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Community-Based Disaster Risk Management in Azerbaijan

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ISSN 2211-4165 ISSN 2211-4173 (electronic)
SpringerBriefs in Geography
ISBN 978-3-319-69652-2 ISBN 978-3-319-69653-9 (eBook)
https://doi.org/10.1007/978-3-319-69653-9

Library of Congress Control Number: 2017957833

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

To all children who live in poverty, with no access to education!

Rovshan Abbasov

Acknowledgements

This work was partially supported by UNİCEF Azerbaijan's Disaster Risk Management Program. The constructive and helpful comments made by two anonymous reviewers are also gratefully acknowledged. The author is grateful to Martha Lawry for proofreading the drafts of the book.

About the Book

Current natural and social conditions in Azerbaijan make children very vulnerable to natural hazards. The preparedness levels of schools and communities in rural areas are rather low, increasing the risk of natural disasters. Over the last 20 years, floods and earthquakes have caused considerable material loss in communities where children are not well protected. These losses are not only a manifestation of natural conditions, but also reveal the low preparedness levels of schools and communities. This book illustrates the main factors of vulnerability and gives a clear picture about the possible interventions to reduce disaster risks both in schools and communities. A new methodology for child-centered vulnerability assessments both in school and community levels has been developed. This methodology can be used to assess the level of vulnerability of schools and communities. A newly prepared training manual will help practitioners conduct trainings for government and community organizations. While the book is focused on a specific region, the suggested approach is generic and can be used elsewhere.

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Abbreviations

AWM OJSC	Amelioration and Water Management Joint Stock Company
Azerenerji	Azerenergy Open Joint Stock Company
Azersu	Azersu Open Joint Stock Company
DDR	Disaster Risk Reduction
DRA	Disaster Risk Assessment
LDG	Local District Government
MCT	Ministry of Culture and Tourism
MEI	Ministry of Economy and Industry
MENR	Ministry of Ecology and Natural Resources
MICT	Ministry of Information and Communication Technologies
MoA	Ministry of Agriculture
MoES	Ministry of Emergency Situations
MoH	Ministry of Health
MoT	Ministry of Transport
MYC	Ministry of Youth and Sport
SSPF	State Social Protection Fund
UNDP	United Nations Development Program
WUA	Water Users' Associations

Outline of the Book

Chapter 1 starts with an explanation of the current situation around the Gabala District of Azerbaijan. It explains how natural hazards may turn into disasters as a result of neglecting the current vulnerable situation in communities. UNICEF's Child-Centered Risk Assessment methodology was shaped by taking into account local circumstances. These circumstances may vary in time and space. Vulnerability has been assessed at the community level taking into consideration the main child vulnerability indicators. Using the aforementioned approach and data, flood, landslide, and earthquake hazard maps have been made. General school building conditions, projected access to high education, access to sanitation, existence of disaster mitigation activities, and medical services in schools are the main indicators used to assess child vulnerability. The indicators also include housing conditions and nutrition level. Based on the aforesaid indicators, the child vulnerability map for Gabala District has been made. The multi-hazard map has been overlaid with the child vulnerability map to show general child-centered disaster risks. This kind of map effectively reflects the recent state of children with respect to hazards and living conditions. The risk formula comprises hazards, vulnerability, exposure, and capacity.

Chapter 2 provides a local case study of mainstreaming disaster risks in local development. Integrated Disaster Risk Management and mainstreaming should be an important part of national and local development plans in the regions, where disaster risks are very high. On the one hand, the development process may reduce the risk of natural hazards, but on the other hand changes in land use planning may increase the vulnerability of the communities. In the context of disaster risks, mainstreaming is the practice of supporting communities through risk conscious land planning and development. Gabala Working Group, which was established as the working group of the project, made proposals for further development and planning that would reduce disaster risks. According to the 2015–2020 plan, all the economic sectors, including tourism, agriculture, and food industry, will make their own contributions to reduce disaster risks. Various government programs related to rural development and poverty reduction have been analyzed. The information

related to economic development for the next 5 years (2016–2010) has been collected and consolidated into one document.

Chapter 3 includes a methodology that can be used to assess school safety conditions and assess capacity of schools to respond to hazards. The methodology enables us to assess both structural and nonstructural safety of schools. The main stages of the assessment are study of natural conditions, review of conditions of school buildings, and evaluation of quality of school drills. Raising awareness is among the most important elements of school safety. One of the most important actions focused on school disaster risk reduction is organization of regular disaster preparedness exercises, which contribute to the testing of all structural and nonstructural actions toward the school DRR and examining the preparedness level of the school staff. The exercises also serve to determine the need for trainings, detecting new needs and actively learning new knowledge and practices. A school Disaster Preparedness Plan is a document determining the key functions of a school in the process of preparation for emergency cases and during hazards. This document is developed with participation of the local emergency departments and is approved by the school management.

Chapter 1
Child Centered Disaster Risk Assessment

Abstract Natural hazards may turn into disasters because of neglecting the current vulnerable situation in communities. UNICEF's Child Centered Risk Assessment methodology was shaped by taking into account local circumstances. These circumstances may vary in time and space. Vulnerability has been assessed at the community level taking into consideration the main vulnerability indicators. Using the approach and data, flood, landslide, and earthquake hazard maps and multi-hazard map have been made. The multi hazard map has been overlaid with the child vulnerability map to show general child centered disaster risks.

Keywords Natural hazards · Physical vulnerability · Social vulnerability Multihazard map · Child centered disaster risk map

1.1 Introduction

A hazard is a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation (DRR/SD 2004). In other words, a hazard is a processes or phenomena occurring in the biosphere that may constitute a damaging event (OAS 1990).

Vulnerability is a state determined by physical, social, economic, and environmental factors or processes which increase the defenselessness of a community to the impact of hazards. Unlike vulnerability, capacity is a resource, skill or strength possessed by people, communities, societies or countries, which enables them to prevent, mitigate, prepare for, withstand, or quickly recover from a disaster (WB 2001). Increased capacity of societies reduces vulnerability and vice versa (IFRCCS/PV) (2009). Hazards and vulnerabilities are the main causes of disasters (UNICEF 2014).

A disaster is a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses (Abbasov 2014a, b). During a disaster, the affected community is not able to cope using its

R. Abbasov, *Community-Based Disaster Risk Management in Azerbaijan*, SpringerBriefs in Geography, https://doi.org/10.1007/978-3-319-69653-9_1

own resources. A disaster is a phenomenon that has a man-made or natural origin and causes great damage or loss of life (Wisner et al. 2004). Disasters can be understood as a joint contribution of hazards and non-preparedness of communities or societies. If a community is not able to manage or cope with hazards, then disasters may happen (WB 2010).

Risk can be understood as the chance or probability that disaster may occur. The risk level depends on vulnerability and hazards that may occur in a given area. Disaster risks are determined by vulnerabilities and geologic conditions that may cause hazards. In the classic literature, disaster risks are identified as:

$$\text{Disaster Risk} = (\text{Hazard} * \text{Vulnerability})/\text{Capacity}$$

As seen from the formula, capacity reduces risks, while hazard and vulnerability increase disaster risks. However, the aforementioned formula does not provide an option for numerical estimation of risks.

The methodology for assessing risk level is mainly based on methodology developed by UNICEF and tested in some countries. UNICEF's methodology takes into account natural conditions, structural and non-structural activities, and the level of preparedness.

Natural and socio-economic conditions in Azerbaijan make the country very vulnerable to natural hazards (UNFCCC 2010). The main hazards observed in the area of Azerbaijan are floods, earthquakes, landslides and droughts. Every year these phenomena cause serious damage to the economy and lives of people. Over the last century the frequency and severity of hazards in the territory of the country has risen and caused considerable material and life loss to communities.

Laws on Civil Defense and on Emergency Situations of the Azerbaijani Republic stipulate that living conditions of Azerbaijani citizens must be environmentally sustainable and safe. According to the law on civil defense, preventive measures to prevent emergencies, minimizing the possible damage and losses due to emergencies, and mitigation of emergencies and their consequences must be considered in every activity in Azerbaijan. Taking into account the current legal situation, current natural and social conditions should be studied with respect to Disaster Risk Reduction.

Current natural and social conditions in the Gabala District of Azerbaijan make children very vulnerable to natural hazards. In addition, the preparedness level of schools is rather low; local schools have a reduced capacity of to meet hazards without human and material losses (Abbasov 2014a, b).

The main goal of this study was to produce child centered risk assessment for residential areas of Gabala District. Disaster risk assessment and mapping is the process of collecting and analyzing information about hazards, their likelihood and impact, and the vulnerability of the population to these hazards. The aim of DRA and mapping is to provide a clear picture regarding the hazard and vulnerability in the targeted area. This information is used during the awareness raising process, which is the initial stage of mainstreaming.

All the activities directed towards disaster risk reduction require detailed vulnerability and disaster risk assessments (UN/ISDR 2009, 2004). A new school based vulnerability assessment methodology which enables us to assess vulnerability at the school level has been developed and tested. In addition, a plan has been developed for mainstreaming disaster risks into the development that can be used by practitioners elsewhere.

1.2 Vulnerability Factors

Vulnerability is a state determined by physical, social, economic, and environmental factors or processes which increase the defenselessness of a community to the impact of hazards. Unlike vulnerability, capacity is the preparedness of a society manifested as resources, skills and strengths of the society. These skills help societies, communities and schools to reduce disaster risks. It also enables them to mitigate the impact of disasters and quickly recover from a disaster.

Physical vulnerability is characterized by the geographic situation regarding hazards. The physical vulnerability of an area depends on its geographic proximity to the source and origin of the disasters; e.g., if an area lies near coast lines, fault lines, unstable hills, etc., it makes the area more vulnerable to disasters than an area that is far away from the origin of the disaster. Mountain regions are very vulnerable due to their closeness to origins of debris flows or landslides. The areas with frequently observed floods or landslides have high vulnerability.

Physical vulnerability also includes the difficulty in access to water resources, means of communication, hospitals, police stations, fire brigades, roads, bridges and exits of a building or an area in the case of a disaster. The lack of proper planning and implementation in construction of residential and commercial buildings results in buildings that are weaker and more vulnerable in earthquakes, floods, landslides and other hazards.

Improperly planned areas and buildings with low resistance to hazards will significantly increase physical vulnerability. Quick access to central routes, hospitals, water sources, and fire stations may considerably reduce physical vulnerability.

Unlike physical vulnerability, economic vulnerability is not related to geographical proximity to sources of hazards. Economic vulnerability is characterized by the income of societies and communities and strengths to properly manage those incomes. In terms of economic vulnerability, poverty is a major factor that determines the condition of societies or communities.

Economic vulnerability of a community can be assessed by determining how varied its sources of income are, the ease of access and control over means of production (e.g. farmland, livestock, irrigation, capital, etc.), adequacy of economic fallback mechanisms and the availability of natural resources in the area (Save the Children 2006).

Social vulnerability is a manifestation of long-term traditions and economic conditions and is characterized by a lack of leadership or decision making capacity in communities. Religious views, national traditions, and cultural background may increase or reduce vulnerability. For example, in societies where most people consider everything as predestinated by God, people have less incentive to change the existing situation and there is no motivation to increase resilience and capacity of the society or community to reduce disaster risks. Social vulnerability is more stable than economic vulnerability. In socially vulnerable societies people are not able to equally participate in decision-making processes. Children, women and the elderly are considered to be the most socially vulnerable. Social vulnerability is closely related to poverty.

Social vulnerability to natural phenomena is greatest among the poorest people in developing countries owing to a lack of information and resources with which to take the appropriate measures. Within this group, again, children, women and the elderly are considered to be the most vulnerable. To reduce social vulnerability, all of the above factors must be addressed but this requires knowledge and understanding of the local conditions, which can—in most cases—only be provided by local actors.

Social vulnerability is closely related to attitudinal vulnerability. Attitudinally vulnerable societies and communities have a deeply negative attitude towards change and lack initiative. These kinds of people in turn become more dependent on external support and tend to act only dependently. Therefore, they can become victims of conflict and hopelessness.

A socially vulnerable community has weak family structures, lack of leadership for decision making and conflict resolution, unequal participation in decision making, weak or no community organizations, and discriminated of people on a racial, ethnic, linguistic or religious basis. Other social factors such as culture, tradition, religion, local norms and values, economic standards, and political accountability also play a vital role in determining the social vulnerability of a community.

Attitudinal vulnerability is a state of a community that has long lasting traditions, views and generally “encouraged” life styles that reduce the capacity to become more resilient. Communities which have a negative attitude towards change and lack initiative in life consequently become more and more dependent on external support. They cannot act independently. Their sources of livelihood do not have variety, lack entrepreneurship and do not possess the concept of collectivism. This brings about disunity and individualism in the society. Thus, they become victims of conflicts, hopelessness and pessimism which reduce their capacity of coping with a disaster.

Under certain conditions, hazards may easily turn into disasters. In highly vulnerable regions, even small-scale hazards may cause disasters. For example, the 2010 floods that happened in downstream regions of the Kura River may be explained as a manifestation of high vulnerability. Table 1.1 shows how the flood hazard became disaster for local populations.

Table 1.1 Flood changes into a disaster under certain circumstances

Hazard	Vulnerability	Risk	Risk reduction
Kura River flood	The dams along the river banks are not adequate; School building is very old	The houses close to the dams may collapse. Children, aged people and disabled persons may lose their lives; The school building may collapse	Reinforcing the dams along the river banks
	There are no vehicles to rescue people from flash floods	People may lose their lives	Availability of cars, rubber boats and life belts
	Lands under crop and pastures located at floodplains	Harvest may get flooded. Food shortage may occur	Planting of crops in places where the risk of flooding is less; reinforcing the dams
	The school staff and population do not know when floods may occur	Cattle may lose their lives. Starvation may occur. Students and teachers may lose their lives	Protecting pastures with dams, establishing an early warning system
	The school staff does not know what to do in case of flood	The students and teachers may lose their lives; The school building and equipment may be damaged	Establishing an early warning system, preparedness of the school staff
	The people do not have money and food reserves in safe places; the students are from poor families	Starvation may occur after the floods	Saving extra money reserves in banks; insuring lives and properties; reducing poverty

1.3 Multi-hazard Assessment Methodology

The Gabala District is located in the north central part of Azerbaijan. In terms of plant cover the district is very rich (Fig. 1.1). The density of the river network, upland relief, and strict vertical zoning make the area very diverse. The district is completely located in a disaster prone part of Azerbaijan. The dominant hazards include earthquakes, floods and landslides. Due to climate changes and a low preparedness level, weather-related disasters are becoming more common. Increased population density, overgrazing and other economic activities contribute to growing disaster risks.

Current natural and social conditions in the Gabala District of Azerbaijan make children very vulnerable to natural hazards. In addition, the preparedness level of schools is low; local schools have a reduced capacity to meet hazards without human and material losses.

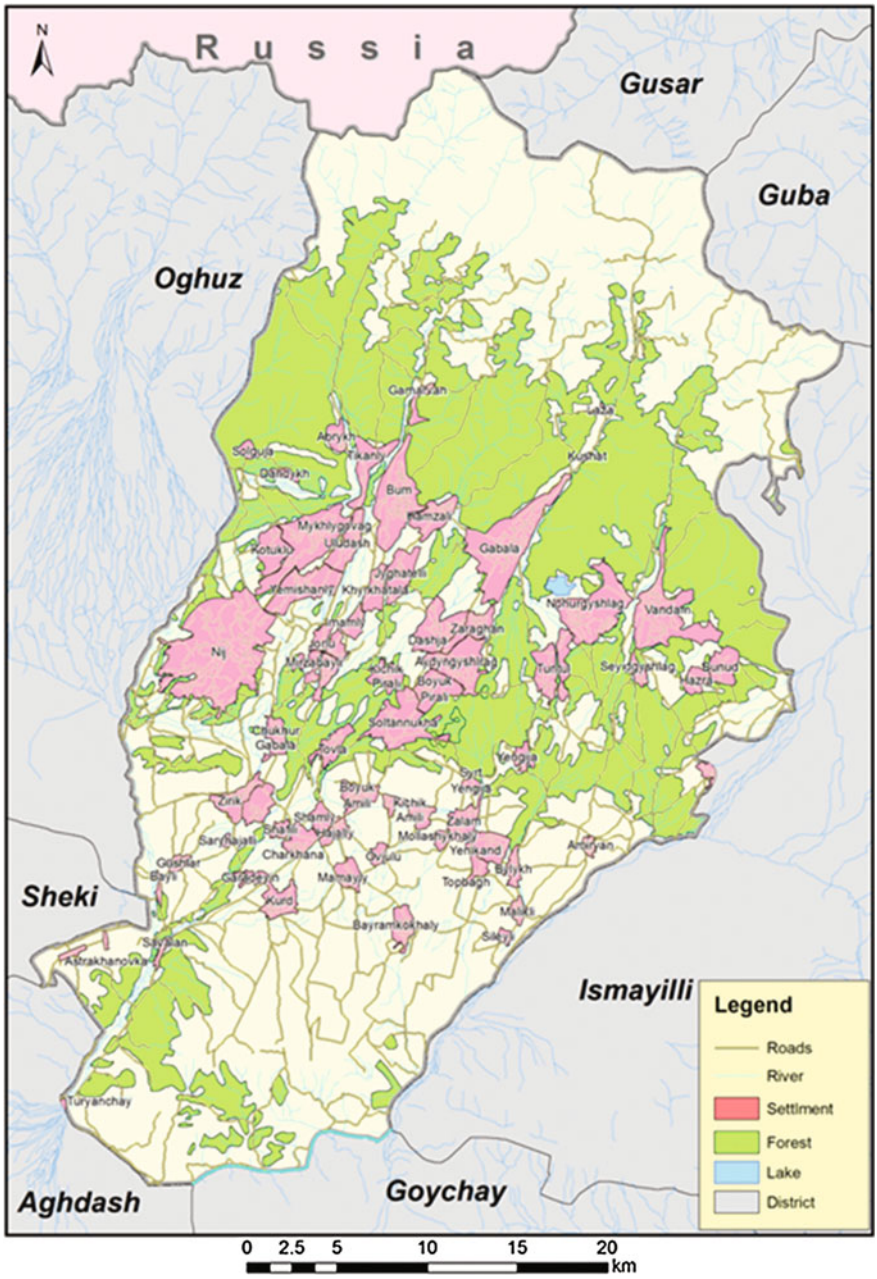


Fig. 1.1 Gabala District map

Recent conditions require detailed assessments for child vulnerability both on school and community levels. These assessments should include all circumstances that cause recent vulnerable conditions of children in Gabala, covering both natural and social factors.

