STATE OF THE USE OF MOBILE TECHNOLOGIES FOR DISASTER PREPAREDNESS IN TAJIKISTAN

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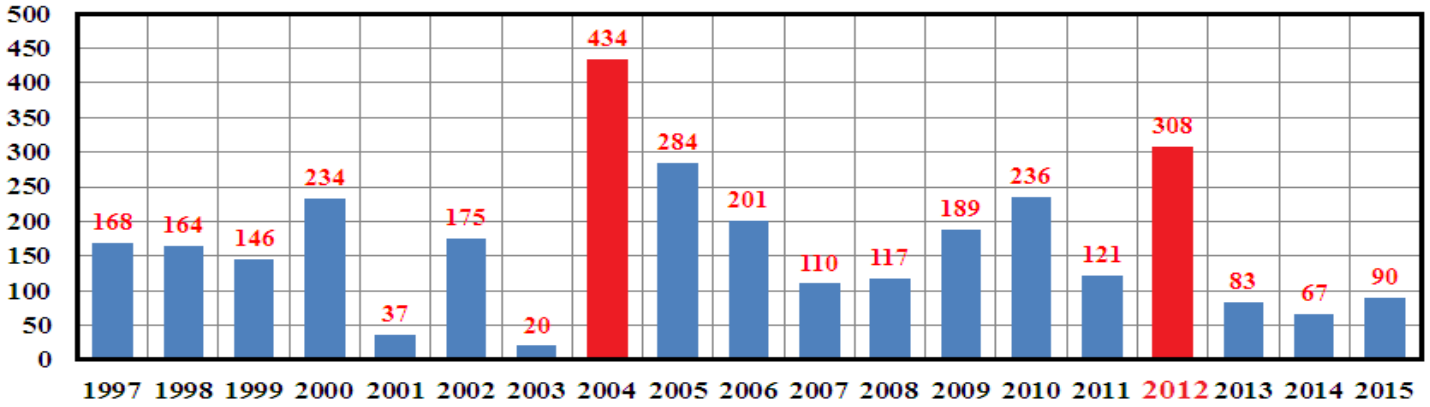
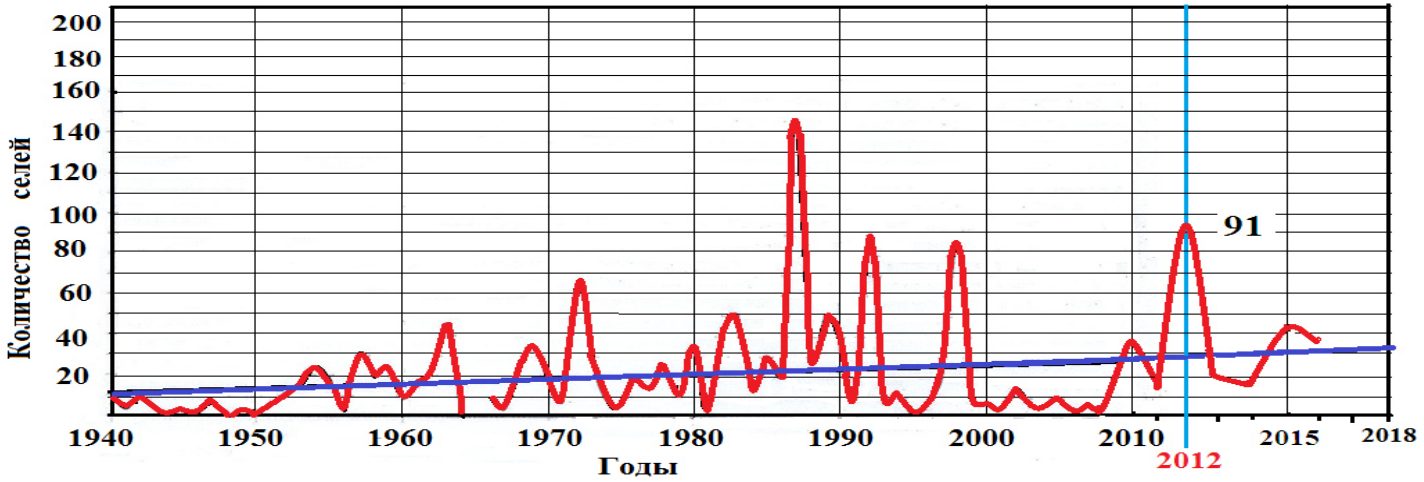
The Republic of Tajikistan is a mountainous country (93%).
Area total – 142,550 km^2
Marks the absolute heights from 300 to 7495 m.
The average annual precipitation is 760 mm.

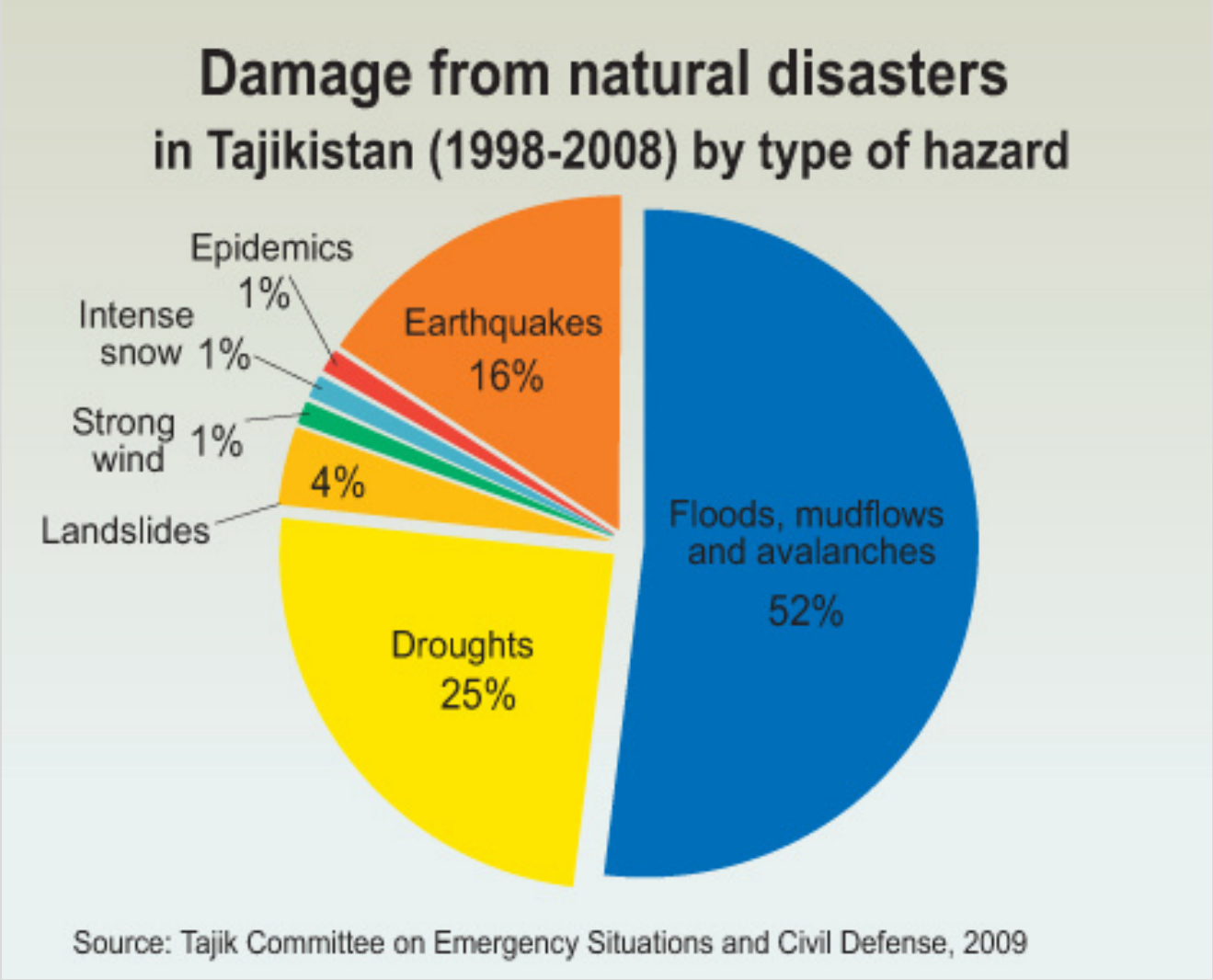
THE NUMBER OF NATURAL DISASTERS IN TAJIKISTAN (1997-2015)



THE NUMBER OF DISASTERS FROM LANDSLIDES AND FLOODS (1940-2016.)

