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
Kyrgyz Republic

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 Organizations 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

The Kyrgyz Republic is located in the northeast of the Central Asian region with a territory of 191 800[3] (2020) square kilometers and a population of 6 694 200[4] (2021). The Kyrgyz Republic is highly susceptible and vulnerable to natural hazards due to its geographic location in a seismically active and mountainous region[5]. The 94% of the country is located at more than 1 000 m above sea level, and 40% above 3 000 m.

According to the official statistics reported below of the Ministry of Emergency Situations of the Kyrgyz Republic

on the number of emergency situations of natural, technogenic, ecological and biological-social nature in country between 1990 and 2010, there were in total 3 689 registered events with damages and losses. The large number of events were related to natural hazards such as mudflows, landslides, avalanches, and floods. The technogenic hazards such as big fires, technogenic and transport accidents also provide large damages and losses.

Number of events
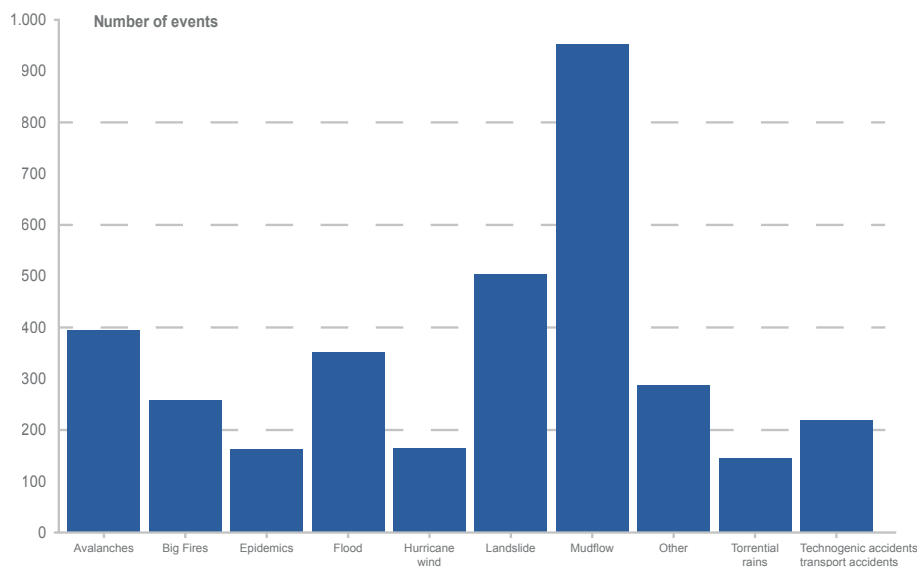
Statistical data on the number of emergencies of natural, man-made, environmental, and biological and social character on the territory of the Kyrgyz Republic for the period 1990 – 2010[6]

INFORM Risk Index

Since 2021, INFORM risk index[7] for Central Asia 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.

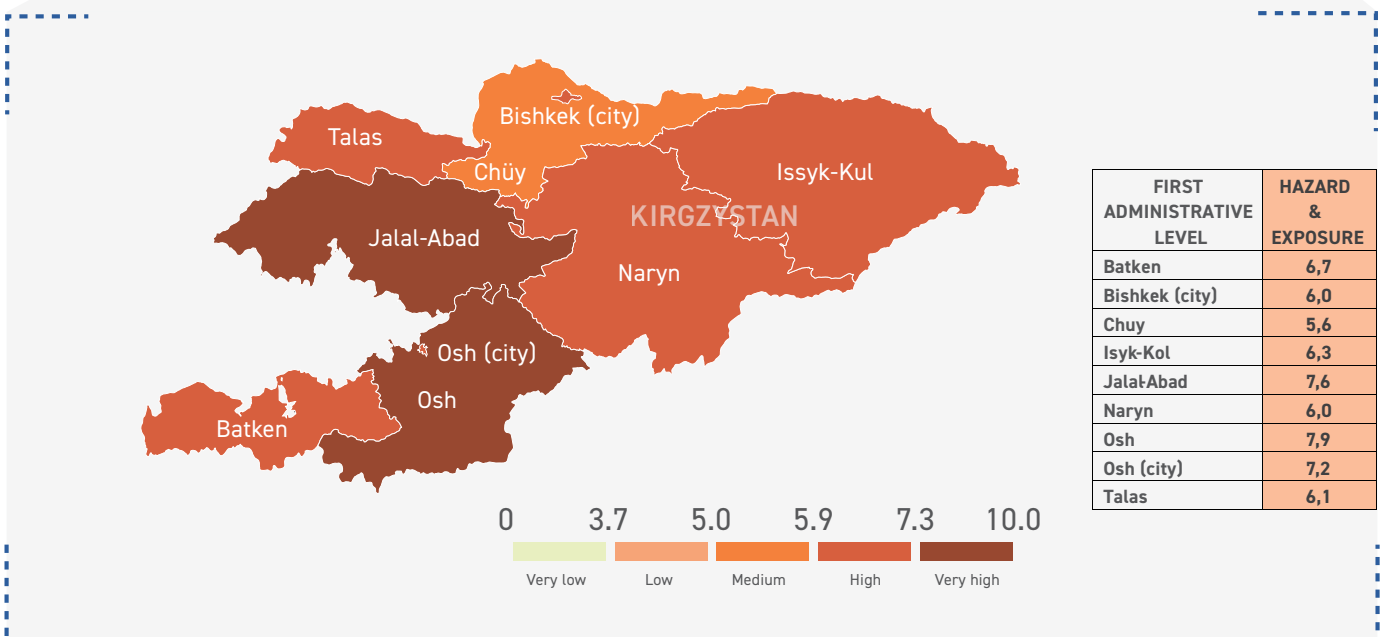The INFORM risk concept[8] envisages three dimensions of risk:

- **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[9], the overall Kyrgyz Republic risk score is defined as Medium (5,2).
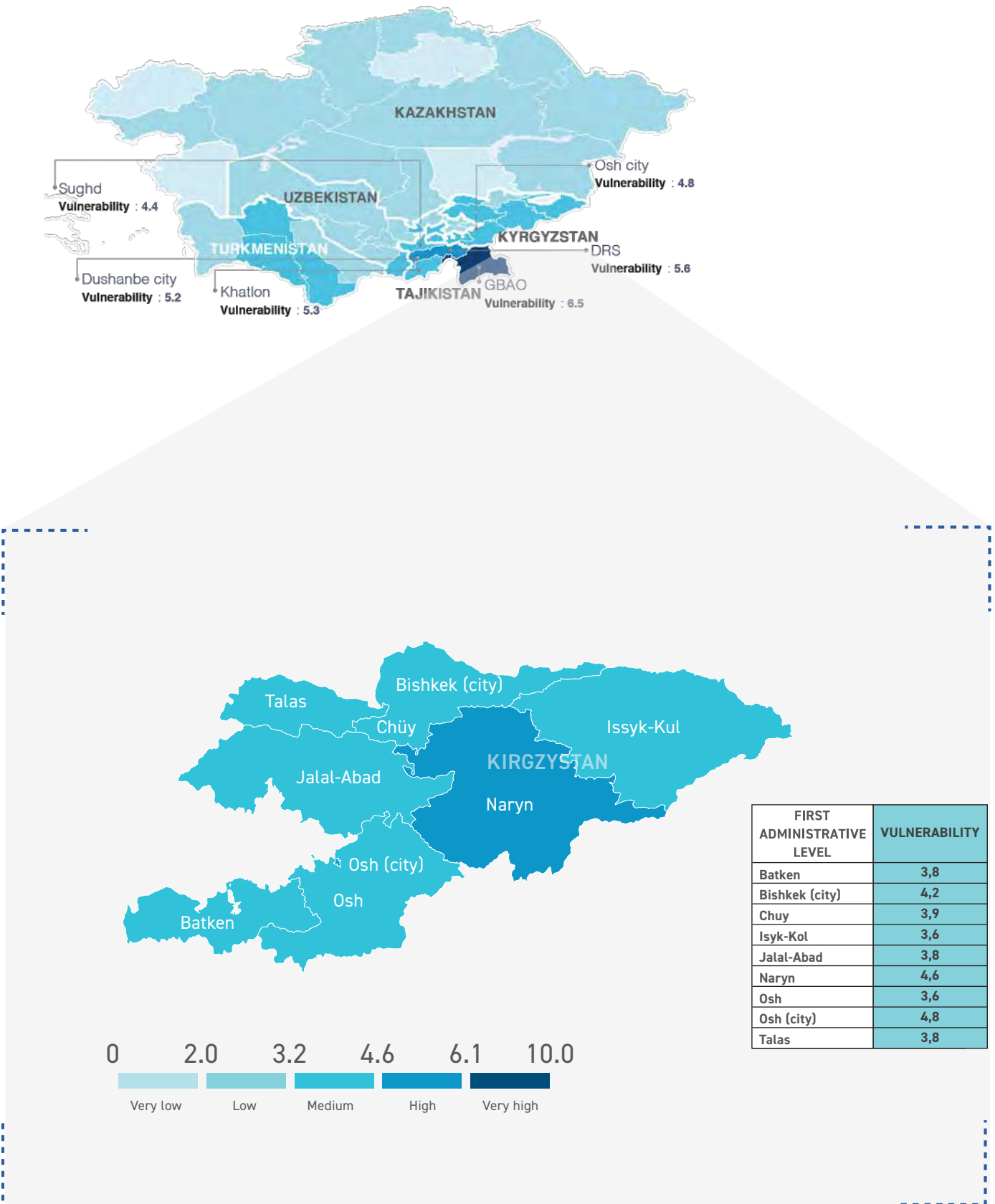

HAZARD & EXPOSURE INDEX

The Hazard&Exposure risk score is overall High. It is Very high (exceeded 7,3) in Jalal-Abad region (8,2), and Osh region (7,9).

