OECD Reviews of Risk Management Policies

Risk Governance Scan of Kazakhstan

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Foreword

Kazakhstan is affected by a variety of natural risks which require careful preparedness and mitigation. Good governance is essential for effective risk management; it strengthens citizens' trust and engagement in the actions needed to achieve social and economic resilience. Kazakhstan is investing in risk governance to address the wide range of natural hazards, technological and man-made threats to which its vast territory is exposed. Fundamental aspects of this approach include promoting public participation in debates about risk management decisions, ensuring the transparency of risk analyses to inform these debates, and holding public officials accountable when they compromise in their duties to protect the population.

The *OECD Risk Governance Scan* examines Kazakhstan's strategic planning for risks of national significance, the vertical co-ordination of numerous risk management stakeholders, and their inclusion in a whole-of-society approach to risk governance. It was undertaken as part of the OECD Kazakhstan country programme and in response to Kazakhstan's request to adhere to the OECD Recommendation on the Governance of Critical Risks.

The report compiles information from disaster risk management officials at central government and regional levels, as well as officials from across different central government institutions with responsibilities that require coordination for risk management policies to take effect. It provides insights and policy conclusions to improve risk governance practices in Kazakhstan, and is relevant to all countries interested in pursuing Priority Action 2 of the Sendai Framework for Disaster Risk Reduction on "strengthening risk governance". Its analyses underpin recommendations on how to reinforce a whole-of-society approach to disaster risk governance. In particular, it highlights opportunities to increase stakeholder participation in the national risk management framework, especially critical infrastructure protection; to foster evidence-based risk policy making with wider risk assessments and information-exchanges; and to enhance the transparency and accountability of risk-management policy decisions.

This report was conducted in the Public Governance Directorate by the secretariat of the OECD High Level Risk Forum and is part of a series of OECD Reviews of Risk Management Policies. The study benefitted from more than 40 field interviews with civil servants, practitioners from the private sector and civil society, and academics with expertise in risk governance and risk management practices.

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Acronyms and abbreviations

ADRC	Asian Disaster Reduction Centre
CES	Committee for Emergency Situations in the Ministry of Internal Affairs *Комитет по чрезвычайным ситуациям Министерства внутренних дел Республики Казахстан*
CESDRR	The Centre for Emergency Situations and Disaster Risk Reduction *Центр по чрезвычайным ситуациям и снижению риска бедствий*
CIP	Critical Infrastructure Protection
DES	Department for Emergency Situations *Департамент по чрезвычайным ситуациям*
DHS	Department of Homeland Security (USA)
EIA	Environmental Impact Assessments
FEMA	Federal Emergency Management Agency (USA)
FONDEN	Fund for Natural Disasters (Mexico) *(Fondo de Desastres Naturales)*
Inter-Departmental Commission	Interdepartmental State Commission for the Prevention and Elimination of Emergency Situations *Межведомственная государственная комиссия по*

	предупреждению и ликвидации чрезвычайных ситуаций
MIA	Ministry of Internal Affairs *Министерство внутренних дел*
MID	The Ministry for Investments and Development *Министерство инвестиций и развития*
MoA	Ministry of Agriculture *Министерство сельского хозяйства*
MoE	Ministry of Energy *Министерство энергетики*
MoES	Ministry of Education and Science *Министерства образования и науки*
NCSOR	National Centre for the Seismological Observations and Research *Национальный центр сейсмологических наблюдений и исследований*
NRA	National risk assessment (UK)
NSS	National Security Strategy 2017 - 2020 *Стратегия национальной безопасности*
PPP	Public Private Partnerships
TDP	Territorial Development Programs *Программы территориального развития*
UNDP	United Nations Development Programme
UNISDR	United Nations Office for Disaster Risk Reduction
WMO	World Meteorological Organization

Executive summary

Kazakhstan is exposed to a wide range of hazards. Approximately 75% of the country's territory is exposed to frequent natural hazards, including recurring seasonal floods and droughts, mudflows, avalanches, extreme temperatures and wildfires. Disasters triggered by these hazards incur high economic costs, damage infrastructure and affect the well-being of citizens. 11% of the national territory is considered to be in a high seismic risk zone. Up to 40% of the country's industrial activities are concentrated in this zone, which is also home to more than 5 million people. Industrial accidents and disruptions to critical infrastructure are also a risk in Kazakhstan. A strategic vision for economic growth and social well-being will need to promote national resilience to disaster risks, and socio-economic development programs should take into account all hazards and threats.

Kazakhstan has begun structural reforms related to disaster risk management (DRM) policies as part of the Kazakhstan 2050 Strategy. Its DRM policies intend to reduce the socio-economic impact of disasters. The OECD has identified many good practices in Kazakhstan in line with the OECD Recommendation for the Governance of Critical Risks (2014). The National Security Strategy 2017-2020 (NSS) takes an all-hazards approach to DRM, defines roles and responsibilities of key stakeholders and sets goals and objectives across the risk management cycle. The lead institution in risk governance is the Central Committee for Emergency Situations (CES), which co-ordinates and monitors implementation of the strategy. The CES seeks to develop a shared vision of risks, drive relevant polices, and co-ordinate risk management roles across sub-national levels of government.

Kazakhstan has developed documents creating a national risk assessment that includes an atlas of natural and man-made hazards and risks of emergency situations in the Republic of Kazakhstan, "The National Situation Analysis of the Security of the Territory of the Republic of Kazakhstan from Natural and Man-made Disasters" and the "Preparedness Plan of the Republic of Kazakhstan for Natural Emergency Situations". Despite these steps, scope remains to establish a national risk assessment aligned to the provisions in the OECD Recommendation. For example, at present, national risk assessment does not take an all-hazards approach includings the risk of terrorism and cyber-attacks, and there is no common methodology enabling the comparison of risks in terms of impact and likelihood.

Kazakhstan could make the formulation of risk management policies more inclusive. Currently, they tend to be developed across different sectoral ministries and focus on single types of risk. There is need to develop a national all-hazards risk assessment to compare risks and help prioritize risk management actions. This process would co-ordinate the efforts of a wide range of government institutions and agencies with specialised knowledge. Public-private partnerships could be leveraged to identify, prepare for and respond to risks. Opportunities exist to open-risk related data and strengthen information exchange with research centres and

civil society. A more structured approach to drawing lessons from disasters would ensure that meaningful policy reform is informed by facts from recent events, and that monitoring implementation of reform includes input from affected communities. All of these priority actions would encourage a more open and transparent national system for critical risks and help ensure that risk policies are based on the best available scientific data. Addressing some of these governance gaps would strengthen Kazakhstan's trajectory towards building a more resilient country and a stronger society in the face of disasters.

Key recommendations

1. Reinforce inclusiveness in the national risk management framework

- Leverage the leadership role of the Central Committee for Emergency Situations to drive horizontal policy integration and mainstream risk management policies.
- Take a whole–of-society approach, involving civil society, the private sector, research institutions, and the public in the formulation of risk policies.
- Establish public-private partnerships to utilize the private sector's skills and capabilities across all phases of the disaster risk management cycle.

2. Foster evidence-based risk policy-making with wider risk assessments and information-exchanges

- Integrate the analysis of all hazards into a single national risk assessment through a whole-of-government process to compare different risks and support capabilities-based planning.
- Adopt open data policies and improve the exchange of information with stakeholders to facilitate co-operation and enhance technical capacities for risk assessments.
- Foster long-term risk analyses beyond seasonal risks by using foresight research and horizon scanning to better anticipate emerging risks, and understand the underlying drivers of vulnerabilities.

3. Reinforce national resilience through disaster risk reduction and greater attention to critical infrastructure

- Develop a national critical infrastructure resilience programme to reduce disruption time and economic losses.
- Establish monitoring and evaluation tools to prevent violations of regulations in urban plans, land-use restrictions, building codes and granting building permits in hazardous areas.

4. Enhance transparency and accountability of risk-management policy decisions

- Publish and distribute to all relevant stakeholders a non-classified version of the National Security Strategy to clarify the roles and responsibilities across stakeholders, and to build a comprehensive understanding of the goals, objectives, and targets across the risk management cycle.
- Establish a comprehensive accountability framework that monitors risk management outcomes and evaluates the performance of all relevant

stakeholders in fulfilment of their mandated responsibilities aligned to the goals in the National Security Strategy.

- Set up a national reporting system of local actions to reduce disaster risk found in building codes, land-use restrictions and urban plans.

5. Promote adaptive capacity, continuous learning and incorporation of new information to revise risk management policies

- Continuously share knowledge and promote lessons-learning exercises by the Central Committee for Emergency Situations and its regional departments to identify policies in need of revision and to strengthen specific risk management capabilities.
- Develop central level guidance and public policies for recovery and reconstruction processes to reinforce "build back better" policies.
- Use the results of post-disaster damage assessments to inform reconstruction plans to reflect the costs of longer-term investments needed to build resilience.

Assessment and Recommendations

1. Reinforce inclusiveness in the national risk management framework

Leverage the CES leadership role to strengthen a whole-of-government approach and drive horizontal integration of risk management policies

Principle I of the OECD Recommendation calls on countries to assign national leadership that coordinates a whole-of-government approach to the governance of critical risks. The institutional set up in Kazakhstan functions on top down and bottom up processes across a multi-level government. The Security Council drives the National Security Strategy, which is meant to align sectoral risk policies to common objectives. The Central Committee for Emergency Situations in the Ministry of Internal Affairs aims to coordinate risk policies and stakeholders across central level government, technical agencies and subnational level stakeholders. In this way, it plays an important role to ensure goals and objectives across the risk management cycle provided in the NSS are achieved across stakeholders.

Vertically shared responsibilities are a dominant feature of the decentralized governance framework, implying significant roles for the sub-national actors at the regional and local level. The CES has established coordination mechanisms with regional Departments for Emergency Situations (DES) – in order to ensure regional risk management strategies are aligned with the goals in the NSS. However, there is little horizontal coordination at the national level and ministries develop their own strategic plans and compete for budgets. The CES could strengthen its coordination role by driving cross-cutting policies and mainstreaming risk management across different sectoral strategic plans. This would support an integrated whole-of-government approach and encourage connections between policy agendas and the alignment of priorities to meet objectives and targets across the risk management cycle.

- Boost the leadership role of the Central Committee for Emergency Situations to coordinate and align risk policies, and raise the status of the Interdepartmental State Commission for the Prevention and Elimination of Emergency Situations, to ensure a whole-of-government approach to the governance of critical risks.
- Mainstream risk policies to enhance understanding of the interconnectedness of risks, connect policy agendas and align priorities.

Mobilise a whole of society approach to involve civil society, the private sector, research institutions, and the public in the formulation of risk policies

Principle I of the Recommendation encourages inclusive policy-making to build a shared vision of critical risks, and to promote compliance and buy-in with risk

management policy decisions. A whole-of-society national framework creates communication channels to engage with communities, civil society organizations, businesses and the private sector to support preparedness. Inclusiveness in the governance framework in Kazakhstan is limited to government actors and would benefit from involvement of a wider set of stakeholders. More interaction with civil society, research institutions and communities could strengthen a whole-of-society approach to the design and formulation of risk policies and leverage on available resources and skills.

- Build information sharing networks and collaborative mechanisms such as expert discussions and joint research activities to increase knowledge, resources and skills to manage and reduce disaster risks.
- Strengthen two-way risk communication channels with communities and civil society to encourage self-preparedness and build a risk culture.

Establish public private partnerships to leverage the private sector's skills and capabilities across all phases of the disaster risk management cycle

Principle I of the Recommendation calls for a whole of society approach to the governance of critical risks, which includes collaboration with the private sector. In Kazakhstan, there is structured cooperation with the private sector in response and recovery. Preparedness could be reinforced through interaction with the private sector whereby the emergency services associated with large state-owned or semi-state owned companies are more broadly leveraged. Engagement with the private sector could be expanded by establishing public private partnerships to increase capabilities and expertise in all phases of the risk management cycle. Further collaboration with the private sector would strengthen a whole-of-society approach, align business continuity planning to goals of the National Security Strategy and increase the knowledge base of critical risks and potential impacts of disasters.

- Clarify in the National Security Strategy and relevant laws and regulations the risk management roles of the private sector and its eventual ownership of critical risks.
- Establish public private partnerships to leverage the skills and resources present in the private sector, to build capabilities throughout the disaster risk management cycle and encourage business continuity planning.

2. Foster evidence-based risk policy-making with wider risk assessments and information-exchanges

Integrate analysis of all hazards into a single national risk assessment through a whole of government process to compare different risks and support capabilities-based planning for all-hazards

The identification of all critical risks and their assessment is recommended in Principle II of the OECD Recommendation to ensure that risk management policies are based on the best available scientific evidence. In Kazakhstan, as in most countries, assessments of single risks are conducted by technical services in agencies. In addition sub-national risk assessments are conducted. However, in Kazakhstan these various technical analyses are not integrated into a single national risk assessment (NRA) according to a common methodology. Establishing such a process would enable Kazakhstan to compare risks according to their relative likelihood and impact, and guide the setting of priorities in capabilities based planning. The development of an all-hazards NRA would help foster consensus on risk management policies across ministries, and could be further leveraged as a risk communication tool to heighten awareness concerning risks of national significance across the population and industry.

- Integrate, strengthen, deepen and expand risk analysis into a single national risk assessment to focus on all risks to inform risk policies and build capabilities across the risk management cycle.
- Develop the methodology and criteria for risk assessments to ensure coordination between the local and national level.

Adopt open data policies and foster the exchange of information with stakeholders to facilitate cooperation and enhance technical capacities for risk assessments

Principle V of the Recommendation calls for supporting transparency and accountability in risk-related decision-making, by encouraging openness to risk information. Kazakhstan has achieved valuable work on risk assessments by a number of technical and scientific agencies. This work could be leveraged if underlying data was made more available. It is recommended for Kazakhstan to adopt open data policies and set up information-exchange platforms with stakeholder groups. More cooperation for the exchange of data such as space imagery, GIS, hydrological and weather information would support capability building in risk assessments and analyses and enable evidence-based risk policies.

- Expand open data policies to include data on risks gathered by various technical agencies and enable access to research institutes that can contribute to data processing and analysis in order to enhance the understanding of risks in Kazakhstan.
- Foster more collaboration with stakeholder groups to support extensive risk analyses including improved and better-informed risk assessments and hazard maps.

- Encourage openness of information about risks, such as assessments and hazard maps at the regional and local level to raise risk awareness and increase self-preparedness.

Foster long-term risk analyses beyond seasonal risks by using foresight research and horizon scanning to better anticipate emerging risks, and understand the underlying drivers of vulnerabilities

Principle II of the Recommendation calls on countries to prepare for the future. Preparedness in Kazakhstan focuses notably on monitoring known hazards and short-term preparedness planning and for recurrent seasonal risks. Many risks, however, cannot be effectively mitigated with short-term actions, and require medium to long-term investments to achieve acceptable levels of risk. Foresight analysis is needed to forecast how risks may evolve or new risks might emerge. Such forward-looking research underpins the effort to understand not only what the risks are today, but what they will look like as the climate changes, society evolves and technology advances. It is recommended that Kazakhstan develop stronger linkages between research capacity for long and medium-term risks by linking the use of foresight and horizon scanning to risk management policy decisions. This should include the development of methods to identify and assess gaps in resources and capabilities to prepare and respond to disasters at the regional level.

- Enhance an understanding of factors driving socio-economic vulnerability and foster long-term risk thinking with the use of foresight analysis and horizon scanning.
- Improve preparedness with automated monitoring systems and a multi-hazard early warning system through closer coordination and cooperation between the national metrological office, lead government departments at the central and local level.
- Carry out a gap analysis at the regional level to identify shortfalls and areas to improve operations and resources for disaster preparedness and response.

3. Reinforce national resilience through disaster risk reduction and greater attention to critical infrastructure

Develop a national critical infrastructure resilience program to reduce disruption time and economic losses

The OECD Recommendation calls on countries to develop public private partnerships with critical infrastructure operators as disruptions to their functionality is a main obstacle to recovery and a major source of economic losses and social hardships in disasters. A key goal of all national resilience plans should be to ensure these critical systems still deliver essential services when shock events occur. In Kazakhstan, the linkage between operators of critical infrastructure and government risk management policy decisions does not appear to exceed regulatory requirements. There is room to increase the understanding in the central government of exposures to critical infrastructures. This includes greater attention to the potential cascading consequences and domino effect of disruptions to critical infrastructure on society and the wider economy. It is recommended that Kazakhstan develop a comprehensive critical infrastructure resilience program that

includes criticality assessments, mapping interdependencies of the most critical functionalities across sectors and promoting information sharing platforms through public private partnerships.

- Encourage central level planning for critical infrastructure resilience to reduce the disruptions of essential services such as energy, water, transportation, heating systems and telecommunications as well as the associated economic losses.
- Foster information sharing with owners and operators of critical infrastructure to align risk and resilience policies across different important sectors.

Establish monitoring and evaluation tools to prevent violations of regulations in urban plans, land use restrictions, building codes and granting building permits in hazardous areas

Structural and non-structural risk reduction measures have been widely developed across Kazakhstan. Risk communication and raising risk awareness is a strong governance aspect of risk reduction in the current framework. There are many efforts to develop building codes for seismic buildings and implement urban planning and land-use restrictions in flood risk areas. However, oversight and monitoring of risk reduction policies will be increasingly important to complement such disaster risk reduction policies. There is a risk of issuing building permits and further development in hazardous areas. Local authorities are communicated information on all hazards to support risk-informed decision-making about urban development and land-use planning, however monitoring and evaluation mechanisms could be further developed to ensure adherence to these regulations and building codes.

- Establish monitoring and evaluation tools to ensure adherence to regulatory standards, building codes, urban development and land-use planning.
- Integrate territorial natural and technological hazard maps that assess the exposure of assets across all regions.

4. Enhance transparency and accountability of risk-management policy decisions

Publish and distribute to all relevant stakeholders a non-classified version of the National Security Strategy to clarify the roles and responsibilities across stakeholders, and to build a comprehensive understanding of the goals, objectives, and targets across the risk management cycle

Principle V of the Recommendation recommends governments to build national risk governance frameworks that are open and transparent about the processes and methodologies of assessing risk related policies. Openness encourages a dialogue across stakeholders and builds a shared vision of critical risks. In Kazakhstan, there are efforts to create strong communication tools about risks as a core task of the Central Committee for Emergency Situations and its regional departments. However, there is room to encourage more openness of the national framework to

ensure clarification about the roles and responsibilities of all stakeholders and a comprehensive understanding of the goals, objectives, and targets across the risk management cycle provided in the National Security Strategy.

- Publish and distribute to all relevant stakeholders a non-classified version of the National Security Strategy to clarify roles and responsibilities and ensure comprehensive understanding of goals, objectives and targets across the risk management cycle.
- Encourage openness and transparency of the national framework and foster open dialogue across stakeholders to build a shared vision of critical risks.

Establish a comprehensive accountability framework that monitors risk management outcomes and evaluates the performance of all relevant stakeholders

Good governance practices underpinned by the Recommendation Principle V calls for accountability mechanisms to ensure that stakeholders fulfil their intended roles and responsibilities. National audit systems further ensure that resources are used efficiently. There are various accountability tools in place practiced by the regional Departments for Emergency Situations (DES) from performance evaluations, internal reviews and open reporting to communities. Despite these tools in place, they are not practiced across all regional DES. It will be increasingly important to ensure accountability measures are agreed upon by all stakeholders for consistent implementation of risk reduction policies. It is recommended that Kazakhstan strengthen the accountability framework to ensure consistent implementation of risk management policies across all stakeholders.

- Establish a national accountability mechanism that monitors risk management outcomes and evaluates the performance of all relevant stakeholders in fulfilment of their mandated roles and responsibilities aligned to the goals in the National Security Strategy

Set up a national reporting system of local actions to reduce disaster risk found in building codes, land-use restrictions and urban plans

The Recommendation suggest countries to mobilise multi-stakeholder approach to invest in risk prevention and mitigation set forth under Principle III – and appropriate monitoring measures to guarantee implementation. In Kazakhstan, the governance of critical risks functions across a multi-level government (central, regional and local) relying on vertical coordination mechanisms. There is a governance gap of overseeing that risk management policies are implemented across all levels of government. It is recommended that Kazakhstan set up a national reporting system to keep track of all risk management activities by stakeholders and oversee that actions are taken across government to reduce disaster risks.

- Set up a national reporting system to ensure that risk management policies are implemented and actions are taken to reduce disaster risks

5. Promote adaptive capacity, continuous learning and incorporation of new information to revise risk management policies

Institute a formal process of lessons learned to revise risk management policies

The OECD Recommendation calls on countries to develop adaptive governance frameworks and continuously share knowledge and incorporate lessons learning to evaluate the effectiveness of policies across the risk management cycle. To increase adaptive capacity it is important to build institutional capacity to ensure these lessons are used to revise public policies where needed. Disaster risk policies should be coordinated from the national to the local level and reviewed and revised in light of changing vulnerability and risk conditions. Kazakhstan demonstrates consistent capacity for post disaster analysis at the central and local levels. There are relatively few examples found however of these lessons leading to actual policy changes. Instituting an independent Commission to draw evidence from post disaster evaluations, scientific research and interviews with disaster risk management stakeholders could be expand adaptive capacity in Kazakhstan. Such a Commission would have as its mandate to formulate recommendations for changes to disaster risk management policy and report these to the Prime Minister and Parliament. This would foster debate on the suitability of current policies in light of new risk information, the availability of new technologies and organisational processes.

- Expand on the value and use of lessons learned exercises following disaster events, to review and revise risk management policies. This includes developing a national Commission to formulate policy reforms for public debate.
- Draw from lessons learned in recovery and reconstruction to revise local building codes, urban development plans, and land-use policies

Develop central level guidance for recovery and reconstruction processes to strengthen "build back better" policies

Principle IV of the OECD Recommendation calls on countries to design integrated risk management policies for recovery and reconstruction to reduce vulnerability to future events and strengthen resilience. Strategic guidance for recovery and reconstruction includes establishing a systematic process to assess post-disaster damage. These assessments help ensure that reconstruction considers the costs and long-term investments in infrastructure that will reduce vulnerability to disaster risks and reinforce policies for "building back better". The current framework in Kazakhstan gives autonomy to local governments to oversee and manage recovery and reconstruction; however, there is a need to strengthen central level policy guidance. It is recommended that Kazakhstan design recovery and reconstruction policies to ensure disaster evaluation processes and systematic assessments of damage and losses are used to inform reconstruction and reduce vulnerability to future disaster risks. The findings should be open to the public and used to inform policy decisions concerning recovery and reconstruction expenditures.

- Establish systematic post-disaster assessments to guide investments to reduce vulnerability levels to future disaster risks

- Set up a national audit to ensure efficient use of public resources in response and recovery
- Encourage knowledge sharing and lessons learned exercises to reduce vulnerability against future disaster risks and reinforce building back better policies.

Chapter 1. Critical risks in Kazakhstan

This chapter provides context to understand disaster risk management policies in Kazakhstan. It outlines the main hazards to which the national territory is exposed, the known socio-economic vulnerabilities and highlights past disaster events.

Natural hazards in Kazakhstan

Kazakhstan's vast territory is prone to a wide range of natural hazards including earthquakes, floods, drought, mudflows, avalanches, landslides, extreme temperatures, blizzards, and wildfires. Approximately 75% of the country's terrain is exposed to a high risk of different types of natural hazards (IFRC, 2013[1]). The variability in terrain, geology, climate and weather exposes the country to seasonal natural hazards. In parallel, the country socio-economic development relies on a range of industrial activities located in hazardous areas, where disasters can disrupt economic activities and social well-being.

Floods are a critical risk in Kazakhstan that occurs yearly across almost every region incurring high economic losses and human impact. Spring floods are known to initiate mass evacuations, damage infrastructure and roads. In addition, the risk of a major earthquake in the former capital and industrial-cultural hub of Almaty poses a major concern. It is estimated that seismic active zones in Kazakhstan hosts up to 40% of industrial activities (IFRC, 2013[1]), while residential areas built up along the foothills are at risk to landslides that can be triggered by earthquakes.

Socio-economic impact of past disasters

Data on past disasters in Kazakhstan are available since 1993 and are not exhaustive. Available historical records of natural disasters in Kazakhstan are provided by the EM-DAT database, Louvain Catholic University (Table 1.1). Based on available data, there have been 22 major events in the last 25 years triggered by a range of natural hazards. Table 1.1provides a summary of the risks, number of events and associated impact on social consequences and estimated damages.

Table 1.1 Major disasters in Kazakhstan since 1993

Risk	Number of Events	Deaths	Total population affected	Estimated damage ('000 USD)
Earthquake	1	3	36,626	N/A
Flood	12	64	151 147	282 570
Extreme temperature	3	3	65 012	N/A
Storm	1	110	N/A	3 000
Landslide	1	48	N/A	N/A
Epidemic	3	7	873	N/A
Wildfire	1	0	8 000	N/A
Total	22	237	80 1658	285 000

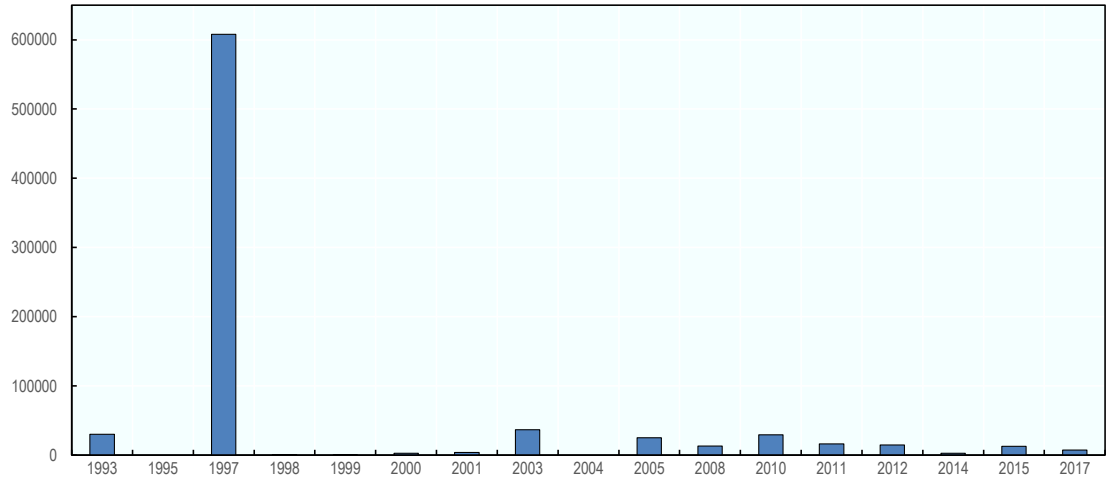
Source: (EM-DAT, 2017[2])

The highest human impact caused by a natural disaster in Kazakhstan was from a blizzard with extremely low temperatures that occurred in December 1995 resulting in 110 deaths. This cold spell led to disruptions in electricity and heat supply systems and blocked transportation routes leaving thousands of truck drivers stranded. Earthquake risk is also a concern, with a strong earthquake hitting in 2003 in the region Zhambyl neighboring Almaty causing 3 deaths and affecting at least 35 626 people. In recent years, more than 10 earthquakes were recorded in western regions of Kazakhstan where mining activities are located. In 2008 the villages Shalkar and Rybtseh located in West Kazakhstan experienced a magnitude 7 earthquake destroying 123 houses and in 2011 a 4 magnitude earthquake in the Tengiz oil field also caused heavy damage (Lobkovskii, Garagash and Dbuvskaya, 2013[3]).

Kazakhstan also experiences hurricane winds, extreme temperatures, mudslides, landslides and epidemics. Although many disasters are not included in the database, there are also frequent wildfires across the steppe and forest areas. Kazakhstan also has to cope with periods of drought.

In the last 25 years, the highest number of the population affected by natural disasters occurred in 1997 from wildfires in August across 6 settlements in East Kazakhstan and a cold spell of -35 degrees in December across Kazakhstan (Figure 1.1).