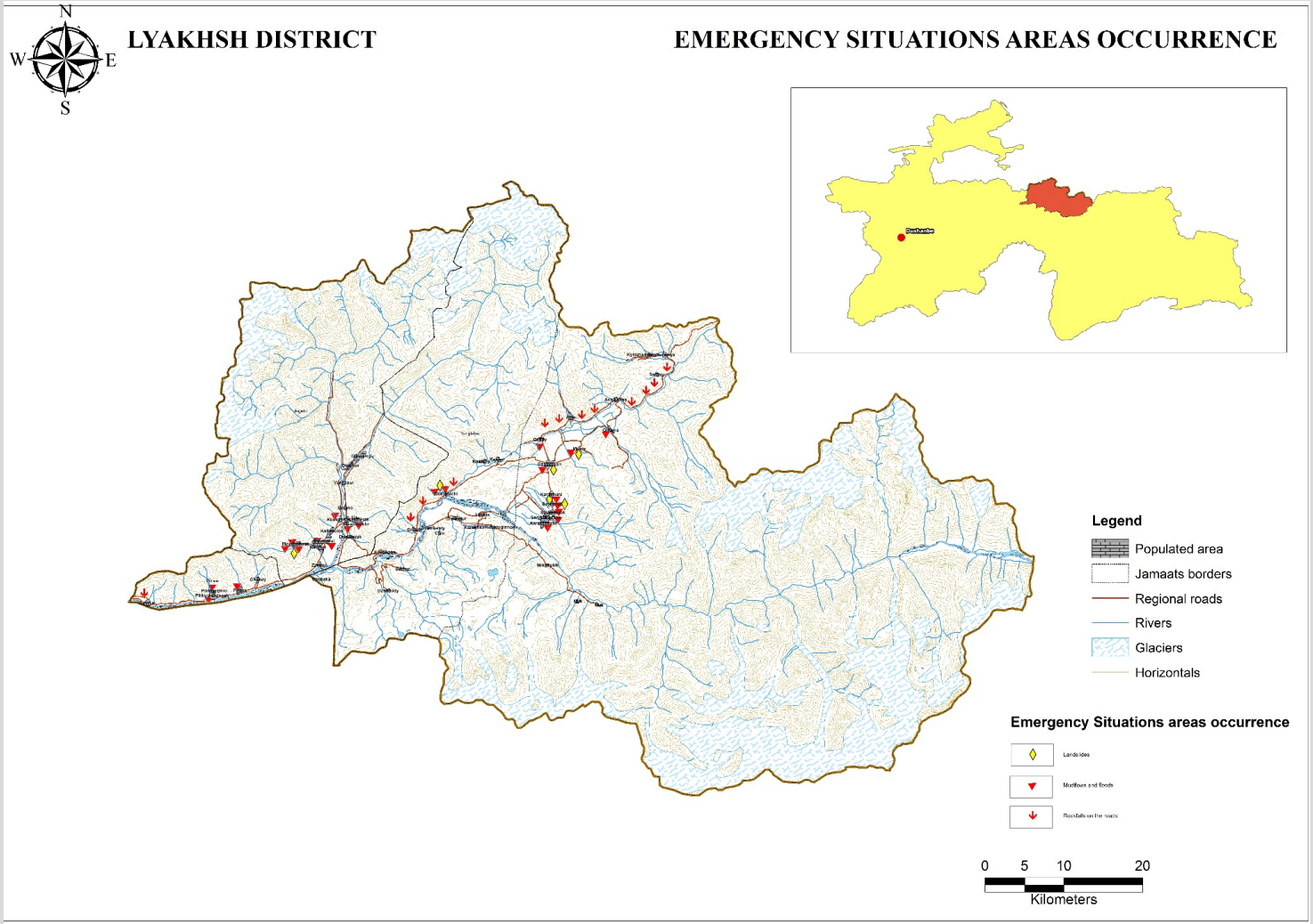


The Agency on statistics under the President of Tajikistan, CoES RT, Yablokov A. A.


Damage from natural disasters
in Tajikistan (1998-2008) by type of hazard
Epidemics 1%
Intense snow 1%
Strong wind 1%
Landslides 4%
Earthquakes 16%
Floods, mudflows and avalanches 52%
Droughts 25%
Source: Tajik Committee on Emergency Situations and Civil Defense, 2009

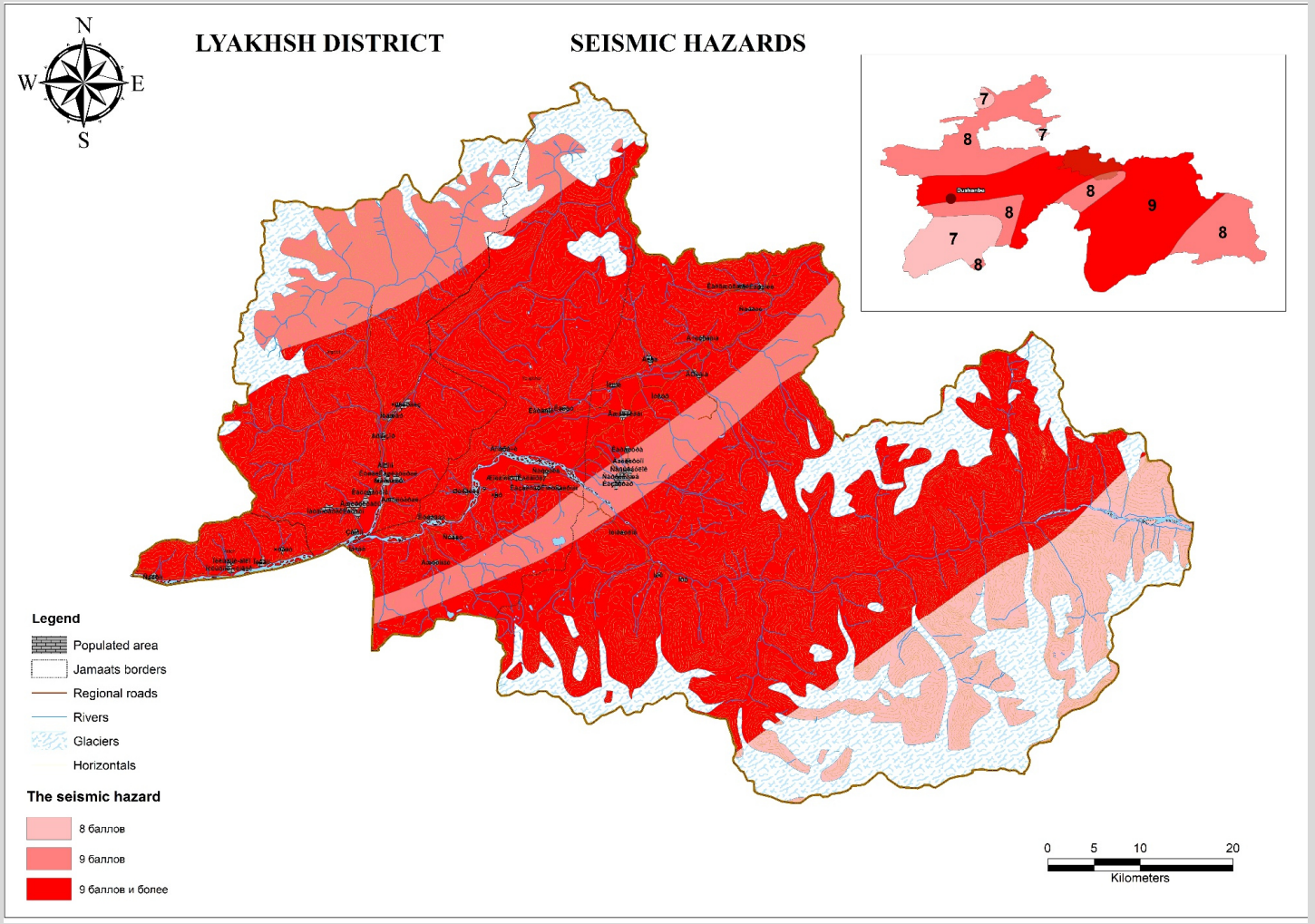
The research was carried out within the framework of the project **«Researching to Risk Mitigation and Early Warning of the Natural Disasters on the Territory of Tajikistan»** by the financial and technical support of the Research Centre for Ecology and Environment of Central Asia (Dushanbe), Xinjiang Institute of ecology and geography of the Academy of Sciences of China.