FIRST ADMINISTRATIVE LEVEL	HAZARD & EXPOSURE
Batken	6,7
Bishkek (city)	6,0
Chuy	5,6
Isyk-Kol	6,3
Jalal-Abad	7,6
Naryn	6,0
Osh	7,9
Osh (city)	7,2
Talas	6,1

Central Asia

VULNERABILITY

The overall Vulnerability score provided in the map below is Medium 4,0, and it reaches a High score in the Naryn region 4,6 and Osh city 4,8.


Sughd
Vulnerability : 4.4

Osh city
Vulnerability : 4.8

Dushanbe city
Vulnerability : 5.2

Khatlon
Vulnerability : 5.3

DRS
Vulnerability : 5.6

GBAO
Vulnerability : 6.5

FIRST ADMINISTRATIVE LEVEL	VULNERABILITY
Batken	3,8
Bishkek (city)	4,2
Chuy	3,9
Isyk-Kol	3,6
Jalal-Abad	3,8
Naryn	4,6
Osh	3,6
Osh (city)	4,8
Talas	3,8

0	2.0	3.2	4.6	6.1	10.0
	Very low	Low	Medium	High	Very high

LACK OF COPING CAPACITY INDEX

The overall score of the Lack of Coping Capacity is Medium (5,4) and it reaches a High level in the Jalal-Abad region (5,9)
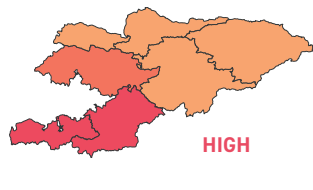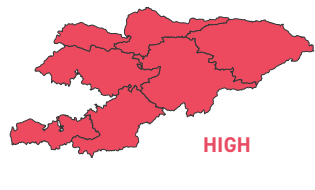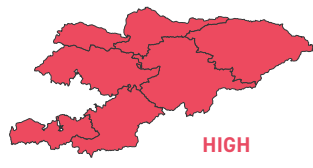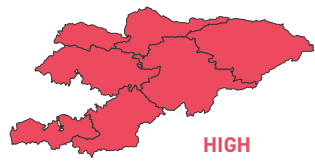
Sughd
Lack of coping capacity: 6.2

KAZAKHSTAN

UZBEKISTAN

TURKMENISTAN

Jalal-Abad
Lack of coping capacity: 5.9

KYRGYZSTAN

Dushanbe
Lack of coping capacity: 6.1

DRS
Lack of coping capacity: 6.3

Khatlon
Lack of coping capacity: 6.3

TAJIKISTAN

GBAO
Lack of coping capacity: 6.1

200 km

Talas

Bishkek (city)

Chüy

Issyk-Kul

KIRGZYSTAN

Jalal-Abad

Naryn

Osh (city)

Osh
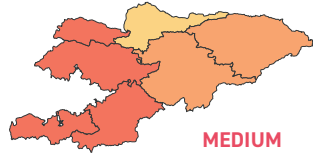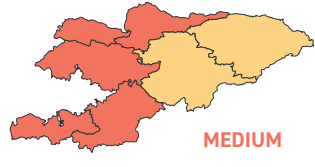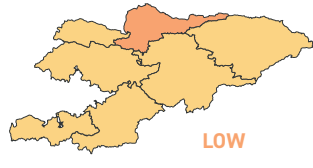
Batken

FIRST ADMINISTRATIVE LEVEL	LACK OF COPING CAPACITY
Batken	5,6
Bishkek (city)	4,5
Chuy	5,7
Isyk-Kol	5,5
Jalal-Abad	5,9
Naryn	5,5
Osh	5,4
Osh (city)	5,1
Talas	5,4

0	3.9	4.7	5.8	7.0	10.0
	Very low	Low	Medium	High	Very high
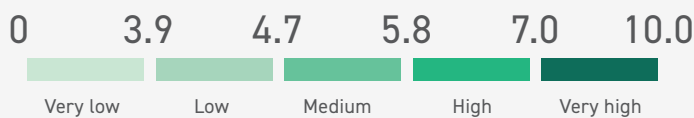
"ThinkHazard!" hazards likelihood

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]: urban flood, earthquake, landslide, and wildfire. The Medium level of the likelihood was defined for water scarcity and extreme heat.

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

HIGH

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

HIGH

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

HIGH

WILDFIRE
The wildfire hazard is classified as high. 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.

HIGH

WATER SCARCITY
The water scarcity hazard is classified as medium. There is up to a 20% chance droughts will occur in the coming 10 years.

