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PROJECT: DIPECHO – VI ***«Fostering Disaster-Resilient Communities in Isolated Mountain Environments of Tajikistan and Kyrgyzstan»***

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REPORT

«Outcomes of risk assessment from natural disasters, evaluation of fire safety and earthquake resistance at educational institutions in Chong-Alai rayon of Osh oblast, Kyrgyz Republic»

Public Foundation MSDSP KG
(An initiative of the Aga Khan Foundation)

Ministry of Emergency Situations of the Kyrgyz Republic

Joint-stock company "Kyrgyz Institute of Geological and Engineering Research"

Kyrgyz Scientific-Research and Project Design Institute of Earthquake-resistant Construction

The report had been reviewed and approved by the decision of the Scientific and Technical Council under the Inter-Ministerial Commission for Civil Protection of the Kyrgyz Republic on 08.05.11

BISHKEK-OSH– 2011

SUMMARY

Summary report on DIPECHO VI - "Fostering Disaster-Resilient Communities in Isolated Mountain Environments of Tajikistan and Kyrgyzstan" project consists of 58 typescript pages and includes 18 tables, 13 pictures and charts, the list of bibliography (sources used) consists of 18 titles and 13 tabular and map annexes.

Key words: schools, kindergartens, natural disasters, risk assessment, Chong-Alai rayon, seismic conditions, earthquake resistance, and soil conditions.

The report includes the outcomes of the survey on risk assessment from seismic and other natural processes, and also fire safety in educational institutions (secondary schools and kindergartens) of Chong-Alai rayon, Osh oblast. The surveys were undertaken with fulfilling the reconnaissance, tunneling, drilling work, geophysical measurements and works, engineering and pilot surveys of building structures and construction materials, inspection of the locations, where educational facilities have been placed.

It was detected that 41% of the schools and kindergartens of the area are brick buildings, 27% of the schools and 47% of the kindergartens are adobe buildings, 20% of the schools and 12% of the kindergartens timber-panel accordingly, and only 12% of them are built of reinforced concrete framed structures. 3% of the buildings were built without any foundations, 15% of them have reinforced-concrete foundations, and 82% of all foundations were made of rubble concrete. In addition to that, more than 80% of all inspected foundations of school and kindergarten buildings were buried into the ground less than 100 cm.

All the surveyed locations of the buildings are not protected from thaw and rainstorm water; all of the buildings there are prone to windstorms and whirlwinds, abundant snowfall and snowdrifts.

Considering these outcomes of the surveys, appropriate recommendations on reducing natural disaster risk have been worked out. Thus, almost everywhere, it was recommended to divert thaw and storm water. In three cases it was recommended to monitor and lower ground water levels.

It was recommended to demolish 44% of school and 38% of kindergarten buildings due to their low physical and technical conditions. Technical solutions on strengthening the structural frameworks to increase their seismic resistance were worked out for 56% of schools and 40% of kindergarten buildings.

It was explicitly recommended to comply with building standards and regulations (SNiP), especially at the stage of designing and/or building the structures, and it is strongly recommended to take into consideration results of engineering-geological, soil and foundation surveys.

The report had been reviewed and approved by the decision of the Scientific and Technical Council under the Inter-Ministerial Commission for Civil Protection of the Kyrgyz Republic on 08.05.11

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Acronyms and abbreviations used in the report

Acronyms and abbreviations	Description
JSC "KIGER"	Joint Stock Company "Kyrgyz Institute of Geological and Engineering Research"
GOST	Government standard
DIPECHO	Disaster Preparedness Program of the European Commission's Humanitarian Office
EGS	Engineering-geological surveys
EGC	Engineering-geological conditions
KSRPDIEC	Kyrgyz Scientific-Research and Project Design Institute of Earthquake-resistant Construction
KR	Kyrgyz Republic
ME&S	Ministry of education and science
MES	MES KR Situations
PF MSDSP KG	Public Foundation Mountain Societies Development Support Programme in Kyrgyz Republic (An initiative of the Aga Khan Foundation)
PFR	Fire safety rules
NDR	Natural disasters risk
SNiP	Building standards and regulations
SZ	Seismic zonation
ND	Natural disasters
DRR	Disaster Risk Reduction
SS	Secondary school
GWL	Ground-water level
CR	Construction Regulations

Public Foundation MSDSP KG implements programs to develop rural areas within multi-focus programs supported by Aga Khan Foundation and other donor agencies.

Activities are aimed at proficiency improvement of different specialists and integrating of new management principles are being implemented, development of rural infrastructure is being supported.

By the end of 2011 PF MSDSP KG has supported building and maintenance of 163 infrastructural facilities, including kindergartens, schools, irrigation canals and drinking water supply system.

Preface

Public Foundation Kyrgyzstan Mountain Societies Development Support Programme (PF MSDP KG) was an initiative of the Aga Khan Foundation. The Aga Khan Foundation is a non-confessional international development agency, which was founded by His Highness the Aga Khan in 1967. The mission of Aga Khan's Foundation is to develop and search for innovative and sustainable solutions for addressing poverty in African and Asian countries. The Aga Khan Foundation being a non-commercial organization has its branches and representative offices in 15 countries of the world. More detailed information on the foundation is available at **www.akdn.org**.

In the Kyrgyz Republic the PF MSDSP KG has been carrying out its activities in Osh and Naryn oblasts since 2006, implementing development programs, aimed at improving living standards and opportunities in remote village communities. The foundation's main thematic sectors are education, health and natural resource management. In addition, the foundation has been actively developing projects on natural disaster risk reduction, climate change adaptation, and market and local self government development.

The report was prepared within the framework of DIPECHO VI – "Fostering Disaster-Resilient Communities in Isolated Mountain Environments of Tajikistan and Kyrgyzstan" Project with the financial support from the European Commission's Humanitarian Aid and Civil Protection Department (ECHO) and the Aga Khan Foundation in the Kyrgyz Republic. The overall objective of the project is to assist communities, local governments, the Kyrgyz Ministry of Emergency Situations and other agencies in building their capacity and reducing disaster risk at the local level.

During the period of 2010-2011 within the framework of this project PF MSDSP KG has conducted a number of activities in support of MES KR through conducting training for the representatives of local government, heads of schools and kindergartens, implementing infrastructural projects on disaster mitigation, issuing special literature for the schools on the methods of disaster preparedness and response, broadcasting other informational television programs on disaster preparedness and disaster risk reduction. For 17 village organizations in Chong-Alai rayon the Public Foundation has conducted educational trainings on disaster preparedness and established voluntary rescue teams with the rayon department of MES. School-based disaster preparedness committees have been set up in 17 schools under the school councils. Emergency simulation exercises have been held for the local population and secondary school pupils with active participation of the committees and voluntary rescue team.

Systematic activities of this type are being integrated into the relevant working plans of local institutions. In addition, the project has provided technical assistance to the Ministry of Emergency Situations and other line research institutions dealing with disaster risk assessment in KR. The main project activities were implemented in Chong-Alai rayon, Osh oblast, which

is the pilot rayon of the project. Pilot risk assessment of educational institutions in Chong-Alai rayon has been conducted with the Ministry of Emergency Situations, KIGER and KSRPDIEC.

Based on the outcomes of the pilot risks assessment, 5 educational institutions, which have been identified as more susceptible to natural disaster risks, were selected to strengthen their building structures.

During the risk assessment at secondary schools and kindergartens of Chong-Alai rayon, the PF MSDSP KG adapted methodology developed by FOCUS Humanitarian Aid, which considers specificity of the activities of MES and other partner research organizations of the Kyrgyz Republic, which took part in this survey. Bearing this in mind, the results of this survey are to be used by a wide range of specialists.

This report is an integrated result of activity of the following five specialist groups:

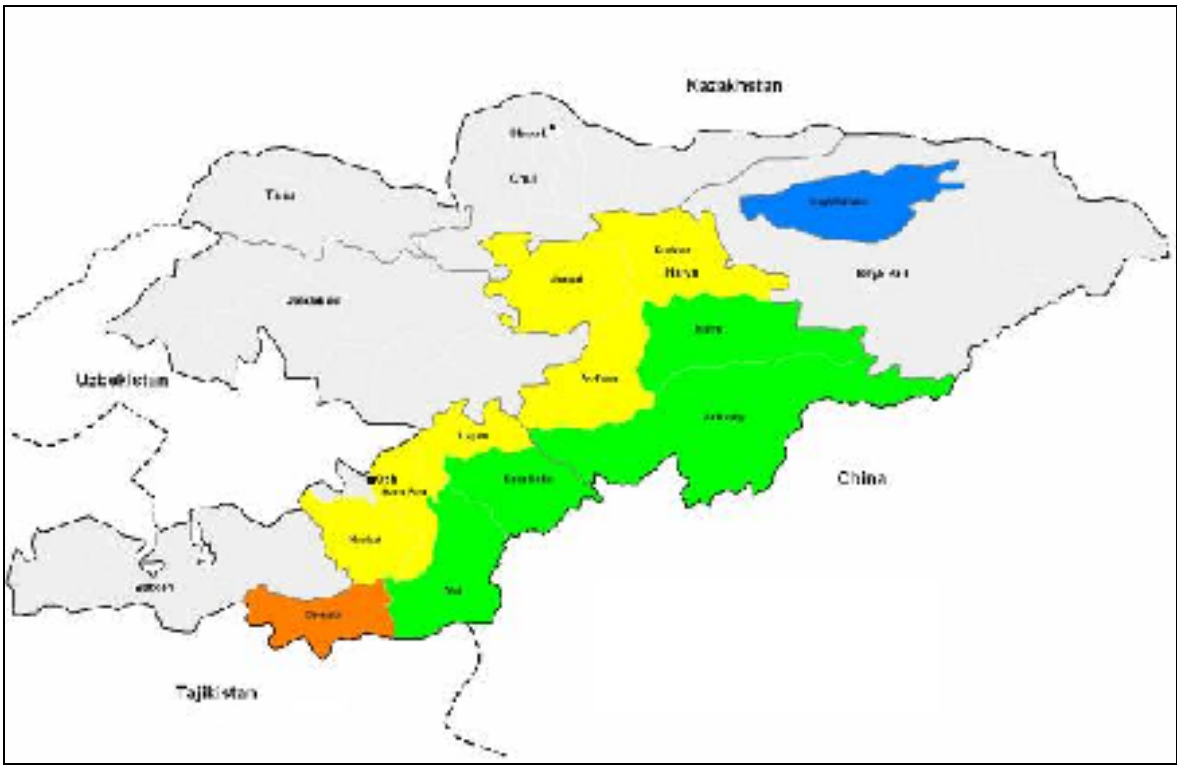
1. Analytical groups of PF MSDSP KG,
2. Department for Monitoring and Forecasting of Emergencies under the Ministry of Emergency Situations KR;
3. Osh oblast Fire department under the Ministry of Emergency Situations;
4. Osh branch of Joint-stock company "Kyrgyz Institute of Geological and Engineering Research" (JSC "KIGER");
5. Kyrgyz Scientific-Research and Project Design Institute of Earthquake-resistant Construction (KSRPDIEC).

Comprehensive field surveys have been carried out from August until November 2010 within the target surveys of buildings and structures of all the facilities surveyed within the area. The surveys were conducted with the implementation of visual inspections, reconnaissance, tunneling, drilling, geophysical works and measurements, other works and engineering surveys of buildings, construction materials and neighboring locations. Processing and generalization of the data was completed in the winter-spring period of 2011.

The report serves as advisory and practical material for analysis of applicability of approaches for other regions of Kyrgyzstan. The report is particularly useful for determining the impacts that disaster risk has on educational facilities and other public institutions.

The suggested work package meets the engineering-geological and engineering survey requirements and standards of the Kyrgyz Republic. Methodology for data generalization is based on standard ways of risk assessment and risk identification. The survey results can serve as a basis for decision making at the local level with the opportunity of using the suggested models at the national level within the national government programs and other initiatives. Survey outcomes and methodology can also be used by international projects and public organizations to define potential complex risks for different types of public infrastructure.

The results of conducted research and the report were reviewed and approved by the the Scientific and Technical Council under the Inter-Ministerial Commission for Civil Protection of the Kyrgyz Republic on 08.05.11



Picture 1. General map of survey area [1, 2, 3]

Notes:

[1] *Chong-Alai rayon is highlighted in orange.*
[2] *Four other rayons, highlighted in green colour are the areas of comprehensive implementation of Aga Khan Foundation's and MSDSPKG development programs".*
[3] *Six other rayons, highlighted in yellow colour are the areas of implementation of working programs and projects of PF MSDSP KG supported by Aga Khan's Foundation and other donor agencies.*

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Authors of the report express deep gratitude to management and staff of the state administration, local self-governance, schools and kindergartens, and communities and inhabitants of Chong-Alai rayon for their interest and full-fledged assistance in effective organization and implementation of the survey.

Content

In 2005 at the Global UN Conference on disaster risk reduction in Japan, 168 countries including the Kyrgyz Republic adopted Hyogo Framework for Actions (HFA) for 2005-2015. Its overall goal – considerable reduction of losses, caused by natural disasters.

Relevance of the issue

In the Kyrgyz Republic (KR), like other places in the world, there is a trend of growing hazardous manmade and natural processes that often result in the loss of human lives.

Increased disaster risk[1] is connected with objective reasons including scientific and technical progress, leading to increase of risk of disasters and accidents. The specific reasons for increased risks include big and complex technical systems; progressive urbanization and intensive development of new territories; and increasing population density. All of these result in human impacts on the environment. This situation can be improved by enhancement of better recording, monitoring and evaluation of natural disasters, and also observed global climate change on the planet.

153 emergencies take place per year in the country, which means that on average every 2,3 days there is one emergency occurring, from which 97% are natural disasters, 2% manmade and 1% environmental.[2]

In connection with the above statements, protection of population and facilities (buildings, structures, roads, bridges, agricultural lands and other territories that were subject to human-induced changes) from natural and manmade emergencies has become an important challenge. Presently, solving of related problems is one of the main functions of the country. Establishment of the Kyrgyz Ministry of Emergency Situations and its visible role in the life of the country and community is evidence of the aforesaid.

Public and social facilities (schools, theaters, kindergartens) are more capacious, in other words the degree of simultaneous attendance is high, and therefore they are more dangerous and risky in terms of occurrence of any natural and manmade disasters. In rural areas, schools and kindergartens are usually the only capacious social facilities, so in this connection there is a higher risk potential for the local people in these institutions.

There are 2191 comprehensive and secondary schools (SS) in Kyrgyzstan, where 1,036,000 children study and 54,000 teachers work. In 700 kindergartens of the country 48,000 children are educated and about 3200 tutors are working. In Chong-Alai rayon there are 49 educational institutions from which 17 are schools, 11 - central kindergartens, 14 – school-based and 7 - home-based kindergartens.

Among natural disasters, earthquakes constitute a special threat for the schools. This fact was especially noted at the international conference in

[1] Electronic tutorial “Emergency prevention, response and recovery” // http://obzh.ru/pre/1-2.html
[2] Forecast of natural disasters in the Kyrgyz Republic. АЛЛ-Press Bishkek, 1997. p.172.

Tashkent, Uzbekistan.[3] During the earthquakes, seismically non-resistant school buildings lead to very high pupil death indicators. Thus, the 2005 earthquake in Pakistan took more than 17,000 lives of children. Many children also died when earthquakes took place in Sichuan, China (12 May 2008). This earthquake killed 69,197 people and about 18,000 people went missing.[4]

In the last 4 years, 4 earthquakes with an intensity of 8 on the MSK-64 ($M \geq 7.4$) scale occurred in the Kyrgyz Republic: Kochkor (2006), Batken (2007), Osh (2008), and Alai (2008).[5]

For instance, the last destructive M=6,6 earthquake on the Richter scale with further aftershock occurred on 5 October 2008, at 9:52 p.m. local time in Nura village in Alai rayon, Osh oblast. As a result of the earthquake all the preexisting houses and socio-cultural facilities in Nura village were destroyed. The earthquake took lives of more than 70 people, most of them were children. Most of the extensive damage was caused by insufficient structural resistance of the buildings, most of them were adobe buildings (more than 92%), and the decisions on space planning and construction of the buildings using bricks and other building materials (8%) did not meet the requirements of acting standards and regulations on seismic-proof construction[5].

According to the latest seismic zonation map (SZM) for the Kyrgyz Republic, which was approved back in 1996, there is a possibility of M=8,0 earthquake at the local seismic focus, and the shaking power (earthquake intensity) according to MSK-64 scale, which has been used in the post Soviet and European countries, can reach an intensity of 9 on the territory of Chong-Alai rayon.

