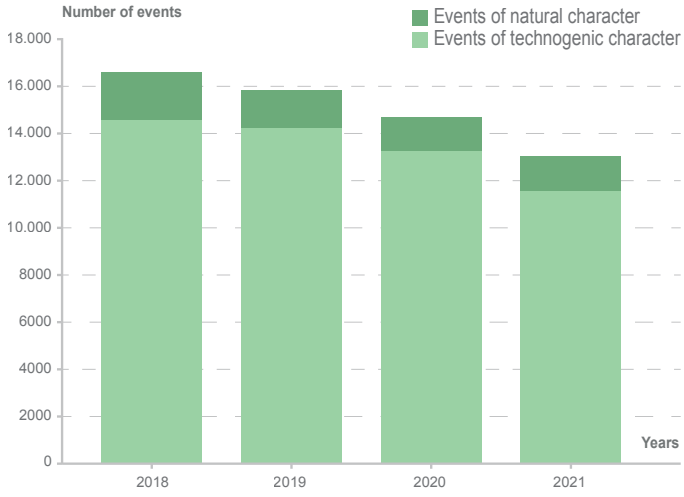
DesInventar Sendai is an updated version of the widely used software that simplifies damage and loss data collection and provides structured recording of damage and loss indicators that are required for the Sendai Framework reporting for Targets A to D. DesInventar Sendai allows definition and the use of Sendai Framework metadata to describe several indicators that includes a finer disaggregation of data. One of the main benefits of DesInventar Sendai is the full compliance with the Sendai Framework Monitor (SFM) to support and facilitate the annual Sendai Framework reporting through the SFM. On this link[2] official values of Sendai Framework Targets are reported for different years.

Both the SFM and the DesInventar Sendai are UNDRR's initiatives to accelerate the implementation of the Sendai Framework priorities to achieve the 7 global targets.

Historical records on disasters

Total area of the Republic of Kazakhstan is 2 699 700[3] square kilometers with a population of 19 002 586[4] (2021). The geographic location of the country makes it highly susceptible to natural hazards[5]. According to UNICEF[6],75% of the country territory is subjected to a high risk of natural hazards; namely, earthquakes, floods, hurricanes, landslides, mudflows, epidemics, extreme temperatures, and wildfires.

The official statistics of the Ministry of Emergency Situations of Kazakhstan reported[7] from 2018 till 2021 a significant number of technogenic emergencies (60 858 technogenic events and 7 711 natural events).



Number of events of technogenic and natural character for the period 2018 - 2021, statistics of the ministry of emergency situations of the Republic of Kazakhstan[8]

YEARS	2018	2019	2020	2021
Events of technogenic character	14 596	14 232	13 258	11 562
Events of natural character	2 023	1 589	1 438	1 476
Total number of events	16 619	15 821	14 696	13 038

INFORM Risk Index

Since 2021, INFORM risk index for Central Asia[9] is maintained by the Center on Emergency Situations and Disaster Risk Reductions (CESDRR) in collaboration with UNDRR Regional Office for Europe and Central Asia and with financial support from United States Agency for International Development (USAID) Bureau for Humanitarian Assistance (BHA). The INFORM risk index for Central Asia is developed at the first administrative level (corresponding to the provinces/oblasts/regions and few independent cities) in Central Asia.

The INFORM risk concept envisages three dimensions of risk:

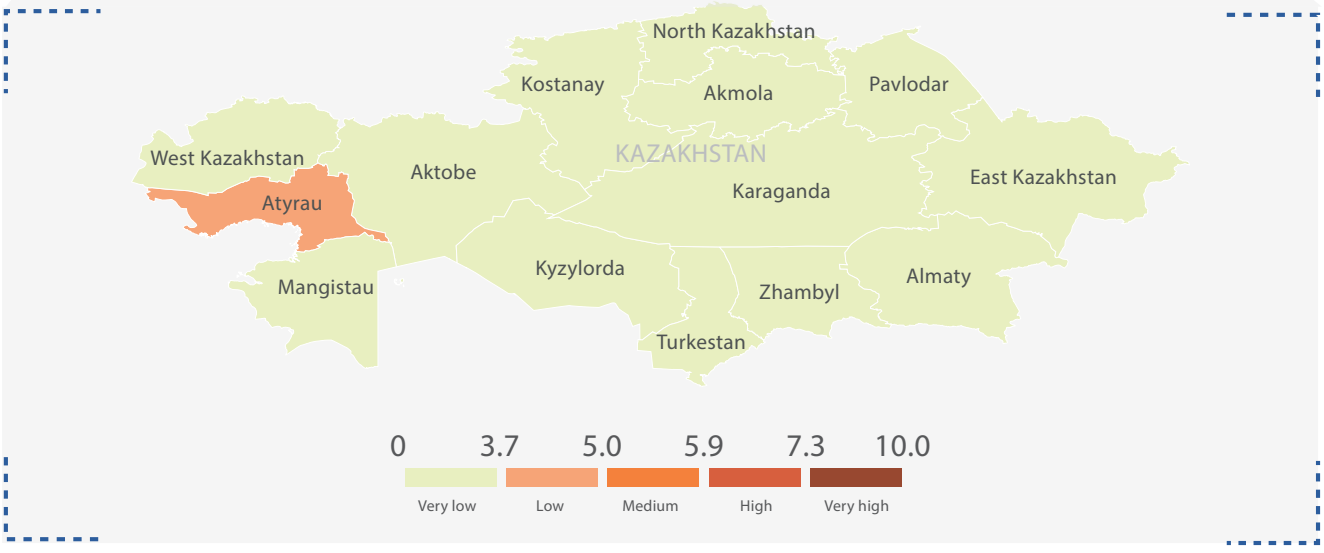
- Hazards & Exposure - events that could occur and the exposure to them.
- Vulnerability - the susceptibility of communities to those hazards.
- Lack of coping capacity - lack of available resources that can alleviate the impact.

In the 2022 INFORM risk index, the overall Republic of Kazakhstan risk score is defined as Very Low (2,5).

FIRST ADMINISTRATIVE LEVEL	HAZARD & EXPOSURE
Akmola	2,0
Aktobe	1,3
Almaty	3,4
Almaty (city)	3,6
Atyrau	3,9
East Kazakhstan	1,6
Karaganda	1,0
Kostanai	1,3
Kyzylorda	2,3
Mangistau	1,3
North Kazakhstan	1,2
Astana (city)	3,6
Pavlodar	1,4
Shymkent (city)	1,6
Turkestan	3,1
West Kazakhstan	2,4
Zhambyl	2,7

HAZARD & EXPOSURE INDEX

Hazard&Exposure index for all regions is Very Low 2,2, except for the region of Atyrau where it is Low 3,9.