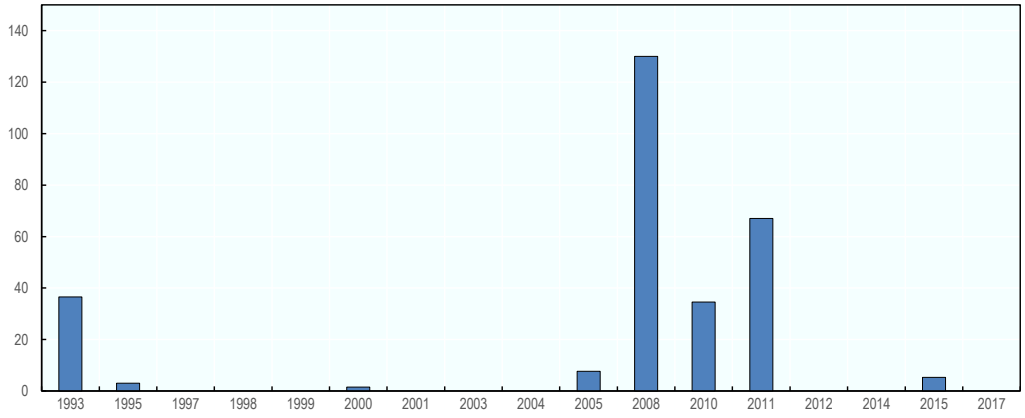
Figure 1.1. Total population affected by natural disasters 1993-2017



Source: (EM-DAT, 2017[2])

However, the main economic impact from disasters in Kazakhstan, as in many other countries, stems from floods. The highest costs incurred by natural disasters have been caused by riverine flooding in February 2008 across South Kazakhstan and Kyzlorda, as well as in April 2011 in West Kazakhstan.

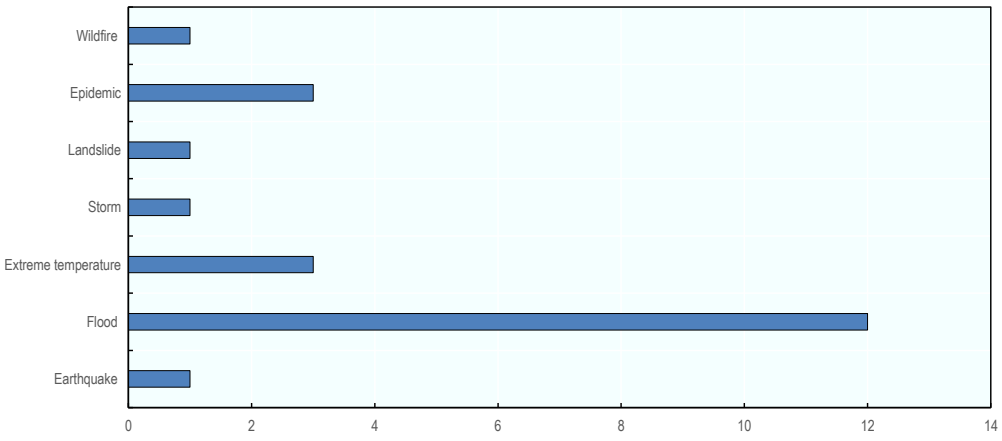
Figure 1.2. Total damage caused by natural disasters in USD million 1993-2017



Source: (EM-DAT, 2017[2])

The majority of the damages resulting from natural disasters since 1993 have been caused by floods of two kinds, riverine flooding and flash floods. Figure 1.3 indicates that 12 incidents of large-scale flooding have been documented since 1993. Recurring floods across the country incur the highest amount of costs and affect the largest segment of the population.

Figure 1.3. Number of natural disasters, 1993-2017



Source: (EM-DAT, 2017[2])

A high recurrence of seasonal flooding

Floods represent a critical risk in Kazakhstan given their economic impact and recurrence. Data from 2008-2018 shows that the country experiences seasonal flooding across many regions. Table 1.2 presents information on major floods in the last decade. Floods occur yearly and affect multiple regions usually in the period from February to July. These floods cause large-scale damage often times across several settlements and require extensive evacuations of vulnerable communities. They are known to break dams, wash away bridges, destroy infrastructure, and damage roadways.

Table 1.2. Major floods in Kazakhstan (2008-2018)

Year/Month	Regions affected	Social Consequences	Cause and damages
2008/02	South Kazakhstan and Kzylorda	More than 13 000 people evacuated	Increase in air temperatures and heavy rains led to riverine flooding. 2 383 houses were inundated, while 298 houses, 8 schools, 2 primary medical centers were destroyed and 2 bridges washed away. Total damage estimated at USD 130 000
2010/02	Almaty region	16 200 persons affected	Flash floods across 10 districts totaled to USD 34 576 in damages
2011/04	West Kazakhstan	16 000 persons affected	An abrupt rise in river levels caused massive riverine flooding, total damage is estimated at USD 67 000
2012/02	South Kazakhstan	9 400 persons affected	Quick melting of snow and rainfall resulted in riverine flooding.
2014/03	Karaganda	Five people killed, and nine injured.	A flash flood triggered by a dam burst.
2015/04	Akmola, Karaganda, Pavlodar and East Kazakhstan	12 670 persons affected	A surge in air temperature and precipitation led to intense snowmelt and increased water levels in the rivers that caused destruction to transportation infrastructure, killed livestock and damage to electricity and water supplies. Total damage estimated at USD 5 300
2017/04	Akmola, Aktobe, East Kazakhstan, Zhambyl, Karaganda, Kostanay, North Kazakhstan	Over 7 000 people evacuated	Snowmelt and rising river levels led up to 1 500 buildings damaged.
2018/03	East Kazakhstan	Up to 400 people evacuated	Long term rainfall and snow melt led to floods that damaged up to 100 houses and public buildings, and washed away a bridge

Source: (EM-DAT, 2017[2]; Asian Disaster Reduction Center, 2017[4])

Flooding occurs in almost all the regions of Kazakhstan due to the terrain and abundance of waterways and watersheds throughout the country. There are eight river basins in the territory of the Republic of Kazakhstan: Aral-Syrdarya, Balkash-Alakol, Ertis, Esil, Zhaiyk-Caspiy, Nura-Sarysu, Tobol-Torgai and Shu-Talas (Chepkemoi, 2017[5]). There are 12 major rivers running through Kazakhstan, 8 of which are transboundary with neighboring countries Russia to the North, China to the East, and Kyrgyzstan, Uzbekistan, and Tajikistan in the South. Many of these large rivers are used for hydroelectricity generation and irrigation for agriculture.

There are also up to 39 thousand of smaller rivers and temporary waterways flowing through Kazakhstan. In addition it is estimated that there are 48 thousand lakes (glaciers included) covering a total water surface area 4 500 km² - the largest being the Aral Sea, Balkhash, Zaisan and Alakol (Shibutov, 2017[6]).

Table 1.3. Major rivers in Kazakhstan

Name of the river	Total length	Type of river	Shared with countries
Ertis	4 280 km	Transboundary	China and Russia
Esil	2 450 km	Transboundary	Russia
Zhaiyk	2 428 km	Transboundary	Russia
Syr Darya	2 211 km	Transboundary	Kyrgyzstan, Tajikistan, and Uzbekistan
Tobol	1 591 km	Transboundary	Russia
Ili	1.439 km	Transboundary	China
Shu	1 186 km	Transboundary	Kyrgyzstan
Talas	661 km	Transboundary	Kyrgyzstan
Nura	978 km	National	
Sary-su	761 km	National	
Emba	712 km	National	
Turgai	662 km	National	

Source: (Chepkemoi, 2017[5])

Kazakhstan predominately experiences two different types of flooding situations seasonally a) flash floods stemming from water sources in the mountains characterized by high flow velocities and changes in discharge rate; b) over-capacity of flat land riverbeds that over topple banks and canals into floodplains. In the spring period when temperatures tend to raise quickly a combination of heavy rainfall and melting snow causes torrential floods (IFRC, 2013[1]). Similarly, an increase in air temperatures and rain combined with melting glaciers contribute to run-off that cause over capacitated riverbeds in the flatlands to flood.

Flooding caused by melting snow occurs throughout almost the entire country during the period starting from February until July. Torrential floods tend to occur in the southern regions in the period February to June where river sources are located in mountainous areas. In these locations following especially harsh winters the soil remains frozen. When air temperatures rise in the spring causing snow to melt, coupled with high precipitation, the abundance of water cannot be absorbed by the terrain. The situation leads to intense water flows down the hillsides (in which the direction is not always clear) generating massive floods where many settlements are often located due to the fertility of the soil along foothills. Floods from snowmelt are also known to occur between March and July, while flatland rivers tend to overflow predominately in the period from March to June.

Box 1.1. Major floods across Kazakhstan in 2017

Data shows Kazakhstan's exposure to flood disaster events is high across all regions. Of a total of 22 disaster events that the country has suffered from 1993 to 2018, 12 correspond to flood events e.g. flash and riverine floods, leaving an estimate of 64 dead, 151 147 people affected and economic damages of USD 282 million. One of the latest flood disaster-related events took place in 2017. This was caused by snowmelt that led to the rise of river levels. The floods affected over 7 000 people and damaged 1 500 houses in the regions of Akmola, Aktobe, East Kazakhstan, Zhambyl, Karaganda, Kostanay, and North Kazakhstan.

Source: (EM-DAT, 2017[2]) (Asian Disaster Reduction Center, 2017[4]) (Shibutov, 2017[6])

A high occurrence of annual spring flooding illustrates the importance of identifying and assessing the underlying drivers to understand Kazakhstan's exposure to flood risks. Recent flood disasters in 2017 were caused by a rise in temperatures and rains, as well as high water levels in reservoirs (Box 1.1). Many settlements were located in flood zone areas and had to be evacuated. These floods demonstrate the need for Kazakhstan to adopt a risk management approach that embraces risk prevention and mitigation, as well as one that incorporates forward-looking perspectives to disaster risk such as the potential impacts of climate change.

Earthquake risks

Earthquake risk is present across Kazakhstan. 11% of the country's territory is situated in high seismic zones. The Tien-Shan and Altai mountains in the south and southeast are particularly susceptible to earthquake hazards. More than 5 million people live in this region. The cultural and industrial hub Almaty is home to 1.7 million people and located in a high earthquake risk area. Regions characterized by particularly high seismic risk include Eastern-Kazakhstan, Almaty region, Zhambyl and South Kazakhstan. Across all these regions, 40% of industrial activities are concentrated in earthquake prone zones (Silacheva, Kulbayeva and Kravchenko, 2018[7]).

Historically, Kazakhstan experiences intense and damaging earthquakes every 80 to 100 years. The period 1811-1911 was marked with high seismic activities affecting several communities. Strong earthquakes occurred in Verneskoye in 1811, a 7.2 magnitude earthquake in Verniy in 1887, in 1889 an 8.3 magnitude earthquake hit Chilik and in 1911 a magnitude 8.2 in Kemin (Silacheva, Kulbayeva and Kravchenko, 2018[7]). The city of Almaty (then called Verniy) was almost entirely destroyed by the earthquake in 1887. The most recent strongest earthquake occurred in Zhambyl in 2003, affecting an estimated 36 626 people, damaging residential and public buildings beyond repair, and disrupting critical services (Box 1.2).

Box 1.2. Earthquake risk in Kazakhstan

The strongest earthquake of magnitude 6.5 - 7 struck in T. Ryskulov District of Zhambyl region in 2003. As a result, 3 people died, more than 20 people were injured and more than 20 000 people were left homeless. More than 7 000 houses, a number of schools, hospitals and administrative buildings were severely damage. In addition, important infrastructure such as power lines and water system partially broke down.

Seismic activity is monitored across Kazakhstan by The Institute of Seismology LLP and the Seismic experimental and methodological expedition LLP are part of the JSC National Centre for Seismological Observation and Research (NCSOR) in the Ministry of Education and Science (MoES). Evidence suggests that at present activity is characterized by several weaker earthquakes and almost daily small tremors. Although no major earthquakes have occurred in Almaty city since 1911, the probability of a major earthquake in this area is high. A high magnitude earthquake could pose major concerns for this cultural and industrial capital by also triggering landslides along the foothills where many residential buildings are located.

Source: (IFRC, 2003[8])

Other risks

Other natural risks across Kazakhstan include wildfires, drought, mudslides, landslides, avalanches, winter storms, and hurricane-like winds. In the mountain regions and foothills mudflows are often triggered by rainfall or breaches of glacial lakes, while the largest mudflows are triggered by earthquakes. There are 300 mudflow basins which directly pose a risk to 156 settlements, communications systems and farmland in Kazakhstan (Committee for Emergency Situations, 2015[9]). The most susceptible area to mudflows and landslides are the mountain and foothill areas of the Almaty region and the city of Almaty. Out of the total area of 13 thousand km² of mudflow-prone zones, this region accounts for more than 11 thousand km² (Committee for Emergency Situations, 2015[9]). In July 2015 a mudflow in Almaty city was triggered by rapid melting of glaciers and the overflow of lake Bezymyannoye. The mudflow disaster resulted in several injuries, the evacuation of over 1 000 people, disruption to gas and water services, overtopping of a dam and significant damages to asets (Satubaldina, 2015[10]). On top of mudslides, droughts are a problem across Kazakhstan with effects on irrigation in the large agricultural sector (Kogan, 1997[11]).

Extreme temperatures including both heatwaves and cold waves are other natural hazards that occur in Kazakhstan. In December 2012 a cold wave with temperatures sustained as low as -40/-46 Celsius swept across northern, eastern and central Kazakhstan affecting people, livestock and infrastructure. The low temperatures caused power supply and heating systems to cut off in several localities (IFRC, 2013[12]). Over 5 000 people were affected by this cold wave, and transportation routes were cut off leaving thousands of truck drivers stranded on the road. There are also regular forest fires and steppe fires across regions in Kazakhstan. Forest wildfires have increased exponentially from 2016 to 2017, from 306 to 563 (54%); and while 31 steppe fires were documented in 2016, incidents went up to 153 in 2017 (500%).

Kazakhstan faces a range of techno-genic risks *including* industrial accidents, fires, explosions; accidents connected with critical infrastructure, chemical, gas and oil facilities. From available statistics provided by EM-DAT, since 2004 there have been 4 major industrial accidents resulting in 110 deaths, however no information is provided on the costs. Epidemic risks have also posed concerns in the past (EM-DAT, 2017[2]).

Socio-economic vulnerabilities to disaster risks

Cultural and industrial hubs are centralized in the cities of Almaty the former capital and largest city which is at high risk of earthquakes, and the current capital of Astana – both at risk to floods. In addition, the country hosts a range of industrial activities: a large-scale agro-industrial complex, mining of minerals and an important gas and oil sector (OECD, 2017[13]). The agro-industrial complex is well developed in Kazakhstan and accounts for a large usage of water (OECD, 2016[14]), and is particularly vulnerable to droughts and floods; including a high risk to livestock. In addition to water management for irrigation, several rivers are used for the generation of hydropower with eight major hydroelectric plants placed on these rivers (UNDP, 2004[15]). Hydro-technical infrastructure, the transportation network, oil and gas infrastructure such as storage and pipelines are at risk to natural hazards and severe weather conditions that could disrupt supply and impact socio-economic well-being.

Socio-economic vulnerability to disasters in Kazakhstan is linked to several factors. Economic prosperity tends to flow to the capital of Astana, while rural regions are often at high exposure to flood risk and require resources to implement risk reduction measures. Disparity of regional socio-economic growth depends on the availability of minerals, oil, gas and fertile land, which results in variations of resources available to implement disaster risk reduction measures. In addition, there is a lack of regulatory oversight on land-use planning, urban development and the process of issuing building permits at the local level (OECD, 2017[16]). This has resulted over time in the development of many communities built in hazardous areas. For example, settlements in the south are often situated on foothills due to fertility of the soil but are particularly at risk to torrential floods, mudflows and mudslides.

To address these and other social and economic vulnerabilities to disasters, a systematic process for identifying risks and documenting past events should be considered which will support risk-informed decision-making. Similarly, in earthquake prone zones, there is a need to ensure resilience of infrastructure to seismic shocks including oversight of building developments along foothills at risk to landslides and other weather related disasters. In parallel, disaster risk reduction and preparedness policies will ensure the fulfilment of socio-economic development goals underway in Kazakhstan.

Coping with climate change

Climate change is expected to exacerbate Kazakhstan's extreme climate conditions. Kazakhstan experiences a continental type of climate with hot summers and cold winters. Temperatures are mild in spring (April to June) and autumn (September to

October) and tend to rise up quite high in July. Snowfall begins in November and generally lasts until April in the mountainous regions.

More recently, the country has experienced episodes of extreme temperatures marked by arid and hot summers with long cold freezing winters. This has led to shorter interim seasons in the spring and autumn, with impacts on the risk of floods and drought. Observed impacts have been on water resources marked with two seasonal periods characterized by the abundance of water in the spring and low levels of water in the winter. This situation affects many communities' especially rural settlements, the large agricultural sector and livestock farming that places heavy reliance on water resource management (Mizina et al., 1999[17]).

In addition to and independent of the causal links between climate change and natural disasters, climate change and sustainable development are driving Kazakhstan's development policy framework in order to adapt to future socio-economic and ecological conditions. Leveraging on the emerging policies to be put in place in terms of climate change adaptation and joining the Paris Agreement, there is opportunity for increased attention to the mitigation and prevention of natural disaster risks.

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Chapter 2. Kazakhstan's disaster risk governance framework

This chapter presents the governance structure for the management of critical risks in Kazakhstan and highlights the key strategic and planning documents. It describes the leadership and coordination mechanisms for implementing these strategies and the relevant laws.

Good governance for the management of critical risks calls for a comprehensive national strategy that clearly defines roles and responsibilities of different stakeholders, and articulates goals, objectives and targets across the risk management cycle (OECD, 2014[18]). The governance framework for managing critical risks in Kazakhstan has been evolving in recent years with the re-designing of public sectoral policies, formulation of strategic plans and the delegation of responsibilities across different government stakeholders. At the central level the framework tends to function on sectoral policies towards single risks under the provisions of different government agencies. It is driven by central level planning engaging top-down and bottom-up processes. The following sections will analyze the main strategic plans, legal framework and roles and responsibilities of different actors to offer an overall picture of the governance framework for managing risks in Kazakhstan.

Core legal and strategic frameworks for risk governance

The OECD Recommendation (OECD, 2014[18]) recommends that a comprehensive national strategy steers disaster risk governance. This strategic framework should put forward clear goals and objectives across the risk management cycle. The risk management cycle refers to: risk identification and assessment, disaster risk reduction in prevention and mitigation, preparedness, and response and recovery (OECD, 2014[18]). The national strategy should promote inclusiveness and participatory processes in the design of risk policies, and set up coordination mechanisms to ensure that stakeholders integrate disaster risk as a priority in their policies. Openness and transparency of the strategic framework ensures trust and ownership of risks, while supporting communication of risks across all stakeholders

Figure 2.1. Disaster risk management cycle

Source: Adapted from (OECD, 2014[18])

The National Security Strategy

The National Security Strategy 2017-2020 sets the framework for risk management policies in Kazakhstan. This important and high-level document addresses all

identified hazards and threats within the borders and external to Kazakhstan. The overall coordination of the National Security Strategy (here in after NSS) is carried out by the Executive Office of the President and the Security Council of the Republic of Kazakhstan. Central government bodies[1] and the ministries provide suggestions to drafting the national security strategy and it is approved at the highest level of government, by Decree of the President. Measures for the governance of critical risks provided in the NSS mainly serves to delegate the roles and functions across government stakeholders in the design of risk policies to manage natural and man-made disaster risks, and reduce their consequences. It guides risk assessment and hazard mapping, priority areas in disaster risk reduction and preparedness, however does not include a strategic policies to guide reconstruction and recovery processes.

A large part of the NSS is deemed classified and not available to public access because of sensitive information related to national security. Limited access to the national strategy means that strategic elements of the governance framework for managing critical risks such as awareness of roles and responsibilities of different stakeholders, and the goals and targets are not known to all government and non-governmental stakeholders who have a role in risk management. This represents a significant gap in terms of openness and transparency to ensure ownership of risks and the effectiveness of risk policies.

As in many OECD countries, risk policies in Kazakhstan have shifted from response based following major events, to prevention, mitigation and preparedness. The NSS supports Kazakhstan's overall national development policy laid out in the Strategy 2050 to build national resilience and promote the well-being of the population through various economic and social development programs (Nazarbayev, 2012[19]; OECD, 2016[14]). The NSS guides ministries and their respective sub-level Departments and Committees on their functions in policy-making to specific risks and promote prevention and preparedness to reduce the consequences of disasters in order to meet goals in the overall development strategy of the country. At the local level, for all regions of the Republic of Kazakhstan, measures to reduce disaster risk are aligned with measures of economic and social development, within Territorial Development Programs (TDP) with the implementation period of 2016-2020.

National risk management strategies should be comprehensive and support capability building across the risk management cycle (OECD, 2014[18]). This means firstly identifying core capabilities across stakeholders. Many OECD countries carry out a gap analysis in order to determine what resources are already in place and identify priority areas in the future given the potential for disaster based on up to date risk assessments. For example, Box 2.1 illustrates a methodology used by the US Federal Emergency Management Agency (FEMA) to carry out gap analysis and improve regional core capabilities. National risk management strategies should be supported by identifying and assessing risk management capabilities to identify gaps for improvement (OECD, 2018[20]).

Box 2.1. Assessing capabilities to identify gaps for improvement in the US: the National Preparedness Goal

Assessing capabilities is helpful to identify gaps for improvement. In the United States, the Federal Emergency Management Agency (FEMA) has set up The National Preparedness Goal. This national goal defines what it means for the whole community to be prepared for all types of disasters and emergencies: "A secure and resilient nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk."

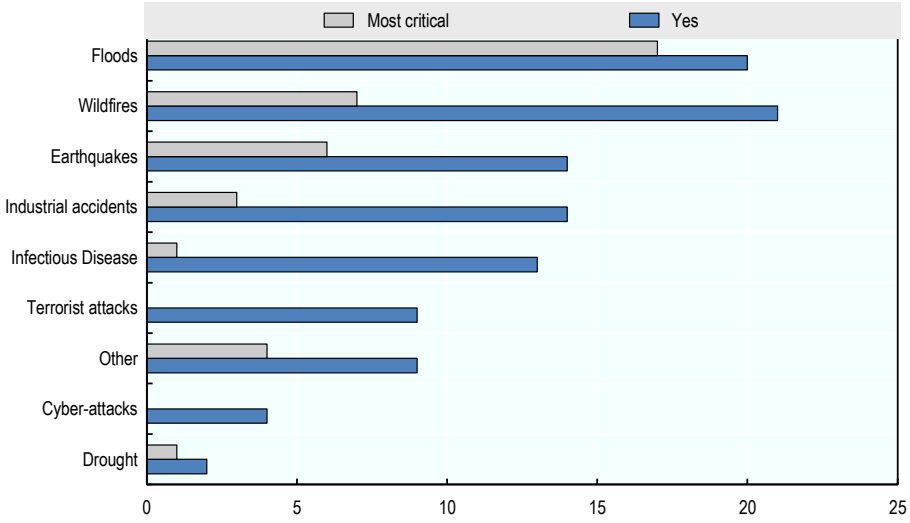
32 core capabilities are identified across national preparedness efforts. These include the national planning frameworks for each of them and a capability target. The targets recognize that everyone needs the flexibility to determine how they apply their resources, based on the threats that are most relevant to them and their communities.

FEMA reviews core capabilities with Core Capability Development Sheets, which provide jurisdictions and organizations with suggestions to improve their core capabilities and close capability gaps identified through the Threat and Hazard Identification and Risk Assessment, the State Preparedness Report, or other capability assessments.

Source: (FEMA, 2018[21])

Inclusiveness at the national strategic level underpins building a shared vision of critical risks. According to an OECD survey conducted in 2018, in Kazakhstan there is a high level of awareness about certain disaster risks stemming from natural hazards with specific risk management policies that target floods, earthquakes and wildfires. Awareness about industrial risks and major accidents that could occur in hazardous facilities are also shared amongst key government stakeholders. However, stakeholders are less aware of emerging risks such as drought. Cyber-attacks is mainly internally assessed by the private sector for example the large telecommunications company Kazakhtelecom.

Figure 2.2. Critical risks in Kazakhstan



Note: Questions "What risks have been identified by your organisation as critical risks, i.e. those with potential for consequences of national significance?" and "What risk does your organisation consider as potentially the most critical?" Answers received 21including central level, regional level, civil society and the private sector.
Source: 2018 OECD Kazakhstan Risk Governance Survey

The NSS in Kazakhstan is a high-level document, which could offer opportunities for broader engagement with stakeholders in the design of the strategy and risk management policies at the highest level. At present, inclusiveness and participation in the policy formulation process appear to remain limited to central level stakeholders. A whole of society approach could support ownership of risk and engagement. In most OECD countries a comprehensive security strategy adopts a whole-of-society approach to ensure engagement of a wide range of stakeholders Box 2.2. In New Zealand, the experiences of both man-made and natural disasters have opened to a whole-of-society and all hazards solution. For example, the national security system has adopted widespread security guidance embracing a whole-of-society approach outlining how both government and wider society should work together to plan and respond to the management of disaster risks. This was particularly brought into focus by the 6.3 magnitude earthquake in Christchurch on the 22nd of February 2011.

Box 2.2. National Strategies Governing Critical Risks in Australia, Finland, New Zealand and Spain

The national strategies for the governance of critical risks of Australia, Finland, New Zealand and Spain illustrate a whole-of-society approach with clear responsibilities, priorities and guidance for the governance of all critical risks

Australia's National Strategy for Disaster Resilience provides high-level guidance on disaster management to federal, state, territory and local governments, businesses and communities and the non-profit sector. The strategy recognizes that disaster resilience is the collective responsibility of the whole society. It coordinates efforts and provides practical directions to all relevant national and local stakeholders. While the Strategy specifically outlines guidance for critical risks emerging from natural hazards, the approach is also applicable for governing other disasters such as pandemics and terrorist events.

The Security Strategy for Society in Finland embraces an inclusive whole-of-society approach and covers the preparedness of society, as well as crisis management of normal and emergency conditions. The all-hazards and threats strategy guides the preparedness of all Finnish institutions, the private sector and non-governmental actors. It also considers the international dimension of hazards and threats, as well as vulnerabilities associated with the disturbance of critical infrastructures networks and supply chain continuity.

National Security System, New Zealand has adopted a comprehensive security guidance that embraces a whole-of-society perspective. The strategy outlines how government and other agencies should work together to plan for and respond to security issues, following the principle of subsidiarity. The strategy aims to improve the effectiveness of governance, strategic planning, and management before, during and after a security challenge. Embracing an all-hazards approach, the framework seeks to address all significant risks New Zealand may face.

Spain's National Security Strategy promotes and facilitates a whole-of-society approach that assigns leadership at the national level and aligns the engagement of the various stakeholders through a national coordination platform. Taking an all-hazards perspective to risk, the strategy provides a comprehensive overview of the current security environment. It identifies objectives and lines of action for the entire spectrum of threats and risks, ranging from natural disasters to human-induced threats.

Sources: (OECD, forthcoming[22]) (Ministry of Defence, 2011[23]) (Council of Australian Governments, 2011[24]) (National Security Council, 2017[25])

The Law on Civil Protection 2014

Disaster risk prevention and management is set up in Article 3 of the Law on Civil Protection 2014 as one of the core tasks and principles of civil defense and protection stated as, "to reduce the consequences of natural and techno-genic disaster risks" (Republic of Kazakhstan, 2014[26]). The adoption of the Law on Civil Protection in 2014 consolidated several laws from previous years, such as: on emergencies of natural and techno-genic character (1996), fire safety (1996), emergency services and the status of the rescuers (1997), civil defense (1997), state material reserves (2000) and industrial safety of hazardous production (2002). The

implementation of the revised law on civil protection offered an opportunity to clarify the roles and responsibilities across different levels of government and for non-governmental stakeholders in the prevention and management of disaster risks.

Additional legal documents provide roles and responsibilities to govern sectoral risks. The Environmental Code 2007 along with Environmental Impact Assessments (EIA) establish guidelines to evaluate environmental safety for different infrastructure projects (OECD, 2017[16]). The Water Code 2003 provides provisions on the use and supply of water resources including sanitation (Water Code of the Republic of Kazakhstan, 2003[27]). Fire safety and industrial safety regulations for organizations and industry are provided in Article 16 of the Law on Civil Protection.

Regional development plans and risk management policies

In Kazakhstan regional socio-economic development plans and regional risk prevention plans are developed in coordination with one another to meet disaster risk reduction goals and targets. Regional authorities are required to draw up Territorial Development Programs (TDP) for a period of four years (2016-2020) to guide socio-economic development in their given jurisdiction (Ministry of National Economy of the Republic of Kazakhstan, 2018[28]). The development programs address all hazards in the region as part of obligation to ensure safety and public order, and to meet national security strategy targets. A detailed analysis of the current situation in the region is illustrated across different social and economic spheres and the main directions, objectives, target indicators and the resources needed to achieve defined goals are presented. The development plans include an index of mitigation infrastructure in the territory to reduce disaster risks. TDPs address all natural and man-made risks in the region and plans to reduce risk levels as part of obligations to meet public safety. The fulfillment of security requirements are identified as a strategic direction of development across all regions.