The child centered risk assessment methodology takes into account both natural circumstances and the level of the children's preparedness. Child preparedness is evaluated using a child vulnerability assessment. In this study, in order to assess the vulnerability of children, UNICEF's child centered risk assessment methodology has been used (UNICEF 2012). This methodology was previously used in several Asian and Pacific countries. In this assessment, the UNICEF methodology has been adapted, taking into account the local circumstances.

The methodology has several stages, all of which take into account natural hazards and children's resilience to these hazards (UNICEF 2011, 2012). Hazard identification and assessment is a very important stage of this methodology. In addition, UNICEF's report "Disaster Risk Analysis: Gabala District" which was the result of previous assessments in the target area was also used to obtain more information regarding the existing situation.

In order to determine most observed hazards, a multi-hazard assessment was carried out. The multi-hazard mapping was carried out using a hazard matrix specially developed for Gabala District. Later this matrix can be used at the national level. The hazard information was taken from national and other official sources. Child centered risk assessment and risk mapping were assessed using the results of aforementioned assessments.

The whole territory of Azerbaijan is prone to earthquakes, forest fires, landslides, floods (including flash floods) and debris flows. However, these circumstances may vary in time and space. For example, flat regions of the country are prone to floods, while mountain areas are prone to landslides and forest fires. Therefore, depending on the region, School Safety Assessment methodologies should be updated, taking into account local climatic and geologic conditions. The School Safety Assessment was developed for Azerbaijani schools within UNICEF's current project.

Generally, UNICEF's School Safety benchmarking levels of hazard risks are graded as HIGH (3), MEDIUM (2) AND LOW (1). High, medium and low risks can be identified taking into account the following characteristics for each hazard (UNICEF 2013):

- Magnitude
- Duration
- Likelihood of occurrence
- Size of the affected area

In order to take into consideration various factors, the DRA guide recommends using a matrix. In this methodology, we have adapted that matrix into UNICEF's scoring level of hazards, resulting in Table 1.2.

Table 1.2 Developed hazard matrix for scoring hazards in Gabala District

Frequency	High	5	4	3
	Medium	4	3	2
	Low	3	2	1
		High	Medium	Low
	Magnitude			

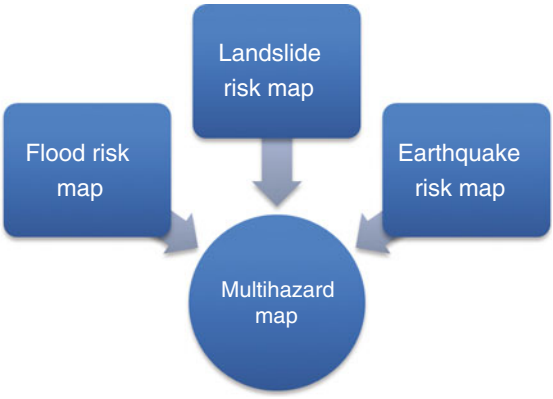


Fig. 1.2 Scheme for preparation of multi-hazard map

Thus, hazards with various frequencies and magnitude may be scored between 1 and 5. A hazard with high frequency and magnitude is ranked as 5, while a hazard with low frequency and low magnitude is ranked as 1. Details of the frequency assessments are given below.

In order to carry out child centered risk assessment for Gabala District, first the most commonly observed hazards were identified. Then the following scheme was used to make a Multi-hazard map (Annex 1.4). This scheme is taken from UNICEF's previous studies carried out in Pakistan and Mozambique (Fig. 1.2).

After making a multi-hazard map, the map was overlaid with a child vulnerability map and then a child centered risk assessment was made (Fig. 1.3).

Fig. 1.3 Scheme for preparation of child centered risk map

1.4 Hazard Analysis and Mapping

According to the official information, flash floods and debris flows, earthquakes and landslides are the main hazards that are observed in the district. This official information was additionally confirmed by the report "Disaster Risk Analysis: Gabala District" that was the result of previous assessments and mainly based on local interviews.

1.4.1 Flood Hazard

Floods in the Gabala District are the main natural hazard and are the main factor restricting local economic development. The flood history shows that they cause serious economic damage to vulnerable communities in the region. According to the Flood Catalog prepared by the Hydrometeorology Institute of the Ministry of Ecology and Natural Resources, 636 flood phenomena were observed in Gabala District over the last 80 years. Floods are observed in the form of flash floods and debris flows (Abbasov 2014a, b).

The aforementioned Flood Catalog was the main source used to determine flood risks. This catalog enables us to evaluate flood risks for villages. In addition, the Gabala flooding map prepared by UNDP in 2014 has been taken into account and was merged with the information of the Flood Catalog. The scoring level was determined according to the matrix.

Using the aforementioned approach and data, a Gabala District flood hazard map has been made (Annex 1.1). This map effectively demonstrates flood risks for various villages. Red color illustrates residential units with high exposure to floods. According to assessments, Gabala town and many villages located along the riverbank have high intensity and duration of floods.

1.4.2 Earthquake Hazard

Earthquakes are one of the main hazards that threaten the local population. In order to formulate an earthquake hazard assessment, the earthquake catalogue of the Geology Institute of National Academy of Sciences has been used. The map that was provided by this institute was the main source of information about the earthquakes happening in the period of 1980–2008 (Fig. 1.4).

The map effectively shows that all the territory of the Gabala District lies within a region where the earthquake hazard is high. According to the MSK-64 intensity scale, the total territory of Azerbaijan falls within an area with an earthquake hazard score of 7 (very strong), 8 (damaging) or 9 (destructive). The territory of Gabala

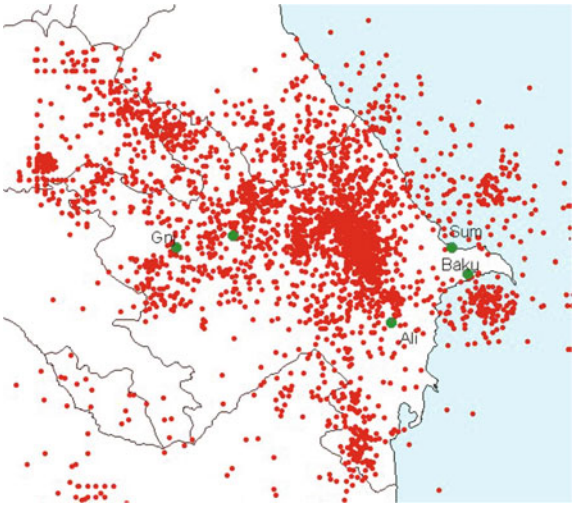


Fig. 1.4 Seismic hazards observed in the territory of Azerbaijan (1980–2005)

District coincides with the 9 and 8 score zones. According to frequencies and magnitudes of earthquakes observed in Gabala, the Gabala District Earthquake Hazard Map was prepared (Annex 1.2). The map reflects a risk level between 1 and 5. Meanwhile, all of Gabala's territory coincides with risk levels 4 and 5. In order to maintain a level 5 risk, the earthquake scoring zones were divided into two zones.

It is very important to note that in most cases local population does not have sufficient collective memory of past earthquakes. This is explained by the low frequencies of earthquakes. This is a usual phenomenon for all quake hazards. Unlike floods and landslides, the recurrence interval of catastrophic quakes can be as great as 100–120 years.

1.4.3 Landslide Hazard

Landslides are one of the most common hazards that damage local communities in Gabala District. The only information is the landslide database of the Regional Ministry of Emergency Situations. This database includes landslides observed over the last 20 years. The National Flood Catalog also has some information regarding landslides. In order to assess landslide risks, GIS specialists used information about landslides taken from the Ministry. Additionally, Digital Elevation Model (used in UNDP project as well) has been used as the risk factor for landslides. This model effectively shows high slope gradients, where landslide risks are rather high. The Gabala District landslide risk map based on village landslide risk assessments is given in (Annex 1.3).

A multi-hazard map was created as the spatial overlay of the most frequent hazards (floods, earthquakes and landslides) in Gabala District (Annex 1.4). Using

Table 1.3 Filled-in matrix for Aydingishlaq village, Gabala

Frequency	High	5 (Earthquake)	4 (Flood)	
	Medium			
	Low			1 (Landslide)
		High	Medium	Low
	Magnitude			

the aforementioned official sources, the hazard matrix was filled in for Aydingishlaq village, Gabala (Table 1.3). The total score for this village is 10.

1.5 Child Vulnerability Assessment

Vulnerability is a state determined by physical, social, economic, and environmental factors or processes which increase the defenselessness of a community to the impact of hazards. Unlike vulnerability, capacity is a resource, skill or strength possessed by people, communities, societies or countries which enables them to prevent, mitigate, prepare for, withstand, or quickly recover from a disaster (Cannon 2007). Increased capacity of societies reduces vulnerability and vice versa.

Long-term detailed analyses have identified the following vulnerabilities for children in the Gabala District:

- Children are not involved in Disaster Risk Reduction activities at schools.
- Cell phones are the only means of early warning among people.
- Dams are in poor condition or not available at all.
- Health points do not have enough capacity to serve people in case of emergencies.
- Some school buildings are in poor condition and less resistant to hazards.
- 90% of the income of village people is from agricultural activities.
- Soil, vegetation and trees are destroyed after flash floods and hail.
- The river bed level is higher than surrounding lands/floodplains with settlements (villages)

Poverty is one of the main drivers for vulnerability. The main income of local communities is agriculture, which is not very effective as an income source in Azerbaijan.

Child vulnerability is a complex manifestation of many factors, which mainly include living and health conditions. In order to assess child vulnerability we have used the indicators for which data is available. These indicators are given here:

1. General school building conditions
2. Projected access to higher education
3. Access to sanitation

4. Children residing in one room dwellings
5. School attendance rate (6–17 years)
6. Condition of roads
7. Vitamin A deficiency (0–59 months)
8. Existence of disaster mitigation activities
9. Existence of medical services in schools
10. Quality of education.

The data for the aforementioned indicators were taken from the data collected by Gabala Working Group, the Health Ministry's Demographic and Health Survey (2011), official data from the Statistical Committee of Azerbaijan (www.stat.gov.az) and Azerbaijan Nutrition Survey conducted by UNICEF Azerbaijan (UNICEF 2013). The reliability of the data has been checked via comparison of information taken from various sources.

The results show that with the exception of a few newly-constructed schools in Gabala town, schools are not able to provide proper sanitation. Currently, 64 schools have no basic sanitation conditions. These include almost all village schools. Most of the village schools' toilets have no basic equipment and sanitary conditions in those toilets are below the required level. This required level is determined by UNICEF's WASH standards. Few schools provide access to running water. In almost all cases water faucets are located far from toilets and may not guarantee proper sanitation conditions. These conditions create obstacles mainly for female school attendees. There are no running water faucets in most schools. In order to meet basic needs, small water tanks have been made. These small water tanks are filled with water that is used for hand washing.

Gabala District has 68 schools in total. Many schools in this district are located in remote villages with sub-standard conditions. School buildings are very vulnerable in terms of structural safety. In most cases buildings are old and unreliable, making them vulnerable to the impact of various hazards. Frequently observed floods and landslides create disaster risks. School children have no capacity to reduce the impact of disasters. Many school buildings are built close to rivers where floods are observed regularly. Schools are not well equipped with DRR equipment. Awareness and preparedness levels of school staff require considerable improvements to reduce the risk of disasters.

63 schools in Gabala have no medical services. These problems are characteristic to all schools in Gabala District. Only one school in the central town has medical personnel (one employee). In the case of an accident, it is rather difficult to provide the necessary medical assistance. Because many villages are located rather far from the central hospital, or the villages have no proper roads, when accidents occur the school children and staff cannot get proper medical assistance. Meanwhile, most of the available hospitals and medical services have no highly qualified staff and are not able to offer high quality care or skilled birth assistance.

The provision of village medical centers with medical equipment is poor. Medical centers are not well provided with medical means and pharmaceuticals. All schools in Gabala lack quality medical services.

After 12 years of age, many children who will not have the opportunity to get higher education go to work in the agricultural sector to help their families. Depending on the village, this rate may vary between 5–15%.

In Azerbaijani conditions, quality of education is one of the main factors that determine vulnerability of children. Primary school education determines access to higher education. Usually in poor families, children have no opportunity to receive high quality school education. This is determined by a lack of highly qualified teaching staff, as well as general family living conditions. In order to gain admission to universities, almost all students must be trained by private teachers. This indicator may be used to assess the poverty and vulnerability of children. Admission to universities in Azerbaijan is highly centralized and carried out by State Student Commission. Despite the fact that admission to universities is open to students who are 17 years of age, the results of admissions exams may accurately reflect the quality of education in a given school. Unlike well-equipped city schools, most village schools in Azerbaijan have rather low entrance rates. These schools lack highly qualified staff, reducing their quality of education. Therefore, during the assessments these entrance rates have been included to evaluate the "quality of education" factor.

Current conditions of school buildings require immediate changes. 55 schools in Gabala District have no proper buildings. Resilience of buildings to disasters is very low, therefore all these schools need new buildings. For example, the Bum village school building is in danger due to weak structural conditions. The school lacks basic conditions in terms of disaster management. DRA methodology developed for Azerbaijani schools has been used to determine vulnerability level of the Bum village school. The results show that the school has a very high risk of exposure.

In total, 10 factors have been taken into account to assess child vulnerability, resulting in a score between 1 and 5. The child vulnerability map given below reflects the situation in Gabala District. The vulnerability level was rated as very high (5), high (4), middle (3), low (2) and very low (1) (Annex 1.5).

1.5.1 Overlaying Disaster Risk and Child Vulnerability

The multi hazard map was overlaid with the child vulnerability map to show general child centered disaster risks. This kind of map effectively reflects the recent state of children with respect to hazards and living conditions. The risk formula comprises hazards, vulnerability, exposure and capacity. Exposure is taken as the percentage of children in a given area that is hazard prone. In Gabala District, the percentage of children in various villages is almost stable and varies between 25–27%. This means that exposure levels will not change between villages and can be taken as a certain value. A more correct way to define exposure rates would be to calculate the number of children in every village that are under the risk of exposure. However, this method requires a more detailed review and mapping that could be the topic of a separate study.

Therefore, child centered risks have been assessed by taking into account multi-hazard risks and child vulnerability levels. As a result of overlaying a multi-hazard map and child vulnerability maps, a child centered risk map was produced. This map reflects many disaster risks and vulnerability issues related to children.

Child centered risk assessment enables us to identify the most vulnerable villages, schools and groups of children in Gabala District. The assessment shows that most residential areas and schools in Gabala District are under high risk in terms of hazards. Children and schools in the villages of Gamarvan, Tikanli, Abrykh, and Solguja are under high risk due to low capacity levels and high risk of hazards. Bum, Hamzali, Mikhligovaq, Yemishanli, Uludash, Cigatelli, Chirkhatala, Mirzabayli, Dandukh, Tovla, Seyidgishlaq, Hazra and Bunud village children are also under high risk.

Solguja village is located in a very disaster prone area. Floods and landslides are the most common hazards in the area. The seismic database also shows a high probability of earthquakes. The main roads that lead to the village are not reliable and are under constant danger of floods. Schools and medical buildings need to be repaired. The school has no basic DRR equipment and even small-scale hazards may cause large-scale disasters. The village needs highly qualified medical staff. Due to a lack of medical staff, several residents were not able to obtain medical assistance in the 2015 floods.

The same situation is observed in the Gamarvan village. Floods in the village are observed frequently. Debris flows wash away road constructions and bridges. A 2015 debris flow washed away the main bridge that leads to the village and inundated village school. Permanent efforts of the district and village municipalities have yielded no results, since the village is located between two unregulated streams. No disaster mitigation activities are conducted in the school. The Gabala Work Group made a proposal to fence the school building with debris resistant materials and invited the local emergency department to assist the school in conducting DRR activities. Additionally, construction of the new bridge will be finished in 2016.

The overall results of the assessment are given in Annex 1.6. The composite risk matrix for the entire district successfully shows the present condition in Gabala District. It is very important to note that composite matrix was estimated by taking into account the weighted average of the total population that live in a disaster prone zone and are under high risk. Child vulnerability is also estimated in the same way (Table 1.4).

Table 1.4 Composite risk matrix of Gabala District

Hazards			Child vulnerability	Child centered risk
	Frequency	Magnitude	High	High
Floods	High	High		
Earthquakes	High	High		
Landslides	Medium	Medium		
Multi-hazard	High	High		

1.6 Recommendations

Multi-hazard risk assessments can be used in development programs at the district levels. Therefore, it is very important to identify the main circumstances that increase disaster risks. Recommendations developed for given schools and communities may be used in developing district development plans.

The most vulnerable villages in Gabala District require immediate intervention to reduce disaster risks. The main recommendations for the most vulnerable villages are given below:

- Roads in Gamarvan, Tikanli, Abrykh and Solguja villages need to be reconstructed
- A new bridge between Bum and these villages will provide access to main roads and central residential areas
- Khyrkhatala village needs to construct a new road
- Gamnarvan, Bum, Dandykh and Tikanli village schools need to be reconstructed
- The school in Mirzabayli village needs to be fenced to protect it from mudflows
- Mikhligovaq, Yemishanli, Uludash, Cigatelli, Chirkhatala, Dandukh, Tovla, Seyidgishlaq, Hazra and Bunud village schools need to be repaired
- All schools, including schools in Gabala town, need regular disaster mitigation activities
- Schools in Boyuk Amili, Hazra, Tikanli and Bum have no fire equipment
- Medical services in all villages are available. However, buildings for medical services in all villages require immediate interventions. Except Gabala town, all residential areas need new hospital buildings. Another option is to provide medical services in schools.

1.7 Moving Forward

Child-centered risk assessments require a broad range of data that may come from different sources. The main success of this study was use of national data simultaneously with the data collected from local people. However, recent research on climate changes reveals that there will be rather notable shifts in frequencies and magnitudes of the observed hazards. In addition, climate changes may cause new hazards not previously observed in the given regions. Therefore, consideration of these shifts would increase the reliability of assessments.

Provision of participatory risk assessments would be very important for local communities and schools as well. This would provide permanent measurement of disaster risk changes and control over the activities conducted in communities and schools. Therefore, the methodology can be used by local governments, community and school authorities. This would require national scale trainings for the aforementioned institutions.