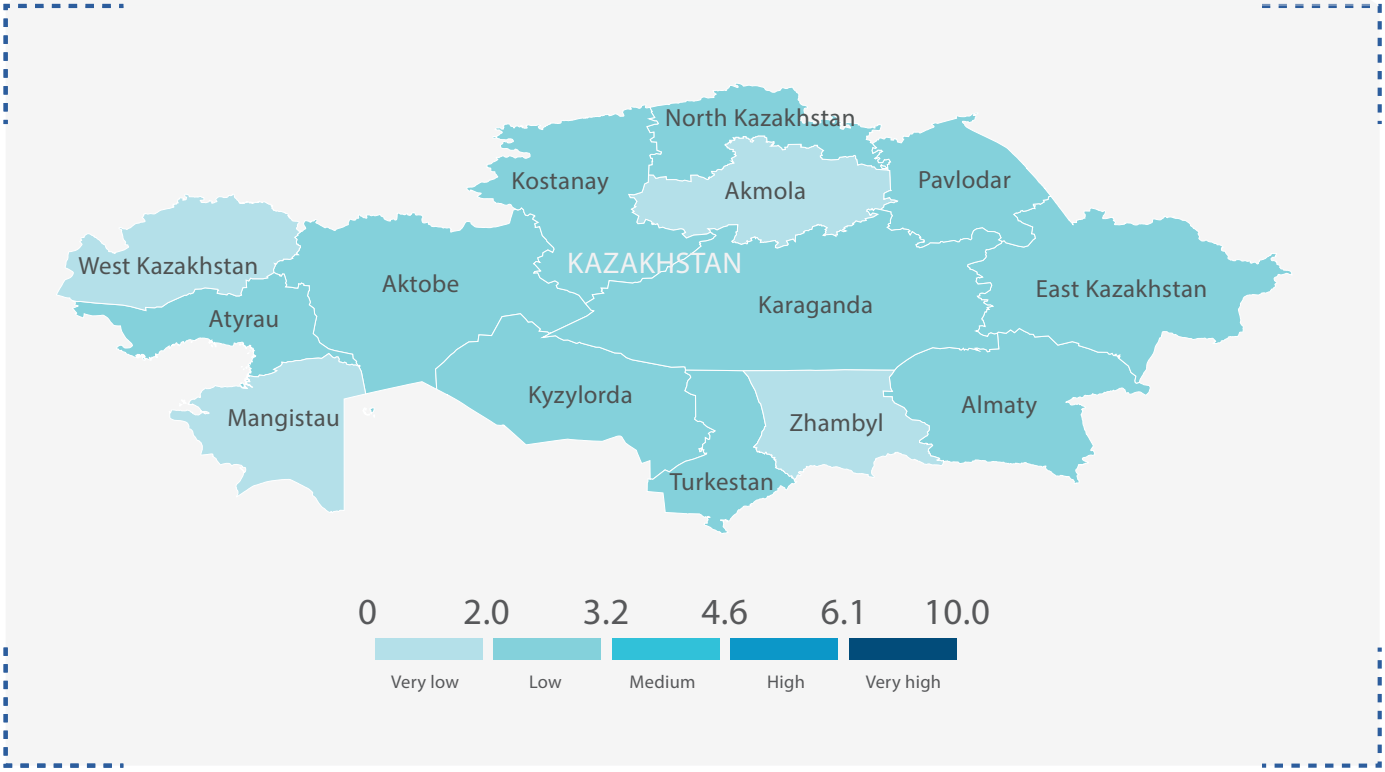


Hazard&Exposure index at regional level does not exceed Low – Very low for all regions.

VULNERABILITY INDEX

The Vulnerability dimension at regional level is provided on the map below and is between Very low - Low for all regions.