MEDIUM

EXTREME HEAT
Extreme heat hazard is classified as medium. 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.

MEDIUM

RIVER FLOOD
The river flood hazard is classified as low. There is a chance of more than 1% that potentially damaging and life-threatening river floods occur in the coming 10 years (return period of c. 1 in 1000 years).

LOW

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

VERY LOW

Legend:

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

Establishment of DesInventar Sendai in Kyrgyz Republic

The Crisis Management Center under the Ministry of Emergency Situations of the Kyrgyz Republic and Secretariat of the National Platform on DRR[13] of the Kyrgyz Republic for Disaster Risk Reduction are firmly committed to the achievement of Sendai Framework Targets and related Sustainable Development Goals.

Supported by UNDRR coordinators and the project team, the Ministry of Emergency Situations[14] (MES) and National Platform on DRR[15] of the Kyrgyz Republic set up and tested the DesInventar Sendai system.

The DesInventar Sendai system was configured in accordance with Kyrgyz Republic's national priority indicators on damages and losses. The list of 51 hazards includes natural, technogenic, biological-social and conflict related category. In addition to the predefined DesInventar Sendai indicators, disaggregation for housing, education and health facilities was elaborated. With the support of UNDRR, a total of 3 496 data cards on past events were collected for the period of 1992-2022. The country risk profile provided in this document is based solely on the information from the DesInventar Sendai database of Kyrgyz Republic with data collected during the system testing period from 2021 to 2022.

DesInventar Risk Profile

The risk profile below is based on data for the period 1992 - 2022 recorded in the DisInventar Sendai system. Most of the registered data cards (2,993 cards, 99%) belong to the period 1998-2018. Since data entry into the DisInventar Sendai database for the specified period is still ongoing, the risk profile provided below cannot be considered a final one, and will be updated as the database is replenished.

Country overview

The current DesInventar Sendai database provides data for the period between 1992-2022. The most of registered data cards (2 993 data cards, 99%) are related to the period between 1998-2018. Since the data entry in DesInventar Sendai database for indicated period is still in progress, the risk profile provided below cannot be considered as a final one.

Reported data in DesInventar for the period 1992-2022

- **TOTAL NUMBER OF DATA CARDS: 3 496** DATA CARDS
- **NUMBER OF DEATHS*: 4 260**
- **NUMBER OF PEOPLE AFFECTED** DIRECTLY AND INDIRECTLY: **280 215**
- **NUMBER OF HOUSES AFFECTED** DAMAGED AND DESTROYED: **188 405**
- **TOTAL ECONOMIC LOSS: 362 MILLION $** THE EXCHANGE RATE VARIES FOR EACH YEAR

The total economic loss is only considered for the records where the information was reported. No estimation has been made for damages to assets as the methodology for economic loss assessment is in development.

Hazard frequency:

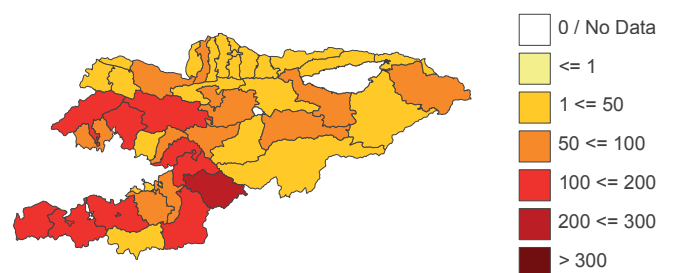|	
MUDFLOW 35%	
AVALANCHE 19%	
LANDSLIDE 12%	
STRONG WIND 9%	
FLOODING 4%	
OTHER 21%	

Mudflows are the most common registered hazard, followed by Avalanches, Landslides and Strong winds. Together these four hazards account for 75% of the records in the database.

Geographical distribution of events

All maps were developed based on geographical boundaries provided by the Database of Global Administrative Areas (GADM) project[16] . The maps illustrate the geographical distribution of disasters across regions and provinces in the country. The spatial distribution of disaster ranges from more than 800 to less than 1 at regional level and from more than 300 to less than 20 at provincial level. The most affected regions are Jalal-Abad, Osh, and Batken. The provinces with the largest occurrences of disaster events are found within the above mentioned regions: Kara-Kuldja, Alai (Osh region), Chatkal, Aksiy, Toktogul, (Jalal-Abad), and Leilek, Batken (Batken region).