The aim of this work is to accelerate the solution of problems related to land degradation, degradation of ecosystems, the growth of poverty, to ensure the conditions for sustainable development of the mountain territories, as well as raising awareness, knowledge and capacities for effective response, self-protection of the population living in difficult mountainous conditions and natural disasters, for example of the Lakhsh (Jirgatal) district of Tajikistan.

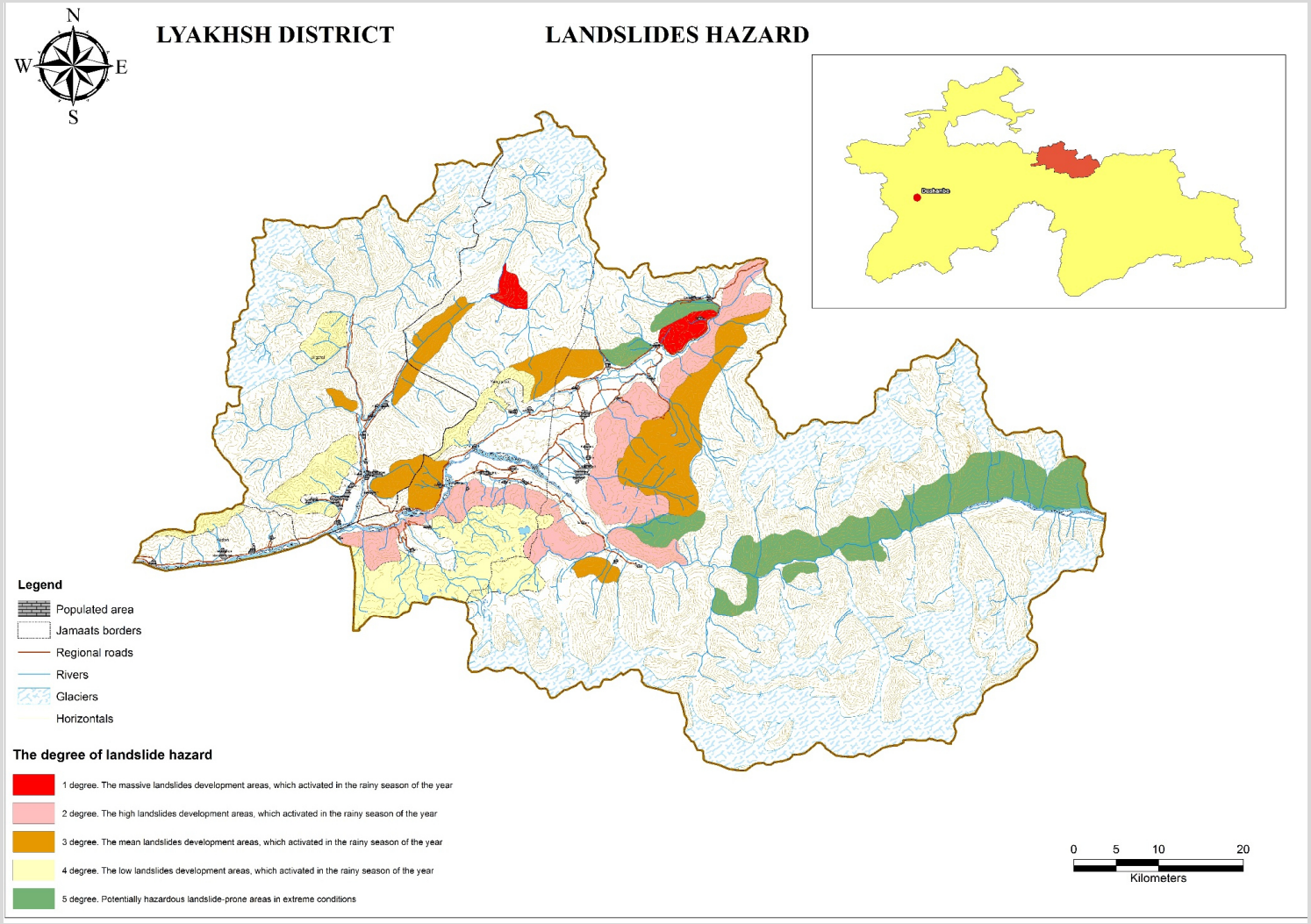


Emergency Situations map of the Lakhsh district

The study area is located on the seismic areas prone to the earthquakes with Intensities I=8 and I=9 (Fig. 3.1.1) of the first category and is part of the southern Tien-Shan, Pre-Pamir (Pamir-Alay) and the North-Pamir seismic zones on the seismic zonation map of the territory of Tajikistan, separated with the Vakhsh and Darvaz-Karakul (North Pamir) regional seismogenic faults.