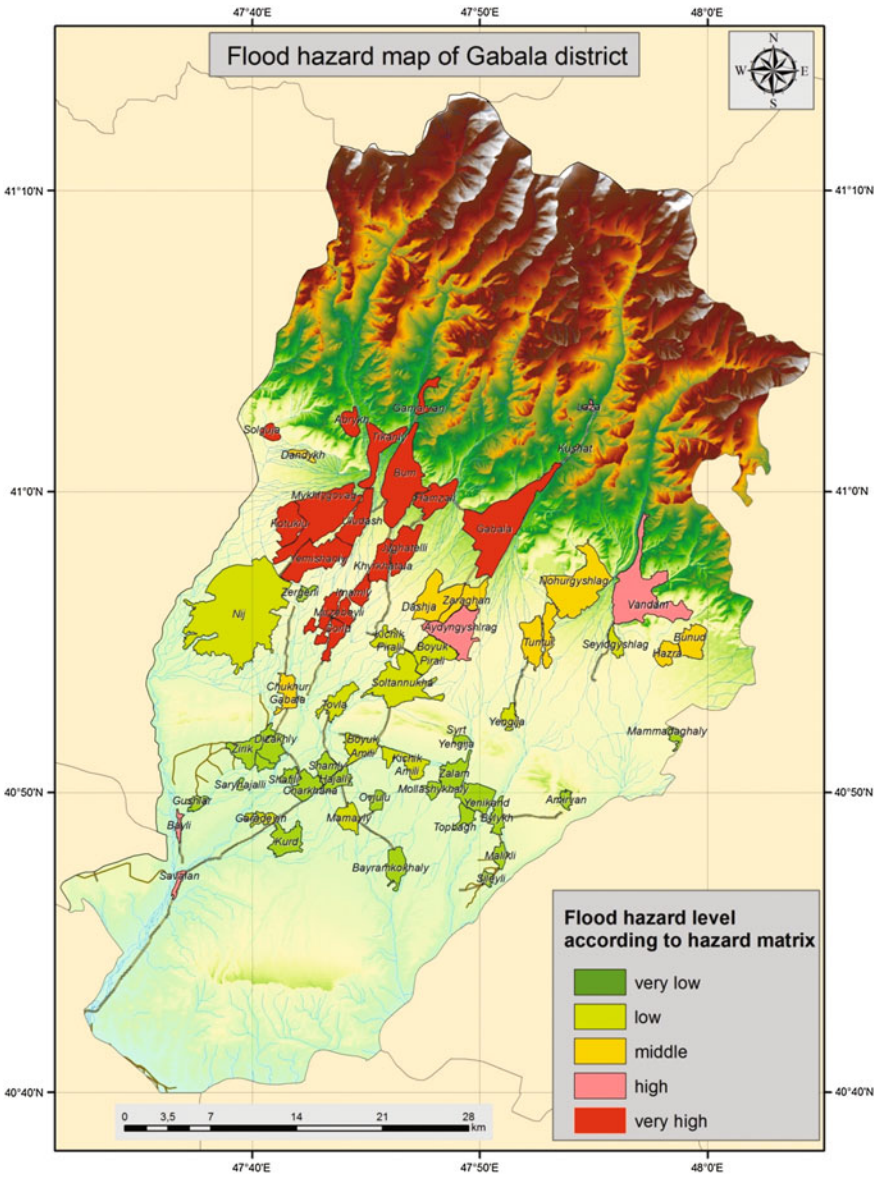
1.8 Conclusion

The study revealed that despite the efforts of the last 20 years, Gabala District still has a high level of child vulnerability. Factors of vulnerability include a broad palette of impacts that place children under risk. These factors include natural conditions in the area, where Gabala District is located. The study revealed floods, earthquakes and landslides are the most common hazards in the region.

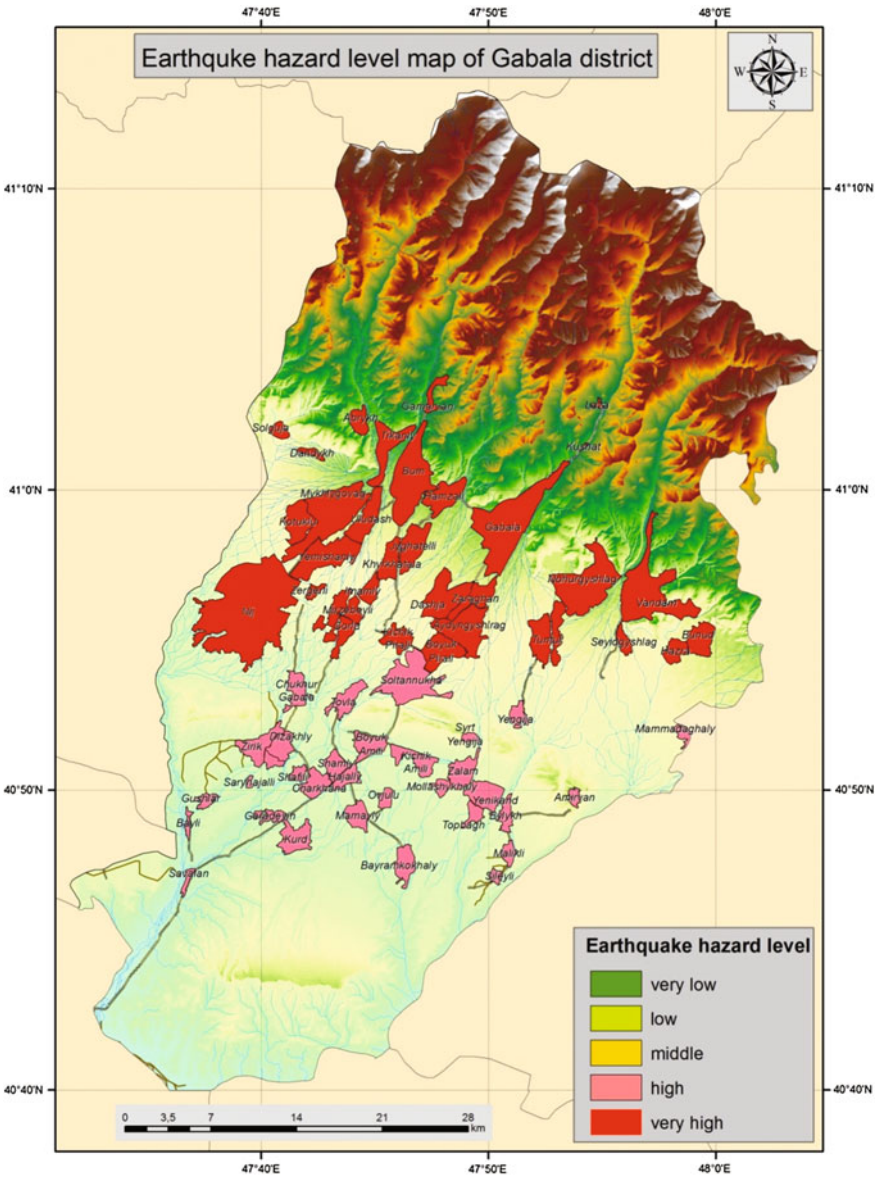
The history of floods and landslides shows that they cause serious economic damage to vulnerable communities in the region. Floods are observed in the form of flash floods and debris flows. The magnitude and frequency of floods is rather high. More comprehensive studies confirm that earthquakes are one of the main hazards that may be observed in the district. Multi-hazard risk mapping was performed taking into consideration all these hazards. Child centered vulnerability analysis was also made based on ten indicators. These indicators mainly include structural and nonstructural safety, as well as poverty in the residential areas.

Child centered risk assessment has identified the most vulnerable villages, schools and groups of children in Gabala District. The assessment shows that most residential areas and schools in Gabala District are under high risk in terms of hazards and preparedness. Multi-hazard risk assessments can be used in development programs on the district levels taking into account recommendations for DRR.

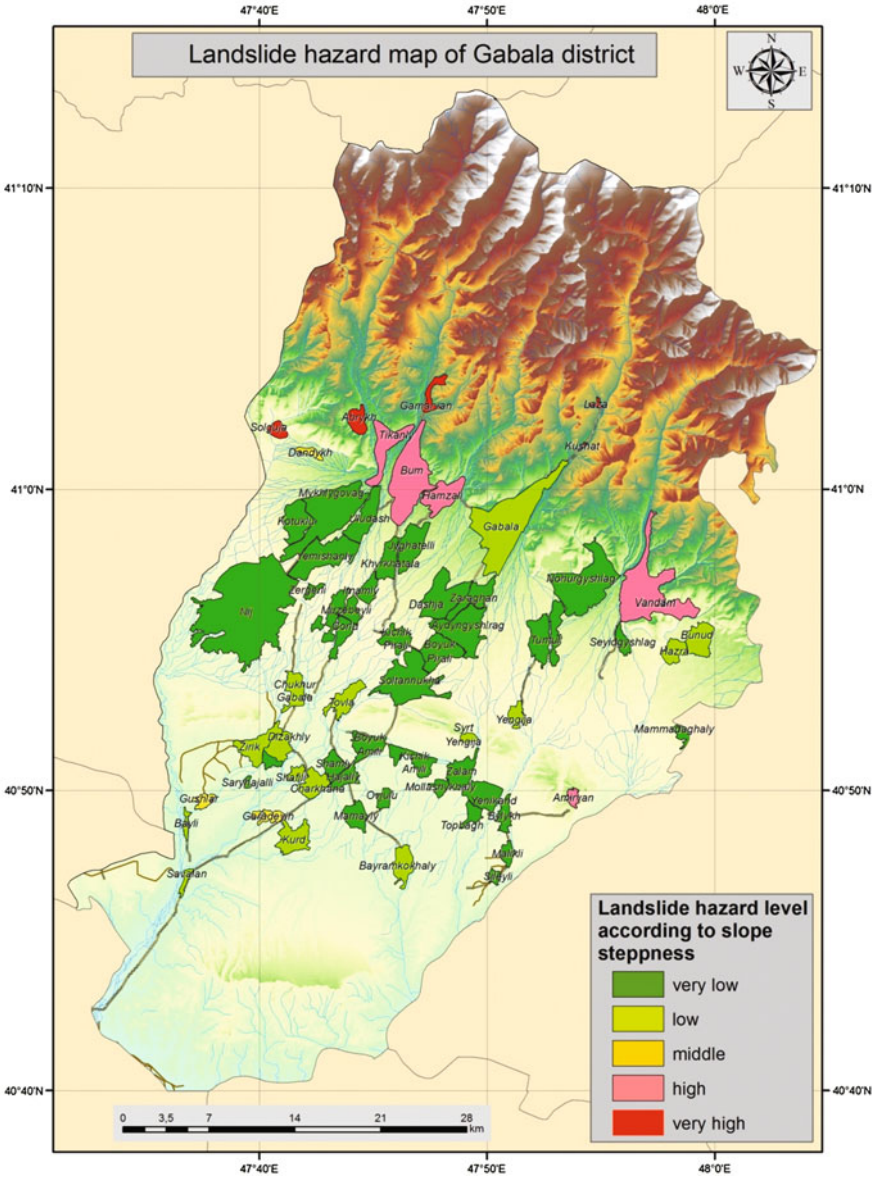
Annex 1.1 Gabala District Flood Hazard Map



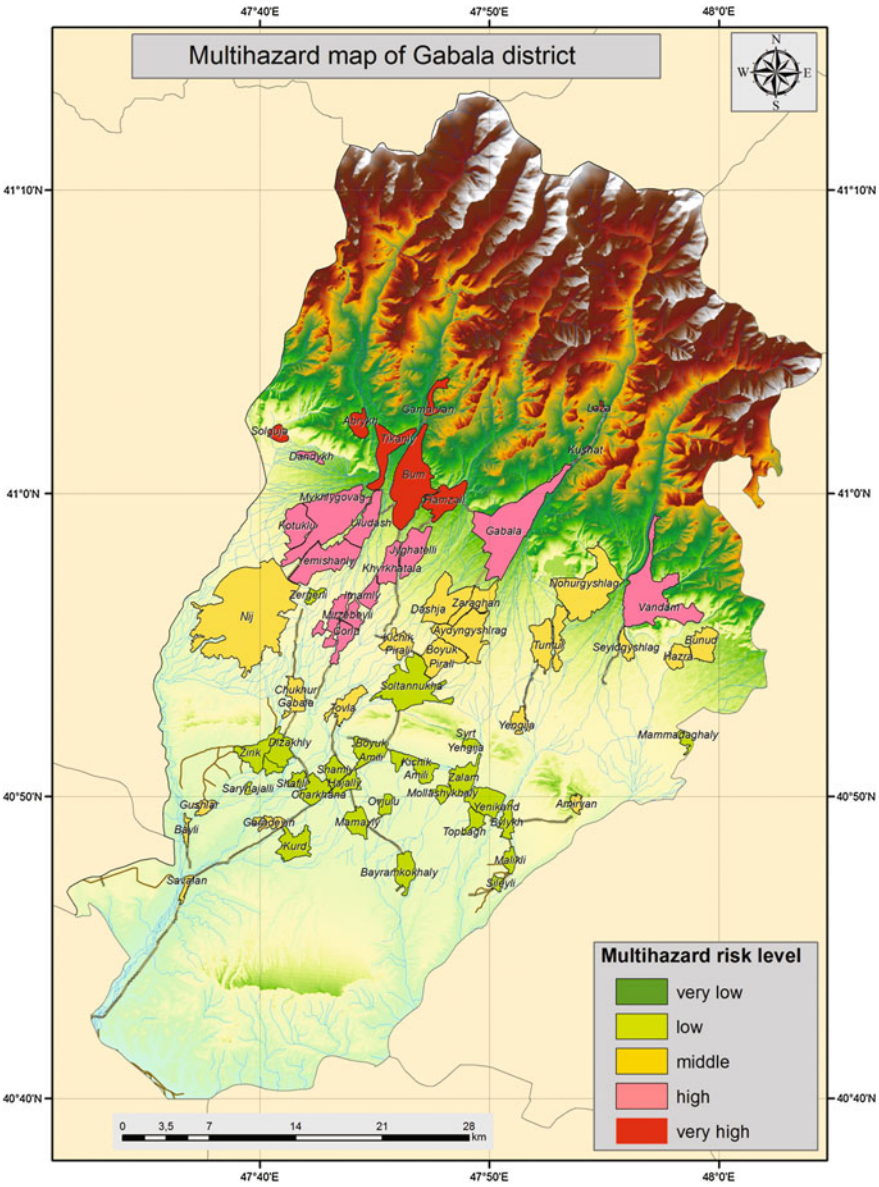
Annex 1.2 Gabala District Earthquake Hazard Map



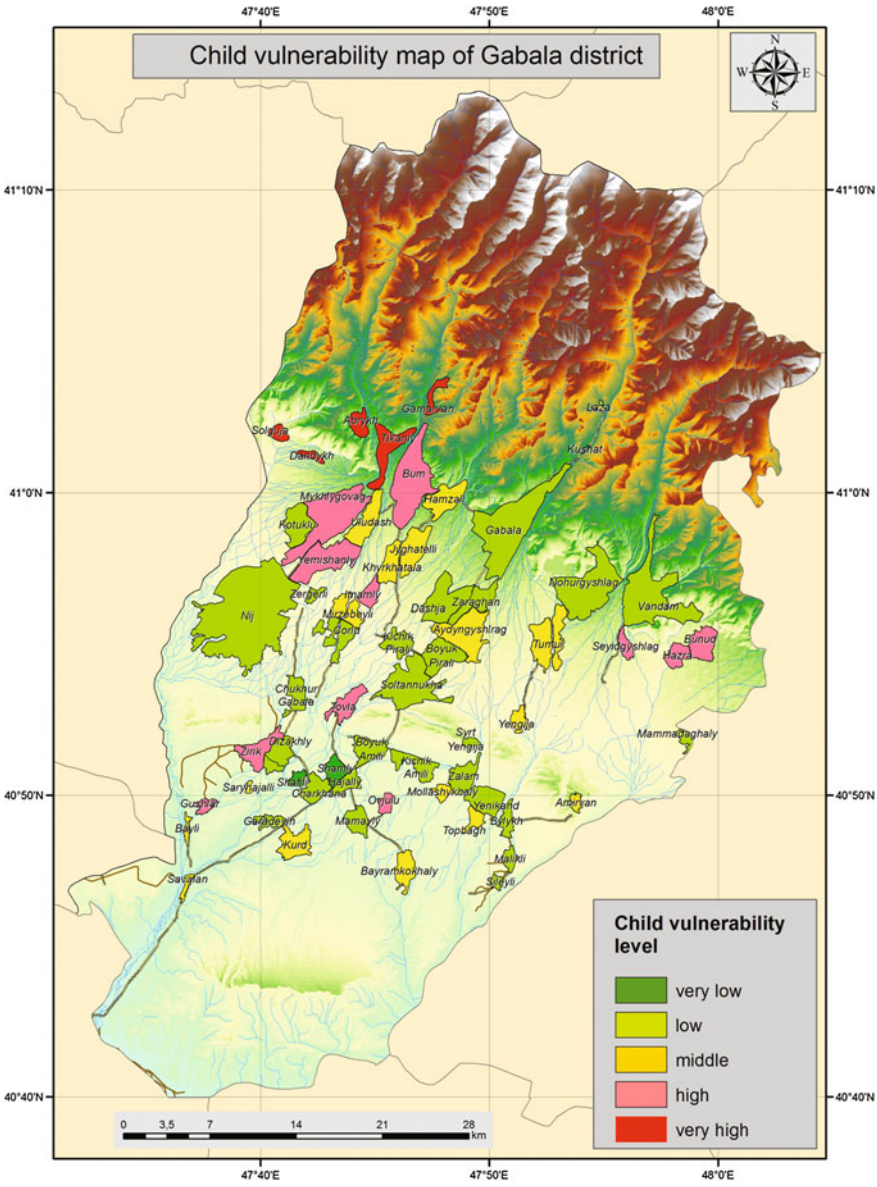
Annex 1.3 Gabala District Landslide Hazard Map