☐	0 / No Data
☐	<= 50
☐	50 <= 150
☐	150 <= 300
☐	300 <= 500
☐	500 <= 800
☐	> 800
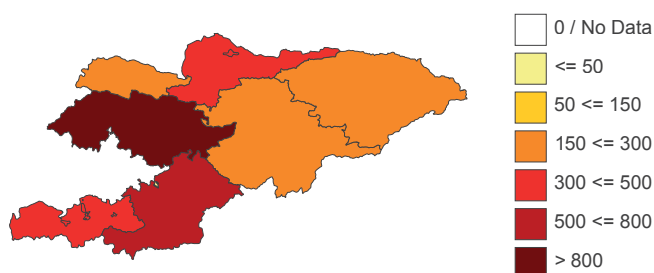
Geographical distribution of events by regions

|	
☐	0 / No Data
☐	<= 1
☐	1 <= 50
☐	50 <= 100
☐	100 <= 200
☐	200 <= 300
☐	> 300

Geographical distribution of events by provinces

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

Geographical distribution of the main hazards

All maps were developed based on geographical boundaries provided by the Database of Global Administrative Areas (GADM) project . The maps illustrate the geographical distribution of disasters across regions and provinces in the country. The spatial distribution of disaster ranges from more than 800 to less than 1 at regional level and from more than 300 to less than 20 at provincial level. The most affected regions are Jalal-Abad, Osh, and Batken.

The provinces with the largest occurrences of disaster events are found within the above mentioned regions: Kara-Kuldja, Alai (Osh region), Chatkal, Aksiy, Toktogul, (Jalal-Abad), and Leilek, Batken (Batken region).
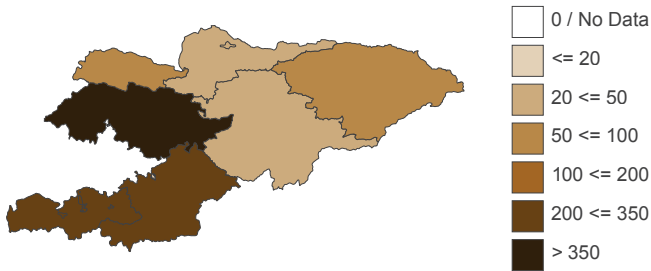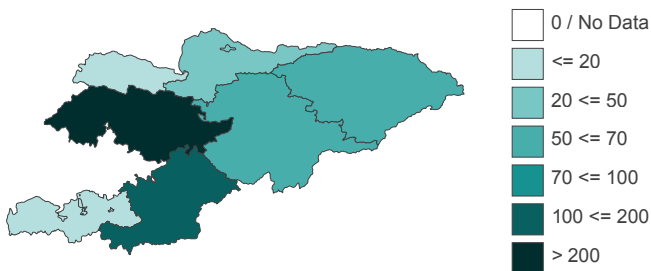

MUDFLOW by regions
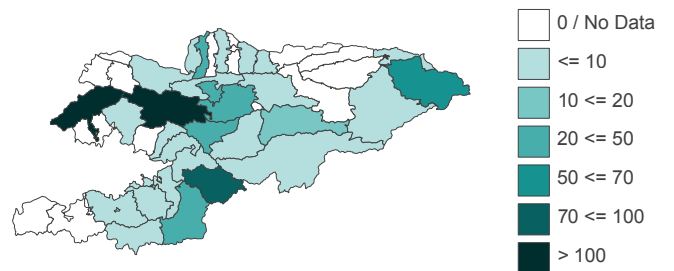Most affected regions: Jalal-Abad, Osh, Batken.
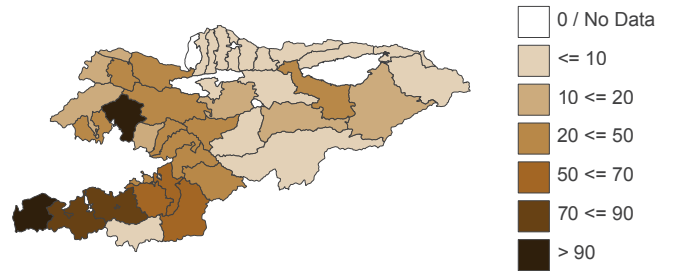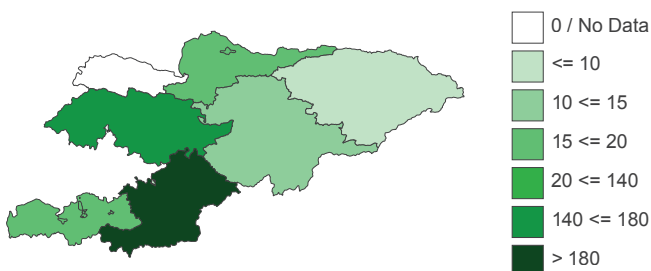
MUDFLOW by provinces