Seismic hazard map Lakhsh district



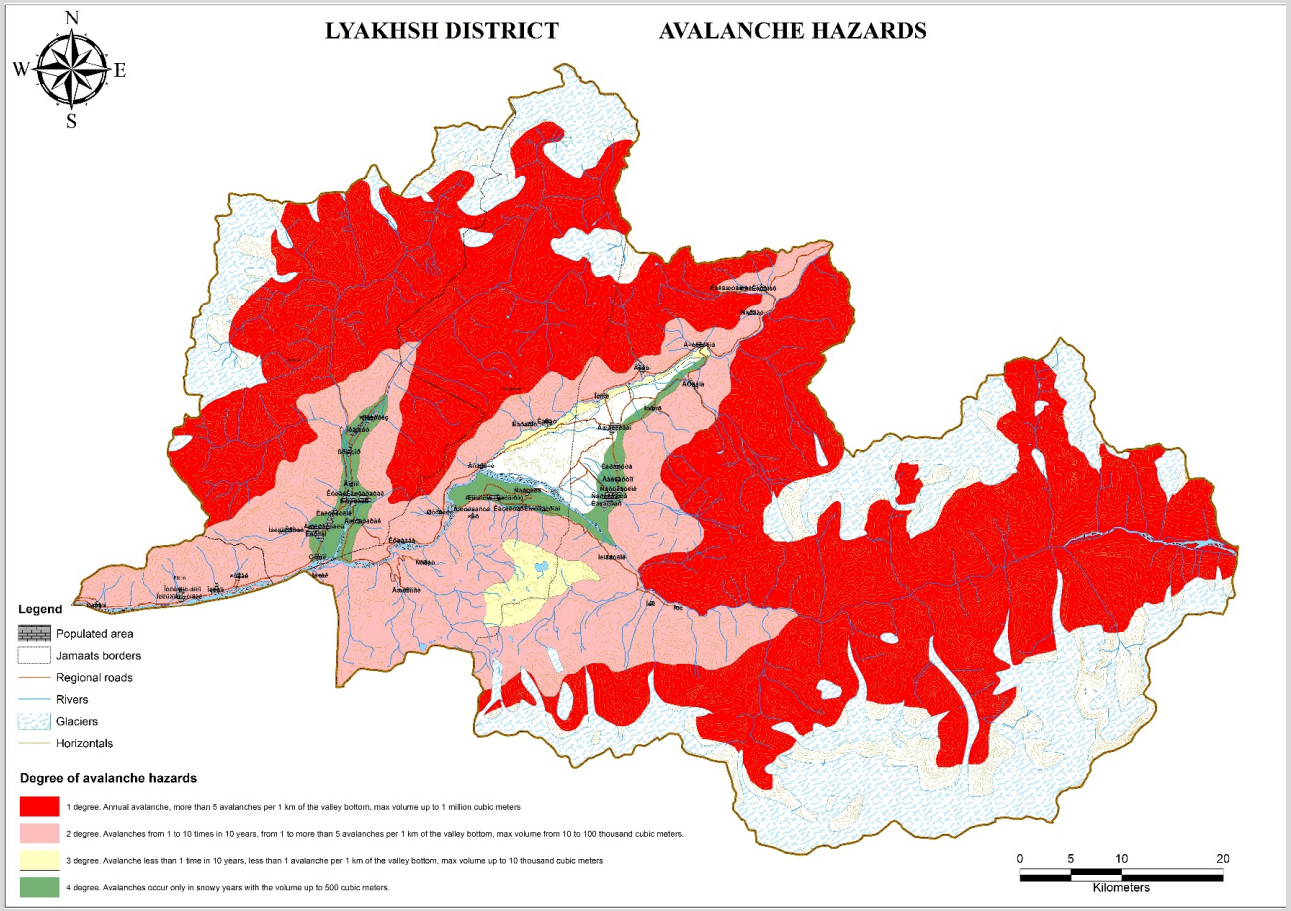
Landslides map Lakhsh district

Scree train on the left side of the Kyzylsu river valley

In the far background (left Bank of the Kyzylsu river), emerging and existing landslides on the Western slope of the Zaalay range. In the middle background (the right Bank of the Kyzylsu river), a fragment of an ancient landslide.

Proluvial debris flow fan (North-Western slope of the ridge Peter I)

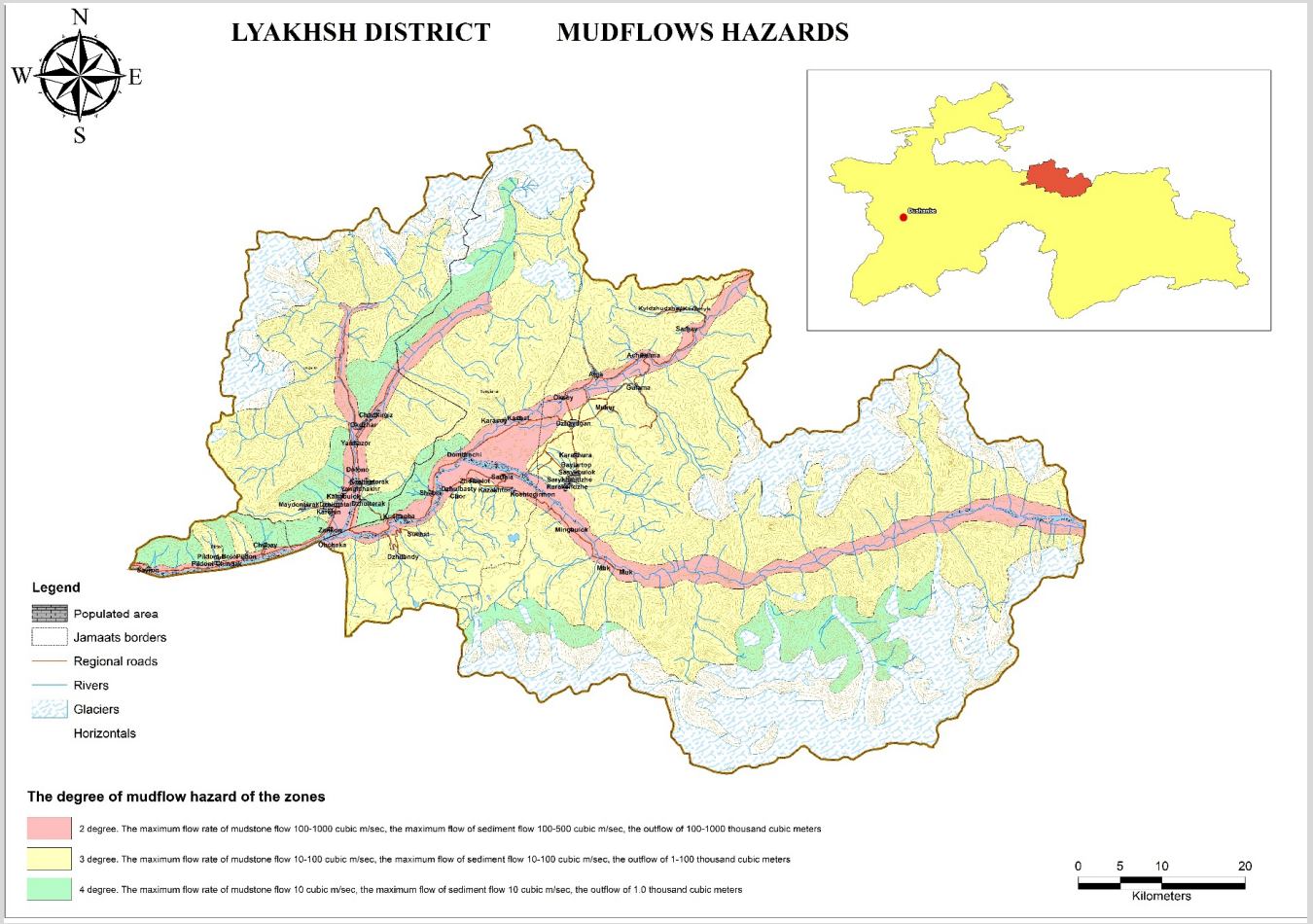
Sediments of the carbonate-terrigenous formations of the upper Cretaceous (far background) and red-colored terrigenous formations of early Cretaceous age (nearest background of the picture).



Avalanches hazards map Lakhsh district

Since October-November of each year, avalanches block the dirt roads of local importance. The road Jirgital-Lakhsh are not under risk of avalanches hazard. The avalanches occur on steep (35-600) logs (flume avalanche) and with the plumb walls of glacial cirques - jumping avalanches. Fall through slope, it is involved in the movement of the underlying snow cover and debris down off.

In the study area debris flow processes are quite widespread. They are known for the rivers tributaries of the major rivers (Surkhob, Muksu, Kyzylsu) with different catchment area are draining the mountain slopes and valleys. The combination of the following natural conditions such as steep slopes with strong divided elevation; significant slopes (7-220) of the channels permanent and temporary watercourses; significant debris material volume in the channel parts of the valleys slopes; intense surface runoff (caused by rainfall, rapid snow and glaciers melting in spring and summer period) base the favorable conditions for debris flows formation in the study area.



Mudflows hazard map Lakhsh district

The main factors of hazard assessment are:

• Topography (steepness and height of slopes, shape, distance of the object from the base of the slope or the edge of the terrace ledge);

• Geology (lithological composition of the bedrock, the nature of occurrence, weathering, tectonic faulting, fracturing, lithological composition of covering formations, moisture);