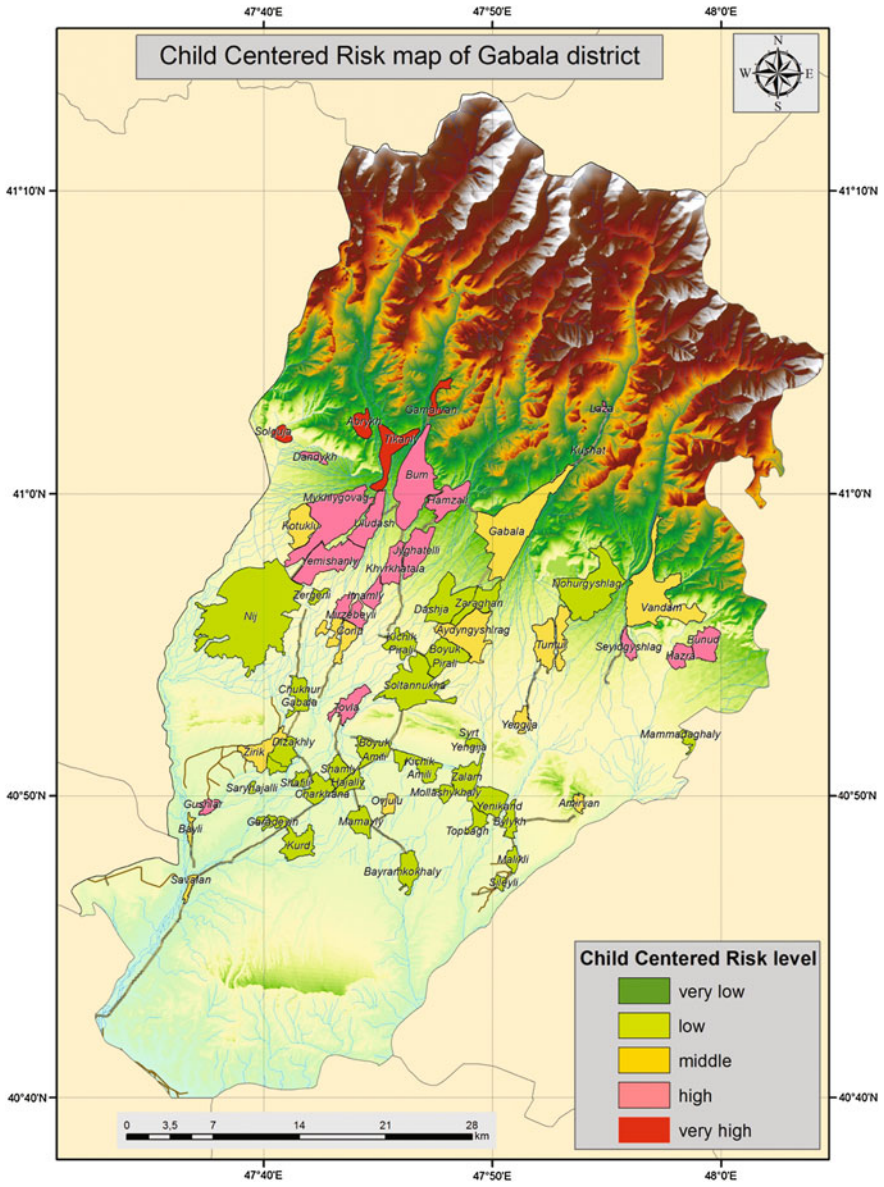
Annex 1.4 Gabala District Multi-hazard Map



Annex 1.5 Gabala District Child Vulnerability Map



Annex 1.6 Gabala District Child Centered Risk Map



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Chapter 2
Mainstreaming of Disaster Risk Analysis into Development of Gabala District, Azerbaijan

Abstract Disaster Risk Management and mainstreaming should be an important part of national and local development plans in the regions, where disaster risks are very high. On the one hand, the development process may reduce the risk of natural hazards, but on the other hand changes in land use planning may increase the vulnerability of the communities. In the context of disaster risks, mainstreaming is the practice of supporting communities through risk conscious land planning and development. Mainstreaming covers all the sectors of economy, including tourism, infrastructure, agriculture, and all types of community activities.

Keywords Hazards · Vulnerability · Disaster risk · Tourism · Agriculture Community · Forestry · Development planning

Gabala District is located in a disaster prone part of Azerbaijan. Current natural and social conditions in Gabala make children very vulnerable. In addition, preparedness level of schools are rather low; local schools have a reduced capacity to meet hazards without human and material losses.

In the context of disaster risks, mainstreaming is the practice of supporting communities through land planning and development. This means that regular development processes should take disaster risks into consideration, reducing risk levels in a particular area. "Risk informed development programming" is the approach according to which development interventions (i.e. building new schools and hospitals, building roads, bridges and communication lines, expanding cities and communities, building factories, etc.) support risk reduction measures. For example, road constructions take into account all possible hazards (i.e. landslides, floods, avalanches, etc.) and relevant measures are incorporated during the construction period to minimize possible impact in the future.

In addition, disaster risks can be reduced by implementing risk reduction activities in agriculture, food industry, school education, health, tourism and transport. Creation of early warning systems and other preparedness measures can also reduce risks (Benson et al. 2004; Benson and Clay 2004).

R. Abbasov, *Community-Based Disaster Risk Management in Azerbaijan*,
SpringerBriefs in Geography, https://doi.org/10.1007/978-3-319-69653-9_2

Firstly, legal and institutional grounds for DRR as well as roles and responsibilities of key stakeholders have been analyzed. Results show that DRR activities in Azerbaijan have a fairly solid legal and institutional background (UNICEF 2014).

Gabala Working Group that was established as the working group of the project made proposals for further development and planning that would reduce disaster risks. The group made proposals of a basket of activities for the upcoming year (2016), which will be included into the district budget. These proposals were approved by the local government of Gabala and will be implemented in the coming year. Development activities reflected in various national programs and action plans were consolidated into a single "2015–2020 Gabala District Development Plan" that includes a broad palette of activities to reduce disaster risks. This plan was analyzed in terms of DRR. According to the 2016–2020 plan, all the economic sectors, including tourism, agriculture, and the food industry, will make their own contributions to reduce disaster risks. Additionally, Ministry of Education, Ministry of Emergency Situations, and Ministry of Health have their own plans to reduce disaster risks in schools.

2.1 Introduction

Gabala District of Azerbaijan is located in a disaster prone zone and is well known for its frequently observed hazards. The population density in the district is rather high (Fig. 2.1). Nearly 27% of the total population is comprised of children. Recently, most of the Gabala schools were found to have fairly low structural safety levels. Schools are not well supplied with DRR equipment and at the same time, DRR preparedness of school staff is rather low. The previously conducted "Disaster Risk Analysis: Gabala District" study has identified high vulnerability of the population in the region.

The main goal of the second stage of the project was to perform child centered vulnerability assessment and to mainstream DRR activities into the development process in Gabala District. DRR actions include both structural and non-structural activities. Many development processes in hazard-prone locations interact with disaster risk by either increasing or reducing exposure and vulnerability to hazards This study includes results of the work done by DRR experts and Gabala Working Group.

2.2 Key Principles for Mainstreaming Disaster Risk Reduction in Development

Disaster is a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses (Correa et al. 2012). During the disaster, the ability of the affected community is not

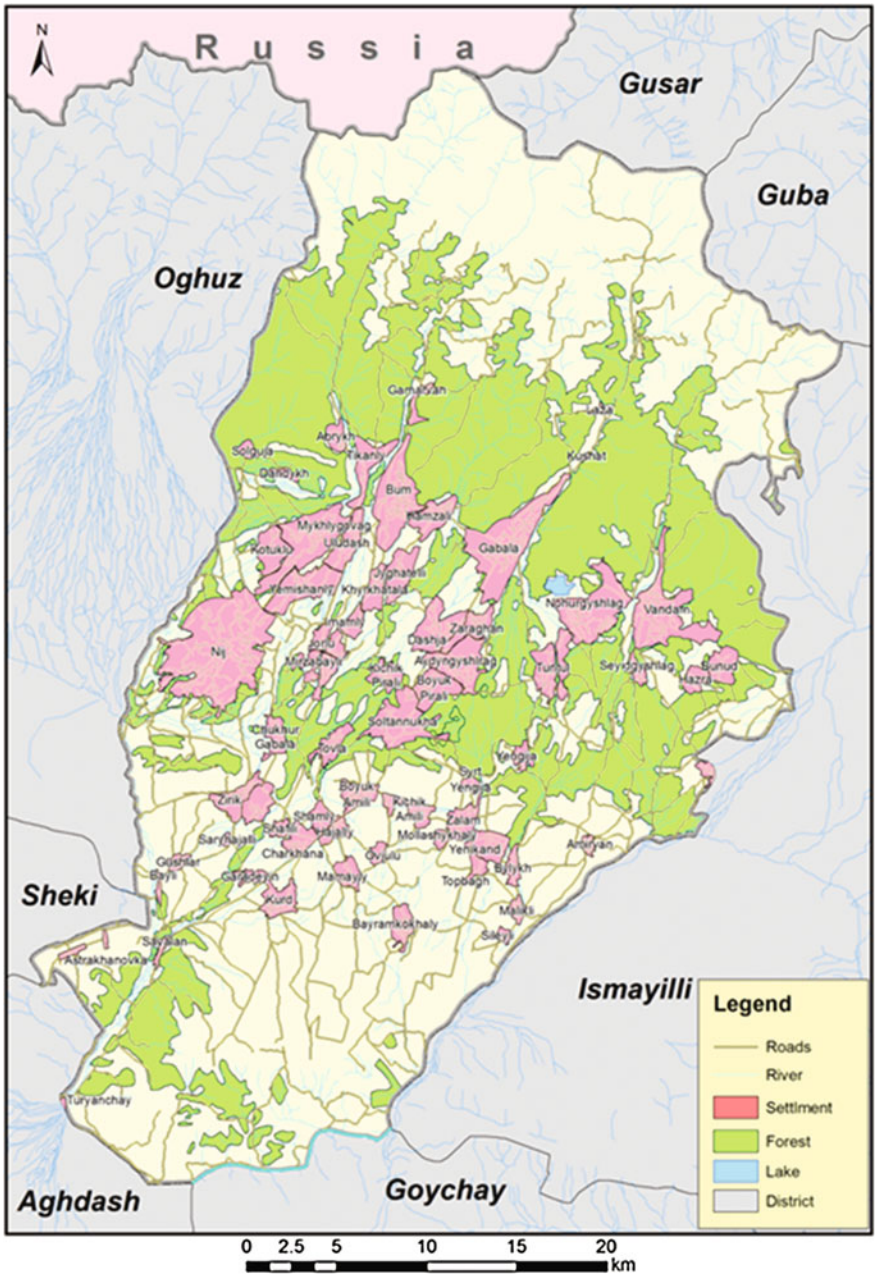

Fig. 2.1 Gabala District map

sufficient for it to cope using its own resources. A disaster is a phenomenon that has a man-made or natural origin and may cause great damage or loss of life if communities or societies have no capacity to manage the situation (UHICEF 2011).

Natural conditions in Azerbaijan expose the country to natural hazards. The main hazards observed in the area of Azerbaijan are floods, earthquakes, landslides and droughts. These phenomena cause serious damage to the economy and lives of people every year. Over the last 20 years, the frequency and severity of hazards in the territory of the country have been high and have caused considerable material and population loss to communities (Abbasov 2014).

Disasters can be understood as a combination of hazards and susceptibility or vulnerability of communities or societies to be harmed. If a community is not able to manage or cope with hazards, then disasters may happen (DRR/SD 2004).

Natural hazards that pose serious disasters can be managed though the actions of people and communities. Strengthening disaster management institutions enables communities and people to cope with various types of disasters easily (IFRCCS/PV 2009).

On the one hand, the development process may reduce the risk of natural hazards, but on the other hand, it may increase the vulnerability of the communities involved (such as through changes in land use planning). In the context of disaster risks, mainstreaming is the practice of supporting communities through risk-conscious land planning and development. This means that regular development processes take disaster risks into consideration, reducing the risk level in a particular area. Political will, correct management and strong disaster risk reduction institutions are essential to provide mainstreaming. Any development process and land use planning should be closely integrated with disaster risk management.

The mainstreaming should be integrated into all sectors of economy. The key areas to be considered in mainstreaming include poverty reduction, industry, tourism, agriculture, infrastructure, education, environment, housing and health. Environmental management, water management, land use planning, gender issues, health issues, and climate change adaptation are also areas that may be included in mainstreaming.

Despite the ongoing efforts of the government, poverty remains one of the root causes of vulnerability for the Gabala District population. According to the Second National Communication to UNFCCC, over the last 20 years, manifestations of climate change-induced phenomena have increased vulnerability even more. In several villages constricted dams and protection walls are gone due to flash floods. This drops basic living conditions in the villages to below the average country level.

Implementation of the State Program on Poverty Reduction and Sustainable Development in the Republic of Azerbaijan for 2008–2015 resulted in supporting overall economic stability in the country, including Gabala District. This ensured economic growth and stability. Many types of private business have been involved to the development process. Agriculture and tourism were the main areas of development. Recently, tourism, the food industry and processing of agricultural goods are being represented by several big enterprises. Newly built hotels and tourist attractions have created new value for the environment of Gabala,

simultaneously making new employment opportunities. Recently, the area began to be seen as one of the most important tourist destinations in Azerbaijan. Development of the tourism sector has created new work places in the district and has created prospects for further development. Support of the agricultural sector has increased income of the population, ensuring poverty reduction. However, the current situation will still require a good deal of effort to reduce poverty in the district. These efforts should mainly cover the processing, agricultural and tourism sectors, since they are the main sources of income for the local population. Hospitals, health facilities, schools and kindergartens need total improvement. Child centered assessment confirms that the condition of many schools does not enable them to provide high quality education and increases the risk of further disasters.

The disaster risks that must be reduced through key activities in these areas are given in Table 2.1:

Table 2.1 Sectorial directions of mainstreaming for Gabala District

Agriculture	Providing insurance cover for products New employment opportunities for local residents Construction of processing enterprises for agricultural products New crop developments resistant to hazards Moving agricultural activities to less hazard-prone zones Protection of lands from hazards
Education	Construction of new disaster resistant village schools Developing school safety programs and disaster management plan Including DRR into curricula Increasing awareness of children in terms of climate changes and disasters Simulation, drills and first aid training for students Increasing structural and non-structural safety of schools Provision of schools with basic sanitation means
Environment	Developing integrated schemes for natural resource management (e.g. water management, forest management) Developing climate change adaptation and mitigation programs Planting of drought resistant tree species
Infrastructure	Building roads and flood resistance bridges in disaster prone zones Developing new power and water systems and internet communications
Health	Construction of new and safe hospitals Establishing mandatory disaster insurance for population (including children) Encouraging hospital disaster management plans
Safer tourism	Construction of new hotels and recreational enterprises in disaster resistant zones Making national parks more user friendly Creating new attractions around the villages
Housing	Developing disaster resistant land use plans and building codes Enforcing zoning and building regulations Construction of pilot disaster resistant and environment friendly houses

2.3 Legislation Concerning Structural and Non-structural Safety in Azerbaijan

The legal basis is one of the most important features in mainstreaming. The legal basis is official legislation that supports DRR mainstreaming. National platforms can play a role in liaising with line ministries and other actors in shaping risk reduction policies.

The Azerbaijani legal basis on DRR and safety of communities includes:

- Town Planning and Building Codes
- Law on Fire Safety
- Law on Civil Defense
- Law on Emergency Situations
- Law on Education
- General education concept (National Curriculum) in Azerbaijan Republic

The Town Planning and Building Code of the Azerbaijani Republic was adopted in 2012. This document forms the legal grounds that stipulate principles of all town planning and building activities in the territory of the Azerbaijani Republic. This is the only document that provides legal grounds for structural safety of buildings, including school buildings. The document also provides legal grounds for the roles of government, municipalities and companies with respect to building activities.

Article 4 and 5 show the main areas of the government policy and authority in the field of urban planning and building. Article 6 talks about the authority of municipalities. Article 9 stipulates principles of fire and environmental safety of constructions and buildings. According to Article 60, all the material used in buildings must be fire-resistant and reliable to prevent the spread of fires. Walls, doors, ceilings (Article 61) and floors should be constructed from fire resistant materials and provide easy fire compartmentalization. In addition, the article suggests that fire compartments should be built so they are easily accessible during fires. According to Article 62, stairs should be easily accessible and usable during emergency evacuations. Article 54 requires that materials used in construction must be certified according to relevant requirements. All the construction materials that are used must be approved by the State Fire Control Service, since it is the main executive body that controls fire resistance of materials and buildings.

The Law on Fire Safety provides legal grounds for non-structural and structural fire safety of schools. The current law on fire safety was adopted in 1997. The law defines legal grounds and principles for state fire protection and control. The law enforces the provision of fire protection on the territory of the Azerbaijan Republic for human life and health, national treasures, and all types of property.

Article 9 of the Law on Fire Safety specifies that the State Fire Service is the main governmental body that guarantees the fire safety of all types of buildings. Article 5 stipulates functions of relevant authorities with respect to fire safety. According to this article, related executive bodies have the following functions:

- Provide for the implementation of fire safety measures in enterprises and managed areas;
- Establish and support fire service teams;
- Organize implementation of fire safety propaganda and educate the population in the area of fire safety;
- Ensure strict compliance with norms, standards and rules of fire safety by the management of government authorities, enterprises and organizations as well as citizens;
- Organize the development and provide the execution of fire safety measures;
- Organize training for the population in fire safety measures.

Article 16 is about implementation of firefighting propaganda and training of the population in fire safety measures. The article suggests that mandatory training on fire safety for children in pre-school facilities and in public schools be provided in accordance with specialized educational programs by the relevant state executive body.

Laws of the Azerbaijan Republic on Civil Defense stipulate the legal grounds and principles of civil defense in Azerbaijan Republic and regulate public relations in the field of civil defense. According to Article 5, the aim of civil defense is to prevent emergencies, minimizing the possible damage and losses due to emergencies and mitigation of emergencies and their consequences. Article 11 stipulates that the Ministry of Emergency Situations of Azerbaijan Republic carries out awareness raising in the area of protection of the population.

Laws of the Azerbaijani Republic on Municipalities (e.g., the Law on Water Economy of Azerbaijan) suggest that municipalities are the main institutions in municipality lands that may carry various types of DRR activities. According to the law, hazard risks can be reduced by joint efforts of municipalities, communities and governments. Laws on management of municipality lands stipulate that municipality lands should be managed effectively and this management should not cause high hazard risks.

2.4 Current DRR Related Institutional Framework, Roles and Responsibilities to Manage School Safety

In order to implement comprehensive DRR strategy, the stakeholders that are involved in disaster risk management should be actively involved in integrated disaster risk management. Integrated Disaster Risk management is the continuous process in which interests of all stakeholders are protected and long-term vision guarantees sustainable development.

The institutional situation in Azerbaijan is characterized by independently operating ministries and entities that form a group of DRR related stakeholders with very limited coordination, mostly on an as-needed basis only. In some cases, these roles and responsibilities duplicate each other. In order to maintain Integrated DRR

management, it is necessary to study the roles of these organizations more deeply and to develop a new institutional DRR Management scheme in the future. Government, the private sector, local communities, and civil society are the main stakeholders in Gabala District that are interested in effective and integrated disaster risk management.