As a result of the disaster risks mentioned above, it is necessity to pay great attention to the seismic conditions in the area, and therefore it was decided to carry out another assessment of seismic conditions using the latest data and technology. Such activity was carried out by the "project's" order and was undertaken by the Kyrgyz Institute of Seismology (KIS) under the Kyrgyz National Academy of Sciences (NAS KR). The graphic Annex 2 provides distribution of earthquake epicenters in Chong-Alai rayon from the beginning of seismic observations up until 2010 in the area. The picture depicts large earthquake epicenters with energy class of 17. These earthquakes could already trigger events with an intensity of 8-9.

According to the estimated assessment of potential maximal (peak) acceleration in the near-surface deposits using the latest data and high technologies, seismicity of all considered locations falls into the zone with potential peak of intensity = 9 (using attenuation models with the most similar to this area conditions). In other words possible maximal earthquake intensity has almost matched with the data collected from the Seismic micro-zonation map (SMZ) of the KR of 1996. But it does not absolutely mean that estimations done were useless at all, because:

[3] Security of school buildings during earthquakes. Collection of materials from Central-Asian regional conference, Tashkent, Uzbekistan 17-18 September, 2008.
[4] Sichuan earthquake (2008).//http://ru.wikipedia.org/wiki.
[5] Seismic hazard assessment at Chong-Alai rayon, Osh oblast. Kyrgyz Institute of Seismology, 2010. p.27.

- First, it was made sure of the certainty in correctness of assessment of seismic conditions in the area;

- Second, the results obtained give an opportunity to conduct direct estimations for earthquake resistance of existing and newly designed buildings and structures with the use of acceleration rates for foundation soil with accuracy of more than 1 m/sec^2 (textual Annex 3);

- Third, seismic hazard assessment based on statistical distribution of events within the observation period showed that during the next 50 years there is a 90% probability of strong events in Chong-Alai rayon with peak soil acceleration of approximately 0.72-0.80g with potential earthquake intensity of 9 for average soil conditions (textual Annex 4).

This pilot project was initiated with the support of Aga Khan Foundation and the European Commission Humanitarian Aid and Civil Protection department (ECHO) to conduct more detailed analysis of the situation related to educational institutions in Chong-Alai rayon, Osh oblast, and for taking further preventive protection and risk reduction measures.

Goal of the survey

The goal is to assess safety of educational institutions in Chong-Alai rayon, Osh oblast, in regards to potential disaster risk, and to develop recommendations on risk reduction and working out suggestions on rational methodologies for general assessment of disaster-induced structural risks.

Objectives of the survey

The following tasks were put in compliance with the survey goal:

- Carry out reconnaissance work in regards to educational institutions in order to provide for rational planning of further engineering-geological and other surveys;

- In addition to the actual documents obtain additional information about educational institution buildings (hereinafter referred to as – buildings), and to interview secondary school and kindergarten personnel and local people in regards to time and specifics of the building structures, conditions of their maintenance and in regards to the problems associated with natural hazards;

- In order to identify engineering-geological conditions of building foundations and areas close-by conduct soil testing, field tunneling, geophysical, drilling and other works with further soil testing survey in the laboratories and desktop processing of the results;

- Based on the latest data and techniques conduct seismic hazard assessment within the inspected areas, point out locations with potential peak soil acceleration from more probable earthquake focuses with accuracy of at least 1m/sec^2;

- Conduct experimental, engineering and other surveys, including measurement and visual inspections of the buildings, carry out preliminary inspections for seismic resistance and compliance with building and technical standards and rules;

- Based on the experimental field and laboratory studies of the buildings and analytical work, define the hazard level of possible large earthquakes in the area and areas close-by, identify potential damage of the buildings;

- Conduct reconnaissance, field and desktop surveys of the buildings and neighboring areas in order to identify hazards from landslides, mudflows, floods, avalanches, bank erosion, rock falls and other disasters with high potential;

- In the key agencies of the KR responsible for engineering-geological, engineering-technical surveys of seismic resistance of the buildings, and disaster risk assessments, conduct analysis of their methodologies and develop recommendations on their improvement.

Second Priority for Action of the Hyogo Framework for Action:

Identify, assess, and monitor disaster risks and enhance early warning - these require our commitment to learn and fully understand any phenomenon, which creates hazards in the areas of live that we are part of.
These factors specifically need assessment applicable to schools. In order to conduct this effective assessment we need to "learn to think as the nature" to understand why the nature can behave so.

Gustavo Vilchez "Safe school in secure area" Thinking of the role of educational community.

This document was prepared within the framework of Project "**Enhancing local system of assessing risk factors in education sector in Central America**" (2008)

PART I. INTRODUCTION

I.1. Profile of the rayon

A. Geography

The subject area, located in Kyzyl-Suu river or Chong-Alai valley, is in south-western Kyrgyzstan, between Alai and Zaalai ranges of the Pamir-Alai mountain system[6].

The rayon altitude ranges between 2300 m (Karamyk village area) to 3050 m (Achy-Suu village area). Climate is sharply continental with cold winters. Average temperature in July is +19-22C, and December -10-15C. Average air temperature is +2,4°C, average highest temperature of the hottest month is +23,8°C and average of the coldest five-day period is -25°C. Absolute maximum temperature is +34°C, minimum -40°C.

The total amount of precipitations per year is 343 mm, 168 mm of it is rain. Average annual maximum water reserve in snow cover is 111 kg per one square meter (very high).

Prevailing wind direction in January is westwards (36% of wind) and eastwards (32%), in view of 75 days or 20% of calms. Total 88% of wind comes at the calms, west and east directions. Prevailing wind direction in July is westwards (45% of winds), south-west (20%) and north (12%), in view of 45 days of calms or 12% of cases. Total 89% of wind relates to the calms and 3 above mentioned directions. Maximum wind speed at 10 meter above the surface is 23 m/sec. Average wind speed in January is 6.9 m/sec in south-west direction.

Maximum depth of null isotherm penetration under the natural snow cover is 225 cm. The normal depth of seasonal frost penetration in the horizontal snow ground for clays and loams is 155 cm, for sandy-loams, fine-grain and dusty sands is 188 cm, for mid- and coarse-grain and gravel sands is 202 cm, and for coarse fragmental soils is 229 cm.

B. Socio-economic profile

The oblast comprises 4 cities (Osh, Kara-Suu, Uzgen and Nookat) and 1 town of Gulcha (administrative center of Alai rayon), 91 ayil okmotus (AO) and 479 villages. Administrative center of the oblast is Osh city. General information is provided in Table I.1.

[6] Chong-Alai rayon//http://ru.wikipedia.org/wiki/

Table I.1

No.	Rayons	Area (sq. km)	Population (people)	Density of population (people per 1 sq. km)	No. of AO	No. of settlements
1	Alai	7 582	76 353	9,7	14	62
2	Aravan	620	99 500	173,2	8	48
3	Kara-Kulja	5 712	87 084	15,4	12	49
4	Kara-Suu	2 837	318 995	124,5	17	126
5	Nookat	4 044	209 235	59,2	17	75
6	Uzgen	3 431	176 174	67,4	20	100
7	Chong-Alai	4 860	25 349	5,3	3	19
	TOTAL:	**29 086**	**992 690**	**13**	**91**	**479**

Chong-Alai rayon is one of 7 rayons of Osh oblast. It is the third biggest rayon in Osh oblast in territorial terms (16,7% of territory), and the smallest in terms of number of population (2,6%) and population density (5,3 people per 1 sq. km).

The rayon center is Daroot-Korgon village. The rayon splits into 3 ayil okmotus: Chong-Alai (11,522 people), Kashka-Suu (7,152 people) and Jekendi (6,675 people). The number of settlements or villages is 19 with total population of 25,349 people and 4,966 households. The number of population in the villages ranges significantly, which is explained by widespread historical location of households on a big area for cattle breeding.

For instance, in Kara-Shybak village there are only 125 inhabitants, and the highest population is in the rayon center Daroot-Korgon – 4,484 people[7] (text annex 1).

Ethnic composition of the rayon comprises of Kyrgyz for 99% and of other nations (Kazakhs, Tatars and Tajiks) for 1%. As of 1 January 2010 the number of registered legal entities in Chong-Alai rayon was 153, which is 9,8% higher than 2009.

The main economic activity of the rayon is cattle breeding. The recent years show growth in agriculture, transport and communication, trade, utilities, and social and individual services. The main share of economic entities is private (63,3%).

There are 11 kindergartens, 17 schools and 11 kindergartens operating in the rayon, where 6,762 children and teenagers are being educated.

[7] Publications of Osh oblast statistics: 2005-2009.

I.2. Hazard areas and forecasts for activation of hazard processes and phenomena in Chong-Alai

81,8% of Chong-Alai territory is occupied by mountains, and 18,2% is flat lands. The highland ratio is 4.5, which proves sufficient energy stored in the landscape and potential for active development of slope processes.

According to the classification of the Project "Sustainable land management in high mountains of Pamir and Pamir-Alai – Integrated and trans-boundary Central Asian initiative (PALM)" implemented by GEF/UNEP/UN in 2011, there were 6 hazard areas in accordance with the types of natural disasters.

Seismic hazard (1).
There are 2 types of seismic areas in the rayon:

- Area with I seismic hazard level with sub-zones:
  - seismic intensity of 9, which occupies mainly the north slopes of Zaalay range (55% of rayon territory);
  - seismic intensity of 9 (34% of rayon territory) located on the right edge of Kyzyl-Suu river (southern slope of Alai range).
- Area with II seismic hazard level (seismic intensity 8 (11% of rayon territory) located in paraxial part of Alai range).

Debris flow hazard (2). According to the debris flow hazard the rayon's territory is split into:

- Area with II level of debris flow hazard with maximum 1,000 m^3/sec potential (8,3% of rayon territory) – Kok-Kiyik and Kangyr-Suu river valleys with their alluvial cones and Achyk-Tash river's alluvial cone;
- Area with III level of debris flow hazard (39,6% of rayon territory) – Altyn-Dara, Shibe, Achyk-Suu, Ming-Jar river basins and Tarasha riverhead, left edge of Sypar-Jar valley and Kyzyl-Ungkur, Daroot, Kashka-Suu river basins and Tekelik (right inflow of Kok-Suu river) with 10 to 100 m^3/sec debris flow discharge potential;
- Area with IV level of debris flow hazard occupies the rest of the mountainous and foothill territory of the rayon (38,4% of rayon territory) with 10 m^3/sec debris flow discharge potential.

Mudflows, floods, bank erosion. Kyzyl-Suu river with widespread flood plain changes its channel rather often thus washing out the right bank during the flood period posing a threat to the highway, Daroot-Korgon village and water intake areas. The intense and concentrated atmospheric precipitations can lead to shower-triggered debris flows.

Outburst hazard glacial lakes (3). The rayon has six high mountainous lakes with outburst potential. Three of them are located near the north slope of Zaalai range outsourcing the left inflows of Kyzyl-Suu river (Kok-Suu and Tekelik rivers), and the other three lakes are near the south slope of the Alai range at the riverhead of the left

inflows of Kyzyl-Suu river thus posing potential risk to the people living in the settlements located in the potential outburst affection area.

Outburst potential can be increased by:

- Abnormal temperature higher than normal maximum (July-August) for 5-10^{0}C in high mountain area during melting of glaciers and snow;
- Intense rains on the glaciers during the thaw period;
- Melting of buried ice in the lake dam due to a high null isotherm;
- Seismic impacts triggering sliding of glaciers, rockfalls or breaking of dam integrity.

Snow avalanche hazard (4). Highland (by-range) locations of the rayon refer to:

- Area with level I snow avalanche hazard (25,7% of rayon territory), where avalanches take place annually – more than 5 avalanches per 1 linear kilometer of the valley bottom with maximum discharge volume up to 1 mln. m^3;
- Mid height mountain locations refer to areas with level II avalanche hazard (24,5% of rayon territory), where avalanches can occur 10 times in 10 years with frequency up to 5 avalanches per 1 linear kilometer of the valley bottom with maximum volume up to 100,000 m^3;
- Areas with level III snow avalanche hazard occupy foothills and low mountain areas of Chong-Alai valley (16,3% of rayon territory), where avalanches are possible once in 10 years with maximum volume up to 10,000 m^3;
- Areas with level IV snow avalanche hazard, where avalanches can occur only in years with abundant snow with maximum volume up to 500 m^3, are spread along the left edge of the valley at Tarasha-Altyn-Dara interfluve (1% of rayon territory).

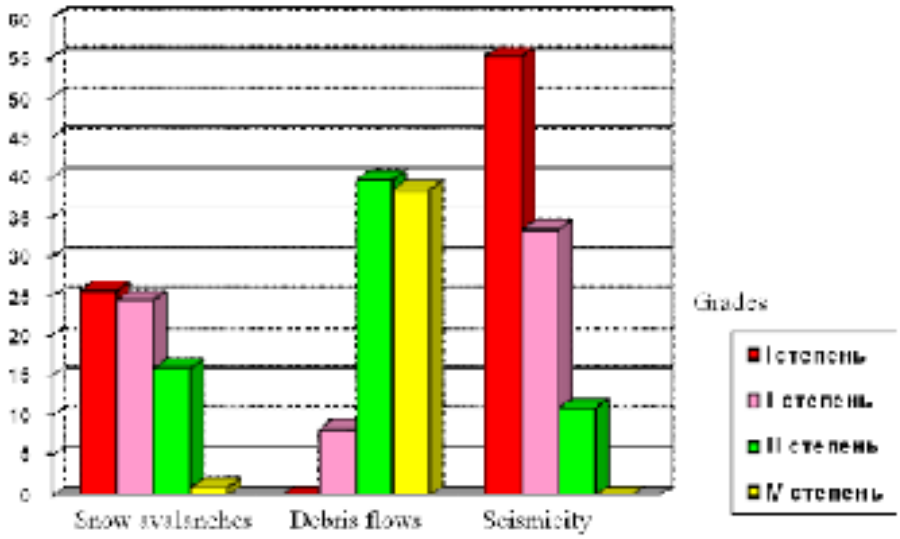
  Snow avalanche processes do not cause a direct threat to settlements and infrastructure.

Water logging hazard (5). Kara-Kabak and Kashka-Suu villages in Kashka-Suu Ayil okmotu, Karamyk village in Jekendi Ayil okmotu are prone to water logging due to rising of the ground water level. The most effective measure here would be the reconstruction of the existing drainage and building of a new drainage system.

Landslide hazard (6). There are 3 landslides on adjacent mountain slopes with Meso-Cainozoic deposits on the right bank of Kyzyl-Suu river posing a threat to economic facilities. The same deposits are well developed in the axial part of Zaalai range in the area of permafrost, though there are no landslide processes observed at this part.

There are many ancient and recent landslides with less than 5 meter thickness in the western part of the rayon on the left bank of Kyzyl-Suu river at a distance of 10-12 km. These landslides do not pose any threat to the population and infrastructure within the settlements. The shallow landslides occur along the Kyzyl-Suu river channel. The only location with landslide risk to dwelling houses is located on the territory of Jekendi Ayil okmotu, which can be activated in spring.

The percentage of areas with various threats (PALM) is provided on Picture 2.



Picture 2. The percentage of areas with various threats from different hazard (PALM)

I.3. Relevance of the issue

The Kyrgyz Republic observes the trend of increased number of manmade and natural hazards often followed with human injuries and victims. This trend is related[8] to objective reasons, which can include scientific and technical progress increasing risk of accidents and disasters first of all at big and complicated technical facilities, and to progressing urbanization and intense development of new territories, increasing population density, and, as a result, increase of human induced environmental impacts.

This can be improved by enhancing registration, recording and monitoring systems of natural disasters. There is also a factor of global climate change, which needs to be considered. During the last year there were about 153 emergencies in the country (97% of them are natural, 2% manmade and 1% environmental[9]), i.e. on average every 2,3 days an emergency takes place.

Social facilities (schools, theatres, kindergartens and others) have high social capacity and, as a result, have high hazard impact. In rural areas schools and kindergartens are often the only social institutions thus being the facilities with high social risk, which makes them more vulnerable to potential socio-economic damage as a result of possible threat of natural or human induced disasters.

[8] Electronic tutorial "Disaster Prevention, Response and Recovery"// http://obzh.ru/pre/1-2.html
[9] Forecast of Natural Disasters in the Kyrgyz Republic. ALL-Press Bishkek, 1997. – p.172 (in Russian version)

In the Kyrgyz Republic there are 2,191 secondary schools with 1,040,700 pupils and 71,200 teachers, 700 kindergartens with 75,955 children and 4,438 tutors, which make 22% of the total population of the State[10]. In Chong-Alai rayon there are 28 educational institutions with 6,762 pupils and 750 teachers and tutors (Annex 2), which makes 30% of the total population of Chong-Alai rayon.