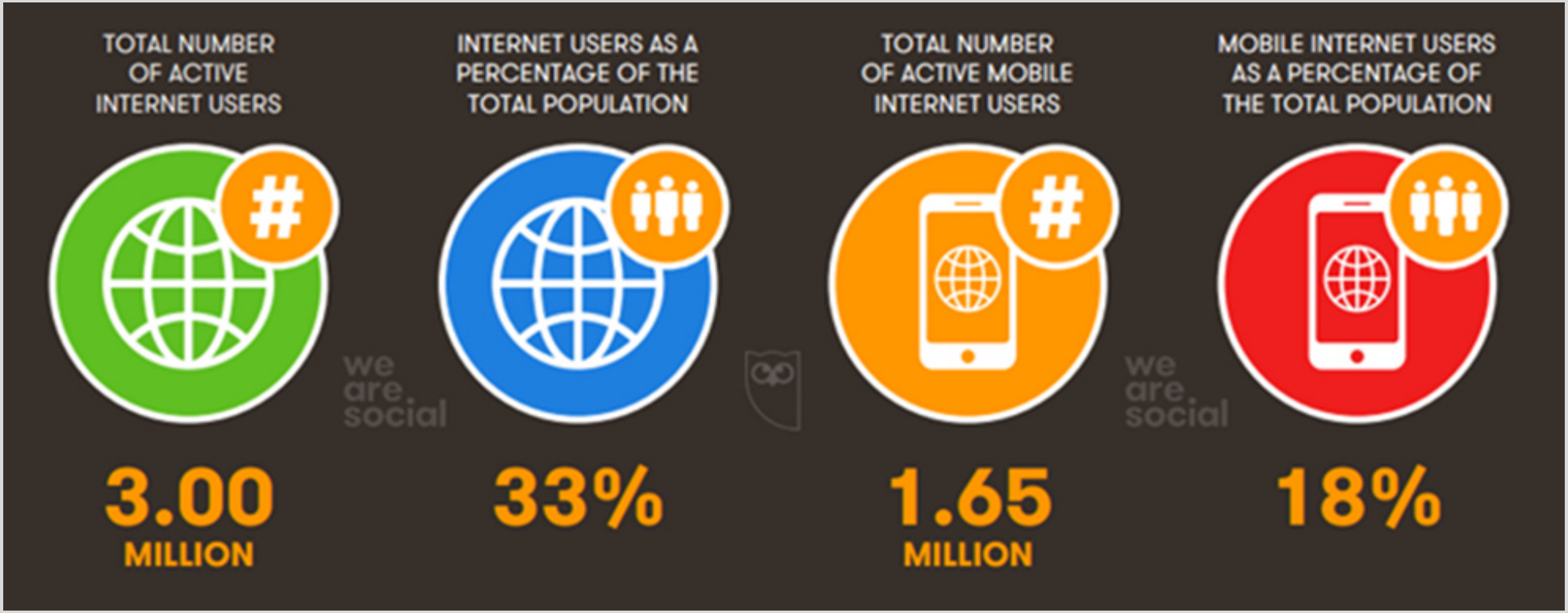
• Hydrogeological conditions (watering rocks, underground water);

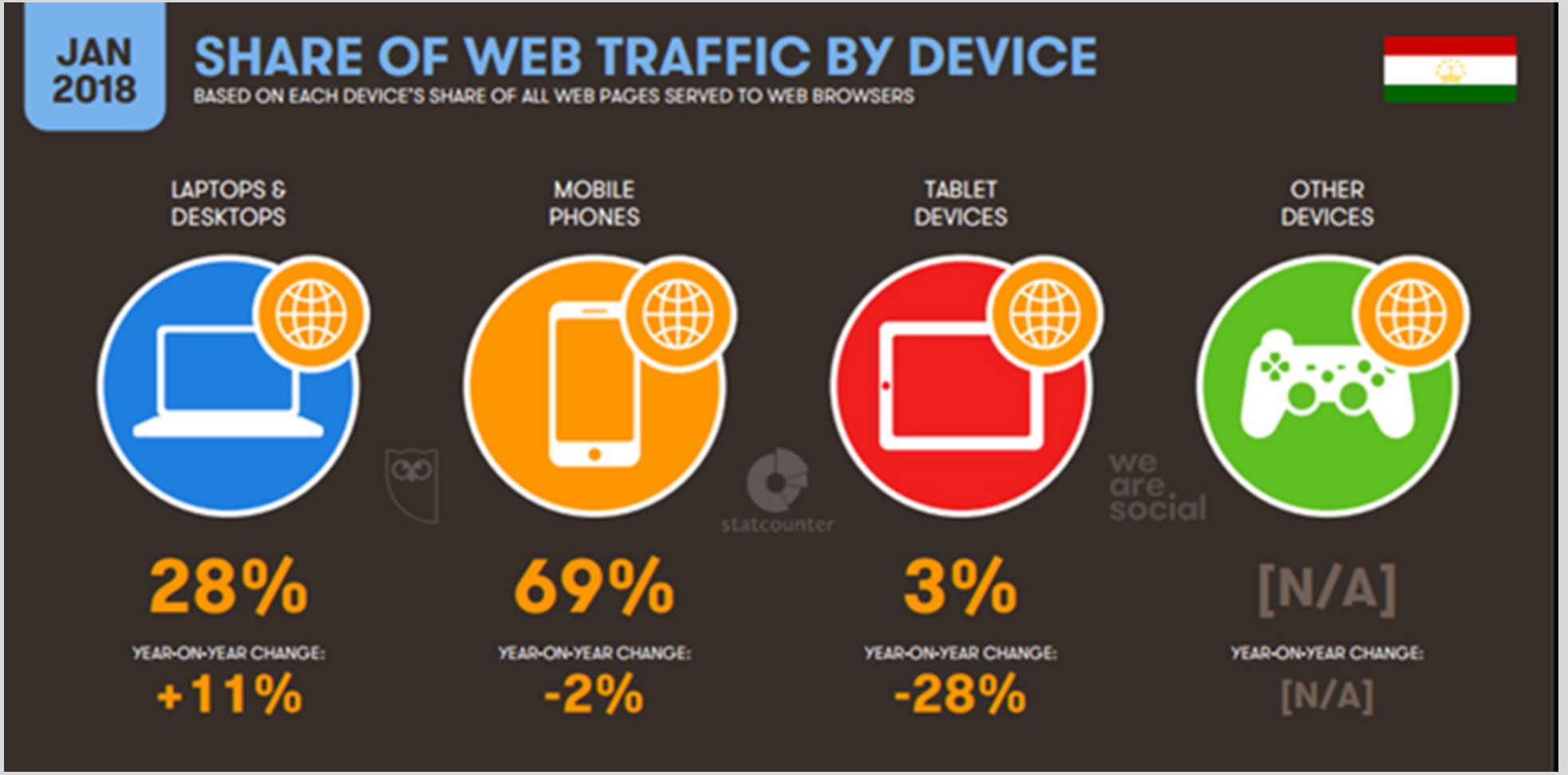
• Exogenic processes (modern active landslides, cracks, accumulation of loose debris in rivers and temporary watercourses, traces of past debris flows, clusters of plumes of debris at the slopes foots).

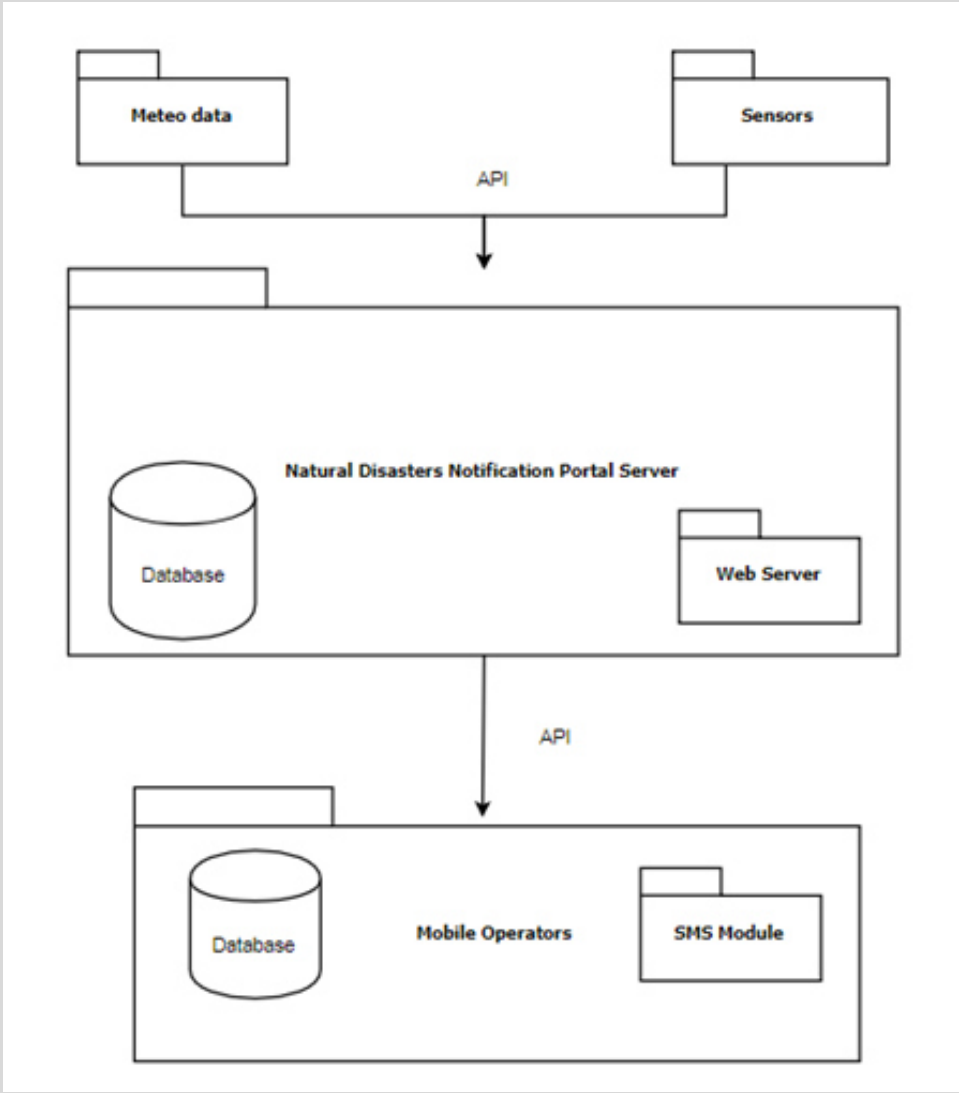
Potentially hazardous - are those areas where currently the landslide process are not developed, but according to geological, natural and other conditions do not exclude the possibility of future activation.