Roles and responsibilities of these organizations are given here:

State Commission on Emergency Situations (Coordination of Assistance in Emergency Situations): The State Commission on Emergency Situations is a derivative body of the Council of Ministries of Azerbaijani Republic. This institution was established in 1992 before establishment of the Ministry of Emergency Situations. Currently the commission works closely with district executive powers. The Deputy Prime Minister is chairman of the commission. The aim of the commission is coordinate activities of ministries and local government bodies during emergency situations.

District Executive Powers: District Executive Powers are local government bodies that govern territories of the districts. Every district executive power has a designated local authority who is in charge of representing districts during emergency situations. This local authority is the deputy head of the district executive power.

Ministry of Emergency Situations: The Ministry of Emergency Situations is the main legal agency in Azerbaijan that supports DRR and disaster risk management. The Ministry is responsible for the following areas:

- Civil defense;
- Protection of the population during natural and human made disasters;
- Prevention of emergency situations and elimination of their consequences;
- Fire security;
- Safety of people in water basins;
- Security of smaller vessels' operations;
- Technical safety in industry and mountain-mine works;
- Safety in construction;
- Drafting of government policy and regulations on the state material reserves funds;
- Management, coordination and supervision on the areas mentioned above;
- Protection of strategic facilities, objects and installations in cases of imminence/occurrence of emergency situations

The Ministry has the following services:

- State Fire Protection Service (Fire risk reduction and management)
- Fire Control Service (Assistance and control over fire safety)
- Civil Defense Troops (Rescue and evacuation in emergency situations)
- State Agency for Control over Construction Safety (Control over structural safety of public buildings during construction, control over building standards)

Ministry of Education: The Ministry of Education is a central government body that implements national policies in education. The Ministry is responsible for including DRR related teaching materials and lesson plans into school curricula via its national curriculum. Current school curricula reflect government policy in terms of Disaster Risk Management well. The Ministry of Education is also responsible for drafting future educational policies.

Ministry of Ecology and Natural Resources: The Ministry is the main government body for protection of the environment in Azerbaijan. Protected areas include the vast majority of all forested areas. These protected areas serve as a buffer for natural hazards and considerably reduce risks. The Ministry controls grazing and logging in mountain regions of Azerbaijan, which are the main causes of landslides and flash floods. In other words, the Ministry contributes to DRR through control over land use and protection of the environment.

Ministry of Health: The Ministry of Health is responsible for implementing health policy and governing the vast majority of medical services in Azerbaijan. State Medical Emergency Service is responsible for providing emergency health services during all types of disasters. The Ministry also contributes to DRR though improving health services. Low-level or non-existent health services are a main cause of vulnerability.

Municipalities: Municipalities are responsible for carrying out land use management and development practices in all municipality lands. The laws of the Azerbaijani Republic give a solid basis to municipalities to carry out all types of structural and non-structural activities in municipality lands. Construction of facilities (e.g., schools, hospitals, bridges, roads) that reduce disaster risks may be carried out by municipalities. Municipalities are also in charge of initiating public control over use of natural resources.

Non-governmental Organizations and Civil Society Groups: Non-Governmental Organizations and Civil Society Groups are independent organizations that represent the public voice in disaster risk management activities. These organizations, in partnership with governments and major groups in society, have key roles to play in promoting the objective of sustaining resilient communities to avert or reduce the impact of these disasters. DRR related awareness raising, training, and public control over the work of institutions are the main activities that are carried out by non-governmental organizations.

Private Business: Many midsize and small enterprises represent private business. This group is mainly interested in establishment of a comprehensive warden system and forecasting. Gilan Holding has a broad palette of activities that include tourism, husbandry, dairy, food and juice production. The holding creates additional employment opportunities to local residents and reduces the vulnerability of these people. The Gabala-Duruja highway not only makes a big contribution to tourism and employment, but also serves as the main road for some mountain communities.

2.5 Gabala District Development Planning

Integrated Disaster Risk Management and mainstreaming should be an important part of national and local development plans in the regions, where disaster risks are very high. Unfortunately, in most cases state and local development plans in Azerbaijan do not take into account disaster risk reduction strategies. The state program on socio-economic development of the regions on 2014–2018 is the main document that provides ground for economic development of the regions. This document includes economic development plans of regions, including Gabala District. The Program stipulates that socio-economic development of the country should provide for sustainable and human centered development of the country. However, the program has no clear mainstreaming mode of disaster risk management activities. In addition, there is no single document that would reflect all of the development activities for the next 4–5 years; several documents that came from various institutions comprise these development activities.

UNICEF's Gabala Working Group that was re-established in May of 2015 started to collect this information with the aim of making one single document. This document includes plans of various organizations, including ministries, private business, local executive powers, and NGOs.

Moreover, the state program on socio-economic development only includes activities that have to be carried out during the next three years. Therefore, Gabala Working Group started to gather information regarding the intended development activities for the next five years. In addition to the development plan, the working group collected information regarding all types of activities that have DRR relevance. This collected information includes the following (Annex 1.2):

- Awareness raising and educational activities
- Support of agricultural sector
- Road and bridge constructions
- Construction of hospitals and medical points
- Construction of firefighting points
- Planting of trees along rivers that cause flood risk
- Construction of new schools or restoration of schools
- Construction of gas supply pipelines in villages
- Constructions of public buildings that could be used during emergency situations
- Creation of school DRR groups in most vulnerable villages
- Activities that may reduce vulnerability of children and communities
- Construction of new hotels and all types of public buildings

In addition to the development plan, Gabala Working Group and DRR experts identified the most important problems of schools and communities that would reduce vulnerability of children and increase resilience.

2.6 Vulnerability of Development Sectors to Disasters in Gabala District

2.6.1 Agriculture

Risk assessment shows that most of the area of the Gabala District is located in disaster prone zones. Because agriculture is dependent on the natural resource base, natural hazards may easily reduce or totally impact agricultural production. Climate changes, floods, and landslide may effect agricultural production easily. For example, after the 2015 hail phenomenon, fruit production in most villages was considerably decreased. According to estimations of Tikanli municipality, the total damage from hail was nearly 120,000 USD. Negative agricultural practices may also exacerbate some hazards. For example, incorrect plowing in upstream villages of Gabala often causes landslides. Therefore, mainstreaming disaster risk reduction into agricultural practices should be directed to reduce the impact of hazards on agriculture and also reduce negative effects of agricultural activity on disaster risks. Various state programs supported by the government of Azerbaijan consider sustainable use of lands and natural resources. For example, "National Program on Environmentally Sustainable Social and Economic Development" (2003) stipulates that management of soil resources in Azerbaijan should be managed in a sustainable way, which in turn would reduce landslides and soil degradation. The Second National Communication of Azerbaijan Republic to the UNFCCC suggests continued work on selection and introduction of drought resistant and highly productive wheat and vine varieties. Introduction of these plants would reduce disaster risks, decreasing vulnerability of people to water related hazards. Development and implementation of government programs to facilitate growth in the manufacture of competitive products by processing plants in the agricultural sectors would increase capacity of the local population, considerably reducing poverty. Within these programs, the private sector has made considerable improvement in the agricultural sector, simultaneously reducing people's vulnerability to hazards and making new employment opportunities. Specific activities in Gabala District under consideration for the 2015–2020 years are given in Annex 1.2.

Support for creation of large farming enterprises in Gabala District is one of the main activities that is considered for the next 3 years. This activity may increase competitiveness of local farmers and open new workplaces that in turn will reduce poverty in the region. These activities are supported by the aforementioned development programs. Over the years of 2014 and 2015, the State Program of Socio-Economic Development of the Regions successfully contributed to the development of Agriculture in Gabala. Official information of the Ministry of Agriculture confirms that several farming companies have successfully increased production of agricultural goods.

In order to increase resilience in the agricultural sector, the government of Azerbaijan and Islamic Bank are planning to invest in the construction of Yengica Water Reservoir. The total usable capacity of this reservoir will be 51×10^6 m^3 of

water that will allow irrigation of an additional 10,000 ha of land. This will definitely reduce pressure of overgrazing on mountain slopes, giving new prospects for fodder production in downstream areas.

According to the development plan, during the years 2016–2018, major agricultural works will be done in Dizakhli, Aydingishlagh and Garadeyin settlements, where new amelioration-irrigation works are considered. These amelioration and irrigation works include drilling of sub artesian wells in the aforementioned villages.

The Ministry of Agriculture is also going to implement new pasture and land use measures to stop erosion in cultivated areas and pastures. Table 2.2 illustrates all activities in agriculture in Gabala District over the period of 2016–2020.

Table 2.2 Planned activities in agricultural sector (2016–2020)

Action	2016	2017	2018	2019	2020	Organization	DRR element
To support the development of livestock-breeding, wheat production, grape-growing, fruit-growing (gardening) and vegetable-growing	+	+	+			MoA, LDG	Poverty reduction
To strengthen the material -technical base of the infrastructure serving the development of the production of agricultural product	+	+	+	+	+	MoA, LDG	Poverty reduction, Capacity building
Land use improvement in the Gabala city			+	+	+	lDG	Reduced hazard risks
Support involvement in entrepreneurship of vulnerable groups of population, including youth, women, IDPs and disabled	+	+	+	+	+	MEI	Reduced poverty, increased capacity for disasters
Support creation of large farming enterprises						MoA, MEI	Reduced poverty, increased capacity for disasters
Continue work towards implementation of measures required for recirculation of eroded and saline lands owned by agricultural producers with implementation of technical and biological measures	+	+	+	+	+	MoA	Reduced risk of landslides

2.6.2 Tourism

Reliable income sources make the population less vulnerable to natural hazards. The 2002–2005 and 2014–2016 State Programs on development of tourism, as well as the 2009–2015 State Program of Socio-Economic Development of the Regions of Azerbaijan contributed to the development of tourism in all regions, including Gabala District. Over the last 20 years tourism became a second major income source for the local population of Gabala.

As it has been noted, many hotels, tourist attractions, and restaurants were built in Gabala District. House renting has become very popular for local residents as it gives considerable income relative to other sectors of the economy. Due to touristic developments, land prices in Gabala District increased more than 10 times over the period of 2000–2014. According to various action plans, the tourism potential of the district will increase over the years 2015–2020. This includes construction of roads and tracks, highways, skiing areas, etc. For example, construction of hotels in 2016–2020 near the Nohurqishlaq reservoir, construction of a water reservoir close to Yengica village, and increasing the length of mountain highways in the district will give new values to tourism sectors, reducing poverty and vulnerability of the people.

2.6.3 Health and Sanitation

Health issues, access to running water and sanitation issues are the most important features of DRR activities. Without proper sanitation conditions, it is not possible to provide a safe living environment. Unfortunately, most of the schools in Gabala District still lack sanitation facilities. Gabala Working Group proposed that the local government provide several schools with running water during the 2016 year.

All the kindergartens in Gabala have medical staff. However, there are no qualified medical staff in the schools.

Studying recent conditions, Gabala Working Group suggested opening medical vacancies in several schools in 2016. According to the initiative of the group, medical vacancies should be opened in all schools, where more than 300 children receive education. The first schools to hire medical staff will be in Bum, Mikhliqovaq, Tikanli, and Nic.

Almost all the medical points in villages are rather old and need to be repaired (Annex 1.1). The Working Group identified this as a factor increasing disaster risks. However, repair of village medical points was not included in the development plans.

According to the regional development plan, construction of the new building for Gabala District Central Hospital is under consideration for the next three years. Construction of this facility will contribute to reducing vulnerability and increasing resilience of local communities to hazards. Also, during the next five years,

construction of health facilities in Yengica, Tuntul and Laza villages is under consideration.

In addition, within the coming years, government of Azerbaijan is going to launch compulsory social insurance system in all regions that will insure local community members from natural and man-made disasters as well.

2.6.4 Water Resource and Flood Management

As it has been noted, water-related hazards, mainly including floods, are common factors that threaten life and property of people in the region. In addition, droughts have become a second major water-related issue in the district. In order to reduce the risk of these hazards, a broad palette of activities has been carried out. Within the 2009–2015 State Program of Socio-Economic Development of the Regions of Azerbaijan, many types of water supply networks, bridges and roads have been built in the district that considerably reduce the risk of floods and droughts. Additional activities will be carried out for the next five years according to various state programs and local plans. These activities include construction of water supply networks, construction of bridges and roads, as well as implementation of integrated basin management approaches in small river basins. An early warning system which is going to be built in 2016 will considerably reduce risk of floods.[1] In addition, the local government is also planning to restore and make protective walls around the schools. Gabala Working Group suggested increasing protection of several schools in terms of floods and heavy rains.

The major expected activity that would reduce water stress is to construct a flood protection dam for Gabala city. Also, in flood risk zones of Bum and Vandam villages, the forestry department will plant riverine forest belts that will considerably reduce flood vulnerability.

The "Integrating Climate Change Risks into Water and Flood Management by Vulnerable Mountainous Communities in the Greater Caucasus Region" project that is being implemented in Gabala by UNDP aims at modernizing the water and flood management and reducing the impact of climate induced flooding and water stress in the Gabala District. Through this project, launching of Flood Early Warning Systems for the Oguz-Gabala region is under consideration. This Early Warning System will considerably reduce the vulnerability of local communities and schools, since these people will have information about possible floods 48 h in advance.

In addition, according to a new institutional framework that was developed through the aforementioned UNDP project, establishment of additional Water

[1]Abbasov (2013) Identification of Institutional Capacity And Needs For Flood And Water Resources Management In Azerbaijan. UNDP document. Available at: http://wrm.az/reports.html.

Table 2.3 Planned activities in 2016–2010 with respect to water management

Action	2016	2017	2018	2019	2020	Organization	DRR element
Continue works on improvement of water supply and sanitation systems of Gabala town		+	+	+	+	"Azərsu" OJSC	Improved sanitation and access to safe water
Continue amelioration-irrigation works for improvement of the water supply of the lands of the district, including drilling of sub-artesian wells in Dizakhli, Aydingishlagh and Garadeyin settlements		+	+	+	+	AWM OJSC, lg	Access to running water, improved sanitation, improved irrigation in agriculture, reduced poverty
Continue flood protection works in the district	+	+	+	+	+	AWM, LDG	Reduced flood risks
Continue plantation works along rivers in flood risk zones of Bum and Vandam villages	+	+	+	+	+	MENR	Reduced Disaster Risks, Increased preparedness
Develop and implement the "National Plan for Integrated Water Management" (Action Plan)			+	+	+	MENR, AWM,	Reduced Flood Disaster Risks, Increased preparedness
Strengthen control over use of water facilities	+	+	+	+	+	Azerenerji, Azersu	Improved access to safe water, improved sanitation
Establish a monitoring system for water facilities and hydraulic structures	+	+	+	+	+	MoES	Improved monitoring and forecasting, reduced disaster risks
River bed clean-up from mudflow debris, bank protection, river bed regulation, reinforcement and heightening of existing protective dams	+	+	+	+	+	AWM	Reduced disaster risks, reduced vulnerability, improved protection

(continued)

Table 2.3 (continued)

Action	2016	2017	2018	2019	2020	Organization	DRR element
Determine sources of natural emergency situations for the district, prepare their hazard and risk maps	+	+	+	+	+	MoES, UNICEF	Reduced Disaster Risks, Reduced vulnerability, Improved warden, increased awareness
Launching of Flood Early warning Systems for the Oguz-Gabala region		+	+			UNDP	Reduced Flood Disaster Risks, Increased preparedness
Construction of protective dam in upper part of Gabala city	+	+				AWM	Reduced flood risk in Gabala District
Construction of water reservoir in Bum village			+	+		AWM	Reduced water stress
Construction of Water Reservoir in Yengica village		+				AWM	Reduced water stress, reduced flood vulnerability in downstream villages
Construction of flood protection dams in Tikanli and Mikhlogovaq villages		+	+	+		AWM	Reduced flood risks

Users' Associations in villages is under consideration, where local communities and schools lack water. Several WUA's have already been established and closely work with the local irrigation department.

Additional information regarding the DRR mainstreaming into water management can be found in Table 2.3.