Thus, in case of noncompliance with safety and building codes, schools and kindergartens including their branches become prone to high social risk because many people are there at the same time. Additionally, the majority of people are children and they cannot always react effectively. This risk potential will increase in case of an emergency.

Information about the secondary educational institutions of Chong-Alai rayon is provided in Table I.2.

Table I.2

Information about educational institutions of Chong-Alai rayon

No.	Type of educational institution	No. of institution	No. of pupils	No. of teachers/ tutors
1	Secondary schools (11 year education)	16	6022	685
2	Secondary schools (9 year education, school «Kulchu»)	1	86	17
3	Kindergartens	11	654	48
	TOTAL:	**28**	**6,762**	**750**

Among all other types of disasters, earthquakes are the most hazardous types of natural disasters and emergencies in the subject area. In this regard, as it was noted during the international conference in Tashkent (Republic of Uzbekistan)[11], the engineering safety of social facilities becomes a more relevant issue. Seismically unstable school buildings lead to a high number of deaths among pupils during earthquakes. For example, one Pakistan earthquake in 2005 killed more than 17,000 children. Similarly, many children also died in the Sichuan earthquake in China (12 May 2008), when the number of the dead reached 69,197 people and almost 18,000 were lost[12].

[10] Data from the National Statistics, 2010 http://212.42.101.124:1041/stat1.kg/index.php?option=com_content&task=view&id=41&Itemid=95

[11] Safety of schools at earthquakes. Workbook of Central-Asian regional conference. Tashkent, Uzbekistan. 17-18 September 2008.

[12] Sichuan earthquake (2008).//http://ru.wikipedia.org/wiki.

For the last 4 years in Kyrgyzstan there were 4 earthquakes with intensity 8 on MSK-64 (M≥7.4) scale: Kochkor (2006), Batken (2007), Osh (2008), Alay (2008).[13]

For instance, the last destructive M=6,6 earthquake on the Richter scale occurred on 5 October 2008 at 9:52 pm local time with a following aftershock with the epicenter close to Nura village in Alai rayon, Osh oblast. This earthquake killed more than 70 people; the majority of them were children. 136 houses were totally destroyed (more than 90% of the entire housing stock), in addition to damages at the local clinic, the municipal hall and the library. The only buildings that were in a satisfactory condition were school buildings.
This damage was foremost caused due to unsatisfactory building structures with prevailing adobe buildings (92%), and other space-and-planning designs and constructive schemes of buildings made of brick and other construction materials (8%) that did not comply with seismic-proof construction norms.

5 October 2008 was the election day of the members to the local councils. Following that Sunday, earthquake aftershocks occurred at night (9:52 pm), when there were no children in educational institutions. However, the only building, which withstood the ground shocks and remained in a satisfactory condition, was the school, which was the election venue in Nura village. All members of the election commission survived. This school was designed by KSRPDIEC and built by the Children Sports Center «Azat» in 2006 using light and quick-build construction techniques and materials in view of contemporary seismic-proof construction standards.

I.4. Strategy and Specifics of the Survey

Goals and objectives of the survey were defined as above (see p. 5-6 of the report). These include activities on comprehensive studies on assessment of safety at educational institutions of Chong-Alai rayon in case of potential natural disaster risks.

The strategy of the study comprised three main stages:

1. Conducting a comprehensive study at the institutions regarding the natural risk assessment, structural stability and fire safety;
2. Developing recommendations on risk reduction of inspected institutions;
3. Submitting the methodological results and inspection outcomes to the Kyrgyz Ministry of Emergency Situations and other agencies for consideration and further decisions.

The challenge of protecting populations and facilities from natural and manmade disasters has become very relevant. Presently, addressing these problems is identified as one of the key functions of the government. However, the range of issues related to monitoring, forecasting and assessing the social aspects of disaster risk is wide and multifunctional. Therefore, in order to provide for a more effective set of these activities it would be useful to involve specific scientific institutions and government agencies.

This study was targeted to identify the whole range of risks within educational structures, and followed a comprehensive assessment of natural and technical factors resulting in a summary assessment of each inspected building and institution.

[13] Seismic hazard assessment in Chong-Alai rayon, Osh oblast. Kyrgyz Institute of Seismology. Bishkek, 2010.-p.27

This work involved 5 study groups from various organizations (see p.9 of this report). All studies have been conducted according to relevant standards like GOST, SNiP and other legal and normative documents of the Kyrgyz Republic using available material and technical resources, practices and techniques of organizations involved.

All educational institutions of Chong-Alai rayon were the targets of this study, though the technique refers to various objects of study.

Various types of surveys were applied to specific structures or sites (locations) of the objects (engineering-geological surveys and natural disaster risk assessment). In order to simplify the match-read and analysis of these surveys, all schools and kindergartens were given a common numbering.

Total number of objects inspected was 28: 17 schools (41 structures/buildings) and 11 kindergartens (11 structures/ buildings) (see Table I.3, I.4 and charts in Annex 1).

Table I.3

Number of inspected educational institutions of Chong-Alai rayon, Osh oblast (Secondary schools)

No.	No. of unit	Name	Village	No. of buildings
1	1	Chong-Alai	Daroot-Korgon	3
2	2	I.Karmyshev	Jarbashy	4
3	3	A.Sait	Daroot-Korgon	2
4	4	Kok-Suu	Chak	2
5	5	Z.Karimbekov	Jash-Tilek	3
6	6	Kulchu	Kulchu	1
7	7	Ynakbai uulu Keldibek	Kyzyl-Eshme	2
8	8	Kara-Kabak	Kyzyldon	1
9	9	J.Bokonbaev	Achyk-Suu	3
10	10	Jayilma	Jayilma	2
11	11	Kabyk	Kabyk	3
12	12	Kashka-Suu	Kashka-Suu	3
13	13	Ak-Suu	Kara-Teyit	2
14	14	Kyrgyzstan	Jekendi	2
15	15	V.I. Lenin	Karamyk	4
16	16	Shibe	Shibe	2
17	17	S.Osmonov	Chuluk	2
	Total			**41**

Table I.4

Number of inspected educational institutions of Chong-Alai rayon, Osh oblast (Kindergartens)

No.	No. of unit	Name	Village	No. of buildings
1	1	I.Matmusaev	Daroot-Korgon	1
2	2	Jetkinchek	Achy-Suu	1
3	3	Jashtilek	Jash-Tilek	1
4	4	Aidanek	Jayilma	1
5	5	Kelechek	Daroot-Korgon	1
6	6	N.Nurdinov	Kyzyl-Eshme	1
7	7	Central kindergarten	Karamyk	1
8	8	Central kindergarten	Jekendi	1
9	9	A. Rahmanova	Daroot-Korgon	1
10	10	Central kindergarten	Chak	1
11	11	Baichechekei (school-based)	Kashka-Suu	1
	Total			**11**

PART II. COMPLEX RISK ASSESSMENT METHODOLOGY

28 facilities have been covered by this study:

- 17 secondary schools (SS) - 41 structures/buildings;
- 11 kindergartens - 11 structures/ buildings;

Complex of studies included the following:

Stage I: Implementation of 4 components (types) of basic risk assessment:

1. Engineering and geological survey of the building locations;
2. Survey on potential threats of natural disaster groups;
3. Engineering survey of construction facilities on seismic resistance;
4. Survey on fire safety of the buildings.

Stage II: Generalization of the survey materials on risks assessment and clarification of the generalized level of risk for the building.

With the aim to present the full scope of the results, this complex of studies is considered as optimal, since in this context of studies it is possible to present a complemented safety assessment for every construction from natural and manmade risk factors.

II.1. Methodology of the Survey

A. Methodology of the engineering and geological survey

Composition and methodology of engineering and geological surveys (types, scope, methods and sequence of the works implementation) on the sites as a whole was pre-determined by existing normative documents and available material and technical base of the contractor. In particular, these types of works in the KR shall be conducted in accordance with SNiP KR 11-01-98[14], SNiP 4.02-91[15] (Abbreviation: Construction Rules and Norms) and other norms (for instance, coefficients of prices indexes on materials and works types of the Gosstroy of the KR). SNiP of the KR 11-01-98, basically, have been created on the basis of SNiP 1.02.07-87[16] and therefore they are frequently used in parallel complementing each other.

Prior to the description of the works methodology on engineering and geological surveys on the site (sites), it is necessary to provide certain explanations and present the general sequence of the works implementation, which are, for a certain extent could be possible to connect to the work method.

[14] SNiP KR 11-01-98 «Engineering survey for different types of construction works». Official publication. State Architectural and Construction Inspectorate under the Government of the KR. Bishkek, 1998.-147page

[15] SNiP 4.02-91. Construction Norms and Rules. Collection of estimated norms and prices on construction works approved by State Construction Committee of the USSR 29.12.90.

[16] SNiP 1.02.07-87[16] «Engineering survey for construction». Official publication. State Construction Committee of the USSR. Moscow, 1988.-105 page.

Engineering and geological surveys (EGS) consist of the complex: Topographic and Geodesy Surveys (TGS) and Engineering and Hydro geological surveys[17] (EHGS).

Preparation to the EHGS has been conducted in two main stages: Elaboration of the Terms of Reference (ToR) – by the client and development of the Study Program[18] (Calendar Plan and Budget) – by the contractor[19]. The study program compiled taking into account the following main points:

1. Consideration of the main objective and research tasks;
2. Familiarization with materials from previous studies on considered or neighboring areas, quality and time of the study conducted;
3. Designing, construction type and class assessment as of structure responsibility; number of floors, depth of the buildings and structural foundation arrangement and pressure on it (or interaction sphere of buildings and structures with ground of the foundation); Construction site or the study territory;
4. Consideration of the specificity of engineering, geological, ground, seismic and other conditions of the area as well as development of dangerous geological processes on the study area.

Complexity of engineering, geological, ground, seismic and other conditions of the area as well as development of dangerous geological processes on the study area directly influencing on the scope of the study implementation.

B. Methodology of surveying potential threats of the natural disasters

Potential natural disasters risk assessment has been conducted taking into account all available data: thematic maps (geological, hydro-geological, engineering and geological maps and maps of forecasting different processes), aerial and satellite images, data on previous research and development, monitoring and other works and studies, and surveys conducted in local communities.

During the natural disaster risk assessment the entire area (basin), including its formation (genesis), distribution, actions and the historical disaster events have been studied. During the study of flood processes, in addition to any other specifics, conditions of deposits (deluvial, proluvial and others) in the area have been studied on the entire length of the flood basin[20], e.g. practically on the entire length of the flood forming river, its tributaries and their catchment areas. Such scope of the study is important because under the conditions of abundant moisture, connectivity of clay products including fragmented rocks covering the slopes decreases dramatically, shear resistance decreases and as a result they are taken away by the flow. Here they are enriched by the collapsed products

[17] SNiP KR 11-01-98 SNiP KR 11-01-98 «Engineering survey for different types of construction works». Official publication. State Architectural and Construction Inspectorate under the Government of the KR. Bishkek, 1998.- p.147. Subpoint 1.1.

[18] For certain small facilities the program may not be prepared and EGS could be conducted based on client's TOR only.

[19] Any legal and physical entity could be considered as client, possessing funds and certain objectives on construction and implementation of special EGS. Any legal or physical entity could act as contractor possessing relevant license to conduct EGS.

20 Maslov .N.N., Kotov M.F.. Engineering Geology. Moscow, Stroizdat, 1971.-342.

from the bank sides, products of erosion and damage of the alluvial cones from side logs. Therefore, the volume of dirt and damaged materials increases and creates powerful flows with mud, rocks - debris flood, which destroy everything in its way.

C. Methodology of Engineering survey of structures on seismic resistance

The survey has been conducted in accordance with SNiP22-01-98 KR[21] and during the re-designing and reconstruction of buildings according to CR-31-01-99.[22] According to these documents, seismic resistance assessment included the following stages:

1. Implementation of the preliminary survey:
   - Time for constructing the building;
   - Construction scheme of the building for determination of the sub-group According to Chapter 3 SNiP 22-01-98 KR;
   - Availability of damages, assessment of the physical deterioration and approximate influence on seismic resistance of the building;
   - Project documentation and the materials of studies;
   - Information on the building reconstruction with modification of the construction design of all carrier structures, pressure or functional objective in the maintenance process;
   - Conditions of engineering communications.

2. Analysis of the project documentation and the materials of engineering and geological surveys:
   - Clarification of the construction design of the building, determined during the preliminary study for the assessment of the building sub-group in accordance with Chapter 3, SNiP 22-01-98 KR;
   - Determination of compliance of the project design with requirements provided for in SNiP KR 20-02:2009 «Seismic construction. Designing norms»;
   - Comparison of the designed seismic loads, accepted in the project and provided for in existing seismic resistance norms valid at a time when assessment has been conducted;
   - Assessment of the ground conditions based on study materials.

3. Determination of the building sub-group in accordance with Chapter 3 of the SNiP 22-01-98 KR «Assessment of the Buildings Seismic Resistance of the existing construction works»;

[21] SNiP 22-01-98 KR.Assessment of the buildings seismic resistance of the existing construction works. Ministry of Architecture and Construction of the KR, Bishkek 1998.-25.

[22] Order to conduct works on buildings and structures engineering survey subject to modification, redesigning or reconstruction on the territory of the Kyrgyz Republic State Inspectorate on Architecture and Construction under the Government of the KR, 1999.-10.

[10] Rules on fire safety for enterprises, organizations, institutions and Housing Fund of the Kyrgyz Republic. Approved by Resolution of Government of KR of 08.02.1995. N33. In the edition of the Government Decree of Kyrgyz Republic dated 13.09.2001, N560.

4. Implementation of the detailed inspection with assessment of the actual conditions of the construction and building as a whole, with determination of durability characteristics of the materials, revealing of defects, examination of certain structures or the building as a whole:
   - Actual construction design of the main carrier elements;
   - Durability characteristics of the carrier construction materials;
   - Extent and damage causes and buildings defects;
   - Deformation of elements (deflections, inclinations, shifts, and subsidence, etc.);
   - Actual load pressure;
   - Engineering communication conditions;
   - Construction deterioration percentage.

5. Assessment of compliance of the construction decisions regarding carrier elements to the existing normative requirements;

6. Calculation and analytical assessment;

7. Compilation of the technical conclusion.

D. Methodology of the fire safety assessment in the structures

Inspection and fire safety assessment of schools and kindergartens in the KR are conducted in accordance with approved Kyrgyz Government Decree dated October 16, 2001 No. 650 « Regulation on the state fire supervision in the Kyrgyz Republic» dated 16 October 2001 No. 650, and according to rules of «Fire safety requirements (FSR)...».[23]

Survey of the buildings was conducted based on visual observations of structures. Criteria of the fire risks are determined in accordance with existing normative acts, SNiP, the rules on fire safety for enterprises, institutions and housing stock of the KR, approved by the Government Decree dated 8 February 1995, No.33.

II.2. Main conclusions and recommendations on justification of the survey methodology

the survey has been conducted by four independent research teams from different agencies within the project framework. The absence of

[23] RULES of fire safety for enterprises, institutions and housing stock of the KR, approved by the Government Decree dated 8 February 1995, No.33 in the revised Kyrgyz Government decree dated 13.09.2001 No.560

administrative resources of the project prevented the creation of a unified Interagency Team. This constraint increased the duration and budget of the survey. Apart from that, generalization of the outcomes has taken a longer period of time since the results of each separate survey were stored in different institutions.

In the future, during the implementation of similar studies, it would be more effective to create a unified, holistic, interagency team under the coordination of one focal ministry (for example Ministry of Emergency Situations or Ministry of Education and Science of KR). Under these circumstances, there would be a possibility to make effective use of and exchange of the results of each specific study, avoiding possible duplication and improving the qualitative use of the materials. It also could contribute to the efficiency of the materials generalization.

During the engineering and geological surveys, measurement specific devices and mechanisms have been used for relatively long periods of exploitation. It may be more efficient if there were an opportunity to use more up-to-date equipment, which could contribute to the precision of measurements and reduce inaccurate information.

PART III. OUTCOMES OF THE SURVEY AND RECOMMENDATIONS FOR RISK REDUCTION

III.1. Outcomes of engineering-geological surveys at educational institutions

More detailed outcomes on each facility are provided in text annex 3.