AVALANCHE by regions
Most affected regions: Jalal-Abad, Osh, Ysyk-Kol.
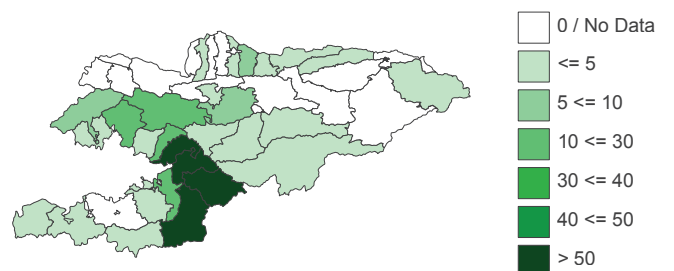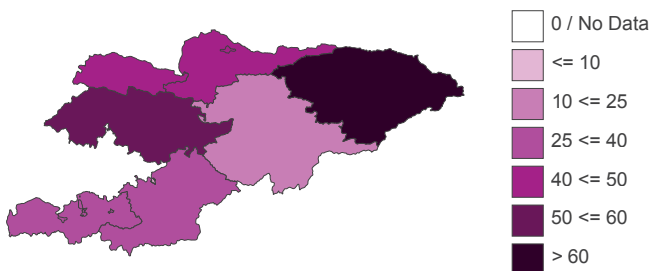
AVALANCHE by provinces

LANDSLIDE by regions
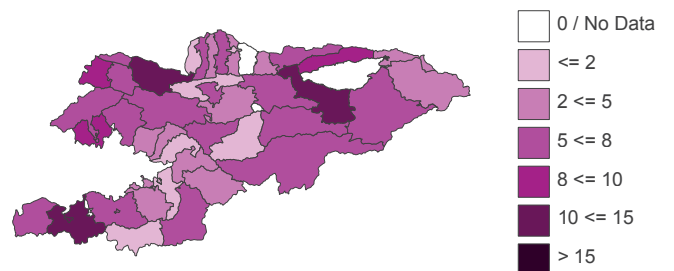Most affected regions: Osh, Jalal-Abad, Chuy

LANDSLIDE by provinces

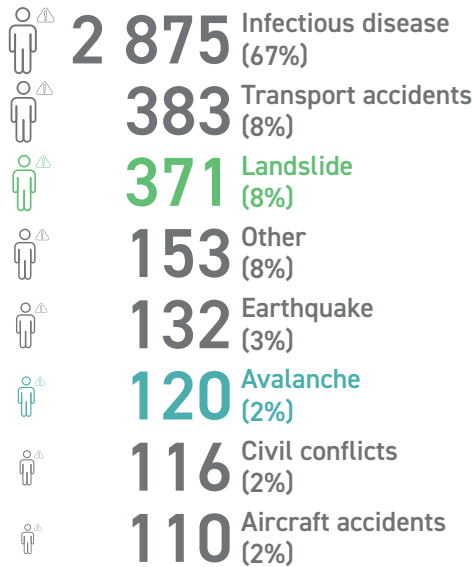**STRONG WIND** by regions
Most affected regions: Ysyk-Kol, Chuy, Jalal-Abad
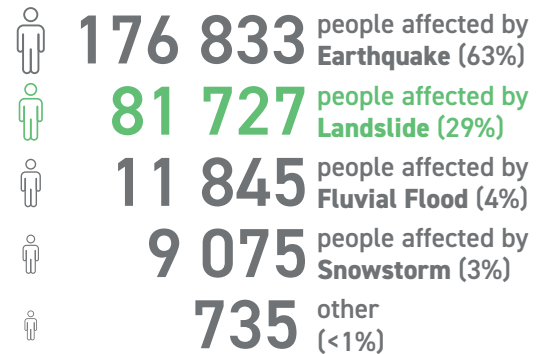
STRONG WIND by provinces

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

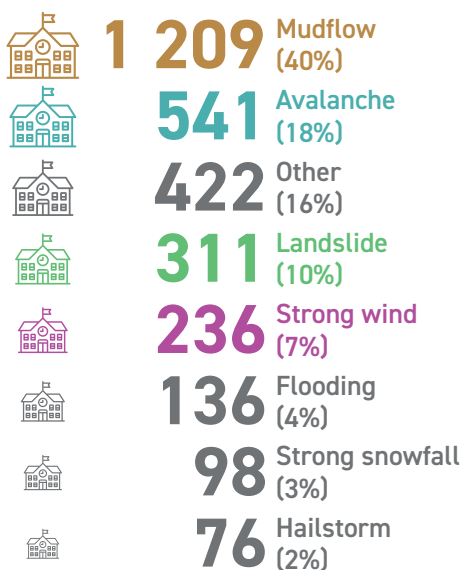## NUMBER OF DEATHS AND MISSING BY HAZARD (TARGET A)*

2 875 Infectious disease (67%)

383 Transport accidents (8%)

371 Landslide (8%)

153 Other (8%)

132 Earthquake (3%)

120 Avalanche (2%)

116 Civil conflicts (2%)

110 Aircraft accidents (2%)

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

NUMBER OF PEOPLE AFFECTED BY HAZARD (TARGET B)