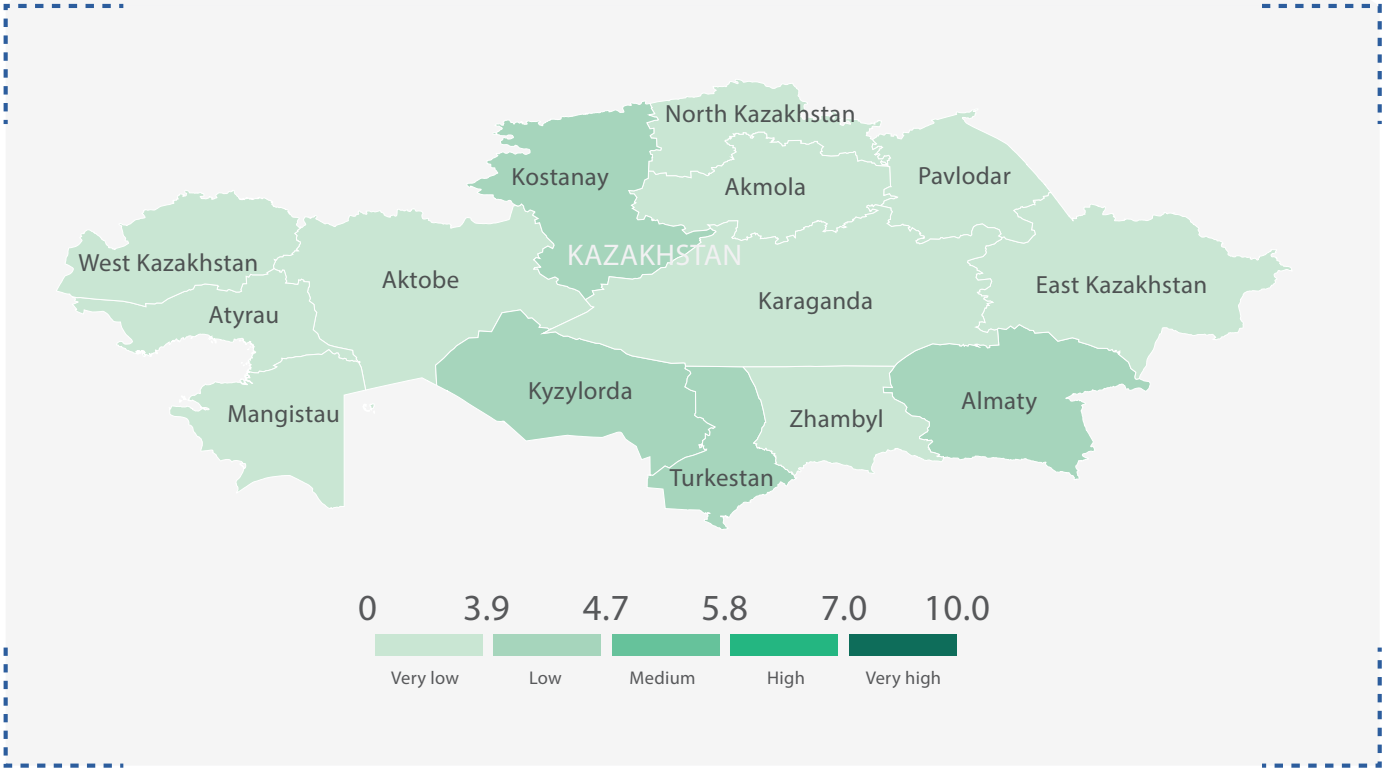
FIRST ADMINISTRATIVE LEVEL	VULNERABILITY
Akmola	3,6
Aktobe	3,8
Almaty	4,1
Almaty (city)	2,9
Atyrau	3,7
East Kazakhstan	3,7
Karaganda	3,4
Kostanai	4,0
Kyzylorda	4,1
Mangistau	3,7
North Kazakhstan	3,7
Astana (city)	2,9
Pavlodar	3,4
Shymkent (city)	3,9
Turkestan	3,9
West Kazakhstan	3,7
Zhambyl	3,7



LACK OF COPING CAPACITY INDEX

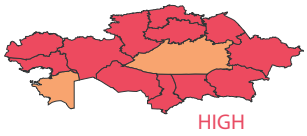
The Lack of coping capacity dimension at regional level is provided on the map below and is between Very Low and Low level (2.9-4.1) for all regions.

FIRST ADMINISTRATIVE LEVEL	LACK OF COPING CAPACITY
Akmola	3,6
Aktobe	3,8
Almaty	4,1
Almaty (city)	2,9
Atyrau	3,7
East Kazakhstan	3,7
Karaganda	3,4
Kostanai	4,0
Kyzylorda	4,1
Mangistau	3,7
North Kazakhstan	3,7
Astana (city)	2,9
Pavlodar	3,4
Shymkent (city)	3,9
Turkestan	3,9
West Kazakhstan	3,7
Zhambyl	3,7

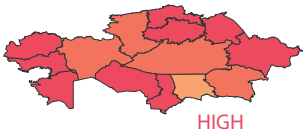


"ThinkHazard!" hazards likelihood

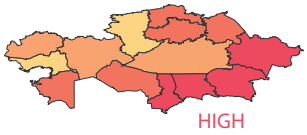
The ThinkHazard! web-based tool is developed and maintained by the Global Facility for Disaster Reduction and Recovery (GFDRR) providing a general view of hazards, for a given location to promote disaster and climate resilience. The tool highlights the likelihood of different natural hazards affecting an area (very low, low, medium, and high)[10] and is based on published hazard data, provided by a range of private, academic, and public organizations[11].
The High level of the likelihood was defined for following hazards[12]: river flood, urban flood, earthquake, landslide, wildfire, and water scarcity. The Medium level of the likelihood was defined for extreme heat, and Very Low for Cyclone.