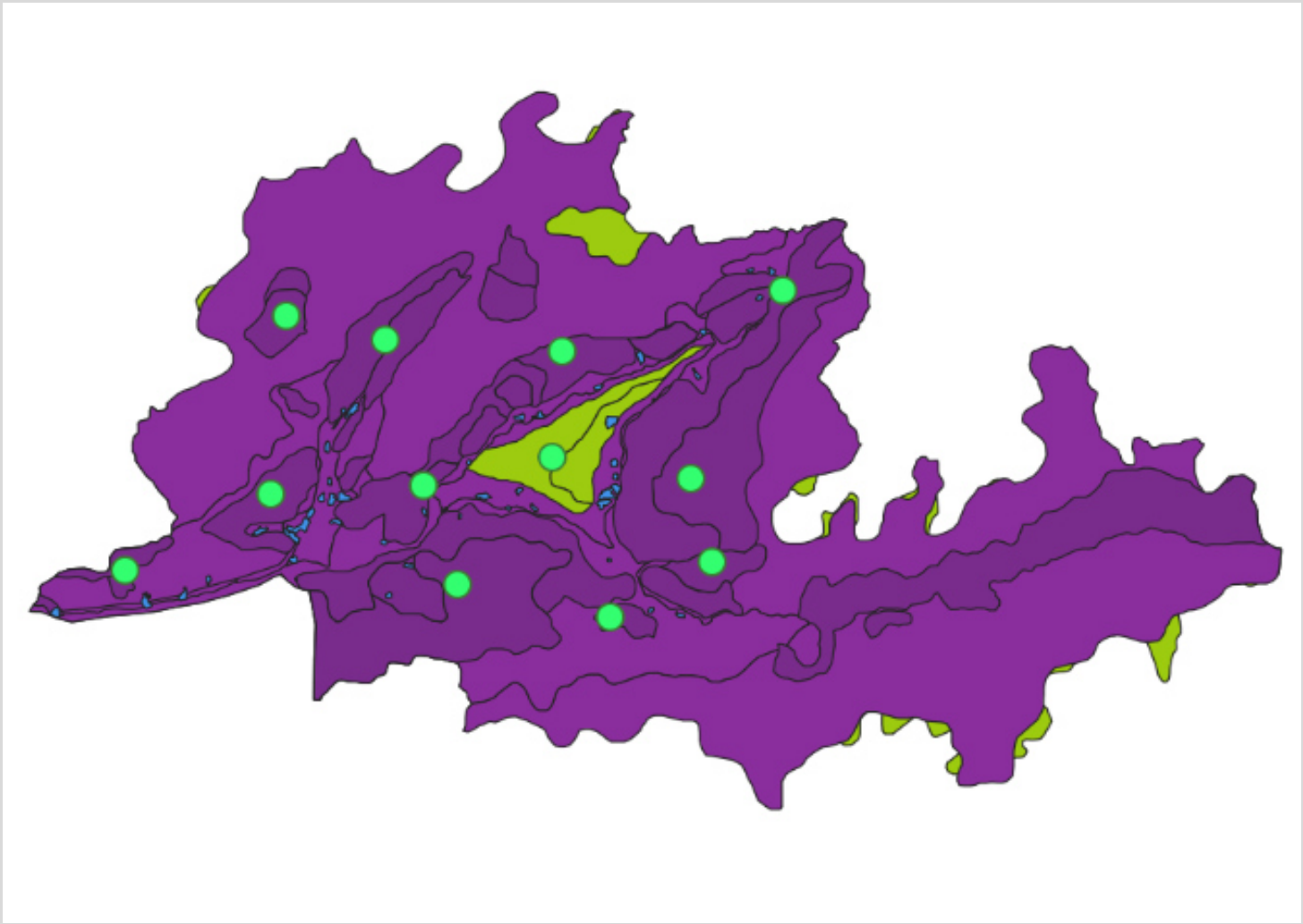
Safe are considered those areas where natural conditions and exogenous geological processes on the tremendous size is almost impossible.

TOTAL POPULATION
INTERNET USERS
ACTIVE SOCIAL MEDIA USERS
MOBILE CONNECTIONS
ACTIVE MOBILE SOCIAL USERS
we are social
we are social
9.01 MILLION
3.00 MILLION
0.31 MILLION
9.69 MILLION
0.17 MILLION
URBANISATION:
27%
PENETRATION:
33%
PENETRATION:
3%
vs. POPULATION:
108%
PENETRATION:
2%


TOTAL NUMBER OF ACTIVE INTERNET USERS
3.00
MILLION
INTERNET USERS AS A PERCENTAGE OF THE TOTAL POPULATION
33%
TOTAL NUMBER OF ACTIVE MOBILE INTERNET USERS
1.65
MILLION
MOBILE INTERNET USERS AS A PERCENTAGE OF THE TOTAL POPULATION
18%
we are social
we are social