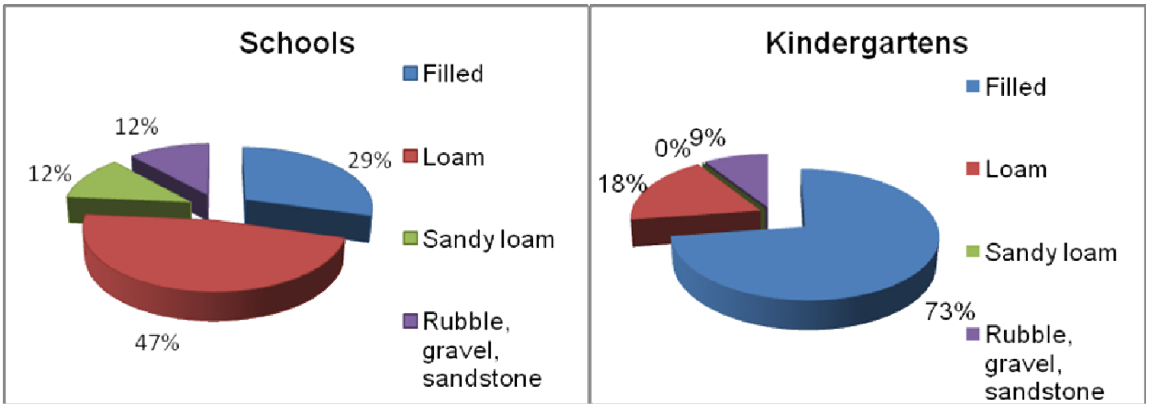
Engineering-geological surveys have been conducted as per the acting SNiP[24,25,26]. The Osh branch of JSC «KIGER» has reported the key outcomes of engineering-geological surveys shown in the following Table III.1.

A. Analysis of first layer soils

Table III.1

Correlation of first layer soil types

No.	Type of soil	Schools	Kindergartens	TOTAL
1	Filled	5	8	**13**
2	Loam	8	2	**10**
3	Sandy loam	2	0	**2**
4	Rubble, gravel, sandstone	2	1	**3**
TOTAL		**17**	**11**	**28**



Picture 3. Correlation of first layer soil types

As it reads from Table III.1 and Charts in Picture 3, the majority of bedding soils with layer thickness of more than 100 cm are loams and filled soil; in two schools these soils

[24] SNiP 11-01-98. Engineering study for different types of construction works. State Architectural and Construction Inspectorate under the Government of the KR. Bishkek, 1998.
[25] SNiP 2.02.01-83. Buildings and structures foundations. Moscow, 1985.
[26] SNiP 1.02.07-87. Engineering surveys for construction works. USSR State Construction Committee. Moscow, 1998.

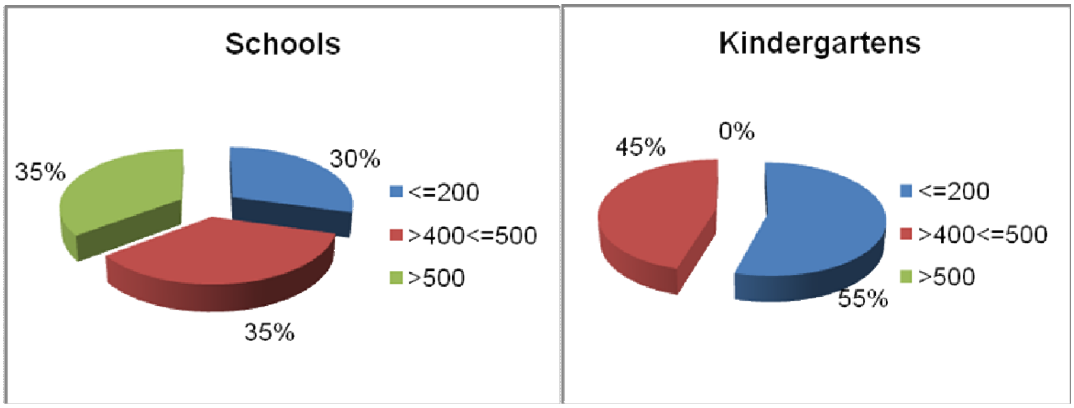
consist of sandy loams; in 4 institutions the first layer is made of rubble and gravel or chippings and pebbles with various fillings.

B. Analysis of estimate resistance of carrier layer

Table III.2

Resistance of carrier layer (kPa)

No.	Resistance of carrier layer (kPa)	Schools	Kindergartens	TOTAL
1	<=200	5	6	**11**
2	>400<=500	6	5	**11**
3	>500	6	0	**6**
TOTAL		**17**	**11**	**28**



Picture 4. Estimate resistance of carrier layer

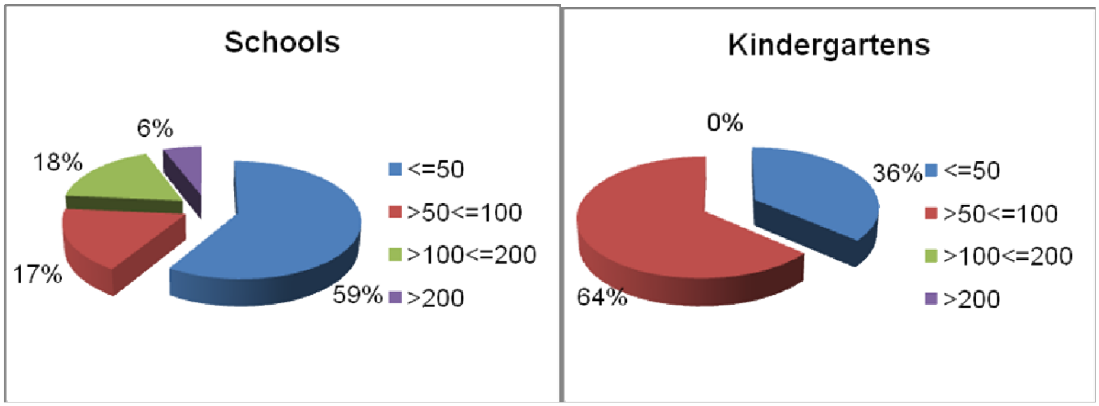
Table III.2. and Picture 4 shows that the main estimate resistance of carrier level in institutions is as follows: less than 200 kPa and between from 400-500 kPa. Only 6 schools have soils with more than 500 kPa resistance capacity. When designing a carrier resistance of a building, in particularly social facilities, deformational and bond properties of soil should be considered. This is because the heterogeneous or weak foundation soils (where estimate resistance indicators of carrier level are close to null) may lead to unacceptable deformations of buildings, which may then be found in emergency condition.

C. Analysis of foundation depth and height

Table III.3

Correlation of foundation depth

No.	Depth of occurrence (cm)	Schools	Kindergartens	TOTAL
1	<=50	10	4	**14**
2	>50<=100	3	7	**10**
3	>100<=200	3	0	**3**
4	>200	1	0	**1**
TOTAL		**17**	**11**	**28**



Picture 5. Correlation of foundation depth

Table III.3 and Picture 5 show that the foundation depth of the majority of institutions, i.e. 59% of school foundations and 36% of kindergarten foundations is placed for less than 50 cm. According to SNiP KR 20-02:2009[27], chapter 6.2, item 6.2.2 "Depth of foundation should be at least 10% of the height of upper (surface) part of the building and should be at least 1 m".

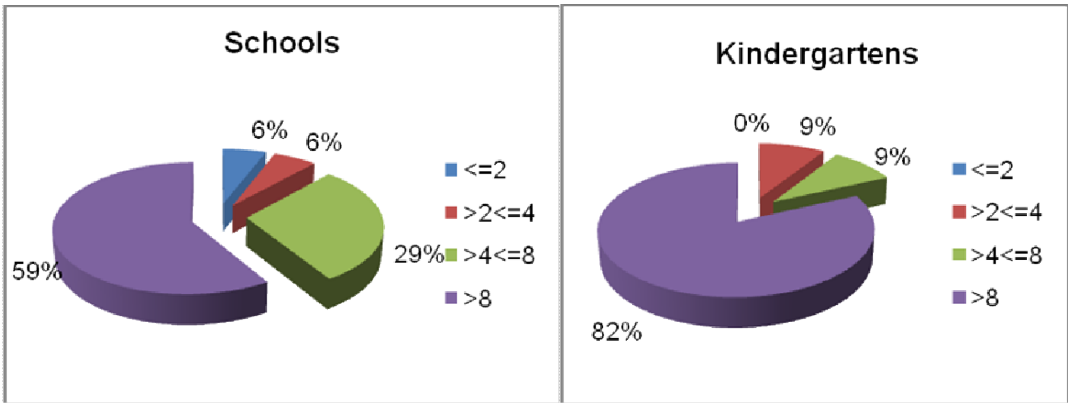
D. Analysis of ground water level

Table III.4

Ground water level (m)

No.	Ground water level (m)	Schools	Kindergartens	TOTAL
1	<=2	1	0	**2**
2	>2<=4	1	1	**3**
3	>4<=8	5	1	**11**
4	>8	10	9	**33**
TOTAL		**17**	**11**	**49**

[27] "SNiP 20-02:2009. Seismic-proof construction. Design standards"



Picture 6. Ground water level (GWL)

The subject rayon is a high mountainous area with maximum depth of zero isotherm penetration of more than 2 meters at all locations. This explains that in case of rise of GWL in this severe climate and in view of shallow foundation depth it may lead to frost heaving everywhere. However, this is a very widespread process, firstly because of deep levels of ground water. The pie chart at Picture 6 shows that the GWL at almost all facilities is more than 8 meters.

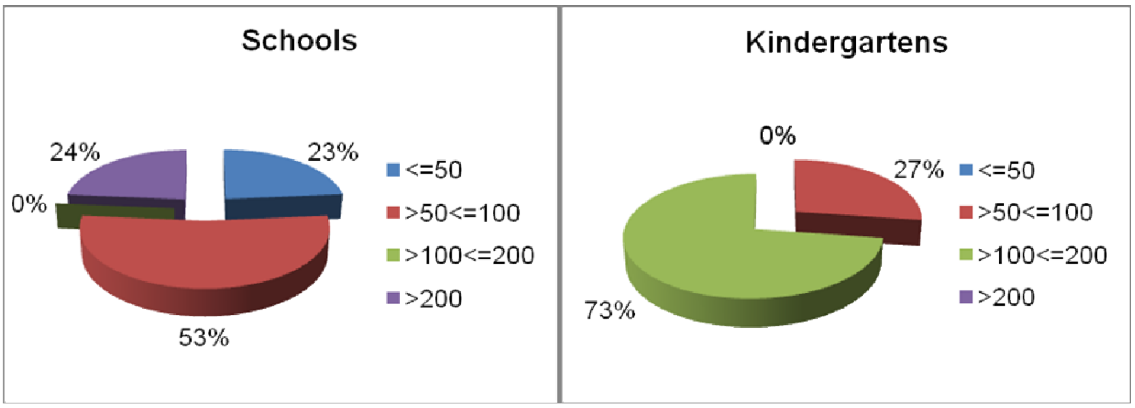
Therefore, this fact of shallow foundations poses high engineering-geological risk. The reason is that if the subsoil or top waters appear and cause wetting of foundations, for example, due to thaw or rain water, or raising of GWL, this may lead to frost heaving.

E. Analysis of foundation height indicators

Table III.5

Indicators of foundation height

No.	Foundation height (cm)	Schools	Kindergartens	TOTAL
1	<=50	4	0	**4**
2	>50<=100	9	3	**13**
3	>100<=200	0	8	**8**
4	>200	4	0	**4**
TOTAL		**17**	**11**	**28**



Picture 7. Indicators of foundation height

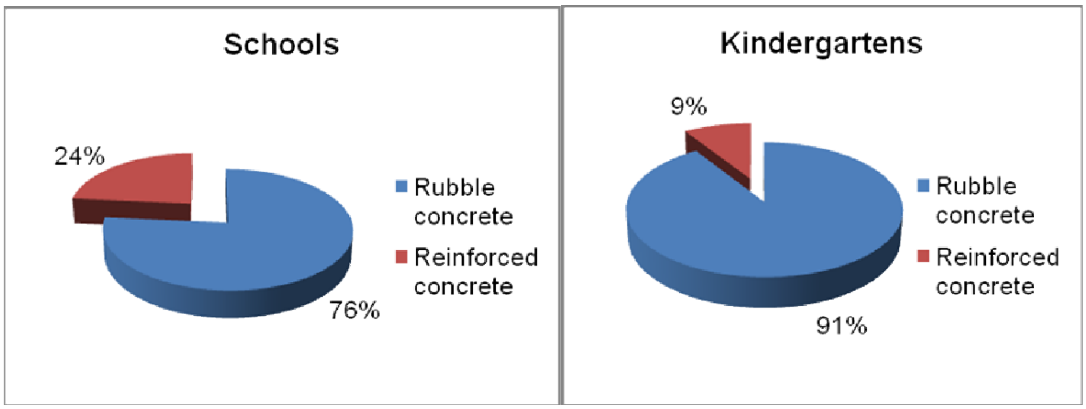
During the inspection of general foundation heights, the situation from point of building codes seems normal. 56% of schools and 27% of kindergartens have 1-meter high foundations. However, if we consider that the rayon territory has sufficient gradients in many locations because of a high mountainous region, and consider that the survey took into consideration the average height of foundations, it will be clear that the foundation height above the land surface is also not very high. This fact may reduce the age of walls of the structures.

F. Analysis of foundation material

Table III.6

Foundation material

No.	Foundation material	Schools	Kindergartens	TOTAL
1	Rubble concrete	13	10	**23**
2	Reinforced concrete	4	1	**5**
TOTAL		**17**	**11**	**28**



Picture 8. Foundation material

The majority of foundations have been built of rubble concrete - 76% of schools and 91% of kindergartens. According to SNiP KR 20-02:2009[6] constructing buildings with rubble concrete foundations in such seismically active regions is not advisable.

According to the Kyrgyzstan Seismic Zonation Map, the seismic intensity level in all locations surveyed within the country is 9. Detailed seismic surveys of soil condition at 32 locations inspected is also 9, and at one site with high level of ground water and with loamy bedding the seismic intensity was more than 9.

Maximum depth of frozen soil at all inspected sites ranges between 2,0-2,5 meters, more precisely 2,25 m. Normative depth of seasonal frost penetration into soils on the snow free horizontal surface is minimal for clays and loamy soils (155 cm). It is maximal for coarse fragmental soils - 229 cm. For all the other soils it ranges between 155 and 229 cm (for sandy loams, sands etc.).

Such facts, like the absolute majority of foundations being buried into the ground for less than 1 meter, prove that rising of surface, top or ground waters can lead to frost heaving, which is damaging for low-rise buildings. The problems with widespread frost heaving are very well known in these regions[28,29].

Recommendations for reduction of potential risk from engineering-geological conditions at surveyed locations of educational buildings

More detailed recommendations on each object are provided in text annex 3.

The general recommendation is that there is need for EGS before any designing and construction of social facilities.

In terms of maintenance of buildings at the immediate locations of surveyed objects, there are very few observed exogenous geological processes:

1. At one location (I.Karmyshev school) the ground consists of more than 4-meter-thick loess-like loams. This place may lead to 2nd grade subsidence, i.e. irregular settling of foundations for more than 5 cm in case of wetting of soils; it does not mention possible 1st grade subsidence as this case may lead to possible maximum subsidence, which should not exceed 5 cm;
2. At one location («Shibe» school in Shibe village) there is a 2nd grade subsidence potential, i.e. it has a potential threat of irregular and unacceptable subsidence of foundations for more than 5 cm in case of wetting of the basis, which requires preventive measures to avoid wetting of foundations;
3. At one school (A. Sait school in Chak village) in Daroot-Korgon village it is recommended to monitor the ground water level (GWL), and if they rise take measures to reduce them;

[28] K.Kojobaev, M.Mirzaliev, O.Mombekov. Report about engineering surveys on the object "Engineering-geological surveys in Kashka-Suu village, Chon-Alai rayon, Osh oblast". Osh-Bishkek, 2007-p.92.
[29] K.Kojobaev, M.Mirzaliev, O.Mombekov. Report about engineering surveys on the object "Engineering-geological surveys in Ak-Bosogo village, Chon-Alai rayon, Osh oblast". Osh-Bishkek, 2007-p.89.

4. the overall recommendation (at all locations except for "Chong-Alai" school in Daroot-Korgon village) is to take actions to provide effective drainage or diversion of thaw waters (cleaning, deepening of concrete facing of sides and the base, provide upland and water diversion ditches around buildings), which will reduce the soil wetting factor and reduce deformation factor (cracks, subsidence) thus preventing collapsing of buildings. This will also provide for compliance with sanitary humidity norms of premises and for longer terms of depreciation of timber blocks of the buildings (floors, roofs etc.).