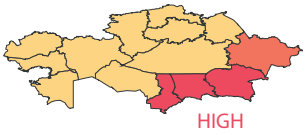
RIVER FLOOD
The river flood hazard is classified as high based on modeled flood information currently available to this tool. This means that potentially damaging and life-threatening river floods are expected to occur at least once in the next 10 years.



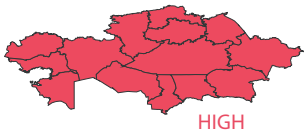
URBAN FLOOD
The urban flood hazard is classified as high. The potentially damaging and life-threatening urban floods are expected to occur at least once in the next 10 years.



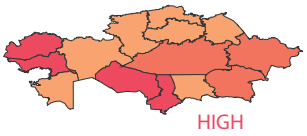
EARTHQUAKE
The earthquake hazard is classified as high according to the information that is currently available. This means that there is more than a 20% chance of potentially-damaging earthquake shaking in the next 50 years.



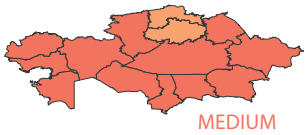
LANDSLIDE
The landslide hazard is classified as high risk. This region has rainfall patterns, terrain slope, geology, soil, land cover and (potentially) earthquakes that make localized landslides a frequent hazard phenomenon.



WILDFIRE
The wildfire hazard is classified as high what means that there is greater than a 50% chance of encountering weather that could support a significant wildfire that is likely to result in both life and property loss in any given year.



WATER SCARCITY
The water scarcity hazard is classified as high. This means that droughts are expected to occur on average every 5 years. The impact of drought must be considered during the design of buildings and infrastructure.



EXTREME HEAT
Extreme heat hazard is classified as medium based on modeled heat information currently available to this tool. This means that there is more than a 25% chance that at least one period of prolonged exposure to extreme heat, resulting in heat stress, will occur in the next five years.

CYCLONE
Cyclone (also known as hurricane or typhoon) hazard is classified as a very low risk which means that there is less than a 1% chance of potentially damaging cyclone-strength winds in the next 10 years.

Legend:

- HIGH — Severe damage expected within project\ or human lifetime, mitigation measures essential.
- MEDIUM — Damaging effects expected within project or human lifetime, consider mitigation measures.
- LOW — Less likely, but damaging events still possible, prudence in critical locations.
- VERY LOW — Unlikely damaging effects, but potential still exists.
- NO DATA AVAILABLE — No dataset for chosen location in ThinkHazard.

Establishment of DesInventar Sendai in the Republic of Kazakhstan

The Government of Republic of Kazakhstan is highly committed to implement the 2030 Agenda for Sustainable Development by actively cooperating with the international partners.

During the project "National Disaster Loss Databases implementation in Central Asia" with the support of the UNDRR Regional Office for Europe & Central Asia, the Ministry of Emergency Situations[13] of the Republic of Kazakhstan was tested and adapted the DesInventar Sendai software to needs for collection, analysis and reporting of disasters at national and local level. The DesInventar Sendai will also help Government of Kazakhstan in improving the current assessment of the disaster loss data accounting process in the country, including existing templates for loss data collection, and databases maintained by different actors.

The DesInventar Sendai installation was configured in accordance with national priority damage and loss indicators. In the current database, the indicators of housing, education, health, energy, water, industrial, transport infrastructure sectors, including, crops, livestock, agricultural, social, and cultural assets are disaggregated. The list of 51 hazards comprises of natural, technogenic, and biological hazards and follows the official taxonomy and country definitions.

DesInventar Risk Profile

The DesInventar Sendai Risk Profile has been prepared by collecting disaster loss data using the DesInventar Sendai system since 2021 in the framework of the "National Disaster Loss Databases implementation in Central Asia" project. It is based on information collected for the period of 1993-2022. However, the data entry process on historical disasters is continuing. The process of disaster loss data collection is in the starting point, and risk profile will require further reviewing to reflect the current situation of disasters in the country.