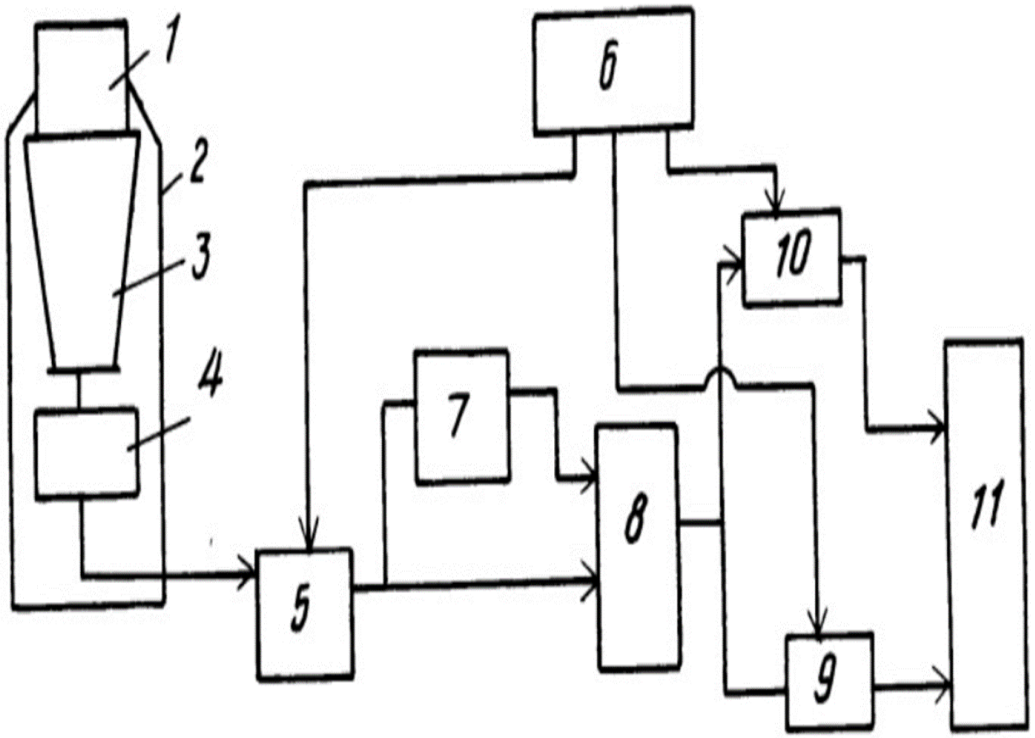

JAN 2018
SHARE OF WEB TRAFFIC BY DEVICE
BASED ON EACH DEVICE'S SHARE OF ALL WEB PAGES SERVED TO WEB BROWSERS
LAPTOPS & DESKTOPS
MOBILE PHONES
TABLET DEVICES
OTHER DEVICES
statcounter
we are social
28%
YEAR-ON-YEAR CHANGE:
+11%
69%
YEAR-ON-YEAR CHANGE:
-2%
3%
YEAR-ON-YEAR CHANGE:
-28%
[N/A]
YEAR-ON-YEAR CHANGE:
[N/A]


Meteo data
Sensors
API
Natural Disasters Notification Portal Server
Database
Web Server
API
Database
Mobile Operators
SMS Module

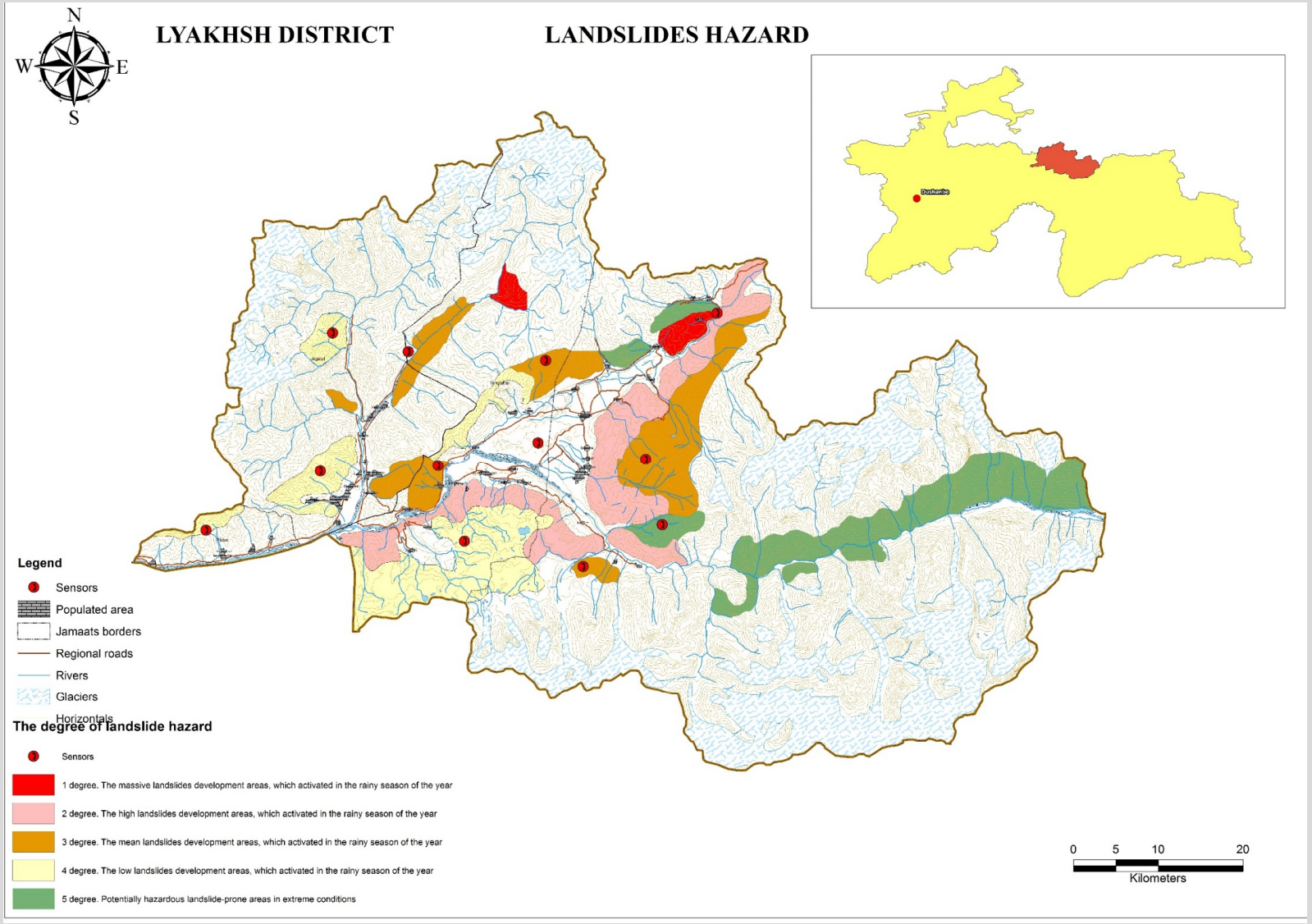


Map of the three types of Natural Disasters and sensors location of the Lakhsh

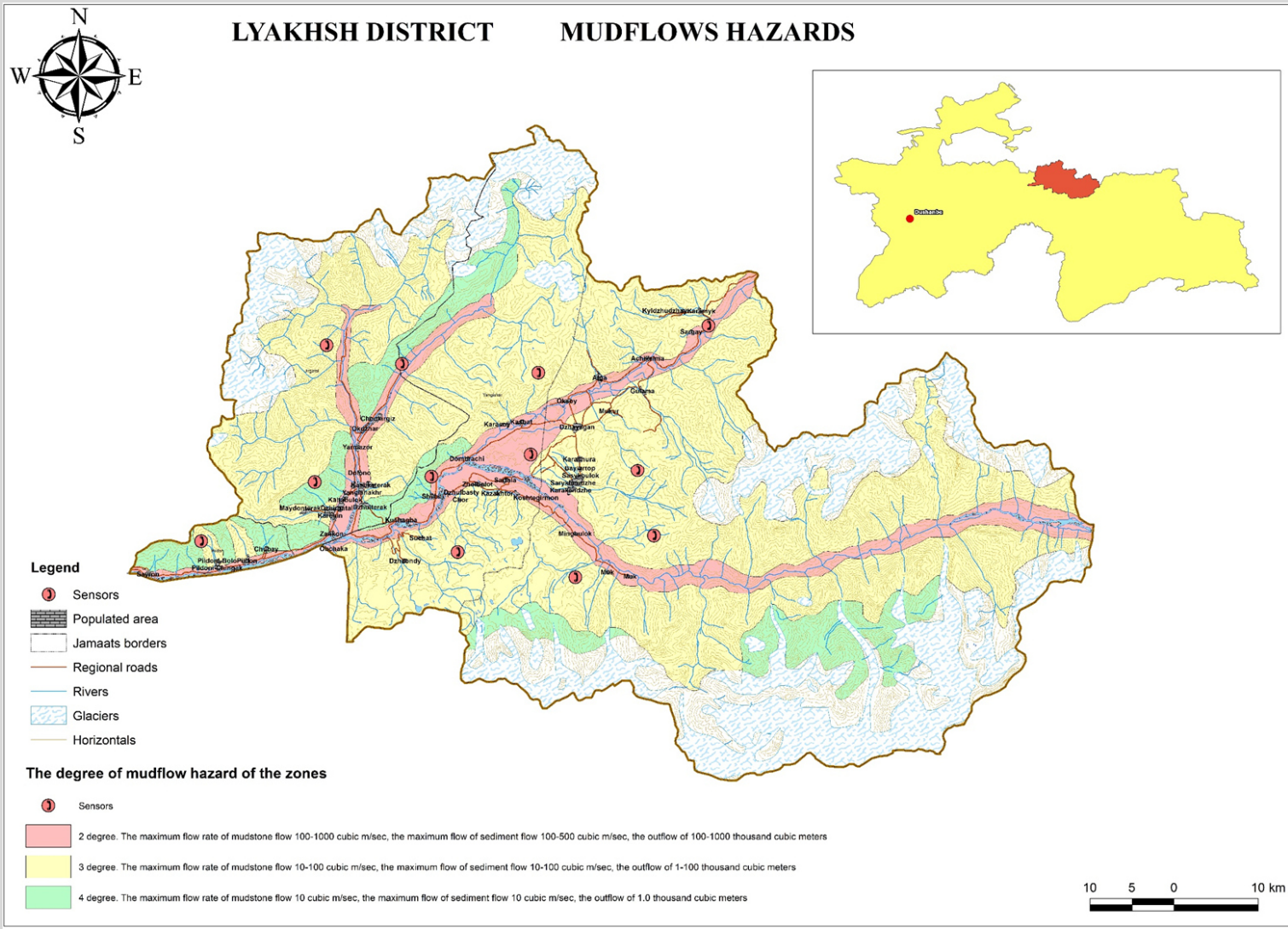
The buffer zone was constructed in which according to the maps of the disaster locate settlements. In the center of the buffer zone mounted the sensors that transmit information to a single emergency database. The sensors are represented monitors the levels of precipitation (precipitation gauge/rain gauge) with weighing bucket with an accuracy of 2% and an output pulse signal. To the sensors added M2M module with SIM card, which sends data from the sensor to the single emergency database center.