III.2. Outcomes of potential risk assessment of natural disasters and emergencies for buildings and locations of educational institutions

More detailed outcomes on each facility are provided in text annex 4.

Field surveys of this risk type have been conducted by visual inspections with preceding thorough review of thematic map data and MES materials from previous surveys, based on existing and pre-developed MES techniques for local communities.[30]

First of all, the reports on each area describe the geomorphologic profile of each facility location. Secondly, they describe the inspection outcomes describing the possible threat of natural and manmade disasters and emergencies for buildings and their locations, with following recommendations on preventive measures and fighting possible natural disasters. The main outcomes of these inspections are provided in text annex 2, which provides recommendations to reduce risks of all the key natural threats for school and kindergarten buildings.

Table III.7

The main types of possible natural disasters at Schools and kindergartens and their vicinities

No.	Potential natural disasters	Schools	Kindergartens	TOTAL
1	Hazard of flooding due to slope flows and thaw water	17	11	**28**
2	Hazard of strong winds and whirlwind	17	11	**28**
3	Hazard of intense snowfalls and snow drifts	17	11	**28**
4	Hazard of raising of ground water level	6	0	**6**
5	Hazard of landslides, debris flows	1	0	**1**
6	Hazard of snow avalanches	2	0	**2**
7	Hazard of bank erosion	1	1	**2**

[30] Training of local population on the rules of inspection and identification of precursors of natural disasters and emergencies in ayil okmotus (village councils), rayons and oblasts. MES KR.

Table III.7 shows that all inspected locations and facilities are prone to flood potential, strong wind and whirlwind threats, intense snowfall and snow drift hazard. This is related to general meteorological conditions of the subject region. Additionally, the roofs do not comply with SNiP[31] requirements.

The threat of rising of ground water levels is present in the areas of 6 schools. This information differs from survey data of PF JSC «KIGER». However, this can be explained; according to the MES the local appearance of soil water, topwater or steep rise of GWL is the after-effect of periodic wetting of foundation beddings induced by thaw and rain waters, and according to data from KIGER, which conducted tunnelling works, such high level of ground waters has been detected only at one school.

Landslide hazard has been detected at Shibe school in Shibe village. Snow avalanche risk is there for 2 schools (S. Osmonov in Chuluk village, «Shibe» in Shibe village) located on the slopes or in their vicinities. Bank erosion threatens 2 facilities (J. Bokonbaev and "Jetkinchek" kindergartens in Achyk-Suu village).

Recommendations on reduction of potential risk of natural disasters and emergencies at inspected buildings of educational institutions.

More detailed recommendations on each facility are presented in text annex 4.

1) Snow avalanche hazard has been detected at 3 facilities (S. Osmonov school in Chuluk village, "Shibe" school in Shibe village, Nurdinov kindergarten in Kyzyl-Eshme village):

- The administration and staff of these institutions should conduct permanent monitoring of situations during the snow seasons, when there is a threat of a snow avalanche (rapid and intense snow fall at avalanche hazardous areas, dramatic warming of temperature and/or falling of wet snow or rain);
- Organize 24-hour observations in avalanche active periods of year at the most hazardous locations within ayil okmotus and rayons. When the threat of avalanche is observed take measures to protect the population (prepare evacuation of people to safer areas, close remaining buildings (closing of all entries and exits, windows, ventilations, switching off natural gas, water, electric power, removing flammable substances).

2) Undertake bank strengthening works at sections with bank erosion potential in regards to 2 institutions (a school and kindergarten) in village Achy-Suu;

3) The need to fasten the roofs has been indentified at all inspected facilities to raise their resistance to normative loads of precipitation and strong winds;

4) It is recommended to activate building insurance policies to mitigate problems from potential natural disasters at all levels (starting from state authorities to local administrations);

[31] SNiP 2.01.07-85. Loads and impacts.

5) Integrate emergency and disaster preparedness classes into the educational programs of educational institutions to strengthen disaster preparedness of teachers, tutors and pupils. Conduct trainings on practical rapid and efficient evacuation, and on basic principles of monitoring natural hazards and identification of their precursors.

III.3. Outcomes of seismic-resistance assessment in buildings of educational institutions

More detailed outcomes on each facility and construction (building) are presented in text annex 5.

In order to assess technical conditions of educational institutions and their risk, the engineering survey has been conducted in 41 buildings of 17 schools and 11 buildings of 11 kindergartens. The inspection of the buildings proved compliance with requirements of CR 31-01-99[32], SNiP 22-01-98 KR[33] and SNiP KR 20-02:2009.[34]

The inspection process involved analysis of structural schemes of the buildings, types and quality of used building structures and construction materials, and quality of construction works. The outcomes of inspections of the schools and kindergartens are provided in text annex 5.

A. Analysis of carrier structures

The outcomes of inspection of construction materials show that the inspected buildings of schools and kindergartens are of different age and were built using various materials for carrier constructions, starting from weak clay materials to contemporary reinforced concrete constructions.

Among the total number of inspected buildings of schools, the majority of the buildings have been build of burnt bricks (41%). However, a sufficient part of the buildings (up to 27%) have been built of clay bricks. The majority of kindergarten have also been built of burnt bricks (54%); a minority of the buildings were built of clay bricks (16%).

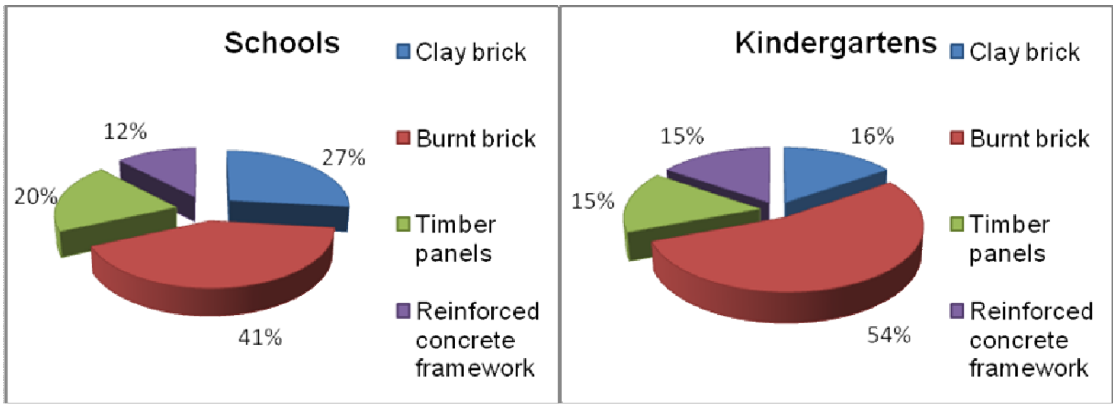
Table III.8

Materials of carrier structures

No.	Material	Schools	Kindergartens	TOTAL
1	Clay brick	11	2	**13**
2	Burnt brick	17	7	**24**
3	Timber panels	8	2	**10**
4	Reinforced concrete framework	5	2	**7**
TOTAL*		**41**	**13**	**54**

[32] CR 31-01-99 "Procedures for engineering survey of buildings and structures subject to restructuring, rearrangement or reconstruction in the Kyrgyz Republic";
[33] SNiP 22-01-98 KP SNiP 22-01-98 KP. Assessment of seismic resistance of the buildings. Ministry of Architecture and Construction of the Kyrgyz Republic, Bishkek, 1998.
[34] SNiP 20-02:2009. Seismic-proof construction. Designing standards. Bishkek 2009.

Note: * 2 kindergarten buildings (Daroot-Korgon and Kashka-Suu villages) are built of timber panels in combination with reinforced concrete framework.



Picture 9. Materials of carrier structures

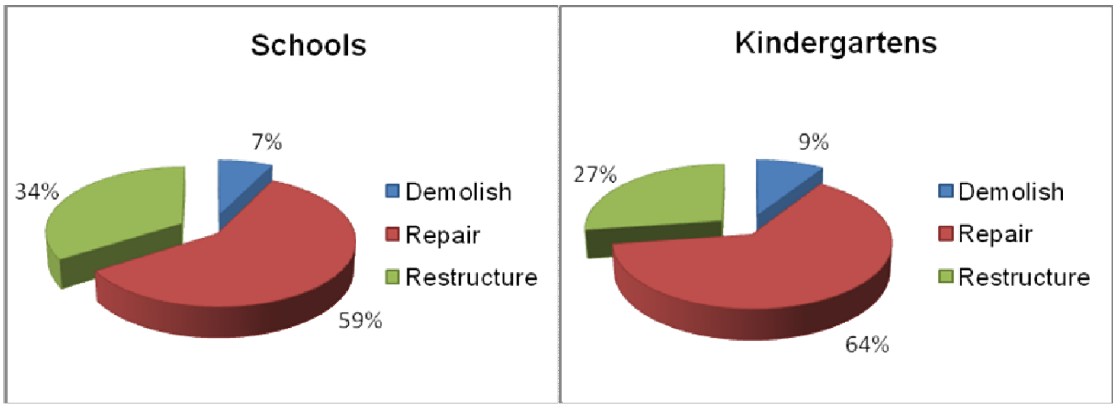
B. Analysis of general condition of the buildings

The outcomes of analysis found that 59% of school buildings and 64% of kindergartens need to be repaired to enhance their seismic resistance. Out of the total number of inspected buildings, the institute of KSRPDIEC recommends to demolish 7% of school buildings (3 buildings) and 9% of kindergarten buildings (1 building). Their technical condition is characterised as seismically non-resistant, and taking into account the high level of seismicity they pose a risk to the safety of people. Restructuring and modernisation of the above buildings is not feasible. Each entity has been given a technical decision by KSRPDIEC institute to strengthen their structural frameworks.

Table III.9

Recommendations to structural risk reduction

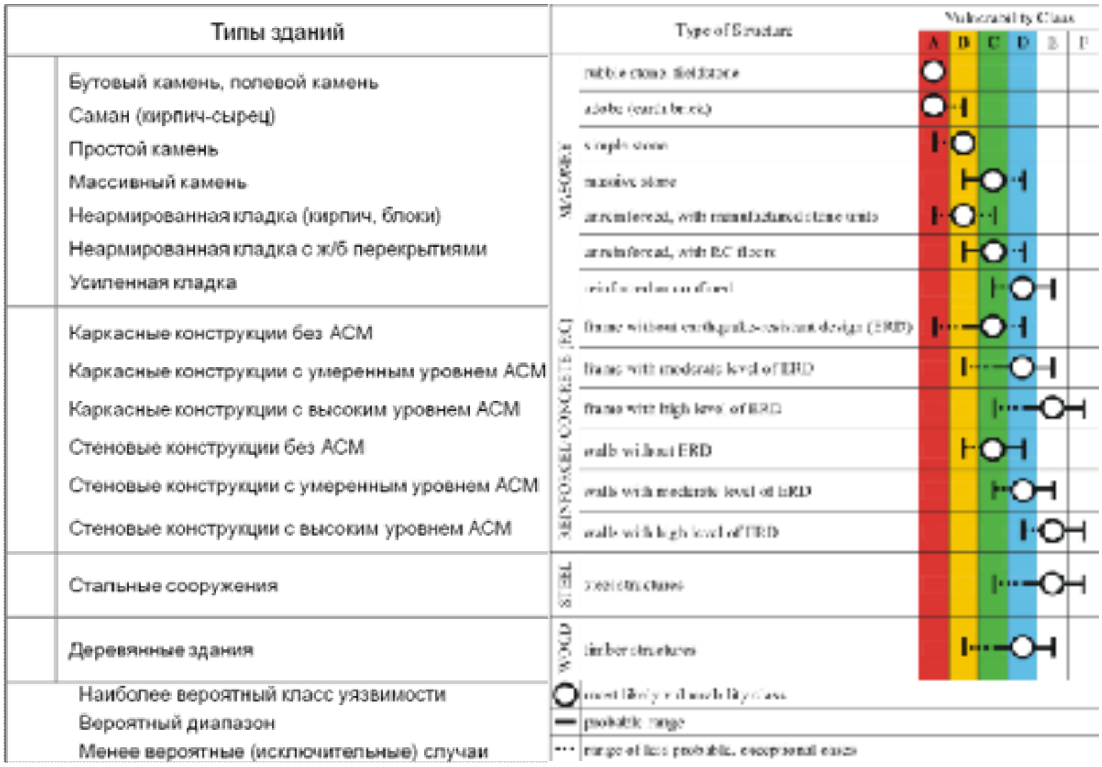
No.	Condition	Schools	Kindergartens	TOTAL
1	Demolish	3	1	**4**
2	Repair	24	7	**31**
3	Restructure	14	3	**17**
TOTAL		**41**	**11**	**52**



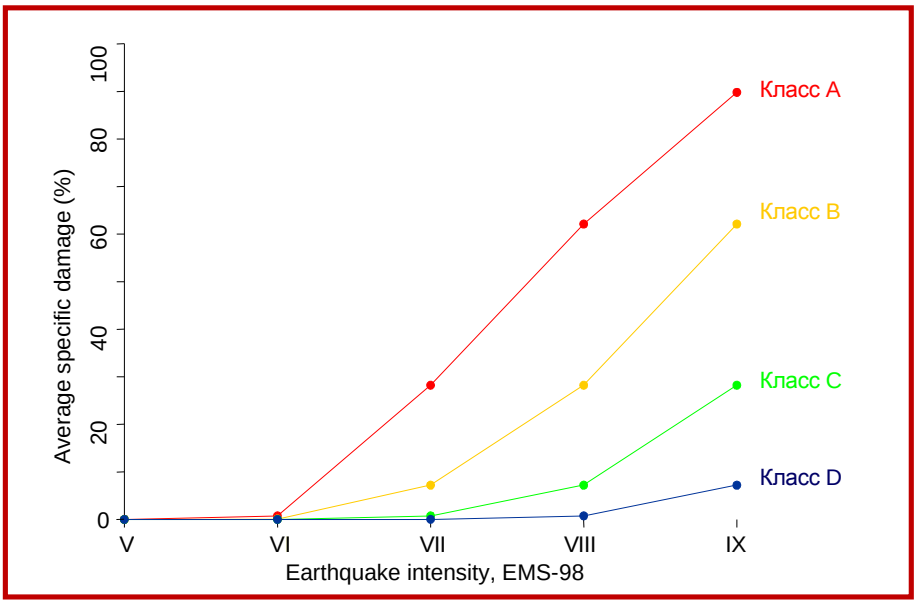
Picture 10. Recommendations for structural risk reduction

C. International norms for structural stability

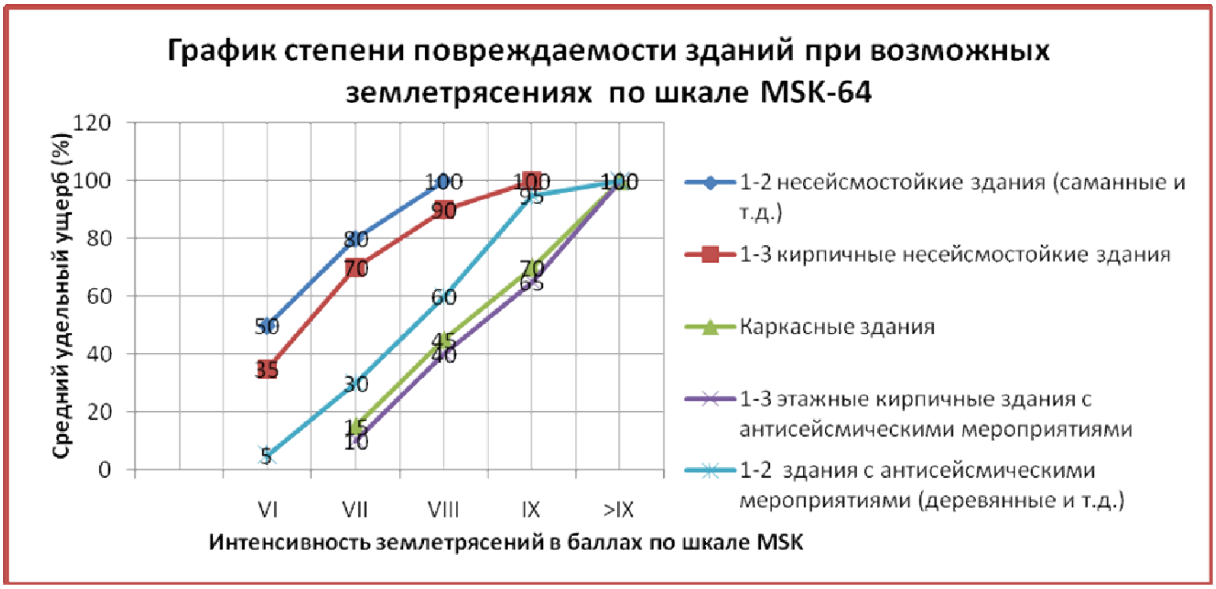
Based on the analysis of recent earthquakes and outcomes of experimental surveys of building structures under the seismic (dynamic) impacts, and based on seismic intensity scale MSK-64 and European macroseismic scale EMS-98 (Picture 11 and 12), the charts of possible damage classes (unit damage) in regards to inspected buildings with various construction schemes have been developed (Picture 11).