To further strengthen the loss data collection on past disasters, the DesInventar Sendai system will specify the country risk profile and make it reliable. As an official tool for disaster loss data accounting, the DesInventar Sendai system will strength capabilities of national Civil Protection authorities in systematic collection and analysis of information on disasters, Sendai Framework reporting and in taking adaption measures on disaster risk reduction.

Country overview

The current database contains data for the period between 1993-2022. The limited number of records were registered currently for the period 1993-2020, while most of the events (i.e., 370, 95%) are very recent and related to the years 2021 and 2022. Thus, the present risk profile can be defined as a starting risk profile, which will change within collecting data.

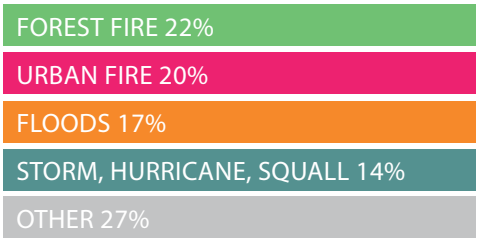
Reported data in DesInventar for the period 1992-2022

- TOTAL NUMBER OF DATA CARDS: 390 DATA CARDS
- NUMBER OF DEATHS*: 999
- NUMBER OF PEOPLE AFFECTED DIRECTLY AND INDIRECTLY: 267.000
- NUMBER OF HOUSES AFFECTED DAMAGED AND DESTROYED: 390
- TOTAL ECONOMIC LOSS: 1.1MILLION $ THE EXCHANGE RATE VARIES FOR EACH YEAR

The total economic loss reflects only reported data, but not actual loss. No estimation has been made based on the damage to the assets since the national methodology for the economic loss assessment is in development.

* In addition to the number of deaths, the count does not include the number of missing persons.

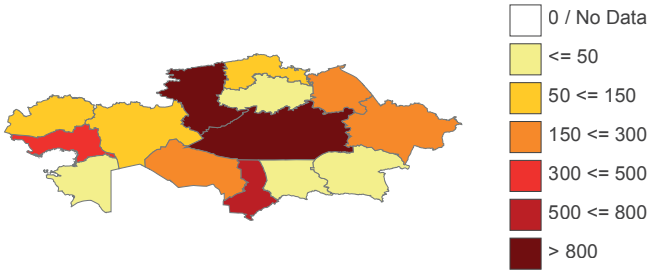
Hazard frequency:



Forest fire is the most common hazard registered, followed by Urban fires, Drowning victims, and Storms, Hurricane, Squall. Together these four hazards cover 73% of the available records.

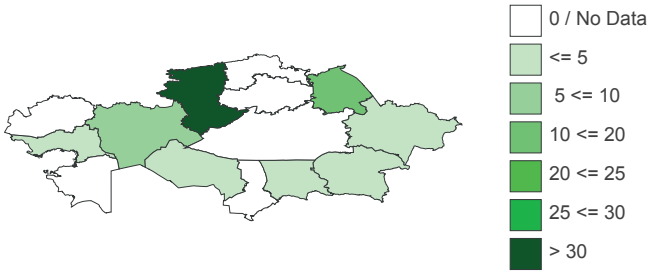
Geographical distribution of data cards

All maps were developed based on geographical boundaries provided by the Database of Global Administrative Areas (GADM) project[14]. The maps illustrate the geographical distribution of data cards across regions and provinces in the country. The spatial distribution of data cards ranges from more than 40 data cards to less than 1 data card at regional level and from more than 5 data cards to less than 1 data card at provincial level. Therefore, the most affected regions are Karaganda, Kostanay, Turkestan, Atyrau and Pavlodar.
This map is showing provinces with the highest number of disaster data cards.