2.6.5 Infrastructure

Well-developed Infrastructure is a most important feature that increases capacity and structural preparedness against disasters. Good hazard resilient infrastructure also provides people access to information during the hazards. Over the last 20 years many types of government activities supported infrastructure development in the district. Roads, connections, Internet and electric lines were constructed to the remote villages. However, the increasing size and density of infrastructure,

Table 2.4 2016–2020 planned activities in infrastructure

Action	2016	2017	2018	2019	2020	Organization	DRR element
School building construction in Bilix village	+	+	+			LDG	Reduced disaster risk
School building construction in Mamayli village	+	+	+			LDG	Reduced disaster risk
School building construction in Zargarli village	+	+	+			LDG	Reduced disaster risk
Construction of the town's full secondary school № 5 for 360 students in Gabala City	+	+	+	+		MoE, LDG	Improved teaching environment, reduced disaster risks for school children
Construction of new kindergarten in Gabala City	+	+	+	+		MoE, LDG	Improved teaching environment, reduced disaster risks for children
Construction of new general Secondary School for 220 students in Ziring village		+	+	+	+	MoE, LDG	Improved teaching environment, reduced disaster risks for school children
Construction of general secondary school for 80 students in Yengija village	+	+	+	+		MoE, LDG	Improved teaching environment, reduced disaster risks for school children
Construction of full secondary school for 180 pupils in Muskurlu village		+	+	+		MoE, LDG	Improved teaching environment, reduced disaster risks for school children
Construction of primary school for 80 pupils in Gabala Muskurlu village, town nursery-kindergarten N 4		+	+	+		MoE, LDG	Improved teaching environment, reduced disaster risks for school children

(continued)

Table 2.4 (continued)

Action	2016	2017	2018	2019	2020	Organization	DRR element
Construction of town nursery-kindergarten N 4		+	+			MoE, LDG	Improved teaching environment, reduced disaster risks for school children
Construction of the road and bridges among Nij-Mikhligovag-Uludash-Tikanli-Abrikh vilages	+	+	+			MoT, LDG	Poverty reduction, capacity building
Construction of bridges between Bum and Tikanli villages						MoT, lg	Capacity building
Asphalt paving on inter-village road between Imamlı and Xırxatala			+	+	+	LDG	Poverty reduction, capacity building
Improving the electric power supply of the Gabala town and all villages, including the construction and reconstruction of the electric power supply lines	+	+	+	+	+	"Azərenerji" OJSC	Capacity building
Construction of the centralized heating supply for the Gabala town		+	+	+	+	"Azəristilik" OJSC	Reduced risk of landslides and floods
Construction of new gas supply pipelines for Bum, Mikhligovaq, İmamlı, Mirzabayli, Uludaş and Tikanlı villages	+	+	+	+	+		Capacity building for schools, reduced risk of disasters
Continue work on improvement of the gas supply of the district	+	+	+	+	+	SOCAR	Capacity building for schools, reduced risk for disasters
Continue work on improving the communication and information services of the district	+	+	+	+	+	MCİT	Better warning capacity
To draft a comprehensive plan for Gabala City.		+	+			LDG	Reduced hazard risks
Major repair of the schools in Cigatelli, Bum, Mirzabayli, Dizakhli villages	+	+	+	+	+	MoE	Improved teaching environment, reduced risk of disasters

(continued)

Table 2.4 (continued)

Action	2016	2017	2018	2019	2020	Organization	DRR element
Continue improvement of road infrastructure in the city of Gabala	+	+	+	+	+	LDG	Improved communications, reduced vulnerability
Continue work to improve communication and information services in the city of Gabala	+	+	+	+	+	MICT	Improved communications, reduced vulnerability, Improved warden system
Launching of Flood Early Warning Systems for the Oguz-Gabala region		+	+			UNDP	Reduced Flood Disaster Risks, Increased preparedness
[a]Restoration of Tikanli School Roof		+				LDG	Reduced child vulnerability
[a]Restoration of the entrance floor in Mirzabayli School		+				LDG	Reduced child vulnerability
[a]Fencing of mudflow road for Mirzabayli school		+				LDG	Reduced child vulnerability
[a]Restoration of Bum school roof		+				LDG	Reduced child vulnerability
[a]Restoration of Mikhliqovaq school		+				LDG	Reduced child vulnerability
[a]Restoration of Tiklanli Middle school		+				LDG	Reduced child vulnerability
Construction of Uludash-Tikanlı-Mikhligovaq road		+				MoT	Reduced flood risk
Improvement of electric lines for İmamlı village		+				Azerenerji	Reduced flood risk
Construction of Internet line for Uludash village		+				MoT	Reduced flood risk
Construction of flood protection dam in Gabala town							Reduced flood risk

[a]Proposed by Gabala Working group

particularly those providing important services, pose challenges for reducing disaster risks. For example, electric and phone lines to mountain villages are very vulnerable to floods.

Various government programs and action plans support a broad palette of activities directed towards the improvement of infrastructure for the next 5 years. According to these plans electric lines will be replaced with more reliable cables and networks. More detailed information about these plans is given in Annex 1.1.

Gabala Working Group, which works closely with the government, agreed on several activities related to repair and maintenance of schools during the year 2016. These activities will be included into the 2016 district budget. These activities would considerably reduce child risk in the given villages.

It is very important to note that some of these activities, especially those related to restoration of schools, are proposed by the Gabala WG. In most villages school buildings are old, equipment is outdated and there is an urgent need to build new schools in 41 villages (Annex 1.1). In order to increase resilience of schools, 23 new school buildings have been constructed since 2004.

The most important activities related to reduction of child vulnerability are the restoration and constructions of schools and kindergartens. For example, construction of a new general Secondary School for 220 students in Ziring village will enable school children to be in a more reliable environment. Studying conditions of schools, Gabala Working Group also proposed building new school buildings in Bylykh, Mamayli and Zargarli villages. This and many other construction activities are included into 2016–2020 development plans.

Other activities related to infrastructure development are given in Table 2.4.

2.7 Conclusion

Mainstreaming of DRR into Gabala District Development plan is a high priority for the local government. Legal and institutional aspects of DRR have been analyzed. The analysis shows that DRR mainstreaming in Azerbaijan has solid legal grounds. Many types of national programs implemented over the last 20 years show the high desire of the government to reduce child related risks in the region. Over the last 20 years huge efforts have been made to reduce vulnerability of children and improve living conditions in villages.

Proper studies on hazard quantification (particularly flood and sediment hazards), hazard and risk mapping, risk-informed approach, monitoring techniques and programs etc. by making use of cutting edge knowledge and tools as well as relevant capacity building programs can also be supplementary activities that can be included as a part of overall recommendations to deal with disaster risks and their reduction.

Various government programs related to rural development and poverty reduction have been analyzed. The information related to economic development of the next 5 years (2016–2010) has been collected and compiled into one single

document. Additionally, Gabala Working Group, which works closely with the government, agreed on several activities related to repair and maintenance of schools during the next 2016 years. These activities will be included in the 2016 district budget. These activities would considerably reduce child risk in the affected villages.

The DRR activities conducted within the development plan in 2015 and 2016 were a successful beginning of the whole process. Recommendations of the Gabala WG are considered in the budget for 2016. There is strong evidences that recommendations from the WG have influenced the development plan and budget for 2016 and benefitted seven high risk villages with a total population of 3062 children (ca. 8% of the total population of children are under 16).

Local executive powers engage in the detailed planning and day-to-day management of developments. Therefore, development plans and programs such as infrastructure improvements (natural gas or water supply, road construction, flood mitigation, etc.) can be steered to benefit high risk villages and populations.

At the same time, it needs to be recognized that there are a number of complex processes (deforestation, issues related to water and pasture management) that currently increase the risk of flooding in the district and in other regions of the country (see Abbasov and Mahmudov 2009).

The MoES has provided strong support to the DRA and regional level representatives expressed enthusiasm about its results. The DRA has also been very positively received on the national level. UNICEF takes a careful approach to institutionalizing it by piloting the DRA in three more districts to consolidate the experience before presenting a solid package to the government for discussion and eventual adoption.

Annex: Main Priorities for DRR in Residential Areas of Gabala District

Residential area	Needs			
	School	Roads	Medical point	Administrative buildings
Abrykh		Construction	Repair	Repair
Amirvan		Repair of internal roads	Repair	Repair
Aydyngyshlrag	Construction	Repair of internal roads	Repair	Repair
Bayli	Construction	Repair of internal roads	Repair	Repair
Bayramkokhaly	Construction	Repair of internal roads	Repair	Repair
Boyuk Amili	Repair	Repair of internal roads	Repair	Repair

(continued)

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Residential area	Needs			
	School	Roads	Medical point	Administrative buildings
Boyuk Pirali	Construction		Repair	Repair
Bum	Construction		Repair	Repair
Bunud	Construction	Repair of internal roads	Repair	Repair
Bylykh	Construction		Repair	Repair
Charkhana			Repair	Repair
Chukhur Gabala	Repair		Repair	Repair
Corlu	Construction		Repair	Repair
Dandykh	Construction	Construction of a new road	Repair	Repair
Dashja		Repair of internal roads	Repair	Repair
Dizakhly			Repair	Repair
Gabala			Repair	Repair
Gamarvan			Repair	Repair
Garadeyin	Repair		Repair	Repair
Gushlar	Construction	Repair of internal roads	Repair	Repair
Hajally	Repair		Repair	Repair
Hamzali	Construction		Repair	Repair
Hazra	Construction	Repair of internal roads	Repair	Repair
Imamly			Repair	Repair
Jyghatelli	Construction		Repair	Repair
Khyrkhatala	Construction	Construction of a new road	Repair	Repair
Kichik Pirali		–	Repair	Repair
Kotuklu			Repair	Repair
Kurd			Repair	Repair
Laza	Construction		Repair	Repair
Malikli	Repair	–	Repair	Repair
Mamayly	Construction	–	Repair	Repair
Mammadaghaly	Construction		Repair	Repair
Mirzebeyli	Construction		Repair	Repair
Mollashykhaly	Construction		Repair	Repair
Mykhlygovag	Construction	–	Repair	Repair
Nij			Repair	Repair
Nohurgyshlag			Repair	Repair

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Residential area	Needs			
	School	Roads	Medical point	Administrative buildings
Ovjulu			Repair	Repair
Saryhajalli	Repair		Repair	Repair
Savalan			Repair	Repair
Seyidgyshlag	Repair		Repair	Repair
Shafili		–	Repair	Repair
Shamly	Construction		Repair	Repair
Sileyli	Construction	–	Repair	Repair
Solguja		–	Repair	Repair
Soltannukha			Repair	Repair
Syrt Yengija	Repair		Repair	Repair
Tikanly	Construction	–	Repair	Repair
Topbagh		–	Repair	Repair
Tovla			Repair	Repair
Tuntul			Repair	Repair
Uludash		–	Repair	Repair
Vandam			Repair	Repair
Yemishanly		–	Repair	Repair
Yengija	Repair		Repair	Repair
Yeni Dizakhly	Repair	–	Repair	Repair
Yenikand			Repair	Repair
Zalam	Construction		Repair	Repair
Zaraghan	Construction		Repair	Repair
Zergerli	Construction		Repair	Repair
Zirik		–	Repair	Repair

Chapter 3
School Based Disaster Risk Management

Abstract The chapter includes a methodology that can be used to assess school safety conditions and assess capacity of schools to respond to hazards. The methodology enables us to assess both structural and non-structural safety of schools. The main stages of the assessment are study of natural conditions, review of conditions of school buildings, and evaluation of quality of school drills. Raising awareness is among the most important elements of school safety. One of the most important actions focused on school disaster risk reduction is organization of regular disaster preparedness exercises, which contribute to the testing of all structural and non-structural actions towards the school DRR and examining the preparedness level of the school staff.

Keywords School · Hazard · Disaster · Child vulnerability · Structural safety Nonstructural safety

The Sendai Framework for Disaster Risk Reduction (DRR) 2015–2030 intends to conduct comprehensive actions on DRR in schools and other educational institutions. As children are more vulnerable than other people in the same emergency situations, the document emphasizes a close integration of children and school problems into all DRR activities, plans and policies.

Azerbaijan is a country where natural hazards are observed frequently. These natural hazards create severe disaster risks for local communities and educational institutions. Natural disasters occurring in the country over the last 20 years were accompanied with large-scale damages. In order to increase resilience of children, structural and non-structural safety of school buildings are necessary to properly respond to hazards.

The submitted document provides guidance for the disaster risk management and reduction in schools and for guaranteeing the schools' safety. In the document, there is a methodology for disaster risk assessment and management in Azerbaijani schools. At the same time, the application of that methodology in the pilot schools is specified and the overview of the works done in these schools is provided. The

R. Abbasov, *Community-Based Disaster Risk Management in Azerbaijan*,
SpringerBriefs in Geography, https://doi.org/10.1007/978-3-319-69653-9_3

methodology can be used not only in Azerbaijan, but in all countries where practitioners need a comprehensive tool to assess school safety.

3.1 Hazards and Disasters

Hazards mean circumstances that are continually observed in nature which can cause material and human losses. The hazards may turn into disasters where no preparedness actions are taken against them. Even the circumstances that are regarded as ordinary in nature may become a disaster for society if no preparedness and response actions are taken by the society. For example, if a flood is observed as a hazard, the resulting submerging may destroy the school buildings and turn into a disaster. In other words, disasters are circumstances that could be harmful to a person's life, normal operation or property and upset social and economic balances.

Key harmful circumstances observed in the territory of Azerbaijan are floods, earthquakes and landslides, and droughts have also recently been observed due to climate changes. Over the last decades, the scale of damage resulting from these natural circumstances has significantly expanded which in turn shows the low level of preparedness of the society for these types of hazards.

The total impact of the factors related to the preparedness level of any community or society toward any potential hazard is vulnerability. For example, lack of early warning systems in the case of floods, potential crumbling of school buildings due to their age and condition, low preparedness level of school staff, lack of an evacuation plan of school children, poor conditions of roads and other factors comprise vulnerability.

A risk is an assumption of any potential result due to natural disasters. For example, the assumption of destruction of a school building as a result of earthquake is a risk. Surely, if the school building is planned for a high magnitude earthquake, then the risk of its destruction will be significantly less. The assumption of low productivity due to drought is a risk. If we take comprehensive actions to conserve water, then the risk of low productivity due to drought will decrease.

Capacity means mobilization of the power, attributes and reserves by a community, school staff or organization in order to achieve any of their goals. For example, availability of an early warning system during floods, strength of school buildings, high preparedness level among schoolchildren and low poverty level may be regarded as capacity.

The process of addressing the factors that may cause any disaster among a community or society and increasing its preparedness level is Disaster Risk Reduction. There is a need for comprehensive efforts to reduce the risk of disaster in schools and educational institutions. Key needs include reinforcing the school buildings, increasing the preparedness level of school children, and establishing an early warning system.

In general, the key factors guaranteeing the safety of a school are as follows:

- Availability of advanced legislative grounds for school safety
- Active participation of stakeholders in ensuring school safety
- Compliance of school building with key safety criteria
- Use of fire resistant materials in construction of school building
- Integration of Disaster Risk Reduction issues into curriculum
- Continuous assessment of disaster risks
- Availability of a school disaster preparedness plan that is regularly reviewed and Improved
- Regularly increasing knowledge and skills of teachers and students of disaster risk
- Organizing regular trainings that enable disaster risk reduction
- Access of school to information from national, regional and local warning systems
- Availability of a modern warning system at school
- Availability of a Disaster Risk Management Group at school
- Availability of a fire tap and water reservoir at school
- Availability of a school evacuation plan and regular improvement of the plan.

3.2 Legal and Institutional Framework for Disaster Risk Reduction at Educational Institutions

The Law on Education of the Republic of Azerbaijan was adopted in 2009. Article 3 of the Law establishes the key principles of the government policy on education. The first paragraph of the Article specifies health and safety, and care of and respect to the environment and humans as a key priority. Under Article 32, the rights of those in educational institutions are defined, including the right to get access to safe and harmless education facilities. Furthermore, the Law emphasizes teaching of health protection and indoctrination in related customs at all stages of education as a key direction.

The General Education Concept of Azerbaijan, that is, the National Curriculum, is a key document that defines educational standards and outputs in Azerbaijan. The document was approved by Decree No 233 of 2006 of the Cabinet of Ministers. The National Curriculum is supported by the Law on Education of the Republic of Azerbaijan.

Subjects such as Life Knowledge, Military Preparedness until Conscription and Physical Training are key subjects focused on protection of health and safety and building capacity in this regard. The subjects of Geography and Biology also provide a fair amount of knowledge on natural phenomena, environmental and natural hazards.

Among the key standards for content of the Life Knowledge subject both on the primary and the secondary education levels are providing enough knowledge to school children on natural phenomena and teaching behavioral practices to be applied during any natural phenomena that may endanger safety.

Within the "Nature and Us" module taught on the primary education level, a student may imagine him/herself as a part of nature and understand the importance of studying nature as well as benefitting from the knowledge and skills gained while in contact with nature.

As part of the Health and Safety module, a student gains awareness of the factors endangering the safety of life and complies with the learned safety rules in his/her daily life. He/she also learns how to use individual and common means of protection during emergencies. Learning objectives include availability of a primary vision of emergencies in all grades of the primary school, interpretation of these situations by their specific features, interpretation of guidelines for use in accident protection and demonstration of self-protection skills in unnaturally created extreme situations according to local conditions.

Health and Safety is also one of the key modules on the general secondary education stage. On the education stage covering 5th–9th grades, the sub-standards on these content lines get gradually deeper and the requirements for knowledge and skills from the school children gradually increase. For example, if a student in 5th grade is required to assess a hazard that may arise during an emergency, a student in 6th grade is required to explain the behaviors needed during the emergency, and a student in 7th grade is required to provide first aid. This increase is reflected in Table 3.1.

In general, as a result of the above study, we should mention that the ability of the student to act adequately during emergencies and handle them as well as disasters of various types, and availability of his/her adequate knowledge and skills on emergencies is fully supported by the Law on Education and the National Curriculum.

Table 3.1 Standards and Sb-standards for the health and safety module of the national curriculum

Category	Standard	Substandard
1.	Demonstrates knowledge and skills in relation to emergency cases	Assesses the hazard that may arise during emergency cases
2.	Demonstrates knowledge and skills in relation to emergency cases	Clarifies the behaviors needed during emergency cases
3.	Demonstrates knowledge and skills in relation to emergency cases	Provides first aid during emergency cases
4.	Demonstrates knowledge and skills in relation to emergency cases	Demonstrates joint action skills in eliminating impacts of emergency cases
5.	Demonstrates knowledge and skills in relation to emergency cases	Drafts projects on eliminating impacts of emergency cases

Furthermore, there are the following laws and codes directly or indirectly focused on strengthening school safety:

- Urban Planning and Construction Code
- Law on Fire Safety
- Law on Civil Protection
- Law on Emergency Cases.

3.3 School DRR Profile

A school DRR profile is a document providing information on DRR actions to be conducted at any school. The document contains information on hazardous phenomena observed in the territory and the history of disasters the school has experienced as well as losses observed during those disasters. At the same time, the DRR profile gives information on the set of response actions to potential hazards in the territory of the school. The document also contains information on the school's DRR teams and safety system, and on regular trainings conducted with the aim to response to the hazards. The text of the DRR profile may also include other information deriving from the local specifications.

3.4 School Disaster Risk Assessment

In assessment of a risk, potential natural disasters in the territory are determined and their possible results are evaluated. The risk assessment requires determining preparedness and vulnerability levels in communities, assessing the existing situation and determining any potential losses. The risk evaluation not only determines which losses may arise from a disaster, but also shows the causes of the losses and suggests ways of reducing them.

In the classical DRR literature, disaster risks are described by the following formula:

$$\textit{Disaster Risk} = (\textit{Hazard} \times \textit{Vulnerability})/\textit{Capacity}$$

As seen from the formula, although a high level of hazards or vulnerabilities increases the risk of disaster, a high level of capacity reduces the disaster risk. This means that a systematic increase in capacity may prevent most disasters.

There is a need for a detailed survey to assess the Disaster Risk at the schools, which also necessitates the following studies:

- Determining hazards occurring in the territory of the school
- Collecting historical information on all hazards by using scientific and observation data
- Determining how all phenomena alter depending on seasons

#	Key stages	Actions
1	Studying the existing situation	Determining all potential hazards. Analyzing the causes, frequency and other indicators of these phenomena.
2	Assessing the existing circumstances	Determining the preparedness for impacts. (School buildings, non-structural sa fety, fire, equipment, DRR teams, etc.)
3	Vulnerability analysis	Determining the territory's vulnerability level. Determining the most vulnerable places in schools.
4	Risk assesment	Determining potential loses
5	Risk reduction	Determining the risk reduction capacity

Fig. 3.1 Stages of disaster risk assessment in schools

- Determining the impact of climate change on the frequency and duration of hazards
- Determining human-based risks (e.g., fire)
- Analysis of human-based actions that may increase the disaster risk in the territory
- Assessing the emergency services such as firefighting and first aid which are nearby
- Assessing resistance of the school building to hazards
- Availability of and regular updating to School Disaster Preparedness Plan
- Integrating DRR issues into curriculum
- Continuously assessing Disaster Risks
- Assessing the knowledge and skills of teachers and students on DRR
- Reviewing regular trainings
- Availability of a modern warning system at the school
- Reviewing the work level of the Disaster Risk Management Team
- Checking the fire tap and water reservoir
- Reviewing the evacuation plan.