Picture11. Classification of buildings vulnerability (EMS-98)



Picture 12. Probable structural damage showing different vulnerability classes (EMS-98)



Picture 13. Chart of probable structural damage in case of earthquakes (MSK-64)

KSRPDIEC analysis of the last earthquakes in Kyrgyzstan showed that actual structural damage is close to the forecast obtained through MSK-64 scale.

Picture 13 shows that the most seismic-proof constructions, as it was meant to be, are those buildings that have been specially designed according to seismic resistance norms. According to the level of seismic resistance they can be categorized in the following order:

- 1-3 storey brick buildings with seismic-proof measures;
- Framework buildings that have almost the same seismic resistance level;
- Other houses (timber and others) with seismic-proof measures.

The most seismically vulnerable are the adobe (earth-brick) buildings with no seismic-proof constructions.

Correctness of these outcomes on high seismic hazard in the region and particular seismic-proof weakness of inspected school and kindergarten buildings was proved by recent M=6.1 earthquake in Tajikistan (24 January 2011). According to operational data of MES KR as a result of this earthquake with intensity = 4-5 in several school buildings of Chong-Alai rayon (Jashtilek, Chak, Shibe, Chuluk) cracks appeared (some of them are through cracks), where educational processes were temporarily suspended.

D. Recommendations on improving seismic resistance of inspected buildings of educational institutions.

More detailed recommendations on each facility and structure (building) are presented in text annex 5.

General recommendations:

1. Conduct comprehensive engineering survey for seismic resistance of the buildings and their foundations for all educational institutions within the country, and identify potential threats from natural disasters. This would justify undertaking of timely preventive measures to increase the level of safety and, as a result, reduce the level of potential social costs incurred from possible emergencies and natural disasters;

2. Comply with the quality requirements of construction and repair works, and with design documentation, to ensure design characteristics of carrier construction of the buildings;

3. Conduct appropriate engineering assessment of the planned structural changes to be done in the process of maintenance, rearrangement and restructuring of premises in order to retain primary estimate schemes of buildings and loads of carrier components;

4. Undertake design and construction works in parallel with engineering communications, water diversion (surface and thaw waters) adjacent to buildings in the area, in order to reduce wetting of bedding soils and, as a result, reduce structural damage;

5. Use stable types of construction materials and structures when constructing a building in a seismically active zone.

E. Detailed recommendations:

1. Due to technically poor seismic resistance and unfeasibility of reconstruction and repair works, 3 buildings of 3 schools (Z.Karimbekov school in Jash-Tilek, J. Bokonbaev school in Achyk-Suu, "Kabyk" school in Kabyk village) and 1 kindergarten building ("Baichechekei" in Kashka-Suu village) are recommended for demolishment;

2. In order to make the current engineering condition of 14 buildings of 8 schools (Z.Karimbekov school in Jash-Tilek, "Kulchu" primary school in Kulchu village, Ynakbai uulu K. school in Kyzyl-Eshme, «Kashka-Suu» school in Kashka-Suu, "Ак-Suu" school in Kara-Teyit, «Kyrgyzstan» school in Jekendi, «Shibe» school in Shibe, S. Osmonov school in Chuluk village), 3 buildings of 3 kindergartens ("Kelechek" and "Rahmonov" kindergartens in Daroot-Korgon, kindergarten in Chak village) comply with existing norms, these buildings are recommended for restructuring.

III.4. Outcomes of fire safety assessment in buildings of educational institutions

More detailed recommendations on each facility and structure (building) are presented in text annex 6.

Inspection and assessment of fire safety at buildings of schools and kindergartens have been conducted in accordance with approved Kyrgyz Government Decree "Regulation on the state fire supervision in the Kyrgyz Republic" dated 16 October 2001 No. 650, and according to rules of "Fire safety requirements (FSR)…".[35]

Visual inspection of the buildings has identified violations of various normative requirements related to structural fire safety. The outcomes of the inspection are presented in text annex 6.

It has also been identified that the absolute majority of the school and kindergarten buildings do not comply with FSR on several items. Out of 17 inspected schools only 3 have fire-prevention water supply with special fire fighting reservoirs ("Chong-Alai" school in Daroot-Korgon, Ynakbai uulu K. in Kyzyl-Eshme and "Kyrgyzstan" in Jekendi village), and only 4 schools have fire breaks between the school buildings and other buildings and structures ("Chong-Alai" in Daroot-Korgon, Ynakbai uulu K. in Kyzyl-Eshme, J. Bokonbaev in Achyk-Suu, "Kyrgyzstan" in Jekendi village).

All the other buildings of schools and central kindergartens have the following violations:

[35] RULES of fire safety for enterprises, institutions and housing stock of the KR, approved by the Government Decree dated 8 February 1995, No.33 in the revised Kyrgyz Government decree dated 13.09.2001 No.560.

- Buildings of schools and kindergartens do not have outdoor fire water supply with special fire water reservoirs;
- No fire breaks provided between the buildings of schools and kindergartens and other buildings and constructions;
- Premises of schools and kindergartens are not equipped with automatic fire alert systems;
- Electric wiring does not comply with the electric wiring rules;
- Buildings of schools and kindergartens are not provided with primary fire-fighting means;
- Timber constructions in attic premises at the schools and kindergartens are not treated with flame retardants;
- Secondary evacuation exits from the buildings are not provided or, spacing between the beds in kindergartens is not enough to ensure evacuation of children in case of potential fires.

Recommendations on increasing fire safety in the buildings of inspected educational institutions

More detailed recommendations on each facility and structure (building) are presented in text annex 6.

1. The main problem of fire safety in the inspected institutions is related to lack of a serious attitude to the rules and requirements, instructions and prescriptions of relevant bodies: state and local authorities and communities. In addition, there is a lack of attention paid to this problem evidenced by insufficient financial and technical means allocated to ensure fire safety;

2. All inspected institutions have an unsatisfactory grade for fire-fighting preparedness. Irrespective of this fact and prescriptions of the Fire service of MES KR, almost all of the schools and kindergartens continue functioning with a number of fire safety violations, which can lead to possible tragedies;

3. There is a low level of awareness among the administration and the staff of the institutions regarding the fire safety rules and the key evacuation rules in case of a fire;

4. 14 or 82% of inspected schools and all kindergartens are recommended to construct outdoor fire water supply with special fire hoses or tanks;

5. 13 or 76% of inspected schools and all kindergartens should provide for fire breaks from the nearest buildings;

6. All inspected institutions should obtain primary fire-fighting means, treat timber structures with flame retardants, arrange functioning reserve evacuation routes and enough space between beds and working places for the pupils to ensure effective evacuation in case of possible fires.

PART IV. GENERALIZATION AND PRESENTATION OF THE SURVEY OUTCOMES

In order to create the terms and conditions for a more effective survey of data with regards to holistic risk assessment of educational institutions in Chong-Alai rayon, Osh oblast, a unified database and map of outcomes has been developed.

The database provides review of both risk types, assessment of specific risk and generalized risks accordingly. Final indicators of risks are presented for each facility surveyed (such as schools and kindergartens) and for every separate structure or building.

IV.1. Structure of database for specific and general risks

Compiled database on assessment of the main types and complex risk presented in text annex 7.

Like other annexes, in the database all inspected entities (schools and kindergartens) are presented in a similar sequence and with identical order numbers, which simplifies data comparison.

In the database 4 types of specific risks assessment are presented. Adopted grading of different risk types has different scales, since during the generalization methodology of each agency conducted risk assessment has been observed, in accordance with internal standards and technical conditions. The system of grades determined by the direction of a single scale, where level "1" is considered as the most safe situation or absence of risk. In the database table, the results of risk levels appears as integer and rounded numbers, which also simplifies the data analysis system.

Therefore the following risk levels have been adopted:

A. Engineering and geological conditions:

- From level «1» (low risk) up to level «2» (high risk).
- In the aggregate assessment and analysis of general engineering and geological conditions of sites where facilities are located (text annex 3).

B. Natural disaster risk:

- From level «1» (low risk) up to level «7» (high risk).
- In the aggregate assessment of the main 7 factors types used in standard assessment of natural disasters threats (Text Annex 4).

C. Quality of the materials used in construction elements of the building:

- From level «1» (low risk) up to level «3» (high risk).).
- Upon assessment of the stability of the main type of construction material (clay, burnt brick, and wood panel design) and the presence of reinforced-concrete framework, which enhances the overall structural stability of the building (Text Annex 5).

D. Fire Safety:

- From level «1» (low risk) up to level «7» (high risk)
- In the aggregate assessment of the main 7 factors types used in standard assessment of fire danger (Text Annex 6).

IV.2. Indicators of the medium risk assessment

1. Medium risk assessment of engineering and geological conditions of all facilities – at level «1», i.e. we can tell about comparatively safe situations within this particular group of factors (of course except for high level of seismic risk – accepted as the main risk of the given territory), where maximum is the level «2». However, in 5 cases the situation has been assessed taking into account the maximum risk level (level «2», tables IV.1, IV.2, and graphical Annexes 4,5):

    1) A.Sait school in Daroot-Korgon village;
    2) «Kulchu» school in Kulchu village;
    3) J.Bokonbaev school in Achyk-Suu village;
    4) «Shibe» school in Shibe village;
    5) «Jetkinchek» kindergarten in Jekendi village;

    At these sites it is recommended to the administration of the institutions to pay special attention to system and methods of monitoring and timely determination of possible negative impacts of geological processes on structures stability with development of measures to minimize these risks. It is also necessary to pay special attention on these sites to the capacity building of human resources, including pupils, regarding actions to be taken in case of threat of emergencies and natural disasters.

2. Medium risk assessment of natural disasters in schools is at level «4», kindergartens at level «3», i.e. we can consider a comparatively safe situation within this particular group of factors, where maximum is the level «7».
    However, in 3 cases the situation has been assessed with maximum risk level (tables IV.1, IV.2 and graphical Annexes 4,5):

    1) J.Bokonbaev school in Achyk-Suu village (maximum level «7» (!));
    2) «Shibe» school in Shibe village (уровень «5»);
    3) S.Osmonov school в Chuluk village (уровень «5»);

    At these sites, it is recommended to the administration of the institutions to pay special attention to the system and methods of monitoring and early detection of precursors of natural disasters and to develop measures to reduce these risks. It is also necessary to pay special attention in these sites to the capacity building of human resources, including pupils, regarding actions in case of threat, emergency situation and natural disasters

3. Medium risk assessment of the materials quality used in construction at all sites is on the level «2», taking into account the short scale of this type of risk, where the maximum is the level of "3", all sites cannot be considered as safe within this particular factor.

   Also, in 14 cases the situation assessed with maximum risk level (level «3», tables IV.1, IV.2 and graphical Annexes 4, 5):

   1) All 3 constructions/buildings Z.Karimbekov school in Jash-Tilek village;
   2) «Kulchu» school in Kulchu village;
   3) Both constructions/buildings of Ynakbai uulu K. school in Kyzyl-Eshme;
   4) 1 construction/building (built in 1978) of J.Bokonbaev school in Achyk-Suu village;
   5) 1 construction/building (built in 1990) of «Kabyk» school in Kabyk village;
   6) All 3 constructions/buildings of «Kashka-Suu» school in Kashka-Suu;
   7) Both constructions/buildings of «Ak-Suu» school in Kara-Teyit village;
   8) Both constructions/buildings of «Kyrgyzstan» school in Jekendi village;
   9) Both constructions/buildings of «Shibe» school in Shibe village;
   10) Both constructions/buildings of S.Osmonov school в Chuluk village;
   11) «Kelechek» kindergarten in Daroot-Korgon village;
   12) A.Rakhmanova kindergarten in Daroot-Korgon village;
   13) Central kindergarten in Chak village;
   14) «Baichechekei» kindergarten (school-based) in Kashka-Suu village;

   At these locations it is recommended to the administration of the institutions to develop and implement, in collaboration with specialized organizations, specific projects on risks reduction and strengthening construction elements of the structures. Prior to the commencement of the strengthening reconstruction works, it could be important to pay special attention to the monitoring and timely determination of those factors that are considered as indicators of the building deformation. It is also important to pay special attention to these sites to issues related to capacity building of human resources, including pupils, to take actions in cases of threat of emergencies and natural disasters.

4. Medium risk assessment of the fire danger of schools and structures on the level «4», at kindergartens «6», i.e. it means that we can state high level of danger (with higher level of danger in kindergartens) in this sector, since the maximum level of this type of risk is «7».

   Also, in 10 cases the situation has been assessed with maximum risk level (level «7», table IV.1, IV.2 and graphical Annexes 4, 5):

   1) One building «Chong-Alai» school in Daroot-Korgon village;
   2) «Kulchu» school in Kulchu village;
   3) «Jayilma» school in Jayilma village;
   4) «Ak-Suu» school in Kara-Teyit village;
   5) «Shibe» school in Shibe village;
   6) I.Matmusaev kindergarten in Daroot-Korgon village;
   7) «Jetkinchek» kindergarten in Achyk-Suu village;
   8) «Aidanek» kindergartenin Jayilma village;

9) Central kindergarten in Jekendi village;
10) «Baichechekei» kindergarten (school-based) in Kashka-Suu village;

At these sites it is recommended to the administration of the institutions to fulfill instructions given by the Fire Service to a greater extent and to develop measures to decrease factors of this type of risk group. It is also important to pay special attention to these sites to issues related to capacity building of human resources, including pupils, to take actions in cases of threat of emergencies and natural disasters.

Table IV.1

Summary database on assessment of the main types of risk and comprehensive risk for educational institutions in Chong-Alai rayon, Osh oblast (Secondary schools)

No.	No. of entity	Name of institution	Gradation of accepted level of different risk types			
			2-high	7-high	3-high	7-high
			1-low	1-low	1-low	1-low
			Risk level of EGF (annex 1)	Total disasters risk (annex 2)	Total construction materials risk (annex 3)	Total fire risk (annex 4)
1	1	Chong-Alai school	1	3	2	6
2	2	N. Karmyshev school	1	3	2	6
3	3	A.Sait school	2	3	2	6
4	4	Kok-Suu school	1	3	2	6
5	5	Z. Kerimbekov school	1	3	3	6
6	6	«Kulchu» school	2	4	3	7
7	7	Ynakbai uulu K. school	1	3	3	6
8	8	«Kara-Kabak» school	1	4	2	6
9	9	J.Bokonbaev school	2	7	2	6
10	10	Jayilma school	1	3	2	7
11	11	«Kabyk» school	1	4	2	6
12	12	Kashka-Suu school	1	3	3	6
13	13	Ak-Suu school	1	4	3	7
14	14	«Kyrgyzstan» school	1	4	3	6
15	15	V.I. Lenin school	1	3	2	6
16	16	«Shibe» school	2	5	3	7
17	17	S.Osmonov school	1	5	3	6
	Average		**1**	**4**	**2**	**6**

Note:

In regards to these structures and buildings it is recommended to the administration of the institutions to urgently develop and implement, in collaboration with specialized organizations, specific projects on specific and general risks reduction. It is also recommended to pay more attention to preventive measures, and the work on continuous capacity building of human resources, including pupils, to take actions in cases of threat of emergencies and natural disasters.

Table IV.2

Summary database on assessment of the main types of risk and comprehensive risk for educational institutions in Chong-Alai rayon, Osh oblast (Kindergartens)

No.	No. of entity	Name of institution	Gradation of accepted level of different risk types			
			2-high	7-high	3-high	7-high
			1-low	1-low	1-low	1-low
			Risk level of EGF (annex 1)	Total disasters risk (annex 2)	Total construction materials risk (annex 3)	Total fire risk (annex 4)
1	1	I.Matmusaev kindergarten	1	3	2	7
2	2	«Jetkinchek» kindergarten	2	4	2	7
3	3	Jashtile kindergarten	1	3	2	6
4	4	Aidanek kindergarten	1	3	2	7
5	5	«Kelechek» kindergarten	1	3	3	6
6	6	N.Nurdinov kindergarten	1	3	2	6
7	7	Central kindergarten	1	3	2	6
8	8	Central kindergarten	1	3	2	7
9	9	A.Rakhmanova kindergarten	1	3	3	6
10	10	Central kindergarten	1	3	3	6
11	11	«Baichechekei» kindergarten (school-based)	1	3	3	7
	Average		**1**	**3**	**2**	**6**

IV.3. Outcomes of the generalized risk assessment

Final outcomes of the risk assessment are presented in two formats:

1. For each separate structure or building within the inspected location from level «1» (low risk) up to level «5» (high risk) on generalization of all 4 types of specific risks assessment.