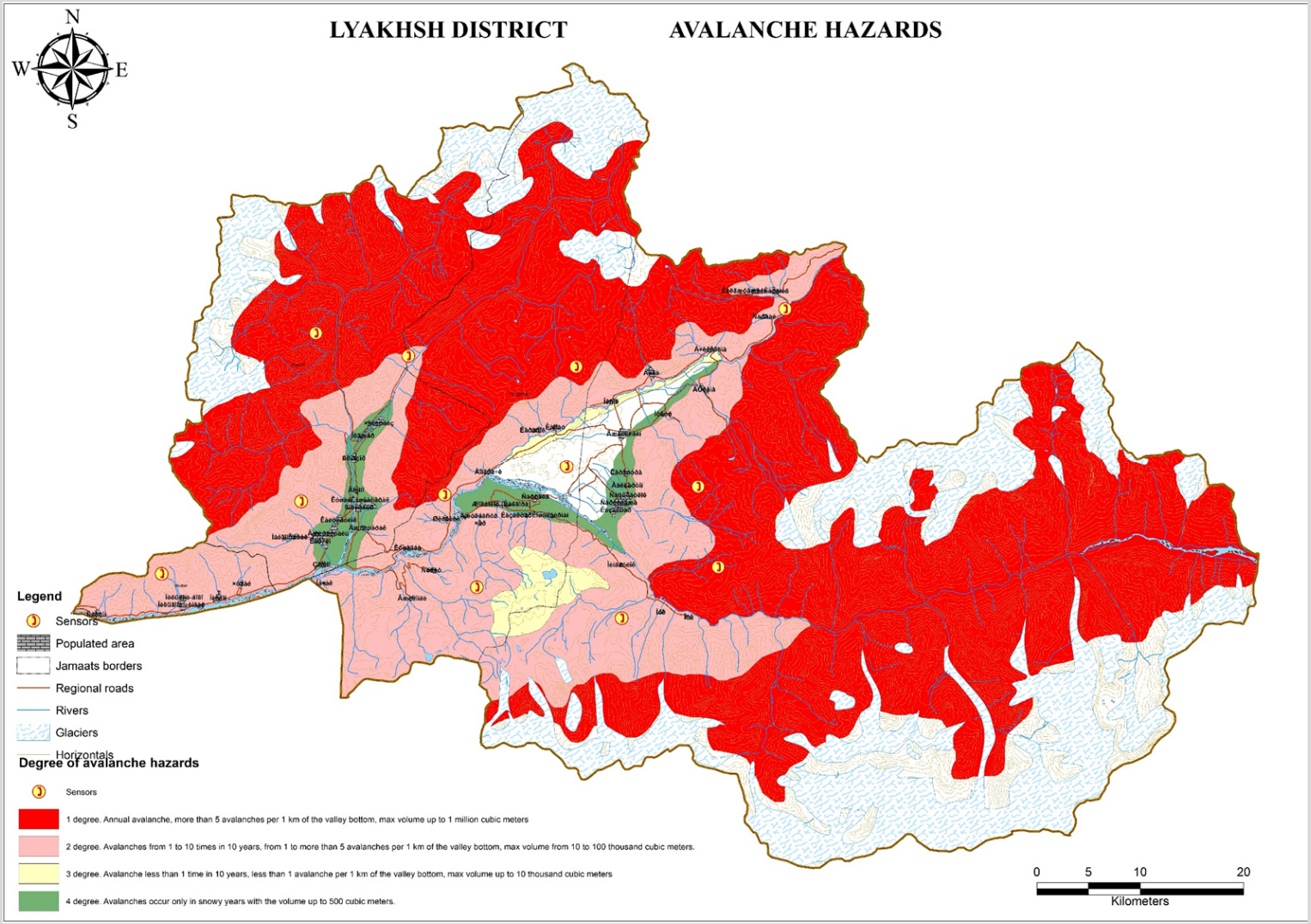


1- Collection segmentation device; 2 - Protective of sensor cover; 3- Sedimentation Tank; 4-Frequency vibration converter; 5-Measuring and coding device; 6- control Unit; 7- Indicator; 8- Key scheme; 9 and 10 Totalizers of the precipitation number and intensity ; 11- Displays device.


N
W
E
S
LYAKHSH DISTRICT
LANDSLIDES HAZARD
Dushanbe
Legend
Sensors
Populated area
Jamaats borders
Regional roads
Rivers
Glaciers
Horizontals
The degree of landslide hazard
Sensors
1 degree. The massive landslides development areas, which activated in the rainy season of the year
2 degree. The high landslides development areas, which activated in the rainy season of the year
3 degree. The mean landslides development areas, which activated in the rainy season of the year
4 degree. The low landslides development areas, which activated in the rainy season of the year
5 degree. Potentially hazardous landslide-prone areas in extreme conditions
0 5 10 20
Kilometers

LYAKHSH DISTRICT MUDFLOWS HAZARDS




LYAKHSH DISTRICT
AVALANCHE HAZARDS
N
W
E
S
Legend
Sensors
Populated area
Jamaats borders
Regional roads
Rivers
Glaciers
Horizontals
Degree of avalanche hazards
Sensors
1 degree. Annual avalanche, more than 5 avalanches per 1 km of the valley bottom, max volume up to 1 million cubic meters
2 degree. Avalanches from 1 to 10 times in 10 years, from 1 to more than 5 avalanches per 1 km of the valley bottom, max volume from 10 to 100 thousand cubic meters.
3 degree. Avalanche less than 1 time in 10 years, less than 1 avalanche per 1 km of the valley bottom, max volume up to 10 thousand cubic meters
4 degree. Avalanches occur only in snowy years with the volume up to 500 cubic meters.
0
5
10
20
Kilometers

Conclusion:

1. As part of effective disaster management, increasing disaster resilience was intended by using mobile technologies;
2. The mobile application allows to perform share and inform vital information before, during and after disaster to conduct efficient management and making better decisions;
3. As a result, key performance indicators of timely warning of approaching emergencies are the reduction in the number of trams, injuries, lost lives and the reduction of material damage.

THANKS FOR YOUR ATTENTION!