To ensure that socio-economic development is informed by risk assessments and hazard information, Security Passports for each region provide a comprehensive risk assessment of the territory and a catalogue of regional hazards. A Security Passport consists of a detailed registry and description of hazards both natural and techno-genic and disaster risk potential. They survey the vulnerability of different communities to hazards and provide information on all hazardous facilities that use chemicals or toxins in their production processes. The Security Passports also inform regional development programs. The NSS serves as a basis for regional disaster risk management strategies framed by Security Passports. In this way passports and socio-economic development plans are aligned to meet goals set forth in the NSS, under the topic of ensuring public safety and reducing the consequences of disaster risks.

Security Passports compile together hazard information used to develop strategic plans for structural measures called Road Maps. The Road Maps list all structural mitigation measures under construction in the region, all of which should first be approved by central level ministries. For example, to address flood risk across the regions in Kazakhstan, the Flood Road Map 2017-2020 is approved by joint order between the Ministry of Agriculture, Ministry of Internal Affairs, Ministry for Investments and Development, and the Ministry of Energy. In this way structural measures for floods involve central level inter-agency coordination and regional

planning based on vertical sharing of responsibilities. Upon approval, the projects in road maps are used by local authorities and the regional civil protection service units to oversee the implementation and monitoring of structural projects for risk reduction.

Structural measures to reduce flood risk are registered in the Floods Road Map and provide transparency and accountability on all flood prevention projects underway across Kazakhstan. Each project is listed with a budget, the source of funding whether regional or central, and the person responsible for implementation. Funding for structural measures is financed primarily by regional budgets. In some cases central government budget may be allocated, especially for large-scale infrastructure such as constructing a new dam or hydroelectric facility. The activities in the road maps are open to multi-stakeholder dialogue and open to public access. However, more openness and transparency could be facilitated on the allocation of public funding for structural projects listed in road maps.

International cooperation

Kazakhstan engages in various international partnerships and platforms in disaster risk management. Kazakhstan has been participating in activities with the OECD High Level Risk Forum (HLRF) since 2015. The government joined the Sendai Framework for Disaster Risk Reduction 2015-2030, encouraging a shift from response based risk policies to prioritizing activities in prevention, mitigation and disaster risk reduction. To support the implementation of a priority of actions aligned to the Sendia framework targets, United Nations Office for Disaster Risk Reduction (UNISDR) has supported Kazakhstan in a specialized training program in July 2016 (UNISDR, 2016[29]). Central and local governments have worked with United Nations Development Programme (UNDP) on various risk raising awareness activities. In 2013 Red Crescent Society in partnership with UNDP and the former, Ministry for Emergency Situations conducted a project on raising awareness about disaster risks and organized education materials to strengthen preparedness in several towns across East and Southeast Kazakhstan that faces the risk of flooding, earthquakes, mudslides, and extreme temperatures (UNDP, 2018[30]). The project involved the development of local hazard maps and evacuation routes, to foster inclusiveness and build community preparedness which is especially important for rural settlements that can be difficult to access during emergencies. Kazakhstan is also a member of the Asian Disaster Reduction Center (ADRC) that has been documenting information on past disasters across Kazakhstan's territory.

Kazakhstan is participating in international activities to build a disaster risk governance framework aligned to international standards. Since 2013, the Department of Climate Change in the Ministry of Energy carries out state policies for the reduction of greenhouse gases. More recently, Kazakhstan has signed the Paris Agreement and set up a Department of Climate Change Committee that is designing a national policy framework for the integration of adaption to climate change into national legislation. These policies plan to address disaster risks as part of the adaptation and sustainable development policy agenda.

Kazakhstan is also a leader in Central Asia for disaster risk reduction platforms. The Centre for Emergency Situations and Disaster Risk Reduction (CESDRR) was opened in 2016 in Almaty and is a collaborative effort between the governments of

the Republic of Kazakhstan and the Kyrgyz Republic (CESDRR, n.d.[31]). The center is designed to better coordinate disaster and preparedness initiatives at the regional level by creating links between government bodies, technical agencies and vulnerable communities. The platform aims to strengthen capacities in disaster risk reduction, contingency planning, monitoring and early-warning systems. It also works on raising risk awareness and developing a safety culture by providing a platform to exchange information, best practices and technical trainings.

The CESDRR, with the support of various UN programs, the Asian Disaster Preparedness Centre and other organizations, has now become a resource and training center for the implementation of the Sendai Framework in Central Asia and the South Caucasus region. Agreements and memorandums of cooperation have been signed with 50 international organizations (CESDRR, n.d.[31]). Up to 30 training seminars have been organized by the center inviting international experts in disaster risk reduction. At the same time, the initiative to create an effective scientific and technical council on the basis of the CESDRR is being worked out, which will consolidate the activities of scientific organizations engaged in reducing the level of seismic, environmental, hydrological threats, as well as in the field of fire and industrial safety.

The principle actors in risk management

Leadership for driving disaster risk management policy

Good governance assigns leadership at the national level to coordinate policy agendas and drive policy implementation across the risk management cycle (OECD, 2014[18]). Leadership should be shown by horizontal integration of risk policies and coordination across multiple levels of government.

Upon Kazakhstan's independence in 1991, there was a need to establish a specialized state body for the coordination of disaster risk management polices throughout the risk management cycle. Since then there has been an evolving policy framework, with frequent changes to institutions with the responsibility for the management of critical risks (Table 2.1).The lead institution is the Committee for Emergency Situations (CES) in the Ministry of Internal Affairs. The CES was established out of the former Ministry for Emergency Situations as part of restructuring central government in 2014. In the same year the new Law on Civil Protection (2014) was adopted. This change in structure has several implications for the division of responsibilities in managing critical risks, budgetary control and authority over setting up risk policies.

Table 2.1. Evolving lead institution for the governance of critical risks in Kazakhstan

Year	Lead institution
1991	Security Council of The Kazakh SSR
1994	State Commission for Emergency Situations
1995	State Committee of the Republic of Kazakhstan for Emergency Situations
1996	Emergency Committee of the Republic of Kazakhstan
1998	Agency of the Republic of Kazakhstan for Emergency Situations
2004	Ministry for Emergency Situations (MES)
2014	Committee for Emergency Situations in the Ministry of Internal Affairs (CES)

Source: (2018 OECD Kazakhstan Risk Governance Survey)

The CES has core responsibilities in all phases of the disaster risk management cycle, specifically in risk assessment, prevention and preparedness, although more of a limited role in recovery and reconstruction. One of its core responsibilities is to monitor the implementation of the range of actions on the prevention and management of disasters, as foreseen by the National Security Strategy.

Interagency platforms are conducive to coordinate policy design and to foster the exchange of good practices. Coordination can be facilitated by working groups and inter-agency committees that bring together government stakeholders, and encourage consultation with a wider range of stakeholders including representatives from private sector and civil society. CES exercises several governance functions to drive effective policy coordination and implementation, such as: inter-agency coordination platforms across central government institutions. This is done by steering the Inter-departmental Commission for the Prevention and Elimination of Emergency Situations (Inter-Departmental Commission), a public multi-stakeholder advisory body focused on the design and coordination of risk policies.

CES shows leadership and aims to streamline risk policies by bringing stakeholders together in the Inter-departmental Commission, which acts as an inter-sectoral and inter-departmental consultative body. The CES drives the Inter-Departmental Commission work agenda, and encourages a multi-stakeholder platform to discuss disaster risk policies. In this way, the CES is open to consultation with a variety of stakeholders in the policy formulation process for the management of critical risks. This includes engagement with representatives from the private sector, civil society and the only non-governmental organization working in disaster risk management in Kazakhstan, the Red Crescent Society. The CES also works on streamlining the exchange of data for environmental hazards in order to implement prevention and preparedness measures across all the regions.

This OECD risk governance scan found a number of mechanisms to facilitate the policy formulation process such as: ad hoc national workshops with government officials, conferences with experts, public comment periods on draft laws and prevention activities that are managed by government departments, and interaction with social media platforms on the communication of risks. Most of these activities are done ad-hoc or to support bi-annual planning for preparedness measures to cope with seasonal risks that takes place before the flooding and mudslide period in the

spring between February and June, and wildfire season during the summer months starting in March.

Across the regions, a Department for Emergency Situations (DES) is established in every region (*oblast*) in Kazakhstan to support the provisions of the central Committee and inform risk policies. All 14 regions have a DES in addition to Astana and Almaty city, and since June 2018 the city of Shymkent which all have elevated status due to their national importance. The central level Committee is responsible for the oversight of DES territorial units and to ensure that regional risk policies are aligned to the national strategy governing critical risks in Kazakhstan.

Sectoral risk policies across central level government

Currently there are 16 line ministries working across different policy areas in Kazakhstan, which develop sector-based risk policies for industrial safety, disaster risk management, water resources management, energy and the environment. Ministries are often working on their own separate strategic plans while competing for budgets (OECD, 2017[13]). Within each ministry there are Departments and Committees that design and implement policies targeting a specific sector. These sub-level Departments and Committees meet the goals and objectives set forth in the ministerial plan based on vertically shared responsibilities and coordination. Sectoral policies tend to be developed in silos. Inter-departmental commissions and working groups are being set up to boost horizontal integration and mainstreaming of risks across ministries. Nonetheless, there is room for results of this coordination to strengthen integrated risk management policies.

Prior to 2014 the Ministry for Emergency Situations was the central authority in the field of civil protection and safety policies. In 2014 along with the new legal framework on Civil Protection, all civil protection functions and disaster risk management policy design were transferred to the Ministry of Internal Affairs. The Ministry of Internal Affairs develops civil protection policies on national and public security. In this regard, the Ministry is responsible for the management of natural and man-made disaster relief and recovery operations. In particular, within the Ministry, the Committee for Emergency Situations is the central executive body and lead institution for the governance of critical risks in Kazakhstan.

The Ministry of Agriculture (MoA) designs policies surrounding agricultural development across the regions and strategic planning in the agro-industrial complex. Its role includes policy attention on water resources management and the risk of floods and drought. In particular, the Committee for Water Resources (in the MoA) ensures coordination on the implementation of national policy in the management of water resources. It participates in the formulation of public policies on the use and protection of water resources, water supply and sanitation. Under the provisions of the Committee for Water Resources, Water Basin Management units are territorial subdivisions that work on integrated management of water resources to ensure coordinated activities across the entire length of rivers and basins. The Committee for Water Resources and the Water Basin Management units play an important role in flood risk management by monitoring water levels in rivers and basins. They also design policies for water supply management that take into account the risk of droughts. In addition, the role of this committee involves overall oversight and monitoring on the status of hydraulic infrastructures. In this way their role in the MoA aims to encourage water policy alignment with

policies surrounding the agro-industrial complex in Kazakhstan. This especially pertains to the irrigation of important water bodies and hydrological risks to the agricultural sector. The CES works in cooperation with the Committee for Water Resources on the management of risks to water systems and plans relevant preparedness measures and risk reduction activities. Disaster recovery is the exception and will be discussed later in this report.

Eight of the 12 largest major rivers flowing through Kazakhstan are shared with neighboring countries Uzbekistan, Tajikistan, Kyrgyzstan, China and Russia (Table 1.3) Transboundary water management is an important issue in Kazakhstan. In the case of these major water resources Kazakhstan mainly hosts the downstream segments; thereby is very much dependent on bilateral agreements for the efficient management and use of strategic water resources and to manage flood risks. The Ministry of Foreign Affairs plays an important role in maintaining cooperative mechanisms with neighboring countries to manage international relations pertaining to these rivers, water resources and hydrological infrastructures. Separate bilateral agreements are coordinated which began in the 1990's and are renewed periodically between the Ministry of Foreign Affairs and China, Central Asian countries (Uzbekistan, Tajikistan, Kyrgyzstan) and Russia on the cooperation for the use and protection of transboundary water resources. These agreements include information sharing provisions on the release and containment of water upstream, as well as information on the potential for flood risks and early-warning communications.

The Ministry of Energy (MoE) is responsible for carrying out the formulation and implementation of national policy across energy sectors, including regulatory framework for emissions and the reduction of greenhouse gases and ozone-depleting substances. The Ministry's most recent initiative is the development of a national platform to support a transition to a "green economy", as part of signing the Paris Agreement and the establishment of a new Division on Climate Adaptation, in the Department of Climate Change. Policies on climate adaptation issues are in the nascent stage and the Department in the MoE plans to set up legislative norms and provisions surrounding adaptation to climate change, which will take into account disaster risk reduction. This new platform aims to include the participation across a wide range of stakeholders including private sector and civil society, in efforts to raise awareness about climate change and disaster risk reduction in Kazakhstan.

The Ministry of National Economy is in charge of carrying out strategic planning in the area of tax and budget policy – and has an important role to allocate budgets across ministries as well as provide support to some regions that may need subsidies to implement regional development programs. Budgets for large-scale infrastructure projects, including risk prevention measures are decided on by this ministry.

The Ministry for Investments and Development (MID) is involved in the development of policies to ensure the resilience of infrastructures. The Ministry has the responsibility to design policies surrounding the safety and security across a range of industrial activities. The Industrial Development and Industrial Safety Committee in the MID develops technical/safety standards. The MID contains an inspection committee with territorial sub-divisions across every region that carry out inspections of industrial sites to ensure adherence to safety regulations. Specific

to the safety and management of road transport, the Committee for Roads (in the MID) has responsibilities to oversee the conditions of national and regional roads, and coordinate the activities of major semi-private road operators and maintenance companies across Kazakhstan. Their responsibility includes providing support in crisis management and preparedness planning measures to ensure that roads are cleaned from flood waters, blizzards, snow and ice, safeguarding their use for evacuations in case of potential major events. The Committee for Roads also conducts environmental and social assessments of road projects. For example, in February 2016 the Committee for Roads conducted a social and environmental impact assessment for the Center-West corridor project that connects Kazakhstan with Azerbaijan, Russia, Iran, Uzbekistan and Turkmenistan (World Bank, 2015[32]).

While these ministries offer policy frameworks to address sectoral risks, there is scope for more horizontal integration of risk policies. It will be increasingly important to mainstream risk across sectoral policies to identify interconnectedness of risks, align policy agendas and identify a priority of actions across the risk management cycle.

Vertical coordination: sub-national level and local significance

Good governance calls for a collective and coherent strategy that engages a whole-of-government approach, and establishes clear roles and responsibilities across all levels of government at the national and subnational level (OECD, 2014[18]). Multi-level government engagement is a strong point in the governance framework in Kazakhstan where top down processes are in place to ensure the NSS risk management policies trickle down to the subnational level. A move towards decentralization has given significant roles and responsibilities to regional and local authorities in disaster risk management established in Article 15 in the Law on Civil Protection (OECD, 2014[33]). Each level of government (regional, district, and city level) has a role in civil protection as set in the Law on Civil Protection 2014.

Top down processes engage regional civil protection units with the central level government. All 17 regions[2] ('oblast') have a territorial Department for Emergency Situations (DES) subordinate to the central level CES. This accounts for all 14 regions, in addition to the cities Astana, Almaty and since July 1 2018 Shymkent that have an elevated status due to their national importance. The role of the DES is to develop regional Security Passports, which are aligned to the NSS under the goal to reduce the consequences of disasters. Security Passports comprise of an all hazards and threats catalogue, settlements passports, and preparedness plans to coordinate the activities and resources of local executive bodies, organizations and enterprises. It is also the main rescue operations service and receives data and analysis from technical agencies on potential disaster scenarios to inform preparedness measures. The DES provides recommendations and advice on disaster risk reduction measures to regional governors and mayors of cities. In this way, the DES participates in the design of Territorial Development Programs, Road maps for structural measures and monitors the implementation of disaster risk reduction activities. These various measures are required in regional Security Passports and ensure the implementation of the NSS as part of the goal to reduce the consequences of disaster risks.

The NSS is a high-level document that is classified and some parts are available to relevant ministries. A clear improvement to risk governance in Kazakhstan is opening up participation of key stakeholders in the formulation of the NSS. Participation should work on top down and bottom up processes. Top down participatory processes can help ensure implementation of strategic goals and objectives at the local level. Bottom up processes are important to make sure national strategies are informed by needs and challenges at the local level, and that risk policies weigh in exposure to all hazards across the regions. The OECD found that nearly half of regional DES participate indirectly through a process of top down vertical coordination with the central CES to develop regional risk management strategies within the framework of Security Passports. This kind of indirect participation in the formulation of the NSS should be extended to all regional DES and key stakeholders. Bottom up participation within this framework would guarantee that regional risk information feeds into the NSS. Providing access to parts of the national strategy would help clarify responsibilities and ensure coordination across all government stakeholders to meet set goals and targets. This would strengthen a whole-of-government approach to the governance of critical risks.

A whole of government and whole of society approach for the governance of critical risks includes openness of national security strategies to the public. It allows to spread knowledge about risks to all parts of society and enables them to make use of this national risk information. In some OECD countries, national security strategies contain elements available for public access, such as in Finland with the National Security Strategy. A good practice is to make the NSS publicly available. These do not disclose sensitive information about national security but open up strategic parts that can help build a shared vision of critical risks and promote inclusiveness for a whole of government and whole of society approach.

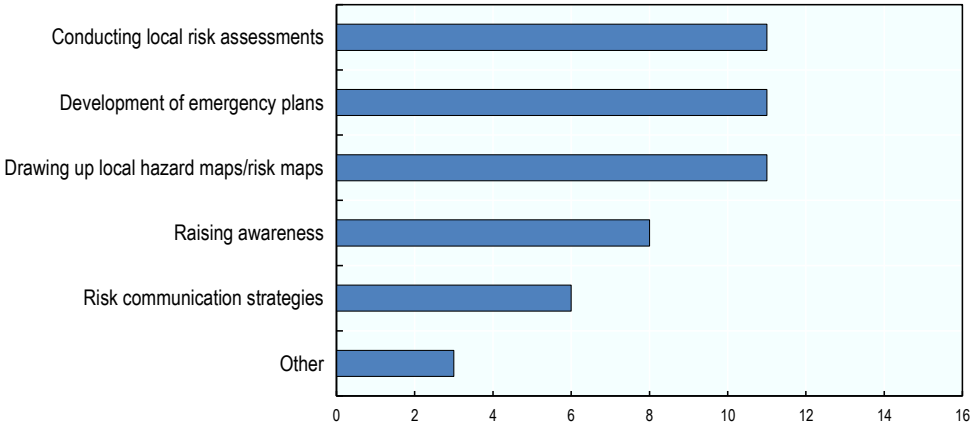
Roles and responsibilities at the subnational level

The governance of critical risks in Kazakhstan functions based upon a structure of multi-level government, with important roles at the subnational and local level. The NSS defines roles and responsibilities of all stakeholders across the risk management cycle and the Law on Civil Protection gives an important role to local authorities. Some of the core tasks of the regional DES are to conduct risk assessments, draw up hazard maps and develop preparedness plans which all fall within the regional Security Passports. They are also involved in raising awareness about risks and developing risk communication strategies. The OECD survey found that 11 out of 16 DES agree on some core tasks such as conducting local risk assessments, the development of emergency plans, and drawing up local hazard maps (Figure 2.3).

As part of increased efforts to build a risk culture in Kazakhstan, the DES play a key role in carrying out trainings, multi-stakeholder exercises and providing risk information on emergency management to the private sector and vulnerable segments of society. Risk communication is an essential ingredient for an effective risk management framework. Effective risk communication increases awareness of households, businesses and communities on hazards and vulnerabilities, and can result in investments in preparedness measures and increase investments in risk reduction activities. As one of the core tasks to communicate risks, clarifying to all DES what their core tasks are would strengthen a whole-of-government approach

and encourage the development of risk communication strategies across all regions. These actions would guarantee alignment between disaster risk management policies at the central level and implementation at the sub-national level.

Figure 2.3. Regional DES roles and responsibilities



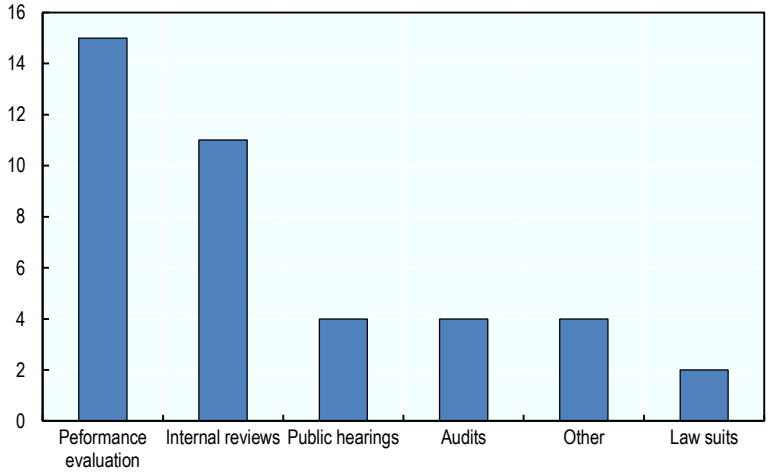
Note: Question "Which of the following roles and responsibilities does the national security strategy require your organisation to fulfil?" Answers received: 16 out of 16 regional DES respondents as of April 2018. Since June 2018 an additional region has been added – Shymkent.
Source: 2018 OECD Kazakhstan Risk Governance Survey, 2018

While a vertical sharing of responsibilities coordinates tasks between the CES and DES, the subnational level also engages in horizontal coordination in disaster risk management between regional civil protection services, regional political authorities (mayors of regions and cities), owners and operators of hazardous facilities and branches of technical agencies monitoring natural hazards. The DES interacts with a wide range of stakeholders to develop preparedness and emergency plans.

Setting up accountability mechanisms

Good governance frameworks call for consistent accountability measures to ensure that those delegated tasks fulfil their roles and responsibilities. In Kazakhstan, the governance framework has set up different accountability instruments to ensure that sub-national stakeholders are fulfilling their responsibilities in disaster risk management such as performance evaluations, internal reviews, public hearings and audits. The current study will focus on the interactions between the regional DES and central CES for the management of critical risks and relevant accountability frameworks. Regional DES take different approaches to the implementation of accountability measures. Almost all DES conduct performance evaluations. Internal reviews are carried out by 11 out of 16 DES. A few regions comment on the use of council reports that share with the public risk reduction activities underway in their communities. Despite these accountability practices in place, they are not applied by all DES. Increasing accountability would reinforce vertical coordination across central level policies and implementation at the local level. It would further ensure transparency and evidence-based risk management policies.

Figure 2.4. Accountability mechanisms at the regional level



Note: Question "What accountability measures are in place to ensure your organisation is carrying out its roles and responsibilities for risk management?" Answers received: 16 out of 16 regional DES respondents as of April 2018. Since June 2018 an additional region has been added – Shymkent.
Source: OECD Kazakhstan Risk Governance Survey, 2018.

In many OECD countries accountability frameworks have been set up to provide transparency on the effectiveness of risk policies and their implementation and on the allocation of public resources for different activities. For example, in the United States, the Department of Homeland Security (DHS) conducts an annual public review providing detailed information on the fiscal year and performance measures of various risk management missions (Box 2.3).

Box 2.3. Department of Homeland Security Performance and Accountability Reports

Accountability measures for risk management guarantee the effectiveness of risk policies and implementation. To ensure that stakeholders fulfil their roles and responsibilities in the US, the Department of Homeland Security (DHS) conducts a yearly report to review the fiscal year and effectiveness of performance for risk management programs in the United States. These performance and accountability reports aim to inform government stakeholders as well as the public on detailed financial status and the allocation of resources to the Department's various missions. In this way the fiscal report provides transparency and accountability of public resources. The yearly report further highlights priorities, strengths and challenges of programs underway in the Department. As a good practice for accountability, this yearly report allows to review key performance measures to ensure alignment with strategic missions and goals of the DHS.

Source: (U.S. Department of Homeland Security, 2017[34]) (OECD Toolkit, 2018[35])

Inclusiveness in disaster risk management policy formulation and implementation

Citizen engagement through raising awareness initiatives

A whole-of-society approach to the governance of critical risks encourages engagement with a wide group of stakeholders involving communities, households and businesses through open and transparent communication channels (OECD, 2014[18]). Inclusiveness of non-governmental stakeholders can encourage self-preparedness and proactive investments in resilience measures. Raising awareness and making risk information available also strengthens support and the mobilisation of resources to implement national security strategies as found with the practice in Australia in Box 2.4. These kinds of platforms are good instruments to strengthen a whole-of-society governance approach to disaster risk management policies.

Box 2.4. Open and accessible risk information in Australia

Information on risks is key to support the implementation of the National Strategy for Disaster Resilience in Australia. The Australian Disaster Resilience Knowledge Hub (the 'Knowledge Hub') provides information about disasters that have affected Australia, including access to evidence-based research to support improved policy development, decision making and good practices in disaster resilience and the Emergency Management sector. The Knowledge Hub is an important publicly accessible knowledge resource supporting the implementation of the National Strategy for Disaster Resilience. Content on the Knowledge Hub is regularly updated and responsive to constructive feedback and ideas from users.

Source: (Australian Institute for Disaster Resilience, 2018[36])

The national system in Kazakhstan promotes various awareness raising activities as well as trainings with the aim of strengthening preparedness of vulnerable communities to disaster risks. Local executive bodies and heads of businesses are offered trainings and seminars at the Republican Educational and Methodological Centre for Civil Protection financed by public funds. Regional DES provides local communities and business representatives with practical trainings and specialized courses to cope with potential disaster scenarios. In addition, there are also targeted plans to communicate risk to vulnerable segments of society such as the elderly, children, disabled persons and low-income homes.

To encourage participation of civil society, Kazakhstan's national framework for managing critical risks involves legislation to oversee and support voluntary participation. Article 17 in the Law on Civil Protection outlines civil society's role in disaster risk management titled, "On Voluntary Activities". The law expands civil society's role in disaster risk management, by opening up room to provide assistance to persons affected by natural disasters through various activities and means of support. The law on volunteer activities includes recognition of the role of the state that should ensure the safety of life and health of volunteers while helping in preparedness and crisis management. This kind of civil society engagement could be further promoted in other phases of the risk management cycle.

There is some participation of non-governmental actors in the governance framework with the involvement of Red Crescent Society. This is the only civil society organization involved in the promotion and implementation of disaster response and preparedness programs in Kazakhstan. The formal legal status of the Red Crescent Society in Kazakhstan falls under the Decree of the President and first began in 1992 with official status given to participation in voluntary assistance to local authorities in the area of providing humanitarian aid. The president of the organization is a permanent member of the Interdepartmental State Commission for the Prevention and Elimination of Emergency Situations. The Red Crescent is involved in several awareness raising activities including first aid trainings that target specifically rural communities and children.

Beyond building and strengthening a risk culture with activities driven by the regional DES and Red Crescent Society, there are considerable efforts underway to strengthen a whole-of-society approach to decision-making and policy design, by opening up public discussions about disaster risk management activities. Public comment periods have been established allowing for citizens to provide feedback and opinions on draft laws and risk reduction measures. As a stepping stone to enhance information-sharing and dialogue with the community, these public engagement activities are a strong entry point to establishing more inclusive and open governance arrangements. Increasing societal engagement would support building a risk culture by ensuring that communities are aware of the hazards and what kinds of measures individuals can take on their own to increase preparedness and resilience. It also supports awareness about the roles and responsibilities of different stakeholders, emergency plans and the different risk reduction activities underway.

Engagement with the private sector

Inclusiveness calls for further engagement with the private sector through public private partnerships to leverage on resources, skills and know-how across the risk management cycle (OECD, 2014[18]).

In Kazakhstan the extent of risk management policies pertaining to the private sector falls under Article 16 of the Law on Civil Protection. This Article requires for owners and operators of industrial buildings and technological facilities to conduct risk assessments and develop relevant preparedness plans. However, further to this legislation there is little engagement with the private sector in the governance framework. Partnerships and platforms to exchange information about sector specific risks and vulnerabilities, and tools to develop preparedness measures such as business continuity planning remain limited. There are many examples of good governance in in the realm of public and private sector engagement, for example in Australia - the Australia Business and Government Liaison Unit described in Box 2.5. The unit brings together the public and private sector in a safe and trusted environment to encourage the exchange information about risks to guide capability building across the risk management cycle and coordinate risk management activities across stakeholders.