   Medium risk assessment for separate structure or building within the inspected location is at level «3», i.e. it could be that there is a medium risk, since the maximum level of the generalized risk of structures is «5».

   However, in 9 cases the situation has been assessed with high level of the generalized risk (level «4»):
   1) «Kulchu» school in Kulchu village;
   2) All 3 constructions/buildings of J.Bokonbaev school in Achyk-Suu village ((built in 1978) with maximum level «5»);
   3) One construction/building (built in 1990) «Kabyk» school in Kabyk village;
   4) Both constructions/buildings of «Ak-Suu» school in Kara-Teyit village;
   5) One construction/building (built in 2000) of «Kyrgyzstan» school in Jekendi village;
   6) Both constructions/buildings of «Shibe» school in Shibe village;
   7) Both constructions/buildings of S.Osmonov school in Chuluk village;
   8) «Jetkinchek» kindergarten in Achyk-Suu village;
   9) «Baichechekei» kindergarten (school-based) in Kashka-Suu village;

2. For each site (schools and kindergartens) risk assessments were given from level «1» (low risk) up to level «4» (high risk) on generalization of all 4 types of specific risks assessment.

   Medium assessment of the generalized risk of the sites (institutions) studied is on the level «3», i.e. it means that high level risk could be stated, since the maximum level of the general risk of the site (institution) - «4».

   Also in 8 cases the situation considered maximum level of risk (level «4»):
   1) СШ «Kulchu» school in Kulchu village;
   2) Ynakbai uulu K. school in Kyzyl-Eshme village;
   3) «Ak-Suu» school in Kara-Teyit village;
   4) «Kyrgyzstan» school in Jekendi village;
   5) «Shibe» school in Shibe village;
   6) S.Osmonov school в Chuluk village;
   7) «Jetkinchek» kindergarten in Achyk-Suu village;
   8) «Baichechekei» kindergarten (school-based) in Kashka-Suu village.

General data is provided in Tables IV.3, IV.4 and in graphic annexes 2, 3.

Table IV.4

Generalized level of risk for educational institutions in Chong-Alai rayon, Osh oblast (secondary schools)

No.	No. of entity	Name of institution	Village	Level of risk
1	1	school Chong-Alai	Daroot-Korgon	3,3
2	2	school N.Karmyshev	Jarbashy	2,0
3	3	school A.Sait school	Daroot-Korgon	2,8
4	4	school «Kok Suu»	Chak	2,7
5	5	school Z.Kerimbekov	Jash-Tilek	3,1
6	6	school «Kulchu» school	Kulchu	4,0
7	7	school Ynakbai uulu K.	Kyzyl-Eshme	3,7
8	8	school «Kara-Kabak»	Kyzyldon	3,2
9	9	school J.Bokonbaev	Achyk-Suu	3,0
10	10	school «Jayilma»	Jayilma	3,2
11	11	school «Kabyk» school	Kabyk	2,9
12	12	school «Kashka Suu»	Kashka Suu	3,2
13	13	school «Ak-Suu»	Kara Teyit	3,5
14	14	school «Kyrgyzstan»	Jekendi	3,6
15	15	school V.I.Lenin	Karamyk	2,2
16	16	school «Shibe»	Shibe	3,8
17	17	school S.Osmonov	Chuluk	3,5

Table IV.5

Generalized level of risk for educational institutions in Chong-Alai rayon, Osh oblast (kindergartens)

No.	No. of entity	Name of institution	Village	Level of risk
1	1	I.Matmusaev kindergarten	Daroot-Korgon	3,2
2	2	«Jetkinchek» kindergarten	Achyk-Suu	3,7
3	3	Jashtile kindergarten	Jash-Tilek	3,0
4	4	Aidanek kindergarten	Jayilma	3.2
5	5	«Kelechek» kindergarten	Daroot-Korgon	3,2
6	6	N.Nurdinov kindergarten	Kyzyl-Eshme	3,0
7	7	Central kindergarten	Karamyk	3,2
8	8	Central kindergarten	Jekendi	3,2
9	9	A.Rakhmanova	Daroot-Korgon	3,2
10	10	Central kindergarten	Chak	3,0
11	11	«Baichechekei» kindergarten (school-based)	Kashka Suu	3,5

IV.4. Graphic representation of the generalized outcomes of risk assessment

For the convenience of visual assessment of geographical location of the sites (educational Institutions) and correlation level of their complex risk, the risk map of educational institutions has been elaborated (graphic Annex 6). The assigned risk level is based on data presented in the summary database on assessment of the main types of risk and complex risk for educational institutions in Chon Alai rayon, Osh oblast (graphic Annex 4, 5).

The map includes geographical layer and outcomes of the risk assessment of each site (schools and kindergartens). It also includes administrative characteristics, names and numbers of entities (in a numerical counting system of the present survey), population density at Village councils (AO) and the population number in the villages. The map has been developed in ArcGIS program.

PART V. MAIN RECOMMENDATIONS

In order to reduce the risk of natural disasters, including seismic risk, as well as their socio-economic impacts, and enhance the fire safety, it is expedient that the following key measures are implemented as soon as possible.

V.1. Recommendations on the improvement of engineering-geological conditions of the sites where the buildings of educational institutions are located

1. On one of the sites ("Shibe" school in Shibe village) the soil subsidence of the second type may take place, i.e. there is a potential hazard of differential and impermissible foundation subsidence of more than 5 cm in case of wetting of foundation bedding, which requires actions to prevent the wetting of foundations.

2. At 3 out of 33 sections of the buildings (or 9%) the monitoring of the ground water level (GWL monitoring) is recommended, and in case the ground water level rises, appropriate measures should be taken to lower it.

3. Before starting any design and construction of schools and kindergartens it is necessary to conduct the preliminary engineering-geological survey (EGS).

V.2. Recommendations on the reduction of potential risks of natural disasters and emergencies for the buildings of educational institutions

1. For the 50 buildings it is necessary to enhance the compliance with the building operation and maintenances procedures, including the thaw water and rain water diversion from the building foundations, and disposal of water from the roofs of the buildings. For this, all inspected locations require improvement of engineering conditions - cleaning, dredging and surfacing with concreting the boards and beds of the catchwater drains and diversion terraces around the buildings (or construction of new ones, if they do not exist), which would allow avoiding undesirable processes, such as differential settlement of foundations and cracks in walls, frost heaving and deformation of buildings, emergence of dampness in the buildings and rapid wear of wooden floor materials.

2. At the two sites ("Shibe" school in Shibe village, and home-based kindergarten in Sary-Bulak or for 5,4%), where there is a hazard of landslides and mudslides, it is necessary to be prepared for potential landslides (learn and have information about possible locations and approximate boundaries of the landslides; visually explore the slopes adjacent to dwelling houses (after snow melting, heavy rainfall, earthquakes; as well as the places of the old landslide movement). In case of appearance of cracks on the body of the ancient landslide or on the new slope, extinction of springs or emergence of new springs, it is necessary to notify the families living in the landslide-hazardous area and resettle them temporarily to safe houses until the specialists arrive and draw up their conclusion. In order to determine the width and speed of the landslide movements, on each side of the cracks on the slope the pegs should be placed,

which should be made of available materials. To make an observation an observer (a resident) should go up and back bypassing the formed landslide body. In case the movements are low-observable, measurements of the distances between the pegs should be taken once a day, and if the movements are visible - every hour. An increase in the distance between the pegs and expansion of cracks as a result of the first measurement by 1 cm, the second - by 2-3 cm, the third - by 6-8 cm, give evidence of the beginning of active landslide displacement, therefore, presence of people as well as cattle grazing in the landslide-hazardous area is strictly prohibited. On the borders of the landslide-hazardous slope the signs warning of landslide hazard should be placed and measures should be taken to protect from landslides (cattle grazing on displacing landslides bodies should be prohibited). Waterproofing and dewatering (drainage) of the landslide body should take place. Unloading the slope by means of flattening, planting trees, bushes and grass to protect the slope from washing away by rainfall and snow-melt waters for the landslides which are in the process of stabilization; fixing the rock mass on the steep slopes with the help of retaining stone walls, concrete or reinforced concrete walls, strengthening the slope with the help of the wedges.

3. For the 5 sites (13,5%), at which the snow avalanche hazard has been identified (S. Osmonov school in Chuluk, “Shibe” school in Shibe, Nurdinov kindergarten in Kyzyl-Eshme, and home-based kindergartens in Sary-Bulak and Batman-Kol villages) in case of avalanche hazard indicators (fast and abundant snowfall in the avalanche catchment areas; rapid change in temperature with warming and / or fall of sleet or rainfalls, sunny clear weather with warm air currents and with abundance of snow on the slopes), during the avalanche-hazardous period within Ayil Okmotu and Rayons the day-and-night duties should be organized in Rayon Administrations, Ayil Okmotus and in the most hazardous areas, and measures should be taken to protect from avalanches (the population evacuation should be timely organized). It is necessary to close tightly the windows, doors, fresh-air inlets and other vents, turn off the gas, water, electricity, remove the poisonous and flammable substances from the houses and place them in the pits or cellars. In the process of evacuation it is necessary to go to the safe hill-sites, having preliminary explored the area on one's own initiative.

4. To reduce the risk of bank erosion for the two facilities (school and kindergarten) in Achy-Suu village the bank protection is recommended.

5. All of the roofs (house tops) of the buildings (all 37inspected buildings or 100%) were built with nonobservance of the SNiPs for loads and for expose to rainfalls and strong winds. Therefore, it is recommended that all of the roofs of the buildings should be repaired or replaced.

6. It is recommended that the personnel of the schools and kindergartens, local and state administrations, and local communities should be, without delay, informed of natural disaster risks, fire safety, and of fire precautions and fire control measures.

7. To facilitate the solution of some of the problems that may take place after the natural disasters, at all levels, starting with government agencies and ending with local administrations, it is desirable that efforts to insure the buildings against natural hazards are intensified.

V.3. Recommendations on the improvement of earthquake resistance of the buildings of educational institutions

1. Taking into account the results of the study conducted in Chong-Alai rayon, Osh oblast, and in order to avoid the disastrous effects of potential natural disasters, including earthquakes, a comprehensive engineering survey of the buildings and adjacent territories of all educational institutions of the KR with respect to earthquake resistance of the buildings and their foundations, as well as potential consequences of natural disasters, is recommended.

2. As a result of the study of the earthquake resistance of the buildings the KSRIPDERC Institute provides the following recommendations (see Table. V.1 below):

Table V.1

Recommendations Provided by KSRIPDERC	**Schools (41 Buildings)**	**Kindergartens (32 Buildings)**
1. Recommended for demolition	14 School Buildings or 34.1%	9 Kindergarten Buildings or 28.1%; 7 Home-based Kindergarten Buildings or 21.9%
2. Recommended for restructure	4 School Buildings or 9.8%	3 Kindergarten Buildings or 9.4%
3. Enforcement of building structures is recommended for their future and more secure operation	23 school buildings or 56.1%	13 Kindergarten buildings or 40%
Total:	**41 Buildings or 100%**	**32 Buildings or 100%**

V.4. Recommendations on the improvement of fire safety of the buildings of educational institutions

1. For the seventeen (or 85%) inspected school buildings and for all (100%) of the kindergarten buildings it is recommended that the outdoor fire water supply system with special fire reservoirs are built.

2. For the sixteen (or 80%) inspected school buildings and for all (100%) of the kindergarten buildings it is necessary to provide for fire breaks between the school buildings and other buildings and structures.

3. For all other school and kindergarten buildings the implementation of the following measures is recommended:

    - the premises of the buildings should be fitted with an automatic fire alarm system;

    - the electric wiring in the buildings should be reinstalled pursuant to the rules of electrical installations;

    - the buildings should be provided with the primary fire fighting means according to existing rules;

    - the structural timber of the of the buildings should be treated with fire retardants;

4. In the school buildings, second fire exits should be provided for, and in the kindergarten buildings it is necessary to provide for free passages between the beds for the evacuation of children in case of possible fire.

Speech of UN Secretary-General at the Opening Session of the Fourth UN Conference on the Least Developed Countries.

The time has come for us to change our view of the world.

Instead of conceiving the least developed countries being poor and weak let us avow these 48 countries to be a huge reserve of not yet enabled capacity.
Investing in the least developed countries opens opportunity for all.
This is an opportunity to save the most vulnerable people in the world from the burden of poverty, hunger and diseases, which might not have appeared. This is the moral duty.
On the second hand investing in the least developed countries can serve as an incentive, helping to promote and support the process of global economical recovery and provision of stability.
This is not charity, but reasonable way of investing...

Ban Ki Moon,
Istanbul, Turkey
9 -13 May 2011

CONCLUSION

Overall conclusions for situation analysis:

1. Within this survey, 28 facilities in Chong-Alai rayon, Osh oblast, have been inspected for risk conditions. Overall, results of integrated risk assessment show that there are no facilities with low potential of integrated risk, and therefore it is important to undertake activities to reduce some types or overall complex of risks identified. If we consider direct threat, there is a need to reduce risk posed to 7,512 people (6,762 children and pupils of schools and kindergartens, and 750 adults – teachers and tutors), that makes up 30% of the total population of Chong-Alai rayon. Thus, the risks detected need to be addressed in order to ensure the safety of this significant population (adults and children).

2. The survey showed that in spite of the critical need for designing and prior EGS, all surveyed schools and kindergartens either do not have building designs or EGS materials. This fact shows that these facilities have been built either following some standard designs or without any designs and EGS at all, which may result in ineffective determination of safe territories for building and construction of facilities and thus violation of stability norms.

3. Building of social facilities is often initiated by the population, international and public organizations. It would be more effective in terms of quality control improvement if the local authorities, line ministries or agencies acted as clients to promote building of all the social institutions. In that case, the procedure for complying with design and building norms would be enhanced.

4. It would be practically feasible and effective to conduct revision of building SNiPs (for instance SNiP KR 20-02:2009 “Seismic-proof construction. Design norms.”) considering standardization and inclusion of new approaches and technologies, providing for use of simple and cost-effective methods of seismic-proof construction using local building materials.

5. When considering specific hazard and probability of intense earthquakes all over the country, it would be effective to assess seismic resistance of school buildings and kindergartens in the entire country and developing preventive measures to strengthen these facilities to make them seismically resistant, and take actions to improve disaster preparedness of the staff members and pupils in educational institutions.

The results of the conducted research and the report have been reviewed and approved by the decision of the Scientific and Technical Council (STC) under the Inter-Ministerial Commission for Civil Protection of the Kyrgyz Republic on 08.05.11, which was chaired by State-Secretary of MES KR, Mr. Temiraliev T.A. and held in Leninskoe village.

During the discussion of the methodology and the results of the survey, the members of STC suggested including materials of this report into the forecasting materials for 2012, which are annually issued by the Department of Monitoring of MES as an output of research work. Another suggestion was to develop recommendations for MES KR, Ministry of Education and Science, Governor of Osh oblast, and Head (akim) of Chong-Alai rayon to take measures on the results of the survey at educational institutions in Chong-Alai rayon.

In the course of the discussion and voting, the STC members decided to recommend this study model to conduct full-scale and similar surveys of other facilities and institutions in the future within the Kyrgyz Republic.

Therefore, the outcomes of the survey can be used on the local and national level for situational analysis and decision making in regards to each separate institution and for potential development of long-term strategies targeted at improving the safety of educational institutions.

General conclusions of the survey:

The model of the suggested survey is a testing model that gives an opportunity to make relevant corrections in case of possible confirmation to undertake more complete or similar surveys of other facilities and institutions throughout the Kyrgyz Republic.