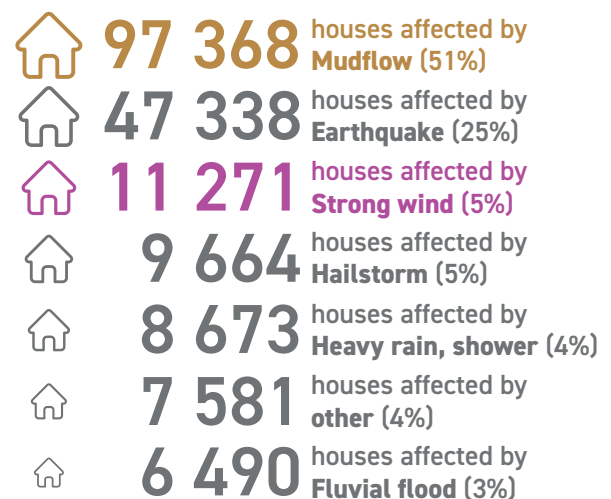**176 833** people affected by **Earthquake (63%)**

81 727 people affected by **Landslide (29%)**

11 845 people affected by **Fluvial Flood (4%)**

9 075 people affected by **Snowstorm (3%)**

735 other (<1%)

DAMAGE TO INFRASTRUCTURE BY HAZARD (TARGET D)*

1 209 Mudflow (40%)

541 Avalanche (18%)

422 Other (16%)

311 Landslide (10%)

236 Strong wind (7%)

136 Flooding (4%)

98 Strong snowfall (3%)

76 Hailstorm (2%)

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

NUMBER OF HOUSES AFFECTED BY HAZARD*

97 368 houses affected by **Mudflow (51%)**

47 338 houses affected by **Earthquake (25%)**

11 271 houses affected by **Strong wind (5%)**

9 664 houses affected by **Hailstorm (5%)**

8 673 houses affected by **Heavy rain, shower (4%)**

7 581 houses affected by **other (4%)**

6 490 houses affected by **Fluvial flood (3%)**
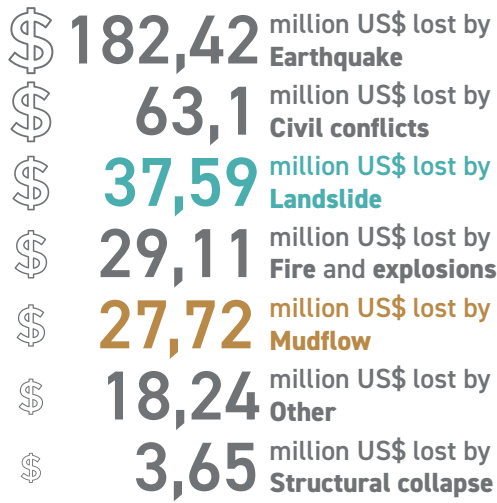
*houses damaged and destroyed. According to currently available data more than 75% of damages to houses are caused by Mudflows and Earthquakes.

TOTAL ECONOMIC LOSS (million US dollars) BY HAZARD (TARGET C)

**182,42** million US$ lost by **Earthquake**

63,1 million US$ lost by **Civil conflicts**

37,59 million US$ lost by **Landslide**

29,11 million US$ lost by **Fire** and **explosions**

27,72 million US$ lost by **Mudflow**

18,24 million US$ lost by **Other**

3,65 million US$ lost by **Structural collapse**

ECONOMIC LOSS BY SECTORS

44% Loss of houses affected

37% Loss to infrastructure

**12%** Loss to agricolture

7% Loss to other

Temporal trends

The representation of the temporal trend of the most frequent hazards shows that for the Mudflows, Avalanches, Landslides, and Strong winds were registered most data cards.