Box 2.5. Building engagement between the public and private sector for national security – Australia Business and Government Liaison Unit

Partnerships with private industry, the community, and academia enable the sharing of relevant intelligence, information and knowledge to build capabilities and coordination to prepare against national critical risks.

Since 2001 Australia's national security was transformed to adapt to the evolving national security environment, shaped by new ways to coordinate and develop capabilities, notably by fostering more close interaction with the private sector. The Australian Security Intelligence Organization has set up the Business and Government Liaison Unit (BGLU) to provide a public interface between the Australian Intelligence Community and the private sector in Australia. The unit produces reports that raises awareness about national security issues. It provides credible information to Australian business security managers that enable them to: recognise and respond to national security threats; develop risk mitigation strategies appropriate to their business; and provide informed briefings to executives and staff. In support of the BGLU website, the Business and Government Liaison Unit engages directly with businesses on a one-to-one basis, working to build strong relationships.

Source: (Australian Government, 2018[37])

Emergency preparedness and response in Kazakhstan involves the private sector, but remains limited to large enterprises. Most large companies in Kazakhstan are semi-private or state owned enterprises and usually in several important industrial sectors for instance telecommunications, roads, gas, electricity, water, and agriculture (OECD, 2017[38]). These large companies tend to have links to ministries and fall under sector specific risk policies that require risk assessments, preparedness planning and emergency response.

Kazakhstan has not yet developed a national strategy on critical infrastructure security and resilience, that is a high priority in many advanced OECD countries (OECD, forthcoming[39]). Ensuring the functioning of vital services and continuity of supplies in case of shock events is part of building national resilience. Despite not having a national strategic program for strengthening critical infrastructure resilience, critical infrastructure are identified at the regional level in Security Passports and referred to as 'communal life-support systems' - categorized as drinking water systems, electricity networks and heating systems (DES Zhambyl, 2016[40]). Within the Security Passport framework, owners and operators are required to draw up preparedness plans and have ready rescue units in the case of disruptions to supply during any kind of disasters. It is not clear to what extent there is involvement of owners and operators in the development of resilience policies; however these infrastructures are required to ensure the quick recovery and restoration of operations and supply during disruptions set out in Article 16 in the Law of Civil Protection 2014.

Strengthening the public-private interface as well as developing a comprehensive resilience program for critical infrastructures will be increasingly an important governance gap to address in Kazakhstan. Critical infrastructure protection programs are increasingly a top priority for OECD governments, where the goal is

to identify critical infrastructures and strengthen resilience to ensure these systems can withstand a shock and return to normal functioning following disruptions to vital services (OECD, forthcoming[39]). Information-sharing on risks and vulnerabilities, conducting criticality assessments, establishing public-private partnerships and mapping out interdependencies are some of the main feature to the governance of critical infrastructure resilience (OECD, 2018[41]).

Conclusion

Kazakhstan is developing a comprehensive national strategic framework to coordinate efforts across government for a whole of government approach to manage critical risks. A national strategy for the governance of critical risks is outlined in the National Security Strategy 2017-2020 to guide risk policies. As a high-level document, the strategy outlines roles and responsibilities of key government stakeholders and sets goals for each phase of the risk management cycle. However, as the strategy is largely classified and not available to the public, the prioritisation, identification and de-classification of relevant sections of the strategy will be increasingly important. Openness of the strategy would clarify roles and responsibilities, engage a wider set of stakeholders, and promote transparency and accountability.

Kazakhstan has designated a lead organisation to coordinate and monitor the implementation of the national strategy across government. While vertical coordination across levels of government is strong aspect of the governance framework, horizontal integration could be strengthened. There is scope for leadership to strengthen alignment of sectoral risk policies developed across central government institutions to ensure coordination and help achieve the goals and objectives of the national security strategy. Developing cross-cutting risk policies will be important as part of building a coordinated and comprehensive strategic vision towards managing critical risks.

Kazakhstan is supporting at a high level a whole-of-government and whole of society approach, with strong efforts to ensure participation of research institutes and civil society in some phases of policy planning. The strategy outlines risk management roles of government stakeholders, but does not appear to establish risk management as a whole of society responsibility, by identifying the role of the private sector and communities. The national strategy is taking steps forward to support citizen engagement with innovative tools such as the e-governmental portal and providing public comment periods for draft laws, prevention projects and through various raising awareness activities. However, inclusiveness in policy making is still limited to central level government stakeholders. Fostering more interaction with civil society and establishing partnerships with the private sector through public private partnerships would allow leveraging capacities across a wider range of stakeholders and support inclusiveness in the design of risk policies.

Notes

[1] The list of stakeholders who are consulted in drafting the National Security Strategy 2017-2020 include: The Executive Office of the President of the Republic of Kazakhstan, Prime Minister's Office, National Security Committee, Ministry of Internal Affairs, Ministry for Investments and Development, Ministry of Agriculture, Ministry of Defence, Ministry of Justice, Ministry of Healthcare, Ministry of Education and Science, Ministry of Finance, Ministry of Foreign Affairs, Ministry of Culture and Sport, Ministry of Defense and Aerospace Industry, Ministry of National Economy, Ministry of Energy, Ministry of Labour and Social Protection, Ministry of Information and Communications, Ministry of Social Development, Agency for Public Service Affairs and Anticorruption and the Akimats of regions Astana, Almaty and Shymkent cities.

[2] When the survey and fact-finding missions were conducted for this report in January and April 2018, there were 16 regions in Kazakhstan: Akmola, Aktobe, Almaty, Atyrau, East Kazakhstan, Karaganda, Kostanay, Kyzlorda, Magystau, North Kazakhstan, Pavlodar, South Kazakhstan, West Kazakhstan, Zhambyl, and the cities of Almaty and Astana. As of June 2018 there are 17 regions in Kazakhstan. The region Turkistan was created in June 2018, when the city of Shymkent was separated from the former regions of South Kazakhstan, and upgraded to the same status as the cities of Astana and Almaty.

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Chapter 3. Evidence-based policy-making

This chapter presents activates undertaken in Kazakhstan to increase knowledge about hazards and risks, and how that knowledge is used to inform risk management policies. It also highlights challenges to evidence based decision-making such as incomplete hazard data-sets and obstacles that the research community faces to access such information.

Risk-informed and evidence-based decision-making is a key component of good governance practices across OECD countries that highlights using the best scientific evidence available to inform risk policies. To support this, the identification of risks and a comprehensive analysis of the risk landscape serve as evidence for designing risk-informed policies. The Recommendations calls for countries to establish national risk assessments that adopt a multi-hazard and transboundary approach (OECD, 2014[18]). Multi-risk assessments are risk management instruments that allow the comparison between hazards and identifying interdependencies across hazards, regions, economic sectors and critical systems to define priorities of risk management actions. National risk assessments provide transparency and accountability of decision-making and efficient use of public resources in various risk management activities. In Kazakhstan the National Security Strategy 2017-2020 adopts an all hazards approach by functioning on single-risk assessments for the identification and evaluation of hazards separately. Integration of these hazard assessments could contribute to a comprehensive national risk assessment that would build a shared view of critical risks in Kazakhstan and identify priorities in disaster risk reduction policies (OECD, 2018[20]).

The risk assessment process

The existing framework for risk assessment in Kazakhstan involves a set of specialized technical government agencies and institutions. They have clearly defined responsibilities and activities guided by specific organizational requirements and limitations. These limitations include the restrictions placed upon them by the access to relevant parts of the National Security Strategy (NSS). The framework is characterized by silos of technical agencies concentrated on single-risks, in which information-sharing and public access to data is partial and regulated.

For each kind of hazard or threat a lead technical agency or research institute is in charge that is associated with a Ministry – often times holding a status of semi-private or a joint stock company. The methodology adopted for these risk assessments tend to be decided on by the organization with little cross collaboration. There is a clear protocol in place for each agency about how information gathered is used, communicated and shared with other stakeholders. The exchange of information is primarily carried out between government-linked scientific agencies and targeted government stakeholders, such as emergency response, civil service units and regional authorities. Some sets of data can be made available upon official request or for purchase; for example to interested research centers or universities. Based on risk analysis, organizational instructions are sent to the territorial units and recommendations to the central and local executive bodies on the implementation of preventive measures and preparedness planning for various kinds of natural and man-made emergencies.

National level data collection for national risk assessments are carried out in accordance with Order 175 of the Ministry of Internal Affairs – which provides the framework for the systematization of information on natural and man-made emergencies, and registering incidents that have occurred across Kazakhstan (Ministry of Internal Affiars, 2015[42]). In this way, systematic risk identification is in place whereby ministries participate by exchanging information on single-risk assessments for different hazards. The framework involves the Ministry of

Defence, Ministry of Agriculture, Ministry for Investments and Development, Ministry of Energy, Ministry of Health, Ministry of Education and Science, as well as sub-territorial bodies of these ministries across the regions ('oblasts'). The framework aims to work towards establishing an integrated national risk assessment and to facilitate information-sharing. However, there is room to increase participation from a wider range of expertise and skills to strengthen data-gathering capabilities, analyses of risks and data sharing within this framework.

Development of a national multi-risk assessment

National risk assessments (NRA) are important instruments in a national strategic framework for the governance of critical risks that enable evidence based policy-making and capabilities based planning (OECD, 2018[20]). In most OECD countries the NRA takes an all hazards approach and puts to use major threat or scenarios based on likelihood and impact. These national risk assessments are risk management tools that allow comparison across critical risks to guide decision-making, build capabilities and set priorities in disaster risk prevention and mitigation.

In Kazakhstan, risk management policies framed by the National Security Strategy (NSS) address all hazards and threats, both natural and man-made – and all risks are assessed separately. The risk assessment framework functions across specific agencies and organizations with expertise on different hazards. It is not clear if the results of these single risk assessments are then integrated into a national multi-risk assessment. At the highest level, Kazakhstan has developed a national "National Situational Analysis of Security of the Territory of the Republic of Kazakhstan from Natural and Technological Disasters" in 2015 that presents a methodological guide to risk assessments (Ministry of Internal Affairs, 2015[43]). It outlines the risk assessment process, criteria for categorizing disasters, and building scenarios of potential disasters. In 2015 a national risk assessments was developed for natural disaster risks called, "Integrated Methodology for Assessing the Risks of Natural Emergency Situations of Natural Character in the Territory of the Republic of Kazakhstan (Disaster Risk Assessment and Presentation of Results)" (Ministry of Internal Affiars, 2015[44]). This document comprises all information on natural hazards in Kazakhstan such as risk assessments, risk management measures, and priority areas for disaster risk reduction.

An all hazards and threats NRA as developed in many OECD countries puts to use major threat or scenarios based on likelihood and impact and compares different risks. Establishing an all hazards NRA would enable evidence based policy-making for risk reduction and inform legislations surrounding land use restrictions, urban plans and building codes. For example, in the UK the NRA identifies and ranks risks for capability-based planning explained in more detail in Box 3.1. A public version of the NRA is made available in the UK to provide comprehensive risk information.

Box 3.1. An all hazards and threat National Risk Assessment in the UK

The UK conducts an annual National Risk Assessment (NRA) to identify and compare all major hazard and threats of national significance that may cause significant impacts in the UK on a five-year horizon. The most recent edition has been released in 2017, the National Risk Register of Civil Emergencies – 2017 Edition.

The NRA is led by the Civil Contingencies Secretariat of the Cabinet Office and involves a large multi-agency process. The NRA is valuable by allowing to rank risks based on the likelihood and potential impact of different emergency risks including natural, man-made and malicious attacks. The NRA constitutes the fundamental basis for capabilities-based planning to support emergency preparedness and response from the national to the local level. While some parts remain confidential, a public version of the NRA is made publicly available and serves as fundamental reference document for risk information and awareness across the country.

Source: (OECD Toolkit, 2018[35]) (Cabinet Office, 2017[45])

In addition to creating a multi-risk national assessment to guide risk-informed policy-making, building national resilience to disaster risks should take a forward-looking approach (OECD, 2016[46]). Risk policies should look beyond short political cycles but also anticipate change and strengthen preparedness for complex risks that may arise, as well to understand how vulnerabilities may change over time. Forward-looking approaches to risk assessment in OECD countries use practices of horizon scanning and foresight to cultivate long-term perspectives of risk management policies Box 3.2. While risk assessments are useful to develop early-warning systems, horizon scanning and foresight analysis support long-term perspectives to build preparedness measures and resilience to an evolving risk landscape (OECD, 2016[46]). For example, it allows to take into account factors that may shape vulnerability over time such as climate change and the potential effects it may have on water resources and the risks of floods and droughts, which are critical risks in Kazakhstan. To support the fulfilment of objectives set forth in the Kazakhstan 2050 strategy, the development of risk-informed policies should include a long-term view of risk-thinking to consider possible transformations in the risk landscape. This includes growing attention to cyber-risks, innovations and hybrid threats that many OECD countries are addressing in national resilience and preparedness strategies (OECD, 2011[47]).

The central level Committee for Emergency Situations (CES) also draws up a national hazard map that covers all natural hazards across the regions. This map is accessible on the CES website, as part of a move towards more open government on the e-government portal that aims to provide open access on the web to a range of informational resources on risks, draft laws, policy reforms and projects. In addition, the CES website provides information on both natural and techno-genic risks and measures one should take in case of different disaster situations (Committee for Emergency Situations, 2018[48]). This is a very positive aspect and could foster more openness and transparency of the national strategy guiding disaster risk management. It could also increase participation of households and businesses by increasing awareness of risks.

Box 3.2. Summary of Strategic Foresight arrangements in selected OECD Members

United Kingdom: Horizon scanning arrangements in government were reviewed in 2012. Recommendations included establishing the Cabinet Secretary as 'senior champion' and chair of a cross-government Advisory Group overseeing new or reinforced machinery for commissioning and discussing the policy implications of foresight / horizon-scanning work. The UK system includes a Foresight team under the Government's Chief Scientific Adviser, which has since 2014 been merged with the Cabinet Office's horizon scanning secretariat.

Finland: Government Foresight Report (GFR) and Government Foresight Network are the key elements of a broader foresight system that also comprises a Parliamentary Committee for the future, a Foresight consortium for labour force, competence and educational needs, an independent public innovation fund (known as SITRA) which inter alia promotes the long term perspective in Finnish decision-making through a National Foresight Network, and a number of futurists' or futures-oriented peoples' networks of which the largest is the Finnish Society for Futures Studies. There is no unified top-down foresight system in Finland but the GFR and Network, including Sectoral reports by the key Ministries are key components of the national system of government.

Sweden: The MSB's Strategic Foresight Analysis focuses on issues within the field of societal security with a time perspective of up to twenty years, with the aim of supporting strategy formulation and long-term planning.

Five future scenarios produced in 2012 (for 2032) covered: A growing population and deteriorating public health; weak economy, high unemployment and social unrest; accelerating climate change and rising oil prices; the threat of terrorism in a world of conflict; antibiotic resistant bacteria spread across the world

United States: Future Strategic Environment: (US DHS Quadrennial Homeland Security Strategy) not formally defined but an analysis of future (up to 20 years ahead) trends, challenges and uncertainties, and key interdependencies, across society, technology, the economy, the environment, and governance carried out as a foundation for considering changes in how the [currently] five homeland security missions are carried out. A 2010 Strategic Foresight Initiative by the Federal Emergency Management Agency (FEMA) was designed to advance understanding of future risk trends and drivers through a three-phase collaborative programme of environmental scanning, scenario planning, and aligning findings to strategy.

Source: (OECD, forthcoming[22]) (OECD, 2016[46])

A collection of small-scale hazard maps have been drawn up by research institutes associated with ministries and are accessible to the public. Recently, a national Atlas was created that is composed of a few hundred small-scale maps surveying natural and techno-genic hazards across Kazakhstan. The Atlas was a joint initiative by the Institute of Geography in the Ministry of Education and Science with the participation of the CES acting as a co-administrator in the scientific and technical programs that contributed to information gathering. The hazard maps contained in the Atlas provide documentation of vulnerability and susceptibility levels of different communities across Kazakhstan that could serve as good evidence to guide risk policies and reduction measures.

Central level single-risk assessments

Risk assessment of different hazards tends to fall under the provision of separate technical and scientific agencies linked to ministries. For more detailed information Table 3.1 provides an outline of the main stakeholders involved in data collection and conducting risk assessments for different hazards in Kazakhstan. This section further describes the risk assessment framework and roles and responsibilities of stakeholders. For each kind of hazard there are protocols in place for the exchange of information between central level government stakeholders and local authorities. These risk assessments are used to identify vulnerable communities and develop relevant preparedness measures to cope with potential disaster situations as well as implement a range of disaster risk reduction measures.

Hydro-meteorological risks

The activities related to meteorological and hydrological monitoring are carried out by a state-run company the National Hydrometeorological Service – Kazhydromet (Committee for Emergency Situations, 2015[9]). The Republican state enterprise Kazhydromet is the main actor that gathers data on hydrological and meteorological information using their observational network. Within the framework of international cooperation and information exchange, RSE Kazhydromet submits to the World Meteorological Organization (WMO) meteorological observational data from 82 meteorological stations, which are publicly available on the WMO website (WMO, n.d.[49]).

Exchange of hydrological and meteorological information with government stakeholders is carried out within the framework of joint orders. Data is open and accessible to non-government stakeholders ,subject to a terms-of-use contract and a cost-recovery fee to obtain the data set. There is space to put this into practice with universities and research centres working on disaster risks. Open data policies enable information exchange and can lead to stronger evidence-based policy-making. Research initiative can help to advance disaster risk modelling and inform preparedness plans.

Open government data is a high priority for OECD countries that supports access to public sector information (OECD, 2018[50]). Effective open government data policies promote transparent and open governance while building public trust and public sector integrity. For further information on the benefits of open data, see Box 3.3.

Box 3.3. Open government data

Open government data is a tool to strengthen transparency and openness of public sector information. OECD countries are interested in good governance arrangements to advance open government policies to support sustainable results. The OECD report on "Open Government Data Report: Enhancing Policy Maturity for Sustainable Impact" explores how open data can support evidence based policies and open innovative opportunities to solving a range of problems. Effective open data policies is supported by raising awareness to foster engagement of businesses, civil society and the community. In this way open data sets a pathway for collaboration in whole of society approach to governance and provides co-creation of public value and innovative solutions. Open data can strengthen open and transparent governance, that build public trust and serve as a basis for stronger government accountability.

Source: (OECD, 2018[50])

Hydrological and meteorological data collected by Kazhydromet are analysed and used to inform preparedness planning for seasonal hazards. Kazhydromet provides concise detailed information on hydrological forecasts during the flood season to the interested state bodies and Akimats (mayors) of the provinces. Forecast data and information is provided every week starting from the 1st of March with a lead time of 7 days and with updates every 3 days.

Table 3.1. Main institutions that conduct risk assessments and monitor hazards in Kazakhstan

Hydro-meteorological observations and monitoring are carried out by Kazhydromet in the Ministry of Energy. Branches of Kazhydromet are located across regions in Kazakhstan, to monitor weather and water conditions and communicate potential risks.
Seismological observation and forecasts of earthquakes is provided by National Centre for Seismological Observations and Research LLP and the Institute of Seismology LLP, which are part of the National Centre for Seismological Observations and Research within the Ministry of Education and Science
The monitoring system and laboratory on data analysis for the control of **radiation-chemicals and sanitation** is carried out by the Committee for the Protection of Consumer Rights within the Ministry of Education and Science.
Monitoring of diseases of animals and plants is carried out by the Ministry of Agriculture.
Assessment and monitoring of **forest fires** is ensured by the Committee of Forestry and Fauna within the Ministry of Agriculture, local fire safety monitoring of steppe territories is carried out by sub-territorial units of the Committee.
The Committee for **Industrial Safety and Development** in the Ministry for Industry and Industrial Development carries out risk analysis of different industrial activities such as mining, sites that use potentially dangerous chemicals or toxins in production processes and woodwork.

Source: 2018 OECD Kazakhstan Risk Governance Survey

Complementary to the data on water resources collected and analyzed by Kazhydromet, the Committee for Water Resources in the Ministry of Agriculture assesses risks related to water bodies and water management infrastructure. The Committee for Water Resources and its sub-territorial Water Basin Management units conduct inspections on the capacity of major watersheds, and monitor the level of water in reservoirs.

Technical and scientific agencies involved in water resources management (Kazkhydromet, the Water Resources Committee and Water Basin Management

units) interact and share information and data collected on water bodies. They also share this information with the regional Department Committees for Emergency Situations (DES) to assess flood risk in the region and identify where reinforcement works are necessary. However, the engagement tends to be limited to assessing seasonal risks and building short-term preparedness measures prior to the 'floods season' in the spring. This annual activity is focused on assessing the potential impacts of a combination of snowmelt and precipitation. Some of these assessments are used for longer-term projects and building larger structural measures including dams, dykes, and constructing new hydro-technical facilities.

Flood risk assessment at the central level supports interaction horizontally across central level government stakeholders to conduct risk assessments. In the case of flood risk there is inter-agency coordination at the central level between the Committee for Water Resources in the Ministry of Agriculture and its sub-territorial Water Basin Management units and inspectors that gather data on water levels, conditions of hydro-technical facilities; and with the national hydro-meteorological service Kazhydromet in the Ministry of Energy that provides data on water levels, weather conditions, and snow reserves that contribute to flood risk. The Ministry for Investments and Development and its sub-level Committee for Roads provides information on road conditions that may be at risk to potential floods, blizzards or snowmelt; while the space agency Kazakhstan Garysh Sapary, a Joint Stock Company in the Ministry of Defence and Aerospace Industry provides satellite imagery and remote sensing systems. Information-exchange should include strengthening cooperation between the national space agency Garysh Sapari and Kazhydromet data. Together these central level bodies coordinate to make national flood risk assessments. This process of inter-agency coordination and cooperation can be seen as a positive approach to risk management within the sphere of hydrological risks and should be further expanded for other hazard assessments.

Floods are recurring risks in Kazakhstan and incur high damages requiring up-to-date risk assessments to inform disaster risk management policies and guide risk reduction actions. In the field of water resource management and flood risk, public debate has highlighted the need for more gauging stations, up to date technologies and renovations to infrastructure to facilitate information conducive for better risk assessments as most of the current infrastructure was built during the soviet period. More radars would allow to capture a larger surface area of Kazakhstan for weather conditions and provide more accurate forecasts.

Mudflow risk

The state agency Kazselezashchita of the Committee for Emergency Situations in the Ministry of Internal Affairs (MIA) gathers data and makes analysis on the risk of mudflows and other geological hazards across Kazakhstan. In order to monitor mudflows, snow avalanches, as well as landslides Kazselezashchita operates its own specialized system of data collection and monitoring using both permanent and seasonal posts located in the mountainous terrain and areas identified as susceptible to mudflows and snow avalanches. Surface monitoring of mudflow is conducted by regular ground and aero-visual surveys. Based on these risk assessments, protective structures such as mudflow dams are put in place in high risk areas.

Earthquake risks

The assessment of the risk of earthquakes falls under the Institute of Seismology LLP under the JSC National Center for Seismological Observations and Research in the Ministry of Education and Science (NCSOR). The Institute of Seismology monitors seismic activity in Kazakhstan, by registering and processing data on tremors. It informs the CES about the potential for strong earthquakes based on analysis of data. Tremors are registered in a database online and available for public access. On conducting risk assessments of earthquakes, the Institute of Seismology works with central CES and subnational bodies. Access to this data is permitted with official requests. Research and risk assessments aim to provide the CES with information to guide the implementation to seismic proof buildings in high seismic zones. The Institute engages with the CES on the design and implementation of structural measures for reducing risks and provides recommendations for the optimization of engineering protection mechanisms against earthquake risks. However, the activities of the Institute do not involve the private sector, and they do not participate in any raising awareness activities.

Risk assessments of earthquakes in Kazakhstan are used to inform building codes and to regulate standards for the seismic proofing of structures. In 2016 an inventory was developed by the CES on structures in earthquake prone zones in need of reinforcement. More than 2,888 residential buildings, 219 schools, 132 hospitals and 57 kindergartens were identified requiring reinforcement measures against seismic risk. As part of the socio-economic development programs across the regions for the period 2016-2020, the Akims and other local executive bodies in the regional and local offices are required to implement and oversee engineering works on infrastructure to ensure resilience to earthquake risk based on risk assessments. There is concern about the oversight and implementation of these standards. For example, Almaty is located in an area at high risk to earthquakes. The density of the population and placement of an important range of industrial enterprises make this a particular problem given the possibility of illegal structures that do not adhere to the building codes for seismic safety. While the development of an inventory of structures needing repair in 2016 is a very positive initiative, constant vigilance and linking this inventory to the planning process is required throughout the 2016-2020 planning period for reinforcement measures against seismic risks to be implemented.

Industrial risks

The Ministry for Investments and Development (MID) holds the Industrial Development and Industrial Safety Committee that develops safety requirements for industrial sectors. Owners and operators of industrial buildings and technological facilities are required to conduct risk assessments, carry out technical surveys and adhere to safety requirements laid out under Article 16 of the Law on Civil Protection. Regional departments of the Industrial Development and Industrial Safety Committee conduct regular inspections to ensure adherence to safety measures. If these requirements are not fulfilled, fines are given to the owners.

Similarly, the owners of hydro-technical facilities falls under industrial risk regulations and are required to conduct risk assessments on the safety of the infrastructure. Owners of water structures are a patchwork across private and public

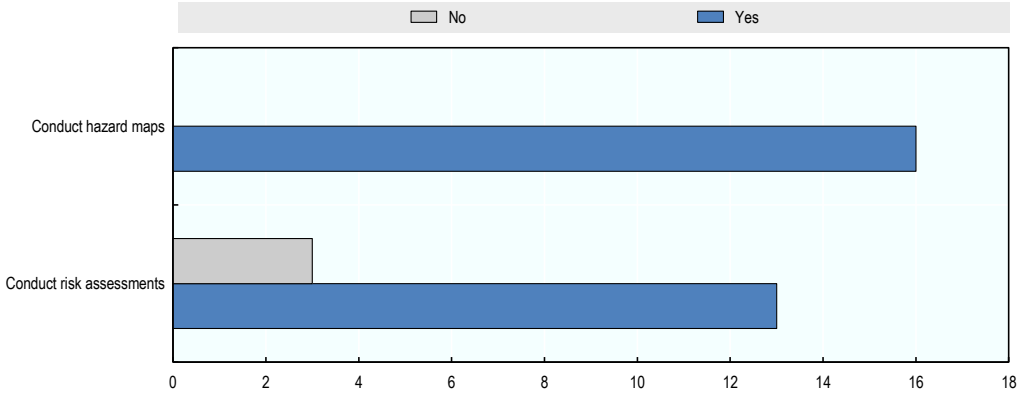
at different levels of government (national and regional). Inspections of these hydrological structures are outsourced to a specialized institute and a safety status study is compiled which is reported to the Basin Inspection Committee. In the case that safety requirements are not fulfilled, a fine is given to the owners and operations are temporarily stopped. The central government assigns an inspection commission composed of the CES, local authorities and water experts to review the situation and ensure safety requirements are implemented before continuity of operations are allowed to resume.

Local risk assessments and hazard maps

Vertically shared responsibilities for conducting risk assessments works within a framework of cross fertilization of information-gathering and analysis carried out in coordination between the central level technical agencies and their regional sub branches, and between the CES and regional authorities of the DES. In this way risk assessments are done by utilising a top down and bottom up approach. In support of national risk assessments of different hazards, regional DES are required to draw up Security Passports which measure, store and share data on hazards in their respective region. Data obtained for Security Passports come from central level technical agencies and their sub territorial branches. The Security Passports contain risk assessments and a catalogue of a full range of hazards in the region. They also provide a registry of dangerous production facilities and vulnerable communities. Regional hazard maps are widely developed, based on available methodologies and resources.

All regional DES are required to draw up hazard maps and conduct risk assessments at the regional and local level. In a survey conducted by the OECD (Figure 3.1) the majority of representatives from regional DES indicated that hazard maps are conducted and risk assessments are carried out by their units. This is a strong governance aspect in the framework showing understanding of the core tasks that should be carried out by regional DES.

Figure 3.1. Conducting risk assessments and hazard maps at the regional level



Note: Questions "Does your organisation conduct risk assessments?" and "Has your organization made hazard maps for exposure to floods, earthquakes, industrial accidents or other risks in your region?" Answers received: 16 out of 16 regional[1] DES respondents as of April 2018. Since June 2018 an additional region has been added – Shymkent.
Source: 2018 OECD Kazakhstan Risk Governance Survey, 2018.

The risk assessment framework requires for DES to conduct hazard maps and risk assessments as a component of regional Security Passports, whereby risk assessments should guide risk management actions and reduce the risk of disasters. Different regions have varying technical capabilities and resources to achieve high quality risk assessments and maps. Regions are building capabilities in conducting risk assessments. Strengthening risk assessments is an objective across many regional DES to reinforce risk prevention. For instance, Zhambyl region is at risk of earthquakes and floods and is developing an interactive hazard map with data to show specific areas at risk. The DES use a methodology of reasonable worst-case scenarios for these assessments. Another example is Karaganda region, which faces major flood risk and needs to develop capabilities for advanced risk assessments that model flood risk and use software and geological information on slopes and terrain. East Kazakhstan faces flood risk and has begun to produce a flood risk map. The DES need more training and professionals that have the capabilities to make advanced disaster risk models. Regions are interested to build capabilities in risk assessments by involving more experts and professionals.

Security Passports require for regional DES to provide a calculation of potential losses by surveying the vulnerability of populations and the exposure and susceptibility of assets to damages. The accuracy of hazard maps and these exposure assessments may be strengthened by more cooperation with other stakeholders. There is room to leverage on the resources offered by the national space agency in Kazakhstan on the use of satellite imagery and GIS technology for risk assessments. Central level government could also set up programs to support the costs such as through subsidies. Collaboration with research centers, the private sector and universities would also contribute to more data gathering and information sharing on hazards, exposure and vulnerability – offering a wide range of sector specific skills and expertise. More participation in the risk assessment process would not only strengthen their value by making them more accurate but also support these instruments as important decision-making tools in areas of land-use restrictions, urban planning and meeting development goals.

Openness and accessibility of hazard maps

A strong aspect of the governance framework is the endorsement at the central level to make public access to all regional hazard maps. Proactive efforts are taking place to communicate risks and raise awareness across society include targeting vulnerable segments of the community. This falls under Kazakhstan's move towards opening up government and creating an e-government portal, where some public data and information can be accessed (OECD, 2017[51]). In regards to hazard maps, there is scope to increase their accessibility which could be embraced by the e-government move.

Regional and local authorities take varying approaches to the openness of hazard maps. A majority of DES agree on the value of public access to risk information as long as they do not contain elements related to national security. Many of the DES are moving towards ensuring that risk information held in hazard and vulnerability maps, emergency plans and hazards catalogues are available to the public. Nonetheless, there is room to ensure hazard maps across all regions are accessible to the public. To further support risk communication and engagement, in some regions citizens are welcomed to write a letter about the hazards situation to the DES who are obliged to respond within limited time frames. A few regions have

public councils that hold open discussions with the community on risk assessments. These kinds of practices set a strong pathway for openness and transparency of risk information and enable risk communication channels.

Challenges to risk-informed evidence-based decision-making: incomplete data-sets and openness

Risk assessments and hazard maps are important risk management instruments to facilitate evidence based decision-making and policies in other phases of the risk management cycle: prevention and mitigation, preparedness, reconstruction and recovery. Openness of these instruments and supporting a whole-of-society approach could boost their value in the governance framework in Kazakhstan. In addition to little stakeholder engagement, the framework appears to create variability of information on different hazards, such as little assessment on the impact of droughts, and wildfires, which are prevalent across Kazakhstan; while assessment of flood risk has been more widely developed. Building an all hazards approach will ensure taking into account the full extent of risks. This means integrating national hazard and risk assessments into a single national risk assessment that allows for comprehensive analysis of the risk landscape.

The current framework in Kazakhstan on information-sharing and risk assessments is limited to a few stakeholders within government, and data gathering falls under provisions of specific technical government agencies and scientific institutions. Due to the commercial nature of the data gathered across a few technical agencies, there is limited access to a systematic data base on past disasters, losses and damages. There are few collaborative initiatives to increase data and risk assessments between Kazhydromet and research centers at universities. Nazarbayev University has many research activities in the area of hazard analysis and disaster risk assessments, and has been developing on GIS technologies to advance these kinds of assessments in Kazakhstan.

While information about risks has been developed over the years, including monitoring and analysis of different hazards, there is no open data on systematic records that can be found on economic losses and social consequences of past disasters. Archives of past disaster serve a basis to build capabilities across the risk management cycle by allowing to identify gaps (OECD, 2018[52]). Box 3.4 presents the centralized disaster database in Canada, which was created to provide disaster risk managers, policy makers, academia and the wider public with comprehensive data on the socio-economic impact of disasters. Publically accessible disaster impact data promotes a transparent and plausible evidence base.

Box 3.4. Canada's comprehensive database on disaster risk information

Canada has an official disaster databases that is a publically accessible web-based repository that contains detailed historical disaster information on more than 1000 natural, technological and conflict events (excluding war) that have happened since 1900 in Canada or abroad and that have directly affected Canadians. The Canadian disaster databse is maintained by Public Safety Canada, and tracks all "significant disaster events" which conform to the Emergency Management Framework for Canada definition of a "disaster" and meet one or more of the following criteria:

- 10 or more people killed;
- 100 or more people affected/injured/infected/evacuated or homeless;
- an appeal for national/international assistance;
- historical significance;
- significant damage/interruption of normal processes such that the community affected cannot recover on its own.

This national database allows to highlight disaster risk trends in Canada and share information among levels of government and emergency responders to support decision-making. Furthermore, it is an important tool raise public awareness for disaster risks and the need to invest in disaster risk management measures.

Source: (Public Safety Canada, 2018[53])

A lack of exchange of information on hazards and risk assessment, has led to variations of quality and precisions of regional risk assessments and hazard maps. There is a gap in risk analysis, for example in the use of probabilistic flood risk assessments, modelling and use of scenarios. As a result, this may limit the potential of local flood risk assessments to inform evidence-based disaster risk management policies. Risk assessments and hazard mapping could benefit from systematic methodological support, resources and technical capacity offered by engagement from a broader research and scientific community.

There is a strong will across stakeholders to build capabilities using scientific evidence and a wide variety of expertise. Currently the DES of the regions are working towards increasing collaboration with a memoranda of cooperation between the DES and scientific organizations for the development of an integrated risk management system that brings together civil protection, joint research activities and situational forecasting in order to reduce the disaster risks.In many OECD countries, a whole of society approach is adopted to leverage on available skills in research institutions and universities, civil society and the private sector. Involving a wider set of stakeholders in local risk assessments and hazard maps would increase their value in informing policy-making such as land-use restrictions and urban planning as well as building codes.

Conclusion

In Kazakhstan risk assessments have been widely developed to cover major hazards and threats. Several technical agencies have been established by the central government to focus on single risk assessments. This action highlights a move towards ensuring risk policies are based on the best scientific evidence. However, risk assessments could be further articulated across multiple technical agencies to establish an integrated and comprehensive national multi-hazard risk assessment that would allow comparing across risks. This would allow identifying priority areas and guiding risk prevention and mitigation activities. Multi-risk assessments inform risk policies effectively if continuously updated and revised. By coordinating resources and developing multi-risk approaches, it would support information sharing on risks, standardization of methodologies and capability building at the local level for precise risk assessments and hazard maps. A national multi-risk approach would further support opening up data and interaction with a wider set of stakeholders across the scientific and research community in Kazakhstan.

Kazakhstan is taking steps to improve its risk governance framework. One of the governance gaps to address will be to establish a national database on systematic records on economic losses and social consequences of past disasters. Archives and data on past disasters help identify governance gaps and establish a base line to build capabilities across the risk management cycle. A comprehensive database could also serve as a useful communication mechanism by informing society about risks and incentivise self-preparedness.

Kazakhstan has made progress to increase openness of risk information at the national policy level, by making risk assessments and hazard maps available to the public. However, openness could be further reinforced across all the regions to ensure that local risk and hazard information are made available to all citizens and the community. Increasing access to information underlying the formulation of disaster risk management policies are an important aspect of raising awareness about risks and building a risk prevention culture across local populations. It further builds trust in government institutions and in risk policies. Kazakhstan might improve the quality of risk maps and thereby the effectiveness of disaster risk reduction policies if it increased stakeholder engagement in the risk assessment process by involving research institutes and the space agency. There is strong demand to increase open data and information-sharing across technical agencies and stakeholders involved in disaster risk management.

Notes

[1] When the survey and fact-finding missions were conducted for this report in January and April 2018, there were 16 regions in Kazakhstan: Akmola, Aktobe, Almaty, Atyrau, East Kazakhstan, Karaganda, Kostanay, Kyzlorda, Magystau, North Kazakhstan, Pavlodar, South Kazakhstan, West Kazakhstan, Zhambyl, and the cities of Almaty and Astana. As of June 2018 there are 17 regions in Kazakhstan. The region Turkistan was created in June 2018, when the city of Shymkent was separated from the former regions of South Kazakhstan, and upgraded to the same status as the cities of Astana and Almaty.

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Chapter 4. Governing disaster risk reduction in Kazakhstan

This chapter describes the governance of disaster risk reduction measures in Kazakhstan. It highlights challenges faced in the oversight and monitoring of such measures, considers such issues as communicating about risks to the public, and considers incentives to invest in mitigation measures.

The OECD Recommendation for the governance of critical risks suggests effective policies of disaster risk reduction to encourage a whole-of-society approach that incorporates risk communication channels to raise awareness and mobilize citizens and businesses to take proactive self-preparedness measures, as well as implement a balance between structural and non-structural measures (OECD, 2014[18]). In most advanced OECD countries raising awareness and encouraging self-preparedness has become an integral part of the governance framework that is enabled by providing various informational resources about risks to communities and businesses. It is also recommended that integrated risk management policies strengthen a mix of structural and non-structural measures to reduce exposure and vulnerability to disaster risks. Physical structural measures should be complemented by non-structural measures such as building codes, land-use restrictions and urban planning including at times the resettlement of the most vulnerable communities (OECD, 2017[54]).

Traditionally disaster risk management in Kazakhstan has focused on reducing the consequences of disaster risks with the implementation of structural measures such as dams, levees and hydro-technical facilities against floods and mudflows. There are efforts to strengthen an integrated approach that involves both structural and non-structural measures. Land-use restriction policies and building codes are in place. A strong aspect of the framework is transparency and accountability provided in Road maps that list all regional structural projects and are driven by central level disaster risk reduction policies. However, the current framework may benefit from the support of cost benefit analysis to identify priorities of prevention activities in consideration of limited regional and local budgets. It is also important to promote non-structural measures such as urban planning, land-use restrictions, and building codes with relevant oversight and evaluation measures to ensure adherence at the local level.

This section presents the governance of disaster risk reduction in Kazakhstan. It discusses the strategic plans in place and stakeholders involved in decision-making about these measures.

Governing structural prevention measures

Structural measures have been widely developed across Kazakhstan. In particular to address the risk of floods and mudflows, a system of dams, levees and hydro-technical facilities regulate water flows and discharge rates. To reduce earthquake risks, engineering works are carried out on buildings to reinforce resilience against seismic shocks. Hazardous production facilities are required to finance and carry out measures aimed at preventing accidents and reducing risk of disruptions to operations against all hazards. The capacity and status of many existing infrastructures has been called into question given their age and wear against hazards over time. Many OECD countries face the challenge of ageing infrastructure given the large stock of public infrastructure built in the 50s and 60s, and even the 1930s. Many face the challenge to review this stock against new policy objectives of fostering resilience in a broader perspective, and include a balanced mix of structural and non-structural measures. In Kazakhstan, the strategic plan incorporates a mix between the development of new infrastructure and reinforcement of existing structures to reduce disaster risks.

Road maps are strategic plans of structural risk reduction measures across Kazakhstan and are aligned to regional socio-economic development plans. These road maps open to public access as part of efforts to strengthen openness and transparency. All prevention projects are registered in the road map and are required to be implemented upon approval by joint-order between the Ministry of Internal Affairs, Ministry for Investments and Development, Ministry of Agriculture, and the Ministry of Energy. The road maps are used by local authorities and the DES to guide and oversee structural measures. The DES monitor the progress on the activities laid out in the Road map and report this to the CES within specific time-frames to strengthen accountability.

To address flood risk, the strategic plan for structural measures across Kazakhstan fall under the floods Road map, titled: '*A set of measures for the prevention and elimination of flood threats for 2017-2020'*. This road map lists each region and detailed information on specific structural works underway within different settlements. It includes the year of implementation and expected year of finalization of the project, the allocation of the budget either regional or national and the person responsible for its execution. Structural measures against floods range from: constructing or reinforcing dams, dykes and levees, reinforcing river banks and bridges, the expansion and dredging of sections of rivers, clearing and strengthening canals, reinforcing hydro-technical complexes, cleaning out emergency reservoirs, and carrying out major repairs to watersheds and reservoirs. The Road map integrates prevention activities dealing with new constructions and the reinforcement of existing infrastructure.

In line with the floods Road map, in 2017, across all regions in total 204 projects were implemented including: the construction and reinforcement of 107 dams, the repair of 71 hydraulic structures, as well as 8 bridges and 12 highways. Other measures implemented include work on riverbeds and on storm sewage systems. In conjunction, as part of strengthening flood risk prevention, activities are also being carried out to reinforce forecasting capabilities by Kazhydromet, with proposals to modernize the data gathering and monitoring system of hydro-meteorological phenomena.

Several stakeholders are involved in the governance of structural prevention measures; however local authorities play a principle role in funding and decision-making. Incentives to implement structural measures are driven by central level policies to ensure socio-economic development across regions takes into account disaster risks and the reduction of their consequences. Each region's Territorial Development Program 2016-2020 has set up targets to ensure safety of the local population, and reduction of the consequences of disaster risks. This is referred to in the target indicator addressing capacity and status of structural measures on: *"the level of provision of infrastructure for countering emergencies"* (Zhambyl region, 2016[55]). The governance framework for structural measures is mainly driven by central level planning, while implementation and oversight is governed by local authorities.

The regional governor (Akim) has the responsibility to submit proposals on structural measures to the central level government for approval, based on consultation with mayors and recommendations provided by the Department Committees for Emergency Situations (DES). Proposals for these projects include detailed technical information on the project, analysis of potential capacity of the

structure and a budget scheme. Decision-making for these measures is informed by local risk assessments and an analysis of hazards. The DES provide this risk information to local authorities at the regional and city level, depending on the scale of the project. Based on risk information, areas of priority are identified. In this way, the framework should function where decision-making for structural measures are informed by available local risk assessments and hazard maps. There is room to integrate more decision support tools such as the use of cost benefit analysis across all regions. Cost benefit analysis allows to compare costs and benefits, and weigh alternative options (Shreve and Kelman, 2014[56]). This would help to justify investments and help prioritize actions in prevention and mitigation.

Flood risk is widespread across all regions and many bodies of water stretch over several regions. Therefore, managing flood risk prevention should consider the entire river basin and coordinate across upstream and downstream risks. According to interviews with regional DES and the Committee for Water Resources in the Ministry of Agriculture, the road map for floods ensures structural projects are coordinated across the entire length of the river and watersheds. The Committee for Emergency Situations (CES) and National Hydro-meteorological Service Kazhydromet together with Water Basin Management units across the territories provide information and data to ensure that prevention and mitigation measures at the regional level are coordinated as part of integrated water management.

In addition to new infrastructure projects set up in the Floods Roads map, there are also activities aimed at reinforcing existing and ageing infrastructure, which is a rising concern in Kazakhstan. Comments have been made on poorly maintained hydraulic infrastructures, many of which were built during the Soviet Union era, in addition to levees that have eroded over time. In this case appropriate risk governance practices should be in place to ensure reinforcement and maintenance works of disaster risk reduction infrastructure.

Past disasters have highlighted the growing need to make inspections and risk assessments on the status and capacity of existing flood mitigation infrastructure. In 2014, heavy rains led to a dam breaking in the Karaganda region, killing 5 people, leaving at least 9 injured and causing large destruction across several settlements. Following this event, norms were modified in the Water Code, requiring owners of hydro-technical facilities to report on conditions of the infrastructure, as well as make regular risk assessments and maintenance. The Committee for Water Resources together with local executive bodies have a role to ensure that these activities are carried out with various roles in oversight and monitoring. In general, the concept of lesson learned from previous incidents has not been seen to be part of the risk management process in Kazakhstan. The Karaganda region dam incident is a case in point where lessons learned can be the catalyst for improvements for the future with amendments to the Water Code 2003.

One of the challenges with the implementation of new structural measures and reinforcement of existing infrastructures has been a lack of oversight and monitoring. For example there are many factors that go into flood risk such as ensuring that snow is removed, as melting snow is one of the driving factors for floods in the spring period. Almaty city and Akmola region expressed that in this case the DES has a role to explain to individual households what they need to do reduce risks and how to remove snow but there are few incentive mechanisms to take any actions, as they can't enforce any kind of tariffs. Recent initiatives have

boosted incentives for industry such as major utility companies to remove snow. The authorities can impose fines for not fulfilling such tasks. Oversight and accountability mechanisms, coupled with methodological support may strengthen incentives for not only owners and operators of industry, but also households to take such prevention measures.

Cost-sharing mechanisms for structural measures

Structural measures can be costly to implement and require funding for regular maintenance to ensure their functioning. In Kazakhstan funding of activities identified in the road maps is mainly sourced from regional budgets; while additional support is offered by the central government budget to regions with fewer resources, where the Ministry of National Economy plays a deciding role. The cost of implementing risk reduction activities set out in the floods Road map 2017-2020 totals to 151.7 billion tenge (USD 448 million); with 102.4 billion tenge (USD 278 million) from the national budget and 49.2 billion tenge (USD 134 million) from local budgets.

Disparities of regional wealth may determine variations of resources available for disaster risk prevention. Some of the most vulnerable regions to hazards, such as Karaganda have experienced severe floods in the last years, however this region has a budget largely subsidized by the central government. In this case, local authorities can apply for financial support for various disaster risk reduction activities. For example following floods in North Kazakhstan in 2016 and 2017, a 3-kilometre levee was built entirely funded by the national budget. Decision-making for funding of this particular project was said to be based on the recurring threat of floods and the necessity to protect vulnerable settlements. While the allocation of this project for funding was deemed to be a legitimate requirement, the system of allocation of the national budget to support regions in the development of structural projects appears to function on an ad hoc basis.

Establishing clear guidelines and rules on the process of allocating public funds for structural measures will be important governance gap to address. Clarifying these procedures will be an important component to better budgeting and strengthening accountability. The development of co-financing practices that involve several stakeholders could be a positive move forward, by bringing together the public and private to help ensure that prevention projects are developed and implemented across all the regions. In some countries public private partnerships (PPP) boost collective investment and ownership of protective infrastructure. For example in Austria, water boards are PPPs and owners invest and maintain it (Box 4.1). This has led to significantly better results in the status of protective infrastructure over time, compared to infrastructure for which maintenance is the responsibility of other interest groups, such as municipalities, who have faced resourcing challenges. Considering the longer-term maintenance requirements of protective infrastructure investment, municipalities may encourage investment by water boards or an equivalent authority in Kazakhstan for example. Another aspect on financing investments structural measures is to consider more applications of decision-making tools such as cost benefit analysis into the overall framework.

Box 4.1. PPP for structural measures: Austria's water boards

Water boards are statutory corporations under Austrian law (Water Act of 1959) and can be composed of any number and combination of individuals, municipalities or companies. Each member contributes financially to a common fund, which is used for the development and maintenance of mitigation or prevention measures. Financially contributions to invest in infrastructure can be considerable. For example, in the case of the Saalbach (province of Salzburg) water board, composed of 600 members, individual contributions can be as high as EUR 50 000 annually. The level of contribution is determined by a point system derived from the exposure of a member's property or dwelling. The initial determination of membership fees is automatically transferred to new property owners.

Water boards may decide to take part in co-financing costly protective infrastructure, instead of leaving this to local authorities. There are several advantages for taking such an initiative. Water boards can expedite the request for a protective infrastructure, which serves the interests of those directly impacted by potential hazardous events. Water boards, just like municipalities, can initiate and request the construction of protective infrastructure, and thereby oblige its members to finance the suggested measures. Investment proposals by water boards receive faster treatment of their request and a higher central co-financing rate than requests submitted by local governments. The difference can be as high as 15% and should thereby reward individual willingness to contribute to financing protective infrastructure.

As water boards become the formal owners of the protective infrastructure they build, they are responsible for maintaining it. This has led to significantly better results in the status of protective infrastructure over time, compared to infrastructure for which maintenance is the responsibility of other interest groups, such as municipalities, who face limitations of resources. Considering the longer-term maintenance requirements of protective infrastructure investment, municipalities may encourage investment via these water boards' partnerships.

Source: (OECD, 2016[57])

Non-structural measures

Non-structural measures are complementary disaster risk reduction instruments to physical measures and can provide cost-efficient alternatives (OECD, 2017[58]). These types of measures are often referred to as building codes, land-use restrictions and urban planning documents as well as raising awareness amongst communities to support self-preparedness. In particular, land use plans, environmental and building codes affect land use and provide effective tools to reduce the vulnerability and exposure of structures and assets to risks. This scope of policies are often developed at a national level but highly contextualized as a local issue. Incentives and implementation often rely on local authorities in decentralized contexts; however these measures have large implications for regional and national resilience. This section will go into some of the policy developments in non-structural measures, and some of the challenges to ensure their effective implementation.

As in many countries, strategic plans for land use have been developed at a high policy level in Kazakhstan through various safety codes and land zoning regulations. As strategic plans are often developed at the national level, vertical coordination mechanisms are important to ensure policies are incorporated into local development plans. Kazakhstan's framework for land-use and urban planning is based on developing urban design projects for cities. The "General Plan" is the main document that guides development of a city, which includes a 30-year projection and is updated as required (OECD, 2017[16]). Legislative documents for urban planning have been developed with the adoption of the Environmental Code 2007, Land Use Code 2003, Seismic Building Design Code 2014 as well as Water Protection Zones. These various Codes designate urban development limitations in risk zones and non-construction zones, and are complemented by technical norms, such as construction standards for sanitary and ecological conditions, and earthquake safety.

Decentralization gives local authorities a deciding role in the implementation of these non-structural policies, especially on the issuance of building permits. Within the framework of different legislations regulating urban planning and land-use, local authorities in city hall are required to consult relevant regulations before delivering building permits. One of the challenges is that there is little integration across sector-specific codes. Coordination across sectoral policies can ensure land use and urban planning strategies are comprehensive across all hazards. This means that when issuing building permits – all relevant Codes are taken into account to ensure no regulatory restrictions fall through the cracks. For instance, a good practice is found in France illustrated in Box 4.2. France develops land-use and urban development plans which identify all hazards: geographical hazards such as possible earthquakes, floods, avalanches, wildfires or landslides. These plans are used in decision making for urban development and the issuance of building permits. The plans further designate high risk zones as non-constructible which makes it illegal to construct in the zone and local authorities can be held accountable for issuing building permits in those zones.

Box 4.2. Integrating land-use planning in hazard assessments in France

In France hazard mapping is a core component to the development of Prevention Plans against Natural Risks. The plans outline hazard zones for possible earthquakes, floods, avalanches, wildfires or landslides. The responsibility for overseeing implementation of risk hazard mapping falls under the Ministry of Ecology, supported by the Regional Directorate for Environment, Planning and Housing (*Direction Régionale de l'Environnement, de l'Aménagement et du Logement*, DREAL) and (public) engineering bureaus. Decentralization of the governance framework leads to a local and multi-stakeholder engagement in the hazard mapping process, including public as well as local authorities and other stakeholders. The maps are open and available to public access.

The hazard maps are regularly included in land-use planning. The spatial development code obliges local authorities to take into consideration hazard maps in urban development, with the Risk Prevention Plan as an annex. The Flood Risk Prevention Plans are required to be drawn up in flood hazard areas and establish clearly designated zones where construction is not allowed on account of high flood risk. To ensure that hazard maps are included in land-use planning, control visits are carried out up to three years after constructions were completed and penalties follow if hazards maps and zoning requirements were not adhered to.

Mayors are in the driver's seat of enforcing hazard zones in land use decisions and they are in charge of granting construction permits. The department prefect monitors the integration of hazard zones in urban planning decisions. In case of doubts about whether hazard zones were respected in granting a construction permit the prefect can launch a legal procedure against municipalities. Mayors can and have been made liable for ignoring hazard zones. Regions also have a monitoring role and can positively encourage the integration of hazard zones in local land-use decisions.

Source: (OECD, 2017[59])

Regulatory restrictions on land use and urban planning should be supported by hazards and risk information for evidence based policies. In Kazakhstan, local officials – the Akims (mayors) are responsible for controlling and regulating development in their jurisdiction. Territorial development programs address issues of land use and urban planning, and are required to take into account risk information, and cost benefit analysis to ensure the most efficient use of land and resources. Some challenges with these measures, is that hazard maps and risk assessments take a long time to develop and need to be continuously updated to take into account changing vulnerability levels, hazards information and urban development. Information and data on all hazards is communicated to local authorities by DES to support risk-informed decision-making about urban development. In addition, the framework mobilises stakeholders involved in land-use and urban development including local authorities, the architecture department and construction companies to go through a consultation process to decide what to build. The DES guides this process by informing decisions based on experiences with previous disaster events. Despite efforts to use risk information and decision-support tools to restrict urban development in hazardous zones - the DES does not

hold any powers to ensure adherence and incentive structures are lacking to take into account regulatory restrictions.

Box 4.3. Donau Machland resettlement program in Austria

Relocating settled areas can be a risk reduction policy option to also increase flood retention zones. In Austria, resettlement does not fall under specific regulations, and no resident can be forced to resettle. Nevertheless, several resettlement programmes have been successfully implemented.

For example, the *Donau Machland* project along the Danube River, removed 260 houses to create retention areas for excess water. The project cost a total of EUR 92 million in compensation payments. The project consisted of an integrated approach combining structural and non-structural measures, with the construction of a large dam and non-constructible area as empty lots to serve as retention zones as complementary protection. The process started in 1993 and saw a slow uptake of compensation offers at first. Consecutive flooding events increased the number of residents that agreed to move.

Source: (OECD, 2017[59])

Another type of non-structural measure, which is more difficult to implement is the displacement of the most vulnerable communities via resettlement. In Kazakhstan, this practice has been implemented in different regions, especially following large-scale floods. For example, in 2016 in the region of Kostanay flooding occurred in a dried up lake bed where many housing settlements had been built without proper planning or regulatory oversight. Due to the high risk of recurring floods in the area, local authorities decided on the resettlement of the community and offered new housing to individuals. DES expressed that by enacting this resettlement activity, they did not break any constitutional law and the community agreed to the decision. The decision-making process for resettlement can be more effective if done transparently by consulting with community members and ensuring the best use of public resources. While moving vulnerable communities can reduce risk exposure, participatory approaches can ensure that individuals are aware of the risks, boost self-preparedness and increase overall social resilience.

Oversight and monitoring of land-use planning and building codes

The effectiveness of non-structural measures that involve restrictions to land-use relies on setting up good incentive structures. Local authorities may have to deal with diverging interests, from public and private spheres, budget allocation decisions and demands for development. Along with developing risk informed land-use restrictions, urban planning and building codes, complementary monitoring and evaluation measures ensure implementation at the local level. In Kazakhstan the causes of building-code violations stem from the difficulty to enforce regulations and lack of oversight and monitoring. In addition, despite having legislations informed by hazard maps and risk assessments, there is a risk of issuing building permits in hazardous areas. The Institute of Geography and the DES of Almaty city and region expressed concern about the illegal developments on the foothills of Almaty city where landslides can be triggered by earthquakes,

as well as mudslides from torrential rains. Kyzlorda region also expressed concern that there are 56 villages located on river banks at high risk of flooding.

Despite legislation in place, more co-operation and co-ordination between the local administrators responsible for land-use, environmental protection and civil protection could boost risk informed decision-making and the adherence to different legislations surrounding land-use, urban planning and building codes. Some options for incentive structures could be fiscal such as added taxes for building in high risk areas or regulatory instruments with bans on construction in high risk zones. Another option to encourage adherence would be prescribe a law that excludes recovery assistance to illegal developments. A part of this framework on promoting non-structural measures should include providing hazards information in leasing agreements to renters and buyers. This could be supported by an insurance market that is engaged in the risk assessment process and set prices of premiums to reflect risk levels. Insurance coupled with building codes can serve as incentives for both buyers and builders to avoid zones at high exposure to hazards and implement mitigation measures (Kunreuther, 1996[60]).

In recognition of the importance to encourage adherence to building codes and land-use restrictions to deter development in hazardous areas and reduce exposure and vulnerability to disaster risks, some regional DES have been pro-active by giving recommendations and referring to risk assessments and hazard maps on discussions about urban design and land-use planning in local administrations. For example, the DES of Astana interacts with local stakeholders involved in urban planning to develop the Astana Program 2019-2020 which took into account flood risks and will lead to modifying the drainage and canal system. Atyrau regional DES ensures regular engagements with local architectural and town planning authorities to develop the general urban plan. They hold consultation processes surrounding new constructions to take into account risks based on experiences with previous events. East Kazakhstan DES shared their experience with water protection zones that are non-constructible areas designated by the owners of hydro-technical facilities. Technical requirements for those zones are passed to local authorities to oversee their implementation and restrict development. These activities aim to foster engagement between DES that hold risk information and hazard maps with local stakeholders involved in land use planning and urban development.

Building codes have been developed in seismic areas, and are a good example of non-structural risk reduction measures. So far these building codes remain limited to earthquake safety, but could be further expanded to the risk of floods and mudflows. In consideration of the high earthquake risk up to 10 magnitude and population density in Almaty region and city, building codes are being revised and updated. In order to integrate seismic safety into new building projects, a table has been developed illustrating different phases of new projects and the criteria that should be followed for constructing new structures. This includes codes on the number of floors and criteria of the foundation. There are also efforts to catalogue all structures in earthquake risk zones and review their status. The Institute of Seismology is assisting by providing data on objects and modelling of earthquakes at different levels from 7-9 magnitude. Findings led to the decision to develop building codes specific to Almaty city.

Mirco-zoning in seismic risk zones to draw up risk maps and relevant building regulations can be an effective risk reduction practice. In 2019 Almaty DES will develop city specific building codes and work with construction companies to decide on requirements such as the height and security levels for structures. In 2011 the state of Chiapas in Mexico at high risk to earthquakes implemented a similar project to develop city specific technical norms for constructions (OECD, 2013[61]). Learning from the Chiapas experience, it will be important to take into account several factors while developing revised building codes in Almaty city. Some issues to be considered are: a question about how and whether the existing stock of buildings can be adjusted to the new building codes and whether some of the existing older buildings should be teared down as they may be unsafe. It will also be important to simultaneously build local capacity and cost-sharing mechanisms, as well as set up monitoring, oversight and evaluation mechanisms.

Whole-of-society approach to cope with disaster events

A whole-of-society approach to prevention calls for engagement with businesses and the private sector, and to establish public private partnerships (OECD, 2014[18]). The private sector can offer resources, expertise and know-how for a range of critical risks and operational skills to manage and reduce the risk of exposure. Governance frameworks should incentivize the private sector to implement risk reduction measures and strengthen resilience against shock events to ensure continuity of operations.

In Kazakhstan, there is some engagement with the private sector at the local level in prevention. It was mentioned that arrangements for providing materials and resources. A good practice was found in the region of Pavlodar, where private businesses supported prevention projects by contributing unused gravel to build structural measures without added costs. In turn businesses were incentivized by ensuring their activities would operate in zones with decreased disaster risk of floods. Despite some good practices, currently the governance framework has a gap in promoting PPPs – where expanding the role of the private sector could increase capabilities and resources in disaster risk reduction across regions in Kazakhstan.

A whole of society approach in the governance of risk reduction further calls for engagement with civil society (OECD, 2014[18]). A first stepping stone should be to open up ways for communities to take part in risk reduction activities. The current framework on decision-making for prevention measures functions primarily on an exchange between sub-national government stakeholders and territorial departments of the CES. Certain initiatives are in place, such as public meetings and consultations that bring together local stakeholders to discuss draft laws and projects, which invite communities to participate as well as the private sector. In some regions these efforts are more prevalent than in others. For example in the Kostanay region, there have been opportunities for the community to offer ideas for prevention projects, and the DES has at times agreed to proposals. Across the board, comment periods are made available online on the e-governmental portal as part of Kazakhstan's move towards an open government. Strengthening awareness of these types of engagement in the decision-making process could strengthen a whole-of-society approach to prevention.

Communication of risk information and raising awareness

A whole-of-society approach to disaster risk prevention and mitigation calls for strengthening a risk culture by raising the population's awareness about risks and increasing the understanding of risk reduction activities (OECD, 2016[62]). Risk communication is increasingly invested in and developed in Kazakhstan –as part of meeting the goals in socio-economic development plans across the regions. Article 47 of the Law on Civil Protection 2014 provides the legislative basis for risk communication, on informing and promoting knowledge in the field of civil protection to the population about disaster risks. Article 12 specifies the structure of authorized bodies in the field of civil protection, which includes the function to inform and notify the population about disaster risks and their vulnerability and exposure levels. There are many raising awareness activities underway that are described this section.

Box 4.4. Raising awareness and promoting self-preparedness in the US: Ready.gov

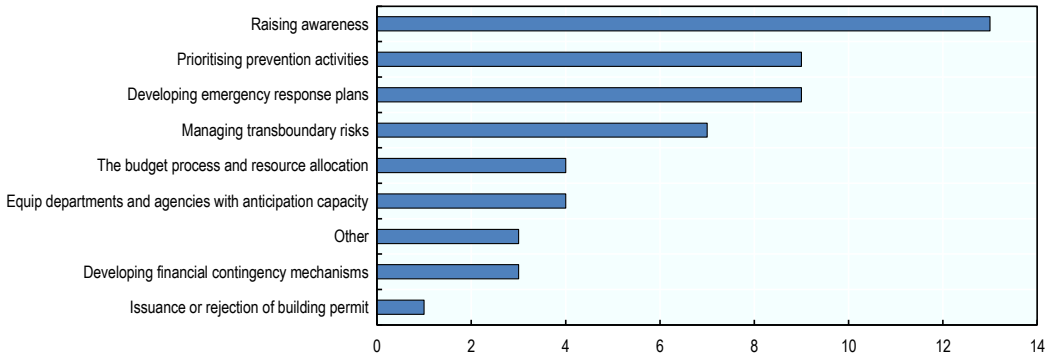
Raising awareness about disaster risks can strengthen community and household self-preparedness and a risk culture, as important components to building overall social resilience to adverse events. In the US in 2003, the Federal Emergency Management Agency (FEMA) launched a National public service campaign – Ready.gov- designed to promote preparedness through public involvement. The campaign offers informative tools about all kinds of risks and action plans to prepare for them. The platform educates and empowers American people to prepare for, respond to and mitigate emergencies, including natural and man-made disasters. The goal of the campaign is to promote preparedness through public involvement.

Ready.gov is built around four key messages: (1) stay informed about the different types of emergencies that could occur and their appropriate responses (2) make a family emergency plan and (3) build an emergency supply kit, and (4) get involved in your community by taking action to prepare for emergencies.

Source: (FEMA, 2018[63])

To support risk communication channels, both central level and regional authorities engage in raising awareness activities. The central level CES website provides consolidated information on different hazards, in addition to updates on any disasters that are occurring across the country. Regional and local authorities with support from DES prepare educational materials such as pamphlets and brochures on self-preparedness measures and advice on how to behave in different disaster scenarios. According to research and bilateral meetings with regional representatives from the DES, awareness raising across the local population is a principle task with many activities underway (Figure 4.1). Across several risk management activities, a majority of regional DES (13 out of a total of 16) agreed to use risk information to raise awareness. Many initiatives are underway to build a risk culture such as brochures, media and specialized training courses for communities and businesses.

Figure 4.1. Regional DES use of hazard maps



Note: Question "How do you use the information contained in hazard maps (e.g. to issue or deny building permits in exposed areas)?" Answers received: 16 out of 16 regional[1] DES respondents as of April 2018. Since June 2018 an additional region has been added – Shymkent.
Source: 2018 OECD Kazakhstan Risk Governance Survey, 2018.

DES at the regional and local level are important facilitators in leading raising awareness activities on disaster risks and vulnerability. Based on interviews during the fact-finding mission this form of inclusiveness in disaster risk prevention and mitigation is a strong aspect where many efforts are being made to encourage community and household self-preparedness. All DES conduct training for private sector representatives, visit schools to hold exercises with students, and conduct interactive sessions focused on a variety of characteristics of emergencies of the region. Information about risks and measures of self-preparedness are broadcasted on local TV channels, posted on the websites of the DES and distributed in social networks. Among the local population, employees of the DES organize the distribution of books, brochures and memos about the various risks of emergencies, such as fires, earthquakes, floods and mudflows. In Almaty city, where there is a high risk of earthquakes there is a special centre where CES lead trainings for businesses, and visit schools to carry out exercises with students. In 2016, Almaty city DES also co-ordinated work on raising awareness with books and brochures about different risks, such as fires and earthquakes disseminated to the local population. These various initiatives are especially important for rural areas that are difficult to access. To support building a culture of risk it will be important reinforce public awareness by making it required for buyers and renters for properties to receive risk information in leasing agreements.

There are efforts to target particularly vulnerable segments of society to disaster risks such as elderly, disabled persons and children. In 2013 Red Crescent Society in Kazakhstan in partnership with UNDP conducted a project on raising awareness and developing educational materials for disaster risk preparedness in several towns in the South-East and Eastern Kazakhstan that faces a range of natural hazards such as earthquake, extreme cold spells, floods and mudslides. The Red Crescent Society in Kazakhstan has featured an important role is this area by providing trainings in first aid, raising awareness in public health and vulnerability to disaster risks. More recently, in 2016 CES developed and introduced methodological recommendations for educational institutions to provide children with lessons on disaster

preparedness. Over the past two years, 8 social videos on children's safety have been prepared on fire safety, carbon monoxide poisoning, swimming, falling from windows, ice and snow, and first aid. With the support from the Ministry of Information and Communications, a systematic broadcast of these clips has been organized on national television channels.

Conclusion

Disaster risk reduction has been a priority policy area in the governance framework for critical risks in Kazakhstan. Structural measures have been widely developed, especially for flood and mudflow risk. Risk reduction indicators are set up in Road maps and ensure accountability and transparency of public resources for these structural prevention projects. Non-structural measures are slowly complimenting structural measures for a more integrated approach to disaster risk reduction. Policies surrounding risk-informed urban planning, land-use and building codes are being developed however require oversight and monitoring mechanisms to deter constructions in risk areas. Disparities of socio-economic conditions across regions mean that resources are not always available to implement risk reduction measures. Co-financing process may help ensure that prevention projects are equally developed and implemented across all the regions. Another aspect on financing investment in structural measures will be to consider the use of decision-making tools such as cost-benefit analysis into the overall framework.

Kazakhstan has made progress to build a whole-of-society approach to prevention and mitigation, through various risk communication and raising awareness activities. Education materials and risk information, including trainings are part of the country's efforts to build a culture of risk and incentivize self-preparedness. Further engagement with the private sector as part of these activities may be promoted to boost a whole-of-society approach to cope with disaster events.

Notes

[1] When the survey and fact-finding missions were conducted for this report in January and April 2018, there were 16 regions in Kazakhstan: Akmola, Almaty, Atyrau, East Kazakhstan, Karaganda, Kostanay, Kyzlorda, Magystau, North Kazakhstan, Pavlodar, South Kazakhstan and Zhambyl. As of June 2018 there are 17 regions in Kazakhstan. The region Turkistan was created in June 2018, when the city of Shymkent was separated from the former regions of South Kazakhstan, and upgraded to the same status as the cities of Astana and Almaty.

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Chapter 5. Disaster preparedness and response

This chapter describes the governance arrangements for emergency preparedness and response in Kazakhstan. It highlights civil protection capabilities needed to manage emergencies before, during and after an event.

Preparedness lies at the heart of civil protection. The main goal of disaster preparedness is to reduce the risk of possible disasters, and lower vulnerability levels. Effective preparedness measures can save lives and reduce the economic impact of disasters. The OECD Recommendation for the governance of critical risks recommends for countries to set up organizational structures, contingency planning and inter-agency communication to strengthen preparedness (OECD, 2014[18]). Governance arrangements should involve coordination mechanisms to pool together efforts of different levels of government and the necessary resources to prepare and respond to major events. Preparing for crises also means having monitoring and early-warning systems in place to detect crises before they occur and setting up relevant preparedness and emergency response plans. Strategic crisis management is an essential part of preparedness that involves leadership, coordination mechanisms, clear chains of command, communication channels and measures for scaling up to respond to crises.

In Kazakhstan, the governance of disaster risk management has tended to focus on preparedness, and building capabilities in crisis management and emergency response. Monitoring and early-warning systems have been widely developed for a range of natural hazards and there is room to improve them and expand analysis beyond seasonal forecasts. The Law on Civil Protection 2014 consolidated the legal framework in disaster risk management and aligned new standards in emergency response with clearly defined roles and responsibilities at the local level to manage crises. Civil protection services and emergency preparedness plans have been developed to prepare for a range of risks. Crisis management and response is coordinated with emergency response units in critical sectors across telecommunications, roads, power supply and medical services to ensure rapid restoration of services. These steps could be a way forward to establish a national critical infrastructure resilience program to boost a whole of society approach to preparedness. This chapter focuses on the current governance framework for disaster preparedness and crisis management in Kazakhstan.

Monitoring hazards and early-warning systems

Preparedness in Kazakhstan relies on monitoring and early warning systems for a range of hazards. Assessed disaster risks are communicated to key stakeholders and serves as a basis to draw up preparedness and emergency response plans. This section provides a synopsis of the stakeholders involved and governance arrangements for monitoring and early warning as they presently stand.

Many improvements have been made to strengthen monitoring and early warning systems for the risk of floods, landslides, mudslides, avalanches and earthquakes in Kazakhstan. Monitoring and early warnings of a range of natural hazards fall under technical and scientific agencies linked to ministries. This framework tends to focus on forecasting recurring seasonal risks and setting up relevant preparedness measures. Aside from natural hazards, industrial sites that use toxins and dangerous chemicals in their production processes are required to have monitoring systems in place and sensors to detect any potential accidents. Governance arrangements are aligned to hazard specific preparedness measures, and information exchange practices are in place to share monitoring conditions and forecasts to key government stakeholders. Communication channels have been set up to alert the population for different kinds of disaster risks along with organizational processes

to initiate contingency plans and emergency response (Ministry of Internal Affairs, 2015[64]).

High earthquake risk is concentrated in the southern part of the country, where the cultural capital Almaty is situated and major industries operate. A national observational system monitors seismic activity that is run and overseen by a number of technical and scientific agencies. This system collects and analyzes data daily. The National Centre for Seismological Observations and Research (NCSOR) conducts observations using a system of 62 seismological stations (NCSOR, 2018[65]). Complementary research is done by the Institute of Geography that has 6 seismic stations in the regions of East Kazakhstan, West Kazakhstan, Zhambyl, Akmola, Karaganda and Almaty; and a central data collection center is located in Almaty (Committee for Emergency Situations, 2015[9]). The central dispatch center operates round-the-clock and provides automated data processing from its own geophysical stations and from NCSO.

Forecasts and analysis of seismic activity inform preparedness such as drawing up contingency plans and preparing rescue units and resources in key locations. The exchange of forecasts about the potential occurrence of earthquakes is regulated by a joint order involving the National Centre for Seismological Observations, Institute of Seismology, Ministry of Internal Affairs, Ministry of Education and Science, and the Ministry of Energy. Meetings are held by the Institute of Geography to discuss potential areas of seismic risks, magnitudes and vulnerable settlements. Forecasts are submitted to several relevant stakeholders including: the Crisis Management Center run by the Committee for Emergency Situations (CES), the Science Committee at the Ministry of Education and Science, and to regional authorities – the mayor of Almaty City and of Almaty Region – where earthquake risk poses a major concern for the community and industrial activities. The DES of regions in earthquake risk zones draw up emergency response plans that involve local governments and the private sector.

Effective alert systems to warn the population about an earthquake can save lives. To alert the population about an earthquake, the regional DES play an important role and have set up multiple communication channels using sirens, TV and radio broadcasting, and media briefings. The Almaty Department for Emergency Situations (DES) has established a system to provide information to the public via SMS. This system is regulated by an agreement between Kazakhtelecom, a major national telecommunications operator in Kazakhstan and the Ministry of Internal Affairs. The agreement ensures issuance of alerts and the functioning of communication channels with the population during a crisis. Recently, there has been discussion to upgrade to a more technologically advanced warning system using a telephone application. In recognition of the important role that early-warnings play in preparedness, the DES in earthquake prone regions are working to improve alert systems.

On monitoring flood and weather-related risks, the national hydro-met service Kazhydromet is the principle actor that collects data and monitors the risk hydrological and meteorological phenomenon. A system of hydrological observation stations and gauges across rivers and reservoirs monitor flow and discharge rates, water levels and potential conditions for flood risks (Kazhydromet, 2017[66]). There are smaller branches of Kazhydromet in different regions in Kazakhstan that are assigned to monitor specific major waterways and watersheds,

basins and reservoirs. 24/7 surveillance is conducted on major rivers, with support from Water Basin Inspection units and the owners and operators of hydro-technical facilities. Kayhydromet coordinates and gathers data on recurring seasonal flood risk using information on seasonal conditions, precipitation levels, changing temperatures and snow melt, and helps to identify areas where disasters are most likely to occur.

To facilitate information sharing about potential flood risks across the territory of Kazakhstan, a joint-order guides information exchange across central level institutions between the Ministry of Energy, Kazhydromet, and the Ministry of Internal Affairs. The order aims to ensure rapid information processing and delivery to the Crisis Management Center in the CES in the case of a risk of a major hydrological event and storm. If water levels start to rise and a maximum level is exceeded this information is passed from Kazhydromet to CES who has the responsibility to issue warnings and communicate potential crises to the DES and local authorities in vulnerable areas. Local authorities are in charge of communicating flood risk to the local population. Monitoring and communicating the risk of storms and weather-related disasters involves similar organizational processes between the Kazhydromet and its regional branches that interact with regional authorities (Akims of the oblasts) and DES, on a procedure to make alerts and warnings to stakeholders. This schema organized between local authorities and DES defines roles and responsibilities to communicate alerts to the population.

Many rivers in Kazakhstan flow across different regions as well as are shared with neighboring countries requiring for transboundary information sharing on monitoring and early-warnings of flood risks. In this case, monitoring of upstream and downstream risks relies on exchange of information between regional authorities, internal to Kazakhstan and with neighboring countries. For example, the Ural river is known to cause flooding in Kazakhstan and has it's upstream segments in Russia before passing downstream into the region of Atyrau in Kazakhstan and finally flowing into the Caspian sea (Zhumbayeva, 2017[67]). Water Basin Management units are in charge of monitoring different sections of the river and coordinate with branches of Kazhydromet to monitor water levels. These stakeholders exchange information with the Russian regional counterpart in the Volgogradsky oblast as well as with two neighbouring regions in Kazakhstan that the river passes through. Agreements are in place on the exchange of information on water retention and release upstream, as well as the potential of flood risks. The Akim are involved in this process of information exchange from all regions in Kazakhstan and Russia to ensure preparedness measures are in place to cope with transboundary flood events.

Communicating early-warnings to the population about the risk of storms and other weather-related risks have been developed, and there are efforts to improve the systems in place. The National Meteorological Service, Kazhydromet, has produced an online interactive map providing up-to-date weather conditions and potential risks using a color coding system (Kazhydromet, 2018[68]). However, it does not communicate real-time data nor transmit early-warnings about potentially dangerous weather conditions such as hurricane like winds and storms. Instead the agency provides data to stakeholders in charge of crisis management who have the role to issue official warnings to vulnerable populations through various communication channels. On monitoring and early warning capabilities for storms and other weather-related risks some criticism has been made on the need to

reinforce the monitoring system with additional radars that would capture more precise information on weather conditions across Kazakhstan.

Box 5.1. Early warning and setting up preparedness measures for seasonal floods in Kazakhstan: the case of the April 2015 floods

Kazakhstan faces yearly seasonal flooding and has set up a system of early warning to monitor river flows, discharge rates and snowmelt. However, catastrophic flooding occurred in April 2015 across Northern Kazakhstan and resulted in the evacuation of 7000 people and thousands of livestock and cattle. The flooding was caused by a sharp increase in temperatures causing rapid melting of snow which overflowed rivers and damaged bridges. One area was also impacted by the failure of a recently built hydroelectric dam (Jumabek) that had been washed away yet was just built the previous year. In the Karaganda Oblast several power transmission towers were destroyed cutting off power to at least 6 settlements. In addition, floods damaged roadways and bridges cutting off transportation.

The National Meteorolgical Service Kazhydromet had been monitoring autumn moisture and winter snow which exceeded normal amounts, and had released forecast warnings for potential flooding in February 2015. These warnings lead to preparations of materials and resources early on in order to be ready to respond to dangerous flooding situations. Based on data and early preparations, civil protection units at the central level (CES) and regional (DES) were able to respond timely and cope with the situation.

Source: (Urazova and Kuzmina, 2015[69])

There is also room to improve monitoring and early warning capacities of flood risk. Regional DES expressed the need to update the network with more gauges and an electronic automated system that indicate the level of water along different parts of the river. Currently the system operates with some automated gauges and a majority of manual components requiring an updated and more technologically advanced system. In particular, Kazakhstan authorities and Kazhydromet show interest to develop real-time information capabilities. There are discussions underway to create an online color-coded map that would inform the population in real-time about weather related risks and floods. OECD found that some regions are cooperating with the national space agency Garysh Sapari for the purpose of monitoring disaster risks. Space imagery can help identify high concentrated snow areas that could lead to floods in the spring as well as indicate the path of wildfires. Fostering further cooperation between all DES and the national space agency would strengthen monitoring capabilities for potential disasters.

Monitoring of mudflow and avalanche risks is conducted by the state agency Kazselezashchita of the Committee for Emergency Situations in the Ministry of Internal Affairs using year-round and seasonal posts (Kazselezaschchita, 2016[70]). There are also stations set up that measure the height of snow throughout the season to detect potential floods and mudslides. The system is composed of 64 year-round posts, 19 seasonal and 6 additional observation posts located in mudflow basins (Committee for Emergency Situations, 2015[9]). There are 30 dispatching points operating around-the-clock that transfer data to the main dispatch centre of Kazselezashchita located in Almaty. Complementary ground surveys are carried out to monitor conditions of mudflow and avalanche prone areas. Based on a joint-

order between the Ministry of Energy and the Ministry of Internal Affairs, there is an exchange of information on monitoring and early-warnings for mudflow hazards across several stakeholders involving: the Crisis Management Center, DES of Almaty city and the Almaty region, Kazselezashchita, Kazhydromet, the Ministry of Energy, and the Committee for Water Resources.

Wildfires in forest areas and the steppe have increased exponentially over the last few years, and require monitoring and early warning systems to detect potential disaster risks . In order to monitor and rapidly detect the onset of wildfires, space monitoring services are provided by the national space agency Garysh Sapari. In addition there are 294 observation towers across Kazakhstan (Committee for Emergency Situations, 2015[9]). The Republican enterprise Kazavialesohrana is in charge of protecting forests from wildfires and carries out aviation patrol (Kazvialesohrana, 2018[71]). During seasons when there is a high risk for wildfires, patrolling operations increase. In regions where wildfires are especially at high risk - North Kazakhstan and East Kazakhstan interactive video surveillance has been installed which allow to quickly detect the onset of fires.

In addition to natural hazards, owners of industrial sites that use hazardous materials in production processes are required to put in place monitoring and early warning systems. These measures fall under safety requirements under Article 16 in the Law on Civil Protection (Republic of Kazakhstan, 2014[26]). The legislation includes specific provisions to establish monitoring, communication and support systems in the case of an incident and to ensure sustainable operations. Owners are required to conduct risk assessments and implement preparedness measures, such as early warning systems, action plans and reserves of material and financial resources to cope with an incident. These plans are submitted to regional DES and local authorities. Preparedness includes regular trainings and exercises with employees. The process for communication of risks during an incident is less clear, where setting up a clear communication strategy could strengthen preparedness to cope with industrial accidents.

Governance arrangements for preparedness

Central level

Preparedness in Kazakhstan follows two policy trajectories, the development of general emergency plans and short-term seasonal preparedness measures. Preparedness for large-scale disasters involves emergency planning across central level institutions coordinated by the CES. A national preparedness plan was developed in 2015 by the Ministry of Internal Affairs and the project coordinated by the CES “Preparedness Plan of the Republic of Kazakhstan for Natural Emergency Situations” (Ministry of Internal Affairs, 2015[64]). It is a comprehensive document outlining all natural hazards and socio-economic vulnerabilities, monitoring and early warnings systems for hazards, and the regulatory and legal framework in Kazakhstan in the field of civil protection. This includes information on roles and responsibilities of stakeholders, material reserves and requirements to prepare for natural disasters internal Kazakhstan, and information on international cooperation in preparedness.

Central government ministries are consulted on preparedness and emergency planning – involving the Ministry of Agriculture, the Ministry for Investment and

Development, the Ministry of Education and Science, the Ministry of Finance, the Ministry of Energy, and the Ministry of National Economy. Within this framework to build preparedness for disaster risks, several ministries set up civil protection services across important sectors for example transportation, roads, telecommunications, information services, fuel services, power systems, medical services, trade and animal protection services. These emergency services often involve state-owned or semi-private companies that provide internal rescue teams and equipment across regional branches in the case of crises. For more detailed information. Box 5.2. provides a comprehensive list of all civil protection services organized by ministries. Each of these services has sub-national branches with equipment, resource and specialists teams ready to respond to local scale disasters.

To promote multi-disciplinary perspectives and inter-sectoral dialogue on preparedness, the Interdepartmental State Commission on the Prevention and Elimination of Emergency Situations (Inter-Departmental Commission) brings together stakeholders to discuss how to prepare for and manage crises. As an advisory and consultative body, the Inter-Departmental Commission engages multi-disciplinary expertise bringing together representatives from ministries, local governments, scientific organisations and industry to identify vulnerability to disaster risks and draw up preparedness plans. Non-governmental organizations also participate, where the head of Red Crescent Society in Kazakhstan sits as a permanent member. Based on an exchange of information across governmental stakeholders, private sector and civil society, the Inter-Departmental Commission provides recommendations to regional authorities on preparedness measures for disaster risks.

The Inter-Departmental Commission meets annually to review preparedness and emergency plans, as well as seasonally before the turn of the season known for floods (beginning in February) and wildfires (starting in March) to discuss short-term preparedness activities. In this way the Inter-Departmental Commission ensures exchange of information and expertise on risks across stakeholders as well as coordination of preparedness activities involving different regions. Short-term preparedness planning is an important component of the governance framework for the management of critical risks in Kazakhstan on account of recurring seasonal risks. Meetings are held prior to the season for floods and wildfires to discuss information on water level forecasts, snow reserves and precipitation and the risk of floods and mudflows in vulnerable parts of the territory. Based on this data, priorities are set for intermediary structural measures and arrangements are made for capacity reserves of materials and rescue supplies.

Box 5.2. Civil Protection Services provided by Ministries in Kazakhstan

The Republican Civil Protection Transport Service (established under the Ministry for Investments and Development) clarifies the calculation for the necessary transport means of the evacuated population. For the provision of evacuation measures, vehicles (trucks and bus transport) as well as aircraft of 8 airlines (including for evacuation) are on stand-by.

The Republican Service of Roads and Bridges (established under the Ministry for Investment and Development) have resources ready in the case of disaster to recover transport networks. The service includes civil protection personnel, engineers and automotive vehicles. The service provides operational and technical cover for evacuation routes across Kazakhstan.

The Republican Civil Protection Communication Service (established under the Ministry of Information and Communications) works on emergency recovery with the joint stock company Kazakhtelecom to keeps ready emergency and recovery communication teams, personnel and special equipment. Kazpost JSC has branches and back up services throughout the country on standby. In addition, there are emergency power generators.

The Republican Civil Protection Information Service (established under the Ministry of Information and Communication) has set up low-power radio and television stations with the joint stock company Kazteleradio. There are also backup sources of energy, including stationary and mobile backup sources.

The Republican Civil Protection Fuels and Oil Service (established on the basis of the Ministry of Energy) has set up emergency personnel and equipment to calculate and provide fuel and oil for the transport service and for vital activities to evacuate the population.

The Republican Civil Protection Power System Service (established under the Ministry of Energy) has set up emergency personnel and equipment to address power supply. If the power supply system is disrupted, the temporary power supply scheme is restored by the civil protection energy engineering forces within 1-2 days; the basic scheme operates for 7 days.

Republican Civil Protection Medical Service (established under the Ministry of Health) has set up preparedness measures for hospitals and blood transfusion centres. In addition, sanitary aviation aircrafts are also ready in standby mode.

The Republican Civil Protection Trade Service (established under the Ministry of National Economy) has set up emergency mobile supply stations, food supply points, and warehousing facilities.

The Republican Civil Protection Animals and Plants Protection System (established under the Ministry of Agriculture) set up personnel and equipment to address animals during disasters. The service includes bio-thermal pits, primitive cattle cemeteries, slaughter sites, slaughter units, and meat processing plants. Stocks of feed are harvested, including hay, silage, straw, as well as a reserve of veterinary drugs for veterinary and prophylactic and other treatments for animals.

Source: 2018 OECD Kazakhstan Risk Governance Survey, 2018

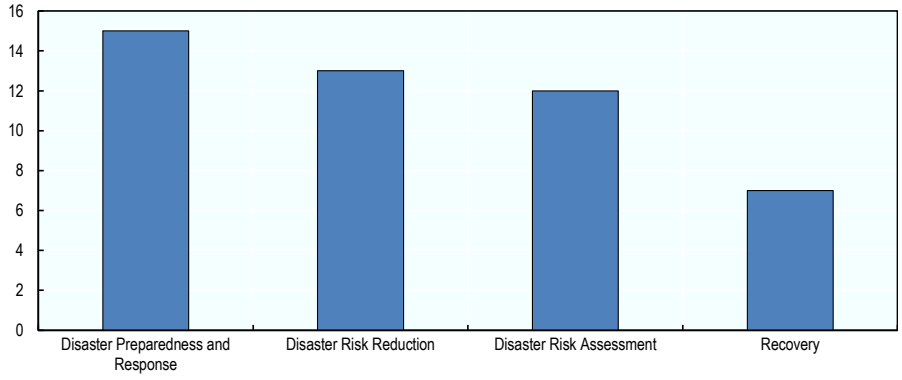
In addition to natural hazards and industrial accidents, the risk of terrorism has been addressed in the legislative framework in 1999. Norms have been introduced to build preparedness and emergency response to the risk of terrorism. With the legislation, video surveillance and 24/7 monitoring of important sites has been set up, and plans related to the risk of terrorism are developed by DES and have to be approved by central level government.

Regional and local preparedness

Preparedness and emergency response plans fall within the framework of Security Passports led by regional DES. Pre-crisis plans for every region are drawn up at a regional level and local level based on assessments on the number of vulnerable villages in vulnerable areas, how many people are at risk, and how many people may need to be evacuated in the case of different disaster scenarios. Based on assessments, preparedness plans are drawn up which include an inventory of resources, rescue teams and equipment; also the identification of routes for evacuations and areas of accommodation for evacuated persons. As a working document preparedness plans for crises are updated and reviewed regularly.

The regional DES has a lead role in driving preparedness planning as one of their core tasks. They develop regional and local emergency response plans and support local authorities in crisis management. Preparedness and response are responsibilities the DES carry out aligned to the goals in the National Security Strategy to reduce the consequences of disaster risks Figure 5.1.

Figure 5.1. Preparedness as part of contributing to the goals in the National Security



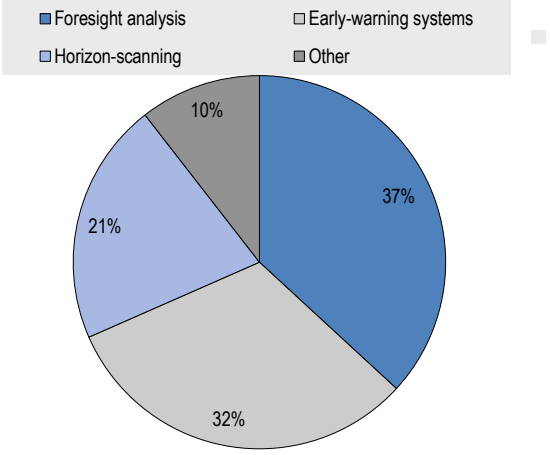
Note: Question: "Does your organisation contribute to achieving the goals set out in the national security strategy in the following phases?" Answers received: 16 out of 16 regional[1] DES respondents as of April 2018. Since June 2018 an additional region has been added – Shymkent.
Source: OECD Kazakhstan Risk Governance Survey, 2018.

DES draw up preparedness and response plans by evaluating two potential situations: one potential situation where the local and regional level can cope with the event using their own resources and a potential situation where other regions would have to step in. Some regions use multiple scenarios to draw up preparedness plans. There are efforts to inform preparedness planning by using multiple scenarios and evaluate interdependencies across risks and critical industrial operations in the region where possible damage to buildings and facilities could

disrupt services of energy, gas, water and transport systems. Multiple scenario analysis could support capability building in preparedness and crisis management. Extending risk assessments can help expand an understanding of interdependencies of risks, and the risk of seasonal hazards to important industrial activities; as well as evaluating vulnerabilities that may change over time and impact these kinds of risks.

Effective preparedness is about preparing for traditional crises and looking into the future for emerging and complex crises (Baubion, 2013[72]). DES engages with relevant organizations to share information on forecasts and analyses of seasonal risks. Long-term risk analysis is less developed such as the use of foresight analysis and horizon scanning. While 37% of DES use foresight analysis, this kind of analysis is mainly attributed to short-term forecasting of seasonal risks. Furthermore, only 21% of DES practice horizon scanning. Both these practices could foster long-term risk thinking and strengthen preparedness for traditional and complex emerging risks (OECD, 2016[46]). These kinds of practices could also help to better understand the underlying drivers of vulnerability and inform preparedness.

Figure 5.2. Methods to detect crises before they occur at the regional level



Note: Question: "Does your organisation attempt to detect crises before they happen?" Answers received: 16 out of 16 regional DES respondents as of April 2018. Since June 2018 an additional region has been added – Shymkent.
Source: 2018 OECD Kazakhstan Risk Governance Survey, 2018.

Preparedness and emergency planning within the framework of Security Passports involve a wide range of stakeholders. This includes local civil protection units, emergency response teams as well as operational services from key industrial sectors such as gas, electricity, water and telecommunications to ensure supplies are uninterrupted during crises and/or operations are restored rapidly. For example Box 5.3 illustrates a part of the Zhambyl Security Passport, which involves a multi-stakeholder platform for preparedness planning and emergency response to hydrological risks (Zhambyl DES, n.d.[73]). It involves civil protection units and emergency rescue units from key industrial sectors. This multi-stakeholder platform appears to be a widespread practice across regions in developing

preparedness, and supports multi-disciplinary exchange on the understanding of potential crises. Although a good practice to promote inclusiveness in the governance of preparedness, the communication channels, coordination mechanisms and chain of command during a crisis is not so clear across all these stakeholders.

Box 5.3. Zhambyl Security Passport: multi-stakeholder emergency preparedness for hydrological risks

Each regional Security Passport provides a list of stakeholders involved in the governance of preparedness and crisis management for different disaster scenarios. In the case of hydrological risks in the region Zhambyl, the following units and assets are involved in crisis management and to support evacuation of the population:

The State institution for firefighting and emergency rescue service of the Emergency Situations Department of the regions, DES of the Zhambyl region, regional branch of Kazselezashchita, 11 units of emergency response with a strength of 700 people, equipment - 256 units, equipment, emergency technical teams for electricity networks (JSC Zhambyl electric networks), emergency technical teams for heating networks (JSC TarazEnergyCenter), emergency technical teams for gas networks (Kaztransgaz-Aimak), emergency technical teams for water distribution networks (Taraz SU - State Utility Enterprise), emergency communication technical teams (JSC Kazakhtelecom), emergency services for roads and bridges (Kazahavtodor), medical services, trade and food services, transport services and rescue teams.

Source: (Zhambyl DES, n.d.[73])

Preparing for seasonal flood risk and earthquakes

In addition to the development of general preparedness and emergency planning led by the DES in the framework of Security Passports, preparedness involves annual multi-stakeholder meetings to discuss seasonal risks such as floods, mudflows and wildfires. Every turn of the season, regional authorities and the DES meet with local authorities to discuss the hazards and particular areas of vulnerability. Similarly, to the Inter-Departmental Commission at the central level, a subnational level Inter-Departmental Commission provides a multi-stakeholder platform to exchange information at the local level and discuss preparedness measures for seasonal hazards. Discussions aim to facilitate pre-crisis plans that may require scaling up and coordination of inter-regional response efforts. The platform also discusses additional measures for the season such as initiating letters of notice and recommendations to local authorities in districts and rural settlements in vulnerable areas, as well as to farmers to prepare agricultural space and livestock, and to owners of industrial sites. In this way, a whole-of-society approach is adopted for preparedness against seasonal risks by communicating risk and incentivizing local farmers and operators to mobilise their own resources before seasonal hazards. Furthering these efforts to reach households could also incentivize individual and community preparedness.

Specifically preparedness for flood risks involves legislation on the provision of different options to manage over capacitated river systems as part of integrated water management. This includes provisions on diverting water into major lakes

and floodplains where there is less asset exposure. For example, Kyzylorda regional DES discussed certain policies in place for the transit of excess waters into rice fields. There are identified points for gathering water and canals to diverge water into low asset areas. These areas are decided on prior to the flood season – upon agreement with owners of farms and agricultural space under a Memorandum of Understanding. The process includes a registry of farms and the amount of cattle and livestock; and identification of special areas where livestock should be moved to in the case of floods or divergence of water into agricultural space.

Preparedness planning in Kazakhstan for flood risk also involves interaction across regions and with neighbouring countries to address several major transboundary waterways. Regional authorities and the DES work on preparedness for flood risk and transboundary waterways, including information exchange and communication of risks with neighbouring countries that share major rivers. For example, during flood season periods it is required for the region North Kazakhstan to transmit official information on data about water resources with Russia. Exchange of information is made on flow rates, the level of water in reservoirs, and a schedule for the release and containment of water upstream in Russia. Information sharing supports early-warnings and necessary lee-way times to trigger emergency response plans in case of major floods. There are transboundary exercises with the Russian Federation to ensure good communication channels are established. The DES in the North Kazakhstan region engages in joint exercises with the counterpart of regional civil protections services in Russia in trainings to extinguish fires, floods and practice early warnings. Similar practices is also conducted with other cross-border regions.

In earthquake prone areas such as in Almaty region and city, as well as Zhambyl, the DES have developed preparedness measures and emergency response plans for major earthquakes. This includes an evacuation plan with points around the city where to gather people. There is also a plan on mass graves and additional material reserves, instructions in place to organize support and supply of resources from other regions. There are also operational plans in place addressing all state services needed to respond to major earthquake, including a plan on transportation, buses, and routes to evacuate the population. There are agreements with other regions in order to determine how to transport people.

Engagement with the private sector and civil society in preparedness

Engagement with the private sector and civil society can boost preparedness by encouraging businesses to develop business continuity plans and promote community and individual household preparedness. In the current framework, small and medium-size businesses play a limited role in interacting with government stakeholders in preparedness. All industrial organizations fall under provisions listed under Article 16 in the Law of Civil Protection which sets specific safety requirements. In addition, facilities that use hazardous substances in production processes have to adhere to additional legislation under Article 16 that requires for owners and operators to analyze the causes of accidents or incidents and implement prevention and preparedness measures (Republic of Kazakhstan, 2014[26]). In the case of an accident, the site is required to immediately inform territorial subdivisions of industrial safety in the local administration and the DES. The DES alert the population located in vulnerable zones about the incident and any injuries that have occurred. Industrial sites are required to develop action plans

for response in parallel to ensuring reserves of materials and finances to cope with incidents as part of preparedness and emergency planning.

Civil society has an emerging role in the governance of preparedness in Kazakhstan. The Red Crescent Society is the only non-profit humanitarian organization in the country. It is involved in many preparedness activities including trainings and exercises with the community and government stakeholders (Kazakh Red Crescent, 2018[74]). The main activities of the organization involve preparation and response to emergency situations, coordinated with regional DES.

To better cope with the effects of natural and man-made disasters all available resources need to be mobilized across a multi-level government and a wider stakeholder group (OECD, 2014[18]). While government capabilities can be overwhelmed, preparing for disasters requires participation from businesses and communities. A community-centric approach as adopted in the US by FEMA for emergency management focuses on strengthening and leveraging what works well in communities on a daily basis Box 5.4. Such an approach offers a more effective path to building societal security and resilience.

Box 5.4. A Whole Community Approach to Emergency Management in the US

In 2012, the Federal Emergency Management Agency (FEMA) introduced a Whole Community emergency management strategy to coordinate all levels of government, increase individual preparedness, and engage with members of the community to strengthen resiliency and security of the United States. The Whole Community Approach to Emergency Management engages government at all levels with communities and individuals when responding to disasters. It provides a strategic framework to guide all members of the emergency management community and provides an overview of core principles, key themes, and pathways for action. This new approach provides a starting point for those learning about Whole Community approaches, or looking for ways to expand existing practices and to begin more operational-based discussions on further implementation. These three principles — understanding and meeting the actual needs of the whole community, engaging and empowering all parts of the community, and strengthening what works well in communities on a daily basis—provide a foundation for pursuing a Whole Community approach to emergency management through which security and resiliency can be attained.

Source: (FEMA, 2011[75]) (OECD Toolkit for Risk Governance, 2018[76])

Strategic crisis management

Strategic crisis management is a key component of preparedness and involves governance arrangements to best cope with traditional crises and prepare for novel crises in an evolving risk landscape (Baubion, 2013[72]). Strategic crisis management calls for forward-looking approaches using a multi-disciplinary perspective to better understand complex crises that may arise. Governance should involve robust leadership to coordinate stakeholders and resources, and communication channels to inform stakeholders and the population.

Leadership and crisis communication

In Kazakhstan the governance of crisis management involves a clear leadership arrangement, multi-level reporting and communication channels within government and some engagement with key industrial sectors. The Law on Civil Protection adopted in 2014 redistributed new functions in disaster risk management and in particular in the phase of crisis management and emergency response. With the new legislation, responsibility for preparedness and drawing up emergency plans remained with the DES; however crisis management was transferred from the DES to local authorities (Akims) at the city and regional level. With the current framework local authorities have the obligation to lead response to any kind of disaster that occurs in their jurisdiction. OECD research suggests that before this change in legislation, every organisation was responding based on their own competencies. With the new consolidated framework, the Akim of the region (governor), and the mayor of the city (Akim) are the lead actors in emergency response depending on scale of event, and coordinate different stakeholders. The DES acts as deputy to the regional and local Akim by providing information, data and recommendations on the management of the crisis.

Leadership of crisis management in Kazakhstan depends on the scale of a potential disaster. There are internal instructions and plans for different levels of disasters that indicate coordination mechanisms, reporting requirements and the activation of civil protection services. At the smallest scale such as an industrial accident it is primarily the owner of the facility that manages the situation using internal teams and resources. Industries are required to set up emergency plans relevant equipment and resources to cope with accidents. If an accident extends beyond the capacity of the site, then an operational response is coordinated by local authorities with the support of local DES and additional civil protection services. In the case of a disaster at the village level, the Akim of the village reports to Akim of the district. If the emergency happens at the district level the Akim of the district reports to the Akim of the region (oblast) and regional civil protection units are involved to cope with the event. A disaster that reaches a regional level requires for the regional Akim to report to the Prime Minister. If the disaster is considered a national disaster, such as involving two countries, it is the role of the central level CES to manage it and reporting is done directly to the Prime Minister and President.

Communication of crises across a multi-level government is clear and reporting requirements are set up across scales of disasters. However criticism has been made on transparency and openness of communication of crisis management to non-governmental stakeholders such as civil society organizations like the Red Cross and communities in vulnerable areas. Crisis management appears to operate in a top down approach, where more inclusiveness and setting up multiple two-way communication channels could support open and transparent dialogue about the crisis across stakeholders and the population.

The crisis management framework has set up coordination mechanisms to mobilise stakeholders and resources as discussed in Security Passports and preparedness planning. Crisis management also involves coordination mechanisms with neighbouring regions to allow for scaling up emergency response. When regional capacities are insufficient, plans are in place to ensure neighbouring regional DES can intervene to provide additional resources and support crisis management operations. For example, in 2015 floods hit multiple settlements across the

following regions: Akmola, Karaganda, Pavlodar and East Kazakhstan (IFRC, 2015[77]). Due to the need to initiate intense evacuations and provide materials across several regions – the Prime Minister entered the situation; and the management of the emergency was coordinated across regional DES in addition to support from the CES and civil protection services linked to ministries.

Strengthening critical infrastructure resilience

OECD governments are strengthening preparedness and building national resilience by developing policy frameworks to increase the resilience of critical infrastructure (OECD, forthcoming[39]). The resilience of critical infrastructure is also highlighted in the Recommendation to strengthen the capacity of vital services to be able to withstand and cope with shocks, and restore functioning rapidly (OECD, 2014[18]). Critical infrastructure is defined as those vital services to the functioning of society and the economy. Disruption to the supply of essential services can incur high economic losses and threaten national security. In most advanced OECD countries, a strategic national policy program for building critical infrastructure resilience and protection have been set up.

The governance of critical infrastructure resilience includes identifying critical sectors, conducting criticality assessments, assessing sectoral risks and vulnerabilities, building public private cooperation and information-sharing platforms, and using policy tools to create incentives to invest in resilience measures (OECD, 2018[41]). They also should addressing the interconnectedness and interdependencies of modern complex systems where disruptions may lead to cascading effects across sectors and economies. One example of such a strategy is found in Sweden, Box 5.5presents the National Critical Infrastructure Protection Strategy- a comprehensive strategy aimed at strengthening the resilience of critical infrastructure. The strategy involves coordination mechanisms to across all stakeholders: multi-level government, business representatives, civil society and private owners and operators of critical infrastructure.

Box 5.5. Sweden: the National Critical Infrastructure Protection (CIP) Strategy 2012

In Sweden, the National Critical Infrastructure Protection Strategy is a comprehensive strategy that aims to strengthen the resilience of Sweden's critical infrastructures. The strategy sets up a coordinated approach amongst all actors. Resilience in this context can be defined as the buffering capacity of critical infrastructure to absorb disturbance while still retaining essentially the same function as prior to the disruptive shock (OECD, 2014a; Chang et al., 2013). This definition includes the ability to withstand shocks without loss of functionality, limiting the duration of service interruption as well as minimising the recovery time.

Based on these considerations, the goal of the National CIP Strategy in Sweden is subdivided into two areas: Strengthening the robustness and flexibility of critical infrastructures and improving cooperation across critical infrastructure subsectors. The strategy aims to strengthen the robustness and flexibility of society, the economy, and the state (national, regional and municipal agencies) to any shock events, and to ensure the effective and rapid relief in the case of an adverse event. These goals are to be attained by improving integrated protection through a concerted and coordinated approach.

Source: (MSB, 2014[78])

In Kazakhstan, a national critical infrastructure security and resilience program has not yet been developed. However, certain efforts are in place to engage with owners and operators of important infrastructures in preparedness and emergency response planning to ensure services continue running in case of disasters. Preparedness outlined in regional Security Passports identifies three critical infrastructures – defined as 'communal life support system': heating, energy and water systems (Zhambyl DES, n.d.[73]). Regional DES take an index of these 'communal life support systems' in their region, and draws up preparedness plans based on interaction with owners and operators of the facility. For example, in the Security Passport of the Zhambyl region, the energy company Zhambyl Electric Networks is listed as an important supplier of energy in the region and at risk to major earthquakes that could disrupt supply of electricity. The Security Passport identifies where substations are located in seismic zones and if a major earthquake were to occur, the minimal amount of time services would be disrupted and an inventory of backup systems in place (Zhambyl DES, n.d.[73]). Similar analysis is made for the risk of floods and potential disruptions to the energy network.

In addition to the sectors mentioned in Security Passports (heating, energy and water systems), there are sectors traditionally categorized as critical in OECD countries that fall under the Civil Protection Services in associated sectoral ministries – such as telecommunications and transport networks. Critical infrastructures in Kazakhstan are mainly semi-private or state-owned enterprises and are required to keep services running and restore supply in the case of a disruptive event. For example to ensure communications continue during disasters, Kazakhtelecom – a major telecommunications operator under the Ministry of Information and Telecommunications participates in Inter-Departmental Commission meetings in order to discuss how to prepare lines of connection and networks if a major disaster would occur. Incentives to strengthen resilience of the

telecommunications network relates to the company subject to 3rd party liability – in the case of disruption of activities for an extended period of time. In 2017 with in order to improve business continuity planning, Kazakhtelecom developed a "Plan for actions for the management of business continuity of Kazakhtelecom" (Kazakhtelecom, 2017[79]). In the transport sector KazakAvtodor, a 100% state owned enterprise is a major roads network regulator and operator. KazakAvtodor is required to coordinate with the Roads Committee in the Ministry for Investments and Development to maintain roads under any conditions and against all hazards. Provisions of preparedness include certain activities to prepare roads against floods, snow and other hazards, and to ensure they can be used by emergency response teams. These activities between government and operators of telecommunications and the transport network provide a starting point to foster information-sharing platforms, partnerships and cooperation with other sectors as part of building a comprehensive critical infrastructure resilience strategy.

In many regions, training and exercises involving the DES with critical infrastructure operators are also an integral part of the preparedness framework. Atyrau region along the Caspian Sea hosts a large off-shore oil industry. To support preparedness measures in this critical sector, exercises are done with owners and operators. The DES of Atyrau took part in a training in September 2017, which included the major oil and gas company the North Caspian Oil Company. In addition, in August 2017, a comprehensive exercise was organized by West Kazakhstan DES on preparing for a large-scale accident at a hazardous facility that produces hydrocarbon – the LLP "Zhaikmunai" company. Stakeholders from the Saratov region in the Russian Federation took part in the exercises as observers.

To incentivise critical infrastructure owners and operators to implement resilience measures, there are sanctions in place for the disruption of services or major accidents. For example, in East Kazakhstan, there was a problem with containers that hold sewage waste, and an accident at a facility resulted in toxic material flowing into nearby water resources. Following the event, a prosecutor came and assigned 4 million tenge (approximately USD 11 000) as a fine to the owner of the facility. Similar sanctions and tariffs apply to all owners and operators of important infrastructure sectors in case of accidents or inability to restore the supply of services rapidly.

Box 5.6. Setting up a national critical infrastructure resilience strategy: some first steps

Some first steps to designing and implementing a national critical infrastructure security and resilience program are identified. These steps are supported by a governance framework that clarifies roles and responsibilities of the private and public sector and has strategic goals and targets for critical infrastructure resilience.

- Define the sectors that are critical

A necessary first step is to define the sectors considered critical. Criticality assessments help to identify assets, systems, and networks and their level of criticality. Assessments include potential public, economic, environmental, and political impacts in the case of disruption and the potential of cascading effects.

- Assign a coordinating ministry to draw up directives for national security

Designate a lead institution to reinforce and coordinate critical infrastructure resilience policies. The coordinating ministry should ensure implementation of policies by sectoral ministries, but it does not substitute regular communication between sector specific ministries and operators

- Designate the operators to draw up operational security plans

Identify operators of critical infrastructure and have them draw up preparedness plans.

- Draw up joint local authorities and operator's preparedness plans

Set up coordinated preparedness plans between local authorities and operators to ensure operational and resource coordination in the case of a disruption, including clear lines of communication and clearly defined roles and responsibilities.

Along with these preliminary steps, governance arrangements for a comprehensive critical infrastructure resilience program include: public private cooperation, information-sharing platforms, and policy tools (mandatory and voluntary) to create incentives to invest in resilience measures.

Source: Adapted from presentation : (SGDSN, 2018[80])

Expanding on the engagement with critical infrastructure owners and operators across all phases of the disaster risk management cycle, would strengthen preparedness against shock events. These initial steps of engagement with owners and operators of important infrastructure sectors recognize the importance of these sectors to national security and socio-economic well-being, and could be expanded in a critical infrastructure resilience strategy.

Conclusion

Kazakhstan has shown many improvements in preparedness and crisis management, by strengthening early warning systems to monitor the risk of floods, landslides, mudslides, avalanches and earthquakes. This action highlights overall development of preparedness policies and preparedness action plans, as well as communication plans to submit early warnings to key stakeholders. However, there

is a need to develop real time warning systems to guide quick and timely response. The framework has been developed to prepare for long terms preparedness plans as well as annual meetings to discuss seasonal preparedness plans.

In Kazakhstan, strategic crisis management has been developed over the years to ensure effective leadership and scaling up processes, including the coordination of resources to effectively manage crises. Preparedness policies in Kazakhstan highlight coordination of resources across government stakeholders and also with critical infrastructure owners and operators. There is limited assessment on the interdependencies and cascading effects that may be triggered by single risks. And there is room to strengthen strategic crisis management by developing a national critical infrastructure resilience program.

Notes

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Chapter 6. Recovery, lessons-learning and adaptive capacity

This chapter describes public policies for post disaster recovery and reconstruction in Kazakhstan. In this context it also considers capacity to adapt to new circumstances and to develop new policies and practices based on lessons learned from past disasters.

Following disasters a clear strategic approach is important to enable the quick restoration of services as well as prompt relief, recovery and reconstruction. This phase should include oversight and accountability measures to ensure optimal use of public funds (OECD, 2014[18]). Oversight and accountability measures for the recovery and reconstruction phase ensure trust and confidence in the government's capacity to enable prompt and effective disaster recovery. The reconstruction phase also provides an opportune moment to invest in long-term resilience by reducing vulnerability to future disaster risks as part of the reconstruction efforts ('building back better').

The aftermath of disasters also opens room for reviewing disaster response and recovery efforts to identify what went well, and what could be improved in the response efforts, and in disaster risk governance. The OECD Recommendation (OECD, 2014[18]) calls on countries to conduct lessons learning exercises after disasters and build institutional capacity to review and revise risk policies. Such processes can strengthen the adaptive capacity of the governance framework by incorporating new risk information to update risk management policies and reduce vulnerabilities to future disaster risks.

In Kazakhstan the national security strategy does not include specific provisions for disaster recovery and reconstruction. Instead, the legislation in the Law on Civil Protection puts the local level in the lead for disaster recovery and reconstruction. However, there is room to establish clear strategic policies that clarify roles and responsibilities for recovery and reconstruction *ex ante*. For example, there is awareness of the need to embrace the 'building back better' principle, however there is scope to formalize this by incorporating the principle in the policy framework governing this phase.

Kazakhstan governance framework shows adaptive capacity, with lessons learning exercises carried out by national and subnational authorities. However, lessons learning tends to be based on ad-hoc initiatives, with the results not necessarily always feeding into disaster risk management policies or informing gap analyses and capability building. This section will analyse public policies for the phase of recovery and reconstruction, and the adaptive capacity of the governance for the management of critical risks.

Public policies for recovery and reconstruction

In Kazakhstan disaster recovery and reconstruction tends to take an ad hoc approach, rather than being based on a strategic vision or clear policies. The responsibility for carrying out recovery and reconstruction are clearly delegated to local authorities. The Law on Civil Protection 2014 puts the local level in the lead, while the central government takes a coordinative and oversight role in the recovery and reconstruction phase.

Local authorities coordinate with infrastructure owners and operators in recovery and reconstruction to facilitate the restoration of vital services to the community. Sector specific emergency services and resources have been set up providing the needed expertise to restore public services. Important infrastructure sectors also have teams of specialists across subnational branches in place to address damaged infrastructure and disruptions caused by accidents and disasters as part of preparedness planning. A patchwork of public and semi-private enterprises are in

charge of a range of activities such as repairs and reconstruction of road and railroads, telecommunication network, energy, heating and water systems and networks. Rehabilitation of important community services are financed by the organisation as part of preparedness plans and emergency reserves for major disasters.

Whole-of-society engagement is an important factor in enabling prompt disaster recovery and reconstruction. The Red Crescent Society, a humanitarian civil society organization plays an important role in supporting recovery efforts in Kazakhstan. The organization gathered volunteer efforts to provide humanitarian assistance following floods in 2015 coordinated with local authorities (IFRC, 2015[81]). Following floods in April 2017, the regional branch of Red Crescent Society in the Karaganda region, provided humanitarian relief to victims and financial aid. The Red Crescent contributed 27.7 million tenge (USD 7 721), which was distributed to victims across affected areas using a system of bank cards. This system allows increased transparency and accountability of the financial aid distribution process.

In addition to civil society participation, businesses in certain cases engage with governments in reconstruction and recovery. In the region of Mangistau, local authorities compensate businesses for supporting disaster recovery and reconstruction efforts that provide relief materials or carry out reconstruction measures. The availability of public compensation for businesses' efforts has fostered participation of private businesses in recovery and reconstruction in this region in the past. Replicating this good practice in other regions could enable swifter recovery and reconstruction.

Post-disaster damage assessments

After a crisis has been managed, it is important to assess the damages to inform the allocation of public expenditures for reconstruction (OECD, 2018[52]). In Kazakhstan, the subnational level carries out post-disaster damage assessments and submits the results to the central level government. Local authorities set up commissions to assess the damages and the recovery and reconstruction costs. The commissions communicate the results to the CES.

Local commissions apply different methodologies for post-disaster assessments, which can lead to inconsistencies in the reported damages and reconstruction costs. Such inconsistencies may in turn off-set prioritization for central government compensation of sub-national recovery and reconstruction costs, particularly relevant in cases where a disaster affected more than one region. On the other hand, a systematic process for disaster damage assessments underpinned by strategic central level guidance could enable more reliable data statistics on the damages incurred by disasters and support the creation of a national disaster loss data-base (OECD, 2018[52]).

Central-level guidance could be further developed to support local commissions on carrying out post-disaster damage assessments. In many OECD countries, the national lead organisation for disaster risk management prepares methodological guides and standards for assessing damages and needs in the aftermath of disasters. For example, in Colombia, the National Unit for Disaster Risk Management has designed a standard method for early damage assessment that adopted by sub-national authorities (OECD, forthcoming[82]). Requirements call for a more detailed

assessment once relief operations have ended. The results of both rounds of damage assessments are discussed in the National Crisis Room and used to inform the design and financing of recovery action plans.

Building back better

The aftermath of disasters should be used to reduce vulnerability and exposure to future disaster risks as part of the reconstruction efforts in order to "Build Back Better" (UNISDR, 2015[83]). This means that reconstruction should incorporate available risk information and the lessons from the disaster to make sure that the reconstruction of communities, assets and infrastructure are more resilient than what was in place before. The central government should be the lead institution governing reconstruction and has responsibility to ensure that reconstruction process takes into account long term resilience and the reinforcement of building back better policies (OECD, 2014[18]).

In Kazakhstan, the central level endorses building back better in disaster recovery as part of the policy dialogue for disaster risk governance. In Kazakhstan, public policy alignment with international agreements in disaster risk management such as the Paris Agreement support policy initiatives to build back better and strengthen resilience to future disaster risks. The DES provides technical expertise and recommendations to help guide subnational governments in the reconstruction process. In this way, experiences with disasters and evaluations aim to facilitate strengthening resilience in the reconstruction processes. The current framework gives autonomy to local governments to oversee and manage this phase; however there may be room to build incentive structures and central level support in resources and capabilities to ensure building back better.

Central level policies support building back better in Kazakhstan, and the high impacts of recurring seasonal disasters in settlements such as floods, mudflows, and wildfires calls for comprehensive risk information to guide disaster reconstruction. It will be important to develop oversight and accountability mechanisms to guarantee that local governments are using experiences from past disasters and best available risk-information to guide recovery and reconstruction for more resilient communities and local economies.

Resettlement has also been an option in Kazakhstan for the most vulnerable communities following disasters. Local authorities are in charge of resettlement processes, by hiring a commission to convene different local stakeholders to conduct studies on areas affected and the assessment of damage. Based on evaluations, decisions are made on the resettlement of homes located in high vulnerability areas. Based on interviews, there does not appear to be a consultation process for resettlement with the community, however interviews with various regional DES expressed that victims are often willing to move because in practice the house that victims receive are usually in better condition and at higher value than the previous property. Resettlement reduces vulnerability levels, however can be costly as a disaster risk reduction measure. This policy option should be done in an open and transparent process to ensure best use of public budgets and based on best scientific evidence.

Financing recovery and reconstruction

In Kazakhstan, legislation in the law on Civil Protection 2014 guides compensation commitments (Republic of Kazakhstan, 2014[26]). Insured properties at the time of the disaster are protected under the law and guarantees compensation in the case damage occurs, described under Article 58 "On Approving the Rules for Compensation for Harm (*Damage*) Caused to Victims of Natural Disasters" (December 19, 2014).

According to this legislation, the state reimburses a minimum level of damage caused to housing and other assets. Healthcare-related costs for injuries suffered because of the disaster may also benefit from local government compensation. Compensation may also be made to farmers for the loss of livestock from natural disasters provided by the central government, given that each livestock unit was calculated prior to the disaster. The law on compensation includes the replacement of property to victims who have suffered the loss of their residencies. Dwellings are provided from the state housing fund free of charge to citizens who have suffered property damage that is unrepairable as a result of a disaster, both natural and man-made on the territory of Kazakhstan.

In order to deter moral hazard, the law exempts certain structures from replacement such as illegally constructed buildings. For example, the law excludes compensation to buildings such as temporary structures, and households or other buildings that are not real estate objects that fall under the legislation of the Republic of Kazakhstan under specific codes for architectural town-planning and construction activities. The law on compensation also excludes luxury items.

The minimum level is not clearly defined in the law. The law states that compensation should be paid out via local state reserves designated for disaster risk management and/or at the expense of organizations, voluntary contributions of citizens, funds and public associations.

Funding for disaster recovery and reconstruction

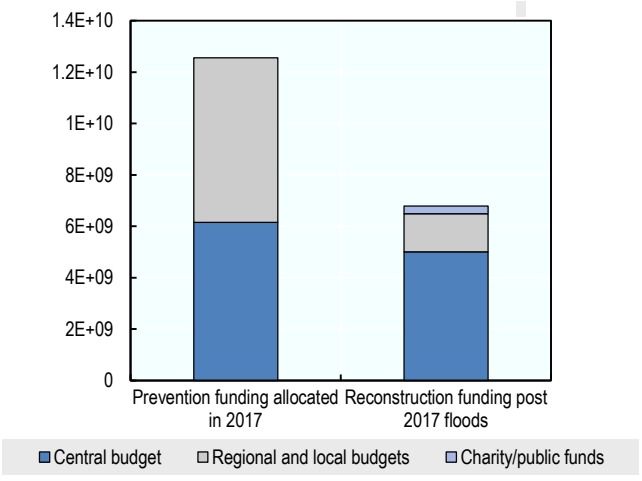
In Kazakhstan, the majority of disaster recovery and reconstruction funding stems from regional and local reserves, reflecting subnational governments lead role in this phase. The current financing framework requires regions to set aside 3% of regional budgets to fund disaster risk management. The funding may be used to finance urgent expenses surrounding relief to cope with disasters as well as compensation for victims and infrastructure recovery and reconstruction. The regional office runs tenders for projects in the aftermath of disasters to reconstruct important infrastructure. The decision-making process for expenditures is based on prioritisation of activities, however the rules holding up this process are not necessarily available and clear to all stakeholders involved in recovery and reconstruction phase. The current framework calls for ensuring that public resources are used efficiently at the local level.

The Kazakhstan government finances recovery and reconstruction through a central reserve for disaster risk management that is administered at the central government level. The central reserve can be used to supports regional governments following disasters. Allocation of funding is decided on depending on the magnitude of the event and each affected region's budget capacity to cope with it. Central level funding is typically allocated based on prioritization of projects such as

reconstruction of important infrastructure and structural prevention measures. However it is not clear if there is a specific national reserve for financing the recovery and reconstruction of disaster events. It will be important to set up oversight and accountability measures to ensure efficient allocation and use of public funding into different post-disaster activities in Kazakhstan.

Public expenditures allocated for recovery and reconstruction in Kazakhstan can be high. Recurring seasonal disasters in particular can strain public reserves. This is especially the case for some of the most vulnerable regions that are have low economic productivity and are subsidized by the central state. Public expenditures for recovery and reconstruction are a mix of central level and regional funds. For example, following severe floods in April 2017 across Akmola, Aktobe, Karaganda, Kostanay and North Kazakhstan the central government allocated 5 billion tenge (USD 14 million) to help the population with financial aid and reconstruct vital services and infrastructure. In addition to central funding, contributions from regions affected provided 1.4 billion tenge (USD 40 822) in total to cope with reconstruction costs (Figure 6.1).

Figure 6.1. Total expenditures on flood risk prevention and reconstruction following floods in 2017



Source: 2018 OECD Kazakhstan Risk Governance Scan Survey

In some cases public funds or charity funds step in to support recovery in Kazakhstan opening up cooperation channels for a whole-of-society approach to the governance of recovery and reconstruction. Following floods in April 2017 the Akimat (regional office) of the region Aktobe established a public fund called "Kolkanat Aktobe" which received more than 237 million tenge (USD 689 414) from enterprises, organizations and institutions both public and private, as well as donations from citizens in the Aktobe region and other regions. Following the same floods, in the region of Kostanay, victims were paid out cash compensation from a charity fund set up by the region "Mercy-Kostanay" a total amount of 27.2 million tenge (USD 79 122). This type of funding is marginally lower than the expenditures at the central, regional and local level, however show increased efforts to open up the governance framework to include private sector, organisations and households in the phase of recovery.

Transparency in the allocation of resources

While an ad-hoc approach to recovery and reconstruction enables flexibility, it may impede transparency in the allocation of resources and financial support for reconstruction. Unclear rules on available central government support for disaster recovery and reconstruction also creates a risk that businesses and households may expect government assistance, if public resources are repeatedly provided without clear rules guiding recovery spending. This in turn may create moral hazard by creating negative incentives for investing in disaster risk reduction measures. It would also be important to establish oversight and accountability measures to guarantee that allocations funds are used for their intended purpose.

Most OECD countries have developed financing framework to cope with disasters that are transparent and open. For example, in Mexico along with a developing a national natural disaster fund, (FONDEN), the government has also set up ReconstrucciónMX, an easy access platform that provides the public information about recovery measures Box 6.1. The platform allows tracking the allocation of resources coming from FONDEN to specific reconstruction projects, strengthening accountability and transparency of the public financing framework.

Box 6.1. Increasing transparency and accountability of recovery in Mexico with ReconstrucciónMX

ReconstrucciónMX is a an information sharing and monitoring tool aimed at linking data from various sources and levels of government involved in the response and recovery process of communities affected by natural disasters. It gives easy access to information about recovery measures under implementation in affected areas and enables an overview of all financing allocated to disaster recovery measures via the Mexico's Natural Disaster Fund (FONDEN). Decision-making and operating agencies as well as the public can access this information freely on the ReconstrucciónMX website. ReconstrucciónMX also includes a system that allows citizen to report any misuse of resources.

The Natural Disaster Fund (FONDEN) has been in place to finance response and recovery needs in the aftermath of natural disasters. The allocation decisions and the effectiveness of the use of resources from the Fund had initially been poorly monitored. Prior to the creation of the ReconstrucciónMX tool, the allocation of the Fund's resources was difficult to assess for the general public and decision makers. ReconstrucciónMX increased transparency and accountability in the use and allocation of resources from FONDEN.

Source: (OECD Observatory of Public Sector Innovation, 2018[84]) (OECD, forthcoming[22])

Disaster risk insurance

Effective risk transfer mechanisms reduce pressure from public budgets. Insurance can serve as financial incentive to boost prevention and self-preparedness across businesses and households (OECD, 2015[85]). The private insurance market in Kazakhstan offers limited insurance policies for disaster risk. As a result, the costs of disaster recovery and reconstruction are often borne by public budgets and complimented by aid from charity funds.

In Kazakhstan steps are taken to set up disaster risk financing instruments such as a comprehensive catastrophe insurance market. The Kazakhstan government has partnered with the World Bank on a project in 2016 to engage in technical support for creating a solid catastrophe insurance market (World Bank, 2018[86]). The project aims to make weather risk insurance products available across Kazakhstan. Major stakeholders are engaged in the project including the Ministry of the National Economy, the National Bank, and the Insurance Association. Technical work involved in the project aims to train stakeholders to develop skills and expertise on catastrophe risk. Setting up this complex insurance infrastructure and system will lead to more risk information being available of the number and extent of natural disasters across national and local governments as well as individual households

It will be important to boost the private insurance sector's role in the current financing framework for disaster risks in Kazakhstan, and strengthen market penetration of insurance. In many OECD countries, in order to strengthen financial resilience to disaster risks, governments and the private insurance sector collaborate to make insurance more widely available and affordable through various insurance and reinsurance schemes (OECD, 2015[85]). Flood Re in the UK provides one such example illustrated in Box 6.2.

Box 6.2. Flood risk (re)insurance in the UK: FloodRe

Governments may collaborate with insurance to help cope with the potential high costs incurred by disasters. Flood Re is a flood reinsurance scheme established by joint-initiative between the government and insurers in the UK, where flood risk is high across many households. The scheme helps make flood insurance more affordable for households at risk to floods, therefore contributing to a higher penetration of insurance coverage by making it more available. The way it works, is that insurers in the UK pay a levy to the Flood Re scheme that raises £180m every to cover even the properties at highest risk. The insurer pays a fixed premium based the council tax band where the home is located, and a fixed excess of £250 is set for each policy. In turn, insurers are guaranteed reinsurance through the Flood Re funds in case compensation is triggered by a flood event. FloodRe also supports communication or risk by raising awareness about what individual households can do to reduce flood risk.

Source: (Flood Re, 2018[87])

Adaptive capacity of the risk governance framework

Reviewing and revising disaster risk management policies allows to identify areas of improvement to adapt critical systems, preparedness, resilience planning, and capability levels to changing risk and vulnerability conditions (OECD, 2014[18]). An improvement cycle refers to policy evaluation, audits, peer reviews, and post crisis reforms (Baubion, 2014[88]). Some key elements to integrated disaster risk management policies that enable adaption involve: building the institutional capacity to learn, develop explicit and normative frameworks to document and compare experiences, and enhance the learning capacity during events (Baubion, 2014[88]).

In Kazakhstan risk management policies currently do not involve a systematic process of continual improvement. The Inter-Departmental Commission for the Prevention and Elimination of Emergency Situations (Inter-Departmental Commission) meets regularly to discuss disaster risk reduction based on updates on the analysis of regional risks. In some cases, ad hoc approaches are taken to modify norms. For example after a dam collapsed from flooding in 2014 and killed 5 people, the Water Code 2003 was updated requiring owners of hydro-technical facilities to report on conditions of the infrastructure, as well as make regular risk assessments and maintenance. Setting up institutional processes to review and revise risk management policies can improve their effectiveness.

Lessons-learning exercises: do they drive policy changes?

Incorporating findings from events and using lessons-learned exercises following disasters are effective ways to improve risk management policies (OECD, 2014[18]). Post crises evaluations and lessons learning help identify gaps and guide capability building to better cope with future disaster risks and crises. The implementation of an improvement cycle in planning for, response and recovery from the most likely events can prevent destruction of infrastructure and the injury and loss of life to those affected by annual events such as hydrological disasters.

Lessons-learning exercises are endorsed at the central level of government in Kazakhstan. The CES takes into account experiences with past disasters to identify areas of improvement in prevention, preparedness and crisis management. Results of lessons learning and post-disaster analyses by the CES are used to develop plans for disaster risk reduction measures. Expanding this practice is valuable to review and revise non-structural risk reduction measures such as urban plans, land-use restrictions and building codes (UNISDR, 2015[83]). For example in Japan, lessons drawn from the Great East Japan Earthquake led to proposition of 37 recommendations including territorial planning in tsunami prone areas (Baubion, 2014[88]).

At the regional level the DES conduct lessons learning for internal events. In a majority of regions these are shared with neighbouring regions to exchange lessons drawn. In Astana city, post disaster lessons learning determine the main directions of development of the system of protection of the population and territories from emergency situations. They are used to outline further ways of improvement, taking into account identified problems and shortcomings. The Karaganda region experiences yearly seasonal flooding and conducts analyses of emergency situations over the years. Akmola also carries out analyses and lessons learning exercises following disasters, which are used to develop plans of measures for disaster risk reduction. Some regions are also drawing from lessons learned in other countries. For example, in the region Mangistau lessons learned from the BP Oil spill were drawn to inform their own preparedness plans for any emergency that might affect oil activities taking place in the Caspian sea.

Box 6.3. Post crises reviews "Guidelines for coordinating a national level emergency response" (Ireland)

The Government of Ireland has developed “Guidelines for coordinating a national level emergency response”, which sets out the various steps involved in coordinating a national-level response for emergencies/crises. This new coordination process includes a systematic post crisis review process with a standardized template to document all lessons learned.

The Guidelines provide a generic template applied to the reviews of all national exercises and emergencies, covering ten different areas such as mobilization of personnel and resources, task delegation and division of labour, and execution of decision making. Relevant departments provide their own responses to the lead government department, who prepares a final report with recommendations. In addition to forming part of the lessons learned process, the recommendations and actions feed into reviewing and updating existing emergency plans at all levels: local, regional and departmental.

Several reviews of severe weather events have been prepared and published, such as “Towards integrated emergency management, a report on the review of the response to the exceptional severe weather events of 2009-2010”, or “Guide to works and development consent for repairing infrastructure damaged in storms or other emergency events”.

The repetitive severe weather events of the winter 2013-2014 and large-scale flooding in the country provided key lessons. These included issues related to:

the harmonization of early-warnings and their better integration into the emergency preparedness process,

better linking local and regional mechanisms with national emergency planning and response,

the measurement of economic losses from disasters to facilitate recovery financing and prevention investment prioritisation.

Sources: (OECD, 2014[89])

In many OECD countries, lessons learning exercises are formalized processes to ensure that lessons drawn from crises lead to policy change and improvements (Baubion, 2014[88]). For example, in New Zealand each crisis is reviewed by a formal process to draw lessons and revise policies. Following the Christchurch earthquakes in 2010 and 2011 the crisis management paradigm was split in two, between exceptional events and more traditional crises (Baubion, 2014[88]). Exceptional events require expanding risk mitigation measures to incorporate more uncertainty and complexity. Other examples include an international dimension of crises such as in the case of the Netherlands, where lessons learning allowed to evaluate communication channels during crises (Torenvlied et al., 2015[90]). To support lessons learning, in some OECD countries methodological support is available to guide the processes, which helps ensuring information is drawn to evaluate policies. In Ireland, the "Guidelines for coordinating a national level of emergency response" includes a systematic post crisis review process and a template for documenting lessons learned Box 6.3.

Box 6.4. Post crisis evaluations and lessons-learning in the Netherlands

The results of evaluations research provides valuable lessons-learned about the performance of the crisis management organisation and areas to improve for future crises. In the Netherlands, the National Manual on Decision Making in Crisis Situations prescribes that the government's actions must be evaluated after a crisis. Following the MH17 flight crash in Ukraine with many Dutch citizens aboard, the Scientific Research and Documentation Centre of the Ministry of Security and Justice commissioned an independent evaluation and mobilised a team of researchers from the University of Twente, to conduct an analysis of the lessons to be learned from the crisis and how it was handled.

The evaluation consisted of three parts: 1) A review of the interdepartmental crisis management, which entailed an evaluation of various actors and their mutual collaboration. It was also assessed to what extent the international political context of the conflict in Ukraine influenced the decision-making process and the performance of the crisis management organisation, 2) The research also evaluated the communication with, and after-care to the victims' families, and 3) The study explored the question of how information was provided to the House of Representatives, the media, and society as a whole.

The results of the evaluation research provides valuable lessons-learned about the performance of the national crisis management organisation and areas to improve to better cope with future crises.

Source: (Ministry of Justice and Security, 2015[91]) (Torenvlied et al., 2015[90])

In Kazakhstan, lessons learned exercises are used following disaster events at the central and regional level. This practice along with exercises allows to evaluate gaps and build capabilities in preparedness and crisis management. Identifying areas of improvement also guides risk reduction measures. To expand on the value of sharing knowledge and lessons learning processes already in place, an institutionalised practice could endorse the incorporation of findings to reform disaster risk management policies. Adapting risk management policies and the governance framework enables improvement, and opens space to adopt new technologies and organisational processes to changing risk and vulnerability conditions.

Conclusion

Kazakhstan has made considerable progress to coordinate recovery and reconstruction. Funding from central and regional governments weighs more on prevention and less than on recovery and reconstruction expenditures. However, the governance framework could develop strategic policies on post-disaster expenditures for recovery reconstruction and compensation and integrate this phase in the disaster risk management cycle. Responsibility of recovery and reconstruction has been designated to subnational levels of government and local authorities in Kazakhstan. Although the legal framework in disaster risk management has clarified these responsibilities, oversight mechanisms, including transparency and accountability measures may compliment this legislation to ensure the efficient use of public funds, as well as risk-informed decision-making.

Kazakhstan supports building back better policies and lessons-learning exercises as valuable instruments to reduce vulnerability to future disasters. However, risk management policies currently do not involve a systematic process of continual improvement. Increasingly lessons learned exercises are used following disaster events, but could be further used to reform public policy, as well as adopt new technologies and organisational processes. The Inter-Departmental Commission for the Prevention and Elimination of Emergency Situations meets regularly to discuss improvement in prevention and updates on the analysis of regional risks, however these do not lead to any concrete changes in risk policies at a high level. An adaptive governance framework continually incorporates new risk information and improvements as part of updating and reviewing the effectiveness of policies to changing risk conditions.

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Annex A. List of interviewees during fact-finding missions (22-23 January and 16-20 April 2018)

Table A 0.1. Interviewees

Central Level
Committee for Emergency Situations in the Ministry of Internal Affairs
Ministry for Investment and Development
Committee for Roads in the Ministry for Investment and Development
Committee for Water Resources in the Ministry of Agriculture
Committee for Climate Change Adaptation in the Ministry of Energy
Committee for Industrial Development in the Ministry for Investment and Development
Subnational level
Representative in the Akimat (city hall) of Kostanay region
Department of Emergency Situations Almaty city
Department of Emergency Situations Almaty region
Department of Emergency Situations Zhambyl region
Department of Emergency Situations South Kazakhstan region
Department of Emergency Situations Mangistau region
Department of Emergency Situations Astana city
Department of Emergency Situations Akmola region
Department of Emergency Situations North Kazakhstan region
Department of Emergency Situations Atyrau region
Department of Emergency Situations East Kazakhstan region
Department of Emergency Situations Kostanay region
Department of Emergency Situations Pavlodar region
Department of Emergency Situations Karaganda region
Scientific and research institutions, civil society and the private sector
Kazhydromet in the Ministry of Energy
Institute of Geography in the Ministry of Education and Science
Red Crescent Society of Kazakhstan
Nazarbayev University
The Center for Emergency Situations and Disaster Risk Reduction (CESDRR)
Kazakhtelecom
KazTransGas
The Baron Company

Note: Add the note here. If you do not need a note, please delete this line.
Source: Add the source here. If you do not need a source, please delete this line.

Questionnaire – Regional Department Committee for Emergency situations

1.1 What risks have been identified by your organisation as critical risks, i.e. those with potential for consequences of national significance?

	Yes	No	Please identify the responsible government body in each phase of the disaster risk management cycle			
			Hazard/ risk assessment	Prevention	Emergency preparedness and response	Recovery
Floods						
Earthquakes						
Wildfires						
Drought						
Infectious disease						
Cyber-attacks						
Industrial accidents						
Terrorist attacks						
Other: *please specify*						

1.2 What risk does your organisation consider as potentially the most critical for your region?

Please indicate one risk and explain your answer.

Section 2: Strategic approach to the governance of critical risks

2.1 Does your organisation participate in the formulation of the **National Security Strategy 2017-2020?**?

☐Yes/ ☐No/☐I don't know

If yes, how?

Please elaborate…

2.2 Which of the following roles and responsibilities does the national security strategy require your organisation to fulfil?

Please indicate all that apply:

- ☐ Drawing up local hazard maps/local risk maps
- ☐ Conducting local risk assessments
- ☐ Development of local emergency / evacuation plans
- ☐ Raising awareness of critical risks
- ☐ Risk communication strategies
- ☐ Other_____

2.3 Does your organisation contribute to achieving the goals set out in the national security strategy in the following phases:

- ☐ Disaster risk assessment
- ☐Disaster risk reduction
- ☐ Disaster preparedness and response
- ☐ Disaster recovery

2.4 What stakeholders does your organisation consult with for carrying out responsibilities in the strategy?

Please elaborate…

2.5 Does your organisation partner with the private sector for the management of critical risks? ☐Yes/ ☐No

Please elaborate…

2.6 Does your organisation work with non-governmental actors concerning management of critical risks? ☐Yes/ ☐No

Please elaborate…

Section 3: Risk assessment

3.1 Does your organisation conduct risk assessments? ☐Yes/ ☐No/☐I don't know

Please elaborate…

3.2 Has your organization made hazard maps for exposure to floods, earthquakes, industrial accidents or other risks in your region? ☐Yes/ ☐No / ☐I don't know

Please elaborate…

3.3 How do you use risk assessments and hazard maps?

Please elaborate…

3.4 Do the results of these risk assessments inform flood risk policy making in any of the following phases of the disaster risk management cycle?

☐Disaster risk reduction: _____

☐ Disaster preparedness and response: _____

☐ Disaster recovery: _____

3.5 Are the results of risk assessments and hazard maps made publicly available? ☐Yes/ ☐No

Please elaborate…

Section 4: Disaster risk reduction

4.1 **What is the process of your organization for the development and implementation of policies to reduce exposure to natural hazards?** *What stakeholders are included? Does this include non-governmental stakeholders such as academics and civil society?*

Please elaborate…

4.2 Who decides on structural measures? How do you make priorities for risk reduction measures?

Please elaborate…

4.3 Who is responsible for carrying out maintenance of structural measures? How well are existing measures maintained?

Please elaborate…

4.4 How do you use the information contained in hazard maps (e.g. to issue or deny building permits in exposed areas)?

If yes, please describe how for each item

☐ Raising risk awareness among stakeholders_____

☐ Issuance or rejection of a building permit_____

☐ Prioritising prevention activities _____

☐ Managing transboundary risks (e.g. rivers and basins across regions)_____

☐ Developing emergency plans_____

☐ The budget process and resource allocation_____

☐ Developing financial contingency mechanisms_____

☐ Equip departments and agencies with anticipation capacity_____

☐ Other, please explain_____

4.5 What activities does your organization undertake for the prevention or mitigation of damages from natural and man-made hazards/risks?

Please elaborate…

4.6 What stakeholders are included in decision-making process for risk reduction measures?

Please elaborate…

4.7 Does your organization take measures to raise public awareness and communicate critical risks? ☐Yes/ ☐No

Please elaborate…

4.8 Do these risk communication efforts target specific vulnerable groups? ☐Yes/ ☐No

Please elaborate…

4.9 What challenges does you organization face to implement structural and non-structural risk reduction measures?

Please elaborate…

4.10 Does your organisation provide an opportunity for the public to provide comment on the design of risk reduction measures? ☐Yes/ ☐No

Please elaborate…

Section 5: Strategic crisis management

5.1. Does your organisation attempt to detect crises before they happen? ☐Yes/ ☐No

If yes, which of the following means does it use to do this?

☐Horizon-scanning
☐Foresight analysis
☐Early-warning systems
☐Others *please specify*:_____

5.2 Who is responsible for issuing early-warning alerts?

Please elaborate…

- What are the mechanics of this system?

-Who communicates what information to whom?

-What kinds of actions are made based on these warnings?

-Are actions documented in a specific document?

5.3 Is one of your functions the development of regional emergency management plans? ☐Yes/ ☐No

If yes, what stakeholders are involved in this process?

Please elaborate…

5.4 Which stakeholders are involved in the ***Interdepartmental state commission on prevention and liquidation of emergency situations*** and how does it coordinate for crisis management:

Please elaborate…

5.5 Does your organisation perform regular drills/exercises to prepare for crisis situations? ☐Yes/ ☐No

If yes, do these exercises involve non-governmental organisations? ☐Yes/ ☐No

Please elaborate…

Section 6: Transparency, accountability and improvement

6.1. What accountability measures are in place to ensure your organisation is carrying out its roles and responsibilities for risk management?

☐Performance evaluation
☐Audits
☐Internal reviews
☐Public hearings
☐Law suits
☐Others *please specify*:_____

6.2 Does your organisation have systematic processes in place to ensure continuous improvement of risk management policies and practices? ☐Yes/ ☐No

Please elaborate…

6.3 Does it conduct systematic lessons learned exercises after disaster events? ☐Yes/ ☐No

Please elaborate…

6.4 How has the legal and regulatory framework evolved in the last 10 years, taking into consideration experiences from past disasters and climate change adaptation?

Please elaborate…

6.5 Are lessons-learned after disaster events shared and communicated to the public? ☐Yes/ ☐No

Please elaborate…

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