These tasks shall be implemented in stages during the disaster risk assessment. These stages are systematically listed in the following schedule (Fig. 3.1).

3.5 Study of Natural Conditions

A study of the natural conditions is the most important and primary requirement in assessing the disaster risk, where the party conducting the assessment gets complete information on hazards occurring in the territory and of their scales, magnitudes,

dissemination area and intensity. The most reliable way of getting information on any hazards is requesting it from official sources.

For example, in order to get information on hazardous hydro-meteorological phenomena, the archive materials of the Ministry of Ecology and Natural Resources may be the most reliable source. In these materials, there is information on droughts, floods, hails, waterspouts and overflows based on accurate observations. The Catalog of Floods prepared by the Institute of Hydrometeorology is the most reliable source of information on floods occurring in small rivers of the country. Information on the hazards of any hydrometeorology phenomena is also obtainable from both scientific materials and the periodical press.

According to some authors, one of the most proper ways of collecting information is holding regular meetings with local communities. As a rule, the representatives of the local communities have detailed information of hazardous hydrometeorology phenomena observed in the territory of any school. The older generation usually has more information. The local historical buildings, the authorities of emergency cases, libraries and newspaper materials are also good information sources.

Information on earthquakes should also be taken from official sources. As earthquakes are not frequent, the local population usually does not have sufficient knowledge of this phenomenon. It is enough to say that the earthquakes occurring in Zagatala and neighboring districts in 2012 were quite unexpected for the local populations. Such information is obtainable from the Republic Seismological Service Center under the National Academy of Sciences of Azerbaijan. At the same time, the seismic maps prepared by the Geology Institute of the National Academy of Sciences may be a source of information on past earthquakes. In general, the territory of Azerbaijan is a very active seismic territory and therefore seismic risks must be taken into account in the school safety assessment.

3.6 Review of School Buildings

Occurrence of disasters due to hazards is also closely related to the conditions of the school buildings directly. The school buildings include educational buildings, educational workshops and all other support buildings. Any buildings in poor condition, not meeting technical safety criteria, significantly increase the disaster risk. For example, the collapse of the school building in Suvagil village in Zagatala Region in 2012 was due to serious faults during the construction. Therefore, the conditions of the school building must be taken into account in assessing school disaster risks.

The practice of UNICEF suggests considering the following factors in reviewing the buildings:

- Any materials to be used in construction of the buildings shall be fireproof
- The foundation of the buildings shall be durable

- Distance between the buildings
- Potential evacuation routes and access of emergency services to the buildings
- Corridors shall be large
- Availability of many evacuation routes
- Symmetry between structural elements
- Vertical durability of the buildings and distribution of loads equally
- Safe connection of the building parts to each other
- Availability of standing seams between the dual parts of the buildings
- Strong resistance to side loads
- Availability of accidental standing seams on bearing walls
- Durability of upper floors in earthquakes.

It should be noted that besides the abovementioned conditions, the impact of other local factors should also be considered. For example, as a result of a review conducted at Ulujali village school, it was detected that the extreme high level of salty ground waters caused a serious hazard for the school's foundation and side walls and decreased the durability of the construction.

3.7 Non-structural Safety

Non-structural safety includes reducing any hazard inside a building not related to the structural works. The non-structural elements include suspended roofs, windows, doors, furniture, computers, electrical devices, heating, ventilation and air-conditioning equipment, piping and electrical systems, generators for emergency cases and other similar equipment.

The UNICEF practice suggests considering the following factors in reviewing the non-structural safety level:

- Strong connection between the suspended roofs
- Reliable connection of stands, blackboards and chandeliers to walls and roofs
- Availability of automatically closing doors with a fireproof material
- Fastening of furniture to walls
- Sustainable placement of table equipment
- Standardized electrical devices
- Placement of dustbins away from electrical devices
- Avoiding placement of heavy items on shelves
- Placement of any items that may cause harm when falling from height to floors
- Fastening information boards and other wall equipment to walls tightly
- Availability of good drain, gutter and rain water systems in the buildings
- Planting tall trees away from the buildings.

In any case, non-structural reduction activities must be determined by considering the results of assessments of hazards, risks and vulnerability both in the school buildings and in the areas that are very close to the school buildings.

3.8 Fire Safety and Other Technogenic Safeties

An assessment of technogenic risks such as fire may begin by studying the conditions of the school territory and of neighboring areas jointly with the school management. A comprehensive survey of the situation enables us to determine all types of hazards that may arise from human activities. In general, such hazards may come from neighboring buildings, close railways, water ditches, production entities, electrical lines, etc. At the same time, studying the status of the use of natural resources may also assist in forecasting human-based potential hazards and in considering them in advance.

Old foundations, slopes or dams where there is a likelihood of break up or landslide in the territory should be studied in terms of their previous use. Availability of any hazardous plants, buildings or activities in neighboring territories should be checked. The representative of the MoES's local authorities should assist in hazard assessment.

Guaranteeing fire safety is one of the priorities in educational institutions. Unlike other natural hazards, a fire hazard exists in all buildings, which may significantly be reduced simply by means of a high level of preparedness.

While designing school buildings, engineers must pay attention to the fire resistance of the buildings as a rule. Use of fireproof materials during the construction has a key role in guaranteeing the fire safety.

In general, the following should be given special attention in reviewing fire safety:

- Construction of the school buildings with fireproof materials
- Availability of sufficient space between the buildings
- Availability of an evacuation plan
- Posting of fire safety rules at school entries and places that are visible to everyone
- Availability of wide corridors
- Availability of many emergency exits that may be opened easily
- Fireproof windows and doors
- Automatic doors
- Availability of grids on windows
- Availability of fire boards
- Availability of fire tap and water pool
- Availability of fireproof cables used in the electrical systems of the buildings
- Keeping combustibles and papers away from electrical heaters
- Conducting visual review of classrooms at the end of school days
- Diminishing use of electricity during classes as much as possible.

It should be noted that the fire safety rules approved by the MoES are in a sufficient document.

We recommend familiarity with this document before conducting any visual review of the fire safety in schools. With good knowledge of the document, the schools' fire safety may be easily reviewed.

3.9 Emergency Equipment

The equipment for emergencies is used in activities of hazard preparedness and in response to emergencies. It is recommended to prepare a tentative list of necessary equipment jointly with the local firefighting and first aid offices. While preparing the list of equipment, the natural conditions, hazards and schools' preparedness levels should be taken into consideration. The equipment should be located in places that are known by everyone and easily visible. In most common cases, the schools should be supplied with the following equipment:

Alarm signal: Such signals are also called OS signals and play an important role in transmitting emergency warnings quickly. As a rule, the use of any alarm signal during training forms strong practices on which signal will be used during earthquakes or fires among the school staff. By knowing in advance which type of signal will be used during various disasters, the school staff starts to take adequate response actions to that accident. For example, if the earthquake signal is given, the schoolchildren take shelter under their tables to prevent items falling on their heads. If the fire signal is given, the schoolchildren can search for the shortest way outside via the windows or door.

Sound enhancers: Sound enhancers may be used either jointly with the SOS signal or independently. The sound enhancers enable speedy dissemination of news. If there is not a special SOS signal at a school, then sound enhancers giving an alarm signal may be used.

Bells: If there is no SOS signal or sound enhancer at a school, then standard bells for classes may be used. As modern bells give different sounds, various bell sounds may be used for different emergency cases such as earthquakes or fires. These bell sounds should be distinguished from standard bells for classes and should be regularly used during preparedness trainings so that the school staff will quickly understand what accident has happened.

Cellular phones: Using cellular phones is a good way to ensure quick dissemination of information on any emergency case to all related places. The cellular phones enable contact with the local MoES office, firefighting service, first aid service, local municipality, parents and any party who may contribute to necessary response actions.

Medical supplies: The medical supplies are used in providing first aid. As a rule, the most necessary equipment for medical aid should be stored in first aid kits. The local first aid service should give the school administration a list of the necessary medical supplies for the schools.

Firefighting equipment: Firefighting equipment is available in separate firefighting shields. The equipment that should be available in the firefighting shields is

determined by the local firefighting service. As a rule, this equipment includes firefighting shovels, axes, mattocks, hammers, rakes, fluid sprays, sand boxes and sand pails.

Smoke detectors: Smoke detectors are for detecting the fumes immediately when a fire starts. If a building is equipped with smoke detectors, then the source of a fire is detected quickly and an automatic warning system is given.

Mobile lanterns and accumulators: Mobile lanterns are necessary for lighting corridors, rooms and other places in emergency cases. In addition to such lanterns, it is also advised to provide temporary electrical sources and accumulators.

3.10 School Disaster Management Committee

Planning of disaster management at schools should include the school management, teaching staff and students, and local community, including local authorities and parents. A high preparedness level of a school staff is as important as the natural conditions and school conditions in disaster risk reduction.

As the planning for effective preparedness for disasters starts from the highest level of the school management, it is crucial for school principals to undertake and understand this process. The school principals must ensure management of disasters at the schools with the support of teachers, responsible persons for disasters at the local level, and parents.

There is also a need for joint partnership for implementation of disaster risk reduction and disaster preparedness activities in schools and pre-school educational institutions. The parties who will be involved in disaster management in the schools, who will contribute to this activity, should be determined by establishing a School Disaster Risk Management Committee (SDRMC). The school principals should act as the chairs of the SDRMCs and should appoint representatives who will replace them when they are absent.

The SDRMC should be established by the active participation of the school management. The key objective in the establishment of the SDRMC is to ensure accountability and responsibility during disaster preparedness and disasters. The key objectives and responsibilities of the SDRMC are as follows:

- Drafting a disaster preparedness and response plan for emergency cases and a School Disaster Preparedness Plan
- Organizing DRR teams to protect the safety of the school staff and involving the school children in these DRR teams
- Arranging disaster seminars, training workshops and exercises
- Maintaining communication with the local first aid, firefighting and MoES offices
- Benefitting from all other means to ensure the safety of the school staff.

Participation of school children from upper grades in the DRR teams that should be established by the initiatives of the SDRMCs is very important. However, it is also

Table 3.2 Disaster risk reduction teams and their duties

Title of team	Commitments
Evacuation team	Studying various evacuation routes; Evacuating wounded people and taking them to the first aid stations; Further examination of rooms
Medical first aid team	Providing medical first aid
Firefighting team	Evacuation of those under hazard jointly with the evacuation team; Firefighting by using fire extinguishing equipment
Communication team	Providing information to local EC, firefighting and first aid offices by using all possible means during emergency cases

important that 1–2 teachers be available to participate on each team to ensure effective operation of the teams. The titles and duties of the DRR teams are provided below in Table 3.2.

SDRMCs may include teachers, community members, executive and municipality representatives, representatives of the authorities for emergency cases and for district educational departments, and parents and students in upper classes.

The SDRMCs are responsible for general management of disasters on the school level. One of the key functions of the Committee is to establish clear communication lines with responsible officers for management of emergency cases; educational authorities; and those who implement early response actions to emergency cases on the district level. In order to make the authorities responding to emergency cases familiar with the relevant schools, relations should be established with them.

DRR and disaster preparedness require joint work of various partners and exchange of information between them, so communication between the stakeholders is crucial. In order to ensure protection of the children by the schools and local authorities, interconnection between the families, communities and district educational authorities and EC departments is very important.

The SDRMC should also determine the types of emergency cases that may occur at the schools and which situations (that is, stimulators) may activate the school disaster preparedness plan.

3.11 Regular Trainings and Information Boards

Awareness raising is among the most important elements of school safety. The awareness raising process may be organized both in a general way and on an as-needed basis. For example, after each exercise process, evaluation should be made to determine shortcomings in the staff's knowledge and further training is organized accordingly. Experts and the local MoES Department staff may also be involved in the trainings.

Information boards should be brief and readable. Such boards enable easy dissemination of information. Information boards contain information on which response actions have been taken before and after emergency cases, on first aid, etc.

3.12 Disaster Preparedness Exercises

One of the most important actions focused on the school disaster risk reduction is organization of regular disaster preparedness exercises, which contribute to testing of all structural and non-structural actions towards the school DRR and examining the preparedness level of the school staff. The exercises also serve to determine the need for trainings, detecting new needs and actively learning new knowledge and practices.

Usually, several hazards may be observed in the territory of each school. Besides the hazard of fire, Azerbaijani schools suffer from floods, earthquakes and landslides. Sometimes earthquakes may be followed by resulting fires, which necessitates organization of separate exercises per hazard. For example, the school staff may take various response actions in disasters such as earthquakes, floods or fires.

The first reaction required by the school staff in case of an earthquake is to prevent the fall of heavy items on students' heads. After the earthquake, the school staff is required to move to the assembly point and search for their colleagues. If anyone is absent at the assembly point, the rescue team is immediately informed. If the rescue team is extremely busy, then the school children themselves should search for their classmates who are absent and provide necessary aid to them.

Skills that should be mastered during training exercises for various hazards are specified in Table 3.3 below.

There are three useful forms of exercises: simple exercises focused on specific skills and practices that may seem unnatural at first; table exercises, particularly for the purposes of management and school leadership, emphasizing various coordination duties; and full-scale scenarios including all members of a community.

The scenario exercises enable testing of coordination of a functional organization on the response actions including operational skills such as protection of life,

Table 3.3 Skills to be learned during exercises for hazards

Type of hazard	Skills to be learned
Earthquake	Preventing bodily damage; moving down, moving to the assembly point
Flood	Moving up to high places; if the scale of a flood is not large, moving up to higher floors or penthouse
Fire	Individual protection from choking, exit routes for accidents, taking burning items outside, using fire extinguishing equipment to extinguish the blaze in case of small-scale fires
All types of hazards	Rescuing colleagues, medical first aid, calling for help, use of communication means

safety, nutrition, accommodation, water and sanitation supply, simple search and rescue to provide psychological and social support, fire extinguishing, control over hazardous materials, and logistical skills. The scenario exercises are more useful when they are implemented by involving the local first aid and firefighting teams.

3.13 School Disaster Preparedness Plan

A School Disaster Preparedness Plan (SDPP) is a document determining the key functions of a school in the process of preparation for emergency cases and during hazards. This document is developed with participation of the local firefighting and MoES departments and is approved by the school management. The document should be as brief and informative as possible and does not contain any unnecessary texts. Each part of the document should only contain 1–2 pages of data to make the document easily readable.

The document must include the following sections:

1. The school's DRR profile. In the DRR profile, the school's brief DRR history and brief information on current activities are provided.
2. SDPP's goal and objectives. This section provides information on the objective for development of the SDPP document and on its key goals.
3. Definitions and terminology. This part includes the key SRR definitions and terms. It clearly explains the definitions of hazard, disaster, risk, vulnerability, capacity, etc.
4. Vulnerability and capacity assessment. In this section, the structural and non-structural safeties of the school are assessed. This part includes information on the conditions of the school buildings, analysis of hazards and evaluation of risks.
5. School Disaster Management Committee. This includes information on the SDRMC and on its activity, implemented activities and measures that have been taken focused on DRR. This part also provides information on DRR teams and their members. It should contain information on the obligations of each member of the DRR teams.
6. Emergency equipment. In this part, information on all DRR equipment is provided. This information should be accompanied by relevant schemes or maps containing information on the locations and of usage rules of all equipment.
7. School Utility Scheme. This section contains information on key water, electricity, telephone and power lines.
8. Evacuation and gathering. This contains information on key evacuation procedures such as isolation, signaling, moving down, gathering, etc. This part should also contain brief information on the assembly point.

9. Duties during hazards. This part contains information on the key duties of each member of the school staff during disasters.
10. Useful telephone numbers. These telephone numbers are provided on the first or last page of the document. This part shall contain contact numbers of the MoES, firefighting department, first medical aid and local police department.
11. The document may include the following annexes: Maps of schools and communities; Log-book of response actions to emergency cases (for registration of any implemented response activities to disasters); other pertinent data.

3.14 Vulnerability Assessment

After an analysis of the existing conditions, vulnerability assessment shall be performed. Regular assessment of the vulnerability contributes to quick solution of any problems arising in the schools. A school-based assessment includes assessment of the statuses of school staff and particularly schoolchildren as members of the team rather than assessment of their personal problems. During such assessments, the schools' natural conditions, the structural and non-structural safeties of the school buildings, the schools' preparedness levels and any other issues related to the safety of the schools are assessed. In order to draft a school disaster preparedness plan, responsive measures for each detected hazard and risk or vulnerability should be considered, assessed and selected. The assessment provides the foundation for drafting comprehensive preparedness plans.

The vulnerability assessment has been drafted exclusively for Azerbaijani schoolchildren and must be adjusted for the local conditions when it is applied in other areas. In this assessment, the natural conditions, the structural and non-structural safeties and the preparedness level of the school staff were taken into account.

Any vulnerability assessment should be conducted with a checklist. Each indicator consists of answers of Yes or No (see Table 3.4). Each 'Yes' answer is scaled to '0', while each 'No' is scaled to '1'. At the end, the obtained figures are added up and the resulting total figure becomes the vulnerability indicator, which in its turn enables us to determine the level of disaster risks. In this case, a school with the lowest degree of preparedness for disaster risks gets a score of 40, while a school with the highest degree of preparedness gets a score of 0.

As seen, the scores range from 0 to 40 in assessment of the vulnerability. Dividing these scores into intervals, we obtain the scale given for a school we assess in Table 3.5 below.

Once the assessment process is finished according to scale above, the document is discussed with the local municipality and educational and executive authorities.