N. OF EVENTS
- 1
- 45
- 90
- 135
- 170
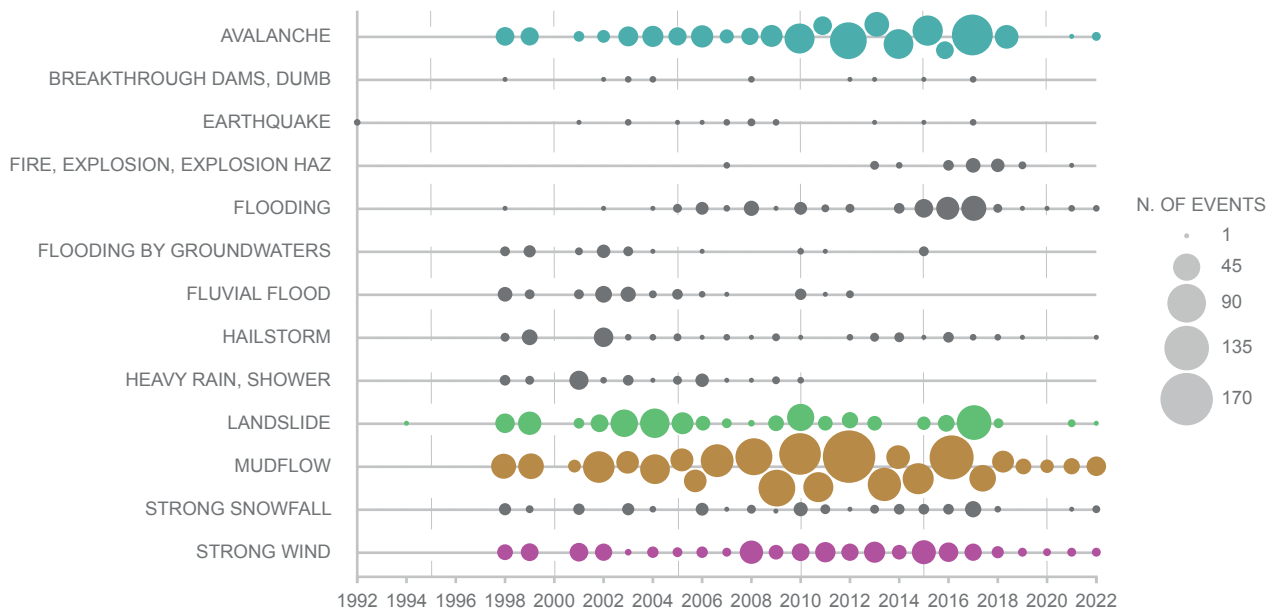
Seasonal trends

The following graph represents the seasonal distribution of disaster for all the main hazards for the period from 1992 to 2022. Disasters occur throughout the entire year; however, the different seasons have an influence on the frequency of disasters with spring to be the most affected season due to mainly the number of mudflows and landslides.
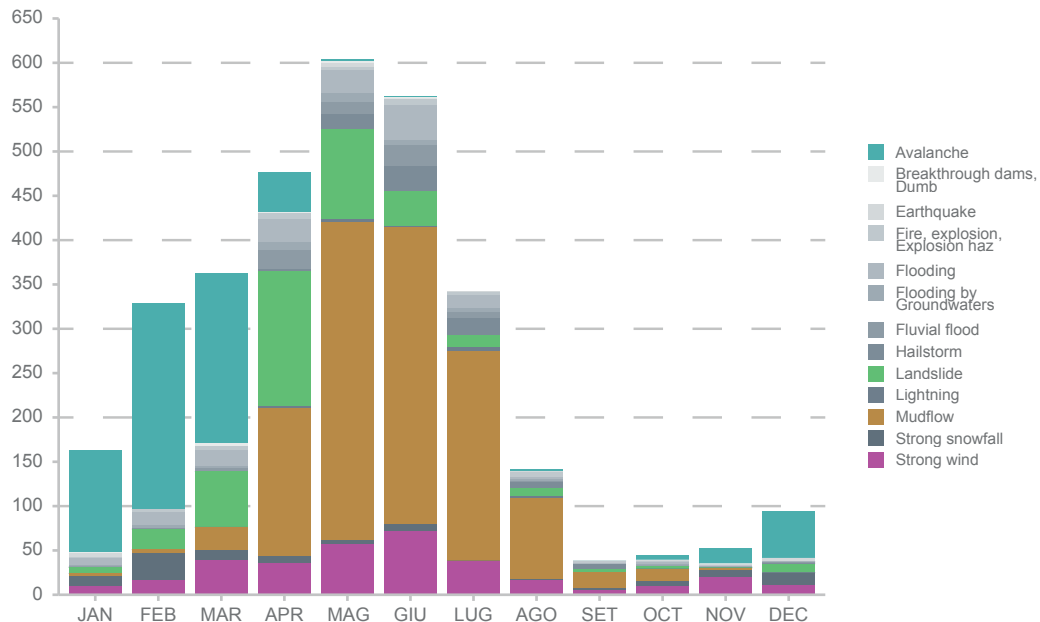
Conclusions

In general disaster risk profile based on DesInventar Sendai data provided here is correlated with the modelled INFORM risk index and ThinkHazard! likelihood levels.

Taking in consideration all functionalities of the DesInventar Sendai system and efforts in loss data collection by the authorities of the Kyrgyz Republic further systematic collection of loss data will provide more reliable and precise country disaster risk profile.

The employees of the Ministry of Emergencies of Kyrgyzstan received technical assistance from UNDRR for the internal application of the DesInventar Sendai system and started testing it in late 2022. The national Technical Working Group established in the country has been trained and is equipped for collecting and entering data, data storage, and using the UNDRR disaster loss database DesInventar Sendai for managing and producing general and detailed information of losses caused by natural phenomena and technogenic accidents.

The DesInventar Sendai system as an official disaster loss data recording tool, will further aim to strengthen the existing capacity of relevant national ministries and departments in the systematic collection and analysis of disaster loss information, and support specific disaster risk reduction measures in the country.

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