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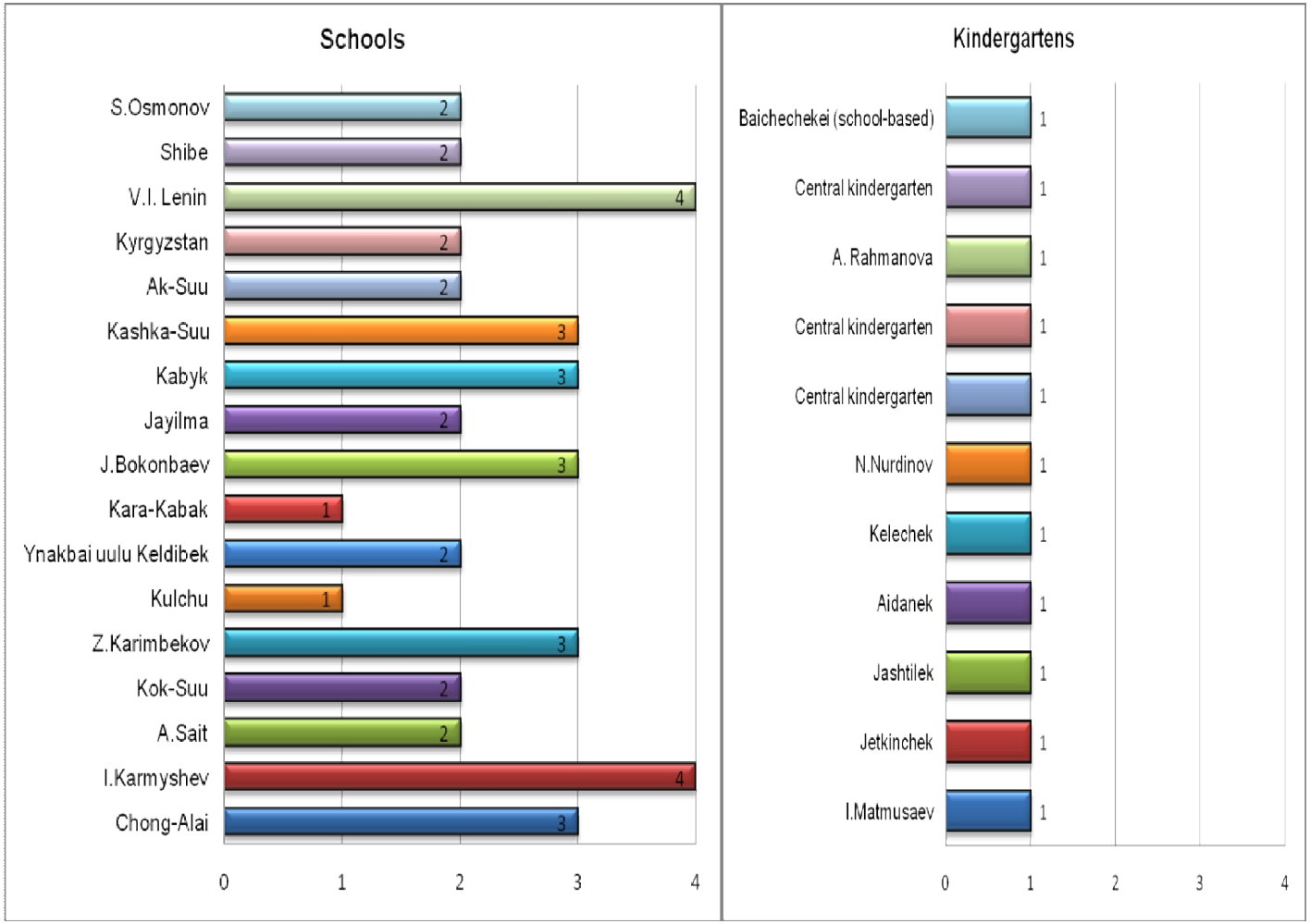
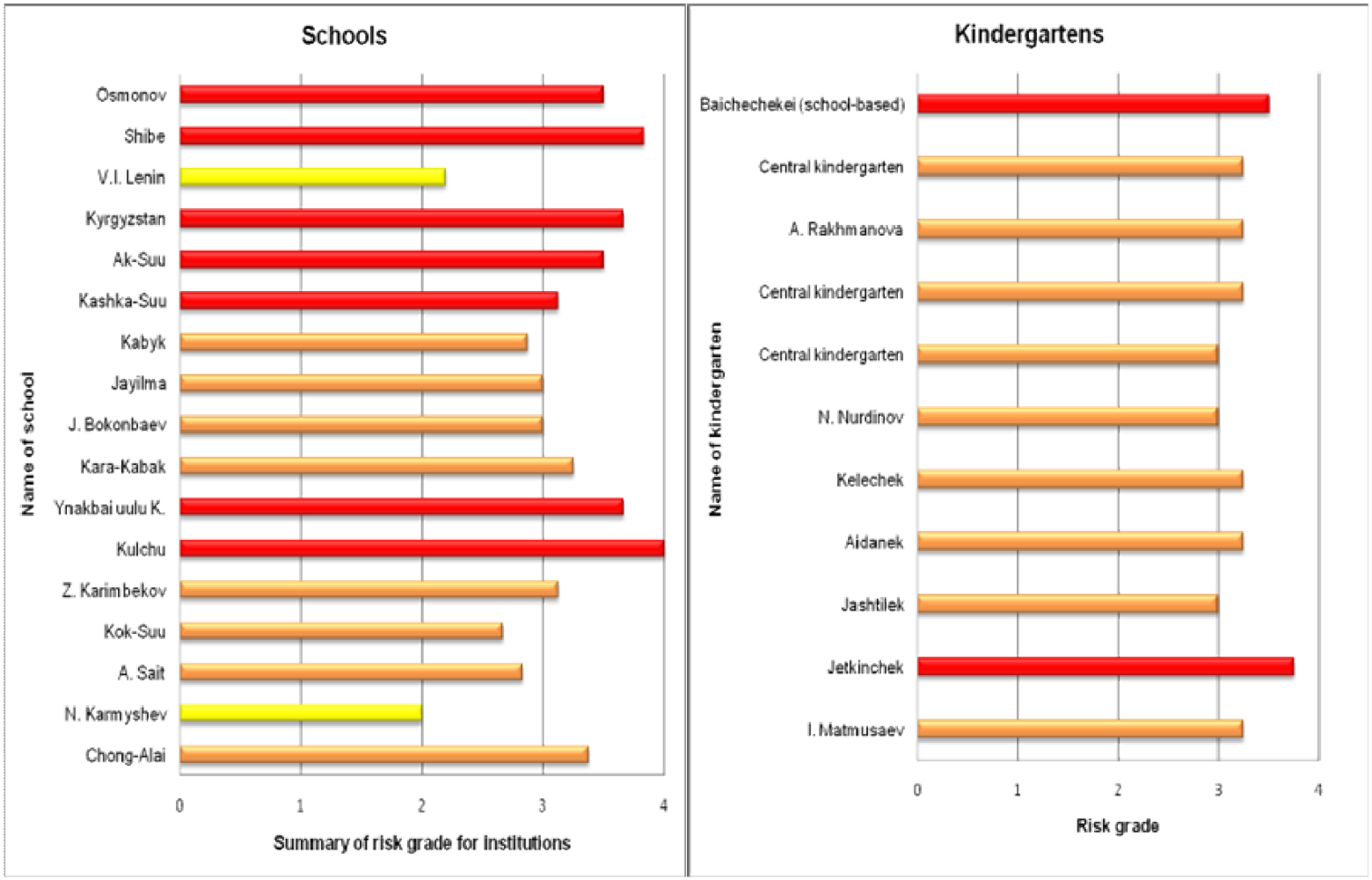
GRAPHICS

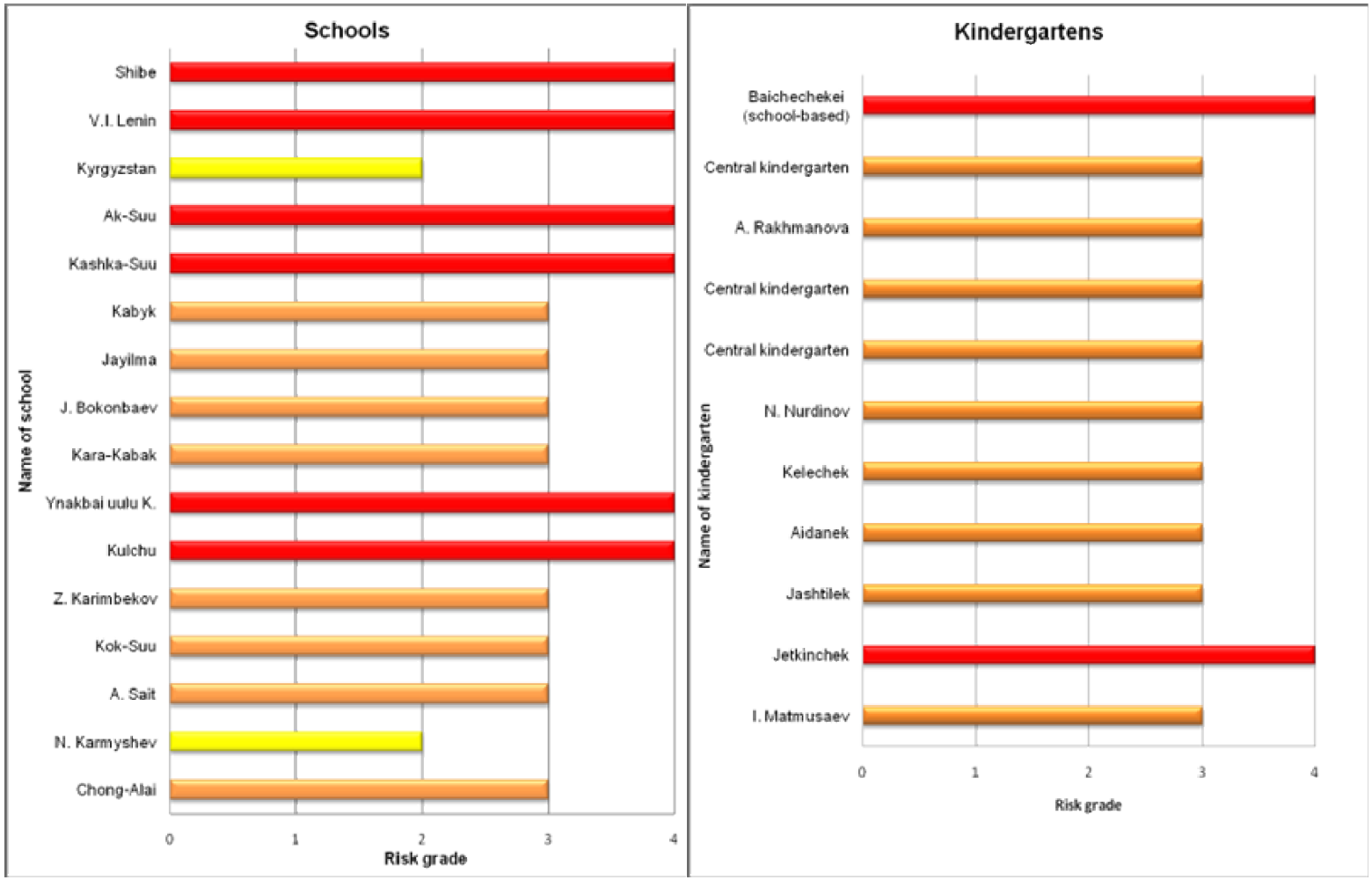
Annex 1. Number of inspected facilities



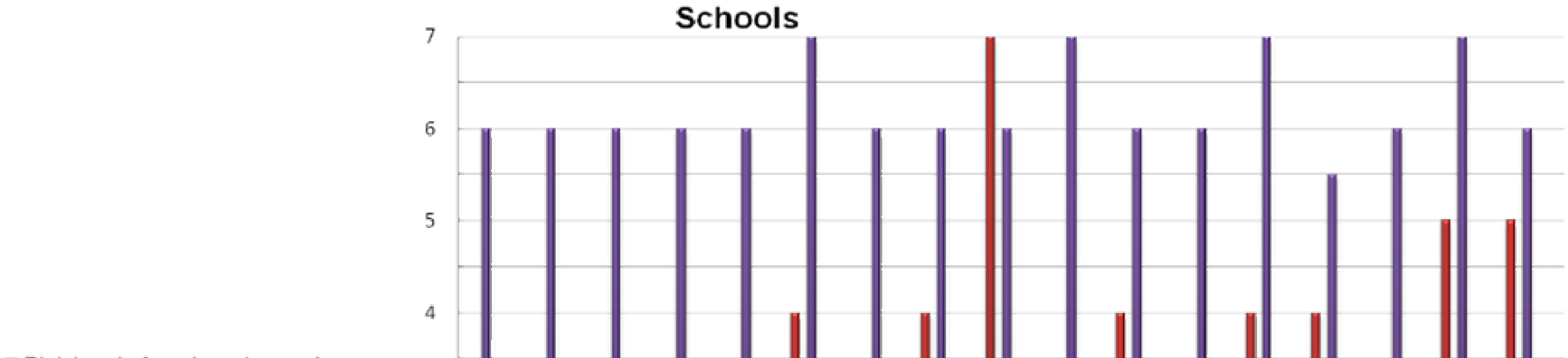
Annex 2. Generalized degree of the risk for buildings of schools and kindergartens (without rounding)



Annex 3. Generalized degree of the risk for buildings of schools and kindergartens (with rounding)

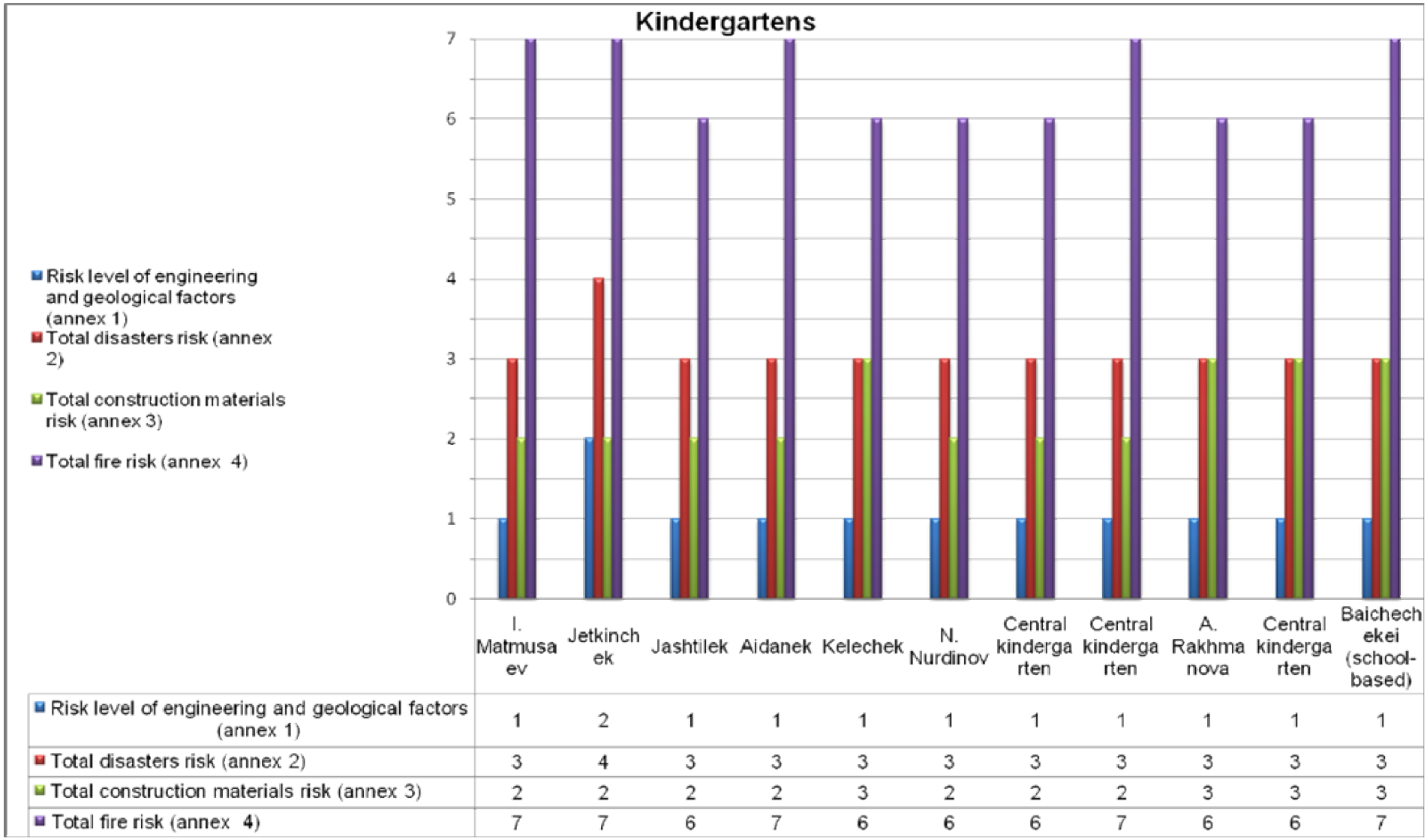


Annex 4. Gradation of main types of risk and complex risk for schools