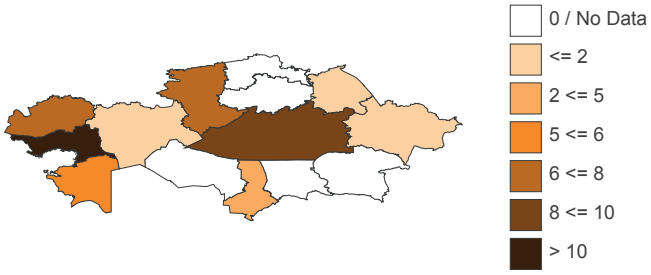


Geographical distribution of disaster events by regions

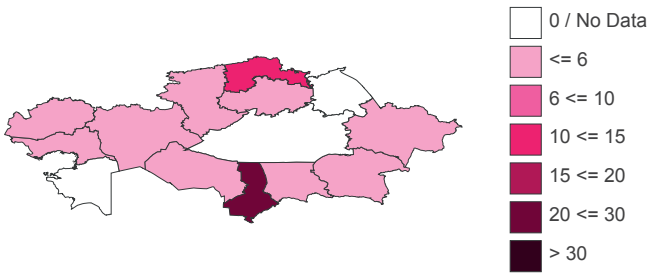
Geographical distribution of the main hazards



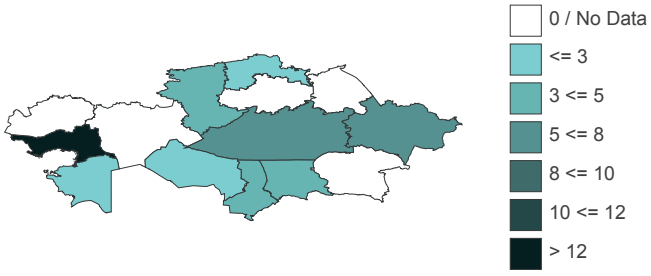
Most affected regions: Kostanay, Pavlodar, Aktobe



FLOODS by regions
Most affected regions: Atyrau, Karaganda,



URBAN FIRE by regions
Most affected regions are Turkestan, Astana city,



STORM, HURRICANE, SQUALL by regions
Most affected regions: Atyrau, East Kazakhstan,

People affected, economic loss and damage related to the Sendai Framework Targets A, B, C, and D

NUMBER OF DEATHS AND MISSING BY HAZARD (TARGET A)*

- 629 Earthquake (38%)
- 459 Pandemic (28%)
- 244 Other (17%)
- 212 Infectious diseases (12%)
- 91 Transport accident (5%)

* The number of deaths is augmented by the inclusion of the number of missing persons.

NUMBER OF PEOPLE AFFECTED BY HAZARD (TARGET B)

- 90.950 people affected by
- 56.700 people affected by
- 36.626 people affected by
- 23.009 people affected by
- 14.882 people affected by

DAMAGE TO INFRASTRUCTURE BY HAZARD (TARGET D)*

- 221 Wildfire (65%)
- 47 Flood (14%)
- 35 Urban fire (10%)
- 17 Other (7%)
- 16 Storm, Hurricane,

* list of infrastructures: education, health, agriculture, water supply, sewerage, industries, communication, transportation, power and energy, relief.

- 186 houses affected by Flood (47%)
- 62 houses affected by Urban fire (15%)
- 62 houses affected by Wild fire (15%)
- 50 houses affected by other (~13%)
- 31 houses affected by Storm, hurricane, squall (7%)

* houses damaged and destroyed. according to currently available data more than 47% of damages to houses are caused by Floods.

TOTAL ECONOMIC LOSS IN % BY HAZARD (TARGET C)

- 37 lost by Mudflow
- 34 lost by Urban fire
- 16 lost by Forest fire
- 9 lost by Flood
- 4 lost by Other

ECONOMIC LOSS BY SECTORS

- 65 Loss of houses
- 21 Loss to
- 8 Loss to
- 6 Loss to

Conclusions

The adoption of the DesInventar Sendai system as an official tool for disaster loss data accounting will strengthen the national capacity in regular collection and analysis of disaster information. Systematic disaster loss data accounting will foster the implementation of the Sendai Framework Targets, Sustainable Development Goals, and will support in defining specific measures for disaster risk reduction.
The Ministry of Emergency Situations of Kazakhstan praised DesInventar Sendai as a national system of disaster loss accounting, and had commenced testing it with its departments in 18 regions of the country.
UNDRR worked with local data collectors in 2022 to populate the DesInventar Sendai database and support the country in mapping the spatial and temporal distribution of risks, and support the reporting against key indicators of the Sendai Framework.

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