Table 3.4 Main indicators of school safety

#	Indicators	No/ Yes	Comments
1.	School is not located in a flood region	1/0	
2.	School is not located in an earthquake region	1/0	
3.	School is not located in a landslide area	1/0	
4.	The distance between buildings is high	1/0	
5.	EC was considered in school construction	1/0	
6.	Access to potential evacuation routes is easy	1/0	
7.	There is symmetry between structural elements	1/0	
8.	Vertical and side durability is reliable in educational buildings	1/0	
9.	Structural elements are safely connected to each other	1/0	
10.	Side loads at the building are distributed reliably	1/0	
11.	Connection walls were built properly	1/0	
12.	There are holes in bearing walls	1/0	
13.	Durable materials were used	1/0	
14.	There is distance between structural columns and partitions	1/0	
15.	Direct transmission of loads to ground is ensured	1/0	
16.	Bearing walls are firmly connected	1/0	
17.	Construction elements outside school are reinforced with structural elements	1/0	
18.	Construction elements inside schools are reinforced with structural elements	1/0	
19.	Furniture and other elements are fastened to walls	1/0	
20.	Stairs are earthquake resistant	1/0	
21.	Rooms may be insulated from other constructions in case of fire	1/0	
22.	School was built from fireproof materials	1/0	
23.	School has access to water and there is a pool in the school yard	1/0	
24	There is a warning system in the school	1/0	
25.	Ceilings, chandeliers and book-shelves are firmly fastened	1/0	
26.	Schoolchildren have a comprehensive awareness of natural conditions	1/0	
27.	School safety is assessed regularly	1/0	
28.	School has modern air-conditioning and heating systems	1/0	
29.	School has an evacuation plan	1/0	
30.	School has a Disaster Preparation Plan	1/0	
31.	School has a Disaster Risk Management Committee	1/0	
32.	Regular DRR exercises are performed	1/0	
33.	DRR issues are integrated into curriculum	1/0	
34.	There are awareness-raising activities at school	1/0	
35.	School may be used as a shelter in emergency cases	1/0	
36.	There is fire extinguishing equipment at school	1/0	

(continued)

Table 3.4 (continued)

#	Indicators	No/ Yes	Comments
37.	There is a hospital in the residential area where the school is located	1/0	
38.	The road network is well-developed in the area where the school is located	1/0	
39.	The residential area where the school is located is easily accessible in any season	1/0	
40.	The area where the school is located is easily accessible to firefighting service	1/0	

Table 3.5 Scale of vulnerability assessment

Scale of vulnerability	Score	Vulnerability status	Key conditions increasing vulnerability
5	Higher than 30	Very high	
3	21–30	High	
4	11–20	Medium	
2	6–10	Low	
1	Lower than 6	Very low	

After discussions, an action plan for reducing the school vulnerability is drafted which should include the following activities:

- Addressing the factors causing deterioration of the school foundation
- Supplying the target schools with necessary tools to increase fire safety
- Supplying the fire boards of the schools with necessary equipment
- Supplying the Warning Systems of the schools with modern equipment
- Fastening the shelves that may cause hazards for disaster risk reduction in case of earthquakes to walls
- Establishing a SDRMC and drafting a SDPP
- Drafting school evacuation plans
- Establishing DRR teams consisting of teachers and schoolchildren
- Developing the knowledge of the SDRMC and DRR teams
- Conducting regular exercises for fires, earthquakes and floods.

All measures focused on vulnerability reduction are called responsive measures, which include structural and non-structural improvement. Furthermore, a range of social projects implemented in the areas where the schools are located may also contribute to the school vulnerability reduction. In addition to local measures, any measures to be implemented at the national level may also assist in empowerment of the schools. The national-level measures may include passing new laws and approving national development programs.

3.15 Example 1: School Based Disaster Risk Assessment (A Case Study of Yeni Suvagil Village School)

3.15.1 School DRR Profile

Zagatala Region's Yeni Suvagil Complete Education School No 1 named after Mina Nazirova was established in Yukhari Suvagil Village in 1924. The school was then moved to its current location due to the displacement of Yukhari Suvagil Village in 1951. At present, there are 366 students in the school. The school has 51 teachers.

In 1987, a new 3-floor building was constructed for the school. On May 7, 2012 at 9.45 a.m., there were 7-point earthquakes with an epicenter very close to that area. It must be noted that all the teachers and the students were in the school at the time of the earthquakes, although the adequate preparedness level completely prevented any human loss. On May 18, the same severe shock was repeated. As a result of those two earthquakes, the school building was destroyed entirely.

As the school is located in a seismically active zone, the possibility of periodic earthquakes is forecasted in the area. The latest earthquake shows that this hazard may occur at any time, which necessitates a high preparedness level among the schoolchildren.

At present, there is a SDRMC operating at the school. The SDRMC members regularly operate not only during earthquakes, but also for adequately guiding the school staff during fires and floods. There are DRR teams at the school. The team members continuously increase their preparedness level by attending various training workshops. The members of the rescue team including schoolchildren have separate duties. In order to maintain a high level of the school's disaster preparedness, continuous exercises for floods, fires and earthquakes are arranged.

Currently, the school has pilot school status within the framework of the Increasing Response of Educational Institutions and Communities to Disaster Risk Project, which is funded by the European Union and implemented by UNICEF. This project's local partners are the Ministry of Education and the Ministry of Emergency Situations of the Republic of Azerbaijan. Within the framework of the project, trainings are conducted for the SDRMC and DRR team members.

3.15.2 Hazards

As the area where Suvagil Village is located has a volatile nature, hazards of various origins are observed here. The area is very seismically active. The earthquakes of 2012 destroyed the school building entirely. The water level in the artesian well in the neighborhood significantly decreased. In the Catalog of Floods prepared by the Institute of Hydrometeorology, the area is mentioned as an area with frequent flooding.

3.15.3 School Buildings

The school building was reconstructed after being destroyed during the 2012 earthquakes (Fig. 3.2). The reconstruction was implemented under the direct control of the MoES. At present, the building's seismic durability is scaled as 9. The school building includes three buildings, separated from each other by standing seams. The corridors are wide and the bearing columns and walls are reliable. Although the school was not built from fireproof materials, there are many evacuation routes which are easily accessible. The buildings are symmetric, and their resistance to side loads is strong. The vertical durability and the equal distribution of the loads are ensured. The stairs are resistant to earthquakes. The stands, boards and chandeliers have been firmly fastened to the walls. The bookshelves and other furniture have been also fastened to the walls completely.

3.15.4 School Emergency Cases Equipment

The school is well equipped with emergency equipment. In the entrance of the school, there is an SOS device. There are also sound intensifiers at the school. The school is connected to the local line telephone network. The school staff uses cellular phones.

The school is well equipped with fire extinguishing supplies. There are fire shields on each floor of the school. There are a fire shovel, axe, mattock, hammer, rake, fluid spray, sand box and sand pail at the school. However, there are no smoke detectors. There are medical supplies and a stretcher that may be used for the first aid at the school. There are several mobile lanterns that may be used during accidents.

Fig. 3.2 Suvagil school building after the 2012 earthquake

3.15.5 Regular Trainings and Information Boards

Continuous exercises are conducted at the school. The exercises are particularly organized for earthquakes and fires. The local first aid and firefighting departments are involved in the exercises. Observations show that the school staff demonstrates complete preparedness during the exercises. The schoolchildren are able to perform necessary response actions when the accident signal is given. The schoolchildren at the assembly point search for their schoolmates and assist wounded ones.

There are sufficient and readable information boards on emergencies at the school, which explain and clearly what to do in cases of fire or earthquake.

3.15.6 School Disaster Preparedness Plan

The School Disaster Preparedness Plan has been drafted with the assistance of UNICEF's DRR expert. The document includes responsive actions to be taken by the school staff in case of fire, earthquake or other emergencies. The document is written in clear language and is readable. The vulnerability assessment section is continuously updated. The document also contains a structural and non-structural assessment of the school; the conditions of the school buildings; and an assessment of hazards. In addition, it contains information on the members of the SDRMC and DRR teams and of their objectives and responsibilities. The SDRMC also includes other issues that must be included in the SDPP.

3.15.7 Vulnerability Assessment

The process of vulnerability assessment shows that the school safety is reliable. The result of the assessment is provided in the following table. According to the assessment, the school's vulnerability level may be considered satisfactory (with a score of 5) and this situation is fully under control Table 3.6).

3.16 Example 2: School Based Disaster Risk Assessment (A Case Study of Uljali School)

3.16.1 School DRR Profile

The Ulajali Village School was established in 1931. At present, there are 624 students in the school. There are 62 teachers. As the school is located very close to the Kura River, it periodically suffers from floods. Observations performed over the last 150 years confirm that the Kura River flooded in 1890, 1915, 1936, 1942,

Table 3.6 Vulnerability assessment for Yeni Suvagil School

#	Indicators	No/ Yes	Comments
1.	School is not located in a flood region	1/0	1
2.	School is not located in an earthquake region	1/0	1
3.	School is not located in a landslide area	1/0	0
4.	The distance between buildings is high	1/0	1
5.	EC was considered in school construction	1/0	0
6.	Access to potential evacuation routes is easy	1/0	0
7.	There is symmetry between structural elements	1/0	0
8.	Vertical and side durability is reliable in educational buildings	1/0	0
9.	Structural elements are safely connected to each other	1/0	0
10.	Side loads at the building are distributed reliably	1/0	0
11.	Connection walls were built properly	1/0	0
12.	There are holes in bearing walls	1/0	1
13.	Durable materials were used	1/0	0
14.	There is distance between structural columns and partitions	1/0	0
15.	Direct transmission of loads to ground is ensured	1/0	0
16.	Bearing walls are firmly connected	1/0	0
17.	Construction elements outside school are reinforced with structural elements	1/0	0
18.	Construction elements inside schools are reinforced with structural elements	1/0	0
19.	Furniture and other elements are fastened to walls	1/0	0
20.	Stairs are earthquake resistant	1/0	0
21.	Rooms may be insulated from other constructions in case of fire	1/0	1
22.	School was built from fireproof materials	1/0	0
23.	School has access to water and there is a pool in the school yard	1/0	0
24.	There is a warning system in the school	1/0	0
25.	Ceilings, chandeliers and book-shelves are firmly fastened	1/0	0
26	Schoolchildren have a comprehensive awareness of natural conditions	1/0	0
27.	School safety is assessed regularly	1/0	0
28.	School has modern air-conditioning and heating systems	1/0	0
29.	School has an evacuation plan	1/0	0
30.	School has a Disaster Preparation Plan	1/0	0
31.	School has a Disaster Risk Management Committee	1/0	0
32.	Regular DRR exercises are performed	1/0	0
33.	DRR issues are integrated into curriculum	1/0	0
34.	There are awareness-raising activities at school	1/0	0
35.	School may be used as a shelter in emergency cases	1/0	0
36.	There is fire extinguishing equipment at school	1/0	0

(continued)

Table 3.6 (continued)

#	Indicators	No/ Yes	Comments
37.	There is a hospital in the residential area where the school is located	1/0	0
38.	The road network is well-developed in the area where the school is located	1/0	0
39.	The residential area where the school is located is easily accessible in any season	1/0	0
40.	The area where the school is located is easily accessible to firefighting service	1/0	0
	Total		5

1944, 1946, 1952, 1969, 1976, 2002, 2003 and 2010. During the flood occurring in May and June of 2010, the school grounds were submerged to a depth of 1–2 m. As a result of this submerging, the floor of the school was completely destroyed and the school supplies became useless (Fig. 3.3).

After the Mingachevir Water Reservoir was put into service in 1953, no flood occurred in the area for over 15 years. It was thought for a long time that the adequate management of the Mingachevir Water Reservoir would end the floods forever. However, recent floods show that this hazard may occur at any time, which strongly necessitates a high preparedness level of the schoolchildren in this regard.

At present, there is a SDRMC consisting of 15 members operating at the school. The SDRMC members regularly operate not only during floods, but also to adequately guide the school staff during fires and earthquakes. The SDRMC members continuously increase their preparedness level by attending various training workshops. Several DRR teams have been organized from the schoolchildren and the teachers and each of the team members has separate duties.

In order to maintain the high level of the school's disaster preparedness, continuous exercises for floods, fires and earthquakes are arranged. Currently, the

Fig. 3.3 Ulajali school building after the 2010 flooding

school has pilot school status within the framework of the Increasing Response of Educational Institutions and Communities to Disaster Risk Project, which is funded by the European Union and implemented by UNICEF. This project's local partners are the Ministry of Education and the Ministry of Emergency Situations of the Republic of Azerbaijan. Within the framework of the project, trainings are conducted for the SDRMC and DRR team members.

3.16.2 Hazards

Ulajali Village is located in a completely flat area. The school is very close to the Kura River. Floods and earthquakes are the key hazards that may be observed. According to the observation data of the National Hydrometeorology Department, floods are very frequent in the area. As a result of the flood occurring in 2010, the school was submerged and the school buildings became completely useless. The territory is very seismically active.

3.16.3 School Buildings

The school building was repaired after the flood of 2010. The construction was conducted directly under the control of the MoES. Currently, the seismic durability of the building is scored as 8. The school building contains four buildings. Three of the buildings are located next to each other, while the fourth building is located a large distance away. The school buildings have been separated from each other with standing seams. The corridors are wide and the bearing columns and walls are reliable. Although the school was not built from fireproof materials, there are many evacuation routes which are easily accessible. The buildings are symmetric, and their resistance to the side loads is strong. The vertical durability and the equal distribution of the loads are ensured. The stairs are resistant to earthquakes. The stands, boards and chandeliers have been reliably fastened to the walls. The bookshelves and other furniture have been also fastened to the walls completely.

During the repeated reviews in 2015, it was detected that the level of the ground waters was very high. As the ground waters were also salty, such a high level was gradually destroying the school's foundation and was damaging its inside parts. At the expense of the funds allocated by UNICEF in 2015, the drain network in the territory was repaired, which resulted in a significant decrease in the level of the ground waters. At the expense of those funds, the destroyed sections of the ground floor were restored.

3.16.4 School Emergency Equipment

The school is well equipped with emergency equipment. However, there is not an SOS device. There are also sound intensifiers at the school. The school is connected to the local telephone network. The school staff uses cellular phones.

The school is highly equipped with fire extinguishing supplies. There are fire shields on each floor of the school. There are a fire shovel, axe, mattock, hammer, rake, fluid spray, sand box and sand pail at the school. However, there are no detectors. There are medical supplies and a stretcher that may be used for the first aid at the school. There are several mobile lanterns that may be used during accidents.

3.16.5 Regular Trainings and Information Boards

Continuous exercises are conducted at the school. The exercises are particularly organized for floods and fires. The local first aid and firefighting departments are involved in the exercises. Observations show that the school staff demonstrates complete preparedness during the exercises. The schoolchildren are able to perform necessary response actions when the accident signal is given. The schoolchildren at the assembly point search for their schoolmates and assist wounded ones.

There are sufficient and readable information boards on emergencies at the school, which explain and clearly what to do in cases of fire or earthquake.

3.16.6 School Disaster Preparedness Plan

The School Disaster Preparedness Plan has been drafted with the assistance of UNICEF's DRR expert. The document includes responsive actions to be taken by the school staff in case of fire, earthquake or other emergencies. The document is written in clear language and is readable. The vulnerability assessment section is continuously updated. The document also contains a structural and non-structural assessment of the school; the conditions of the school buildings; and an assessment of hazards. In addition, it contains information on the members of the SDRMC and DRR teams and of their objectives and responsibilities. The SDRMC also includes other issues that must be included in the SDPP.

3.16.7 Vulnerability Assessment

The process of vulnerability assessment shows that the school safety is reliable. The result of the assessment is provided in the following table. According to the assessment, the school's vulnerability level may be considered as low vulnerability (score of 12) and this situation is fully under control (Table 3.7).

Table 3.7 Vulnerability assessment for Ulajali School

#	Indicators	No/ Yes	Comments
1.	School is not located in a flood region	1/0	1
2.	School is not located in an earthquake region	1/0	1
3.	School is not located in a landslide area	1/0	0
4.	The distance between buildings is high	1/0	0
5.	EC was considered in school construction	1/0	1
6.	Access to potential evacuation routes is easy	1/0	0
7.	There is symmetry between structural elements	1/0	0
8.	Vertical and side durability is reliable in educational buildings	1/0	0
9.	Structural elements are safely connected to each other	1/0	0
10.	Side loads at the building are distributed reliably	1/0	0
11.	Connection walls were built properly	1/0	0
12.	There are holes in bearing walls	1/0	1
13.	Durable materials were used	1/0	0
14.	There is distance between structural columns and partitions	1/0	0
15.	Direct transmission of loads to ground is ensured	1/0	0
16.	Bearing walls are firmly connected	1/0	0
17.	Construction elements outside school are reinforced with structural elements	1/0	0
18.	Construction elements inside schools are reinforced with structural elements	1/0	0
19.	Furniture and other elements are fastened to walls	1/0	0
20.	Stairs are earthquake resistant	1/0	0
21.	Rooms may be insulated from other constructions in case of fire	1/0	1
22.	School was built from fireproof materials	1/0	1
23.	School has access to water and there is a pool in the school yard	1/0	0
24.	There is a warning system in the school	1/0	0
25.	Ceilings, chandeliers and book-shelves are firmly fastened	1/0	0
26.	Schoolchildren have a comprehensive awareness of natural conditions	1/0	0
27.	School safety is assessed regularly	1/0	0
28.	School has modern air-conditioning and heating systems	1/0	1
29.	School has an evacuation plan	1/0	1
30.	School has a Disaster Preparation Plan	1/0	0
31	School has a Disaster Risk Management Committee	1/0	0
32.	Regular DRR exercises are performed	1/0	0
33.	DRR issues are integrated into curriculum	1/0	0
34.	There are awareness-raising activities at school	1/0	0
35.	School may be used as a shelter in emergency cases	1/0	1
36.	There is fire extinguishing equipment at school	1/0	1

(continued)

Table 3.7 (continued)

#	Indicators	No/ Yes	Comments
37.	There is a hospital in the residential area where the school is located	1/0	1
38.	The road network is well-developed in the area where the school is located	1/0	0
39.	The residential area where the school is located is easily accessible in any season	1/0	0
40.	The area where the school is located is easily accessible to firefighting service	1/0	1
	Total		12

3.17 Conclusion

According to the surveys conducted, a new methodology enabling us to assess the Disaster Risks in Azerbaijani schools has been drafted, which also enables us to review the most important elements ensuring the school safety. For the vulnerability assessment, a scale with special figures is suggested. The scale enables detection of all shortcomings of the school safety. The scale also enables us to evaluate the vulnerability levels of various schools and the existing risks.

Acknowledgements This work was partially supported by UNİCEF Azerbaijan's Disaster Risk Management Program. he constructive and helpful comments made by two anonymous reviewers are also gratefully acknowledged. The author is grateful to Martha Lawry for proofreading the drafts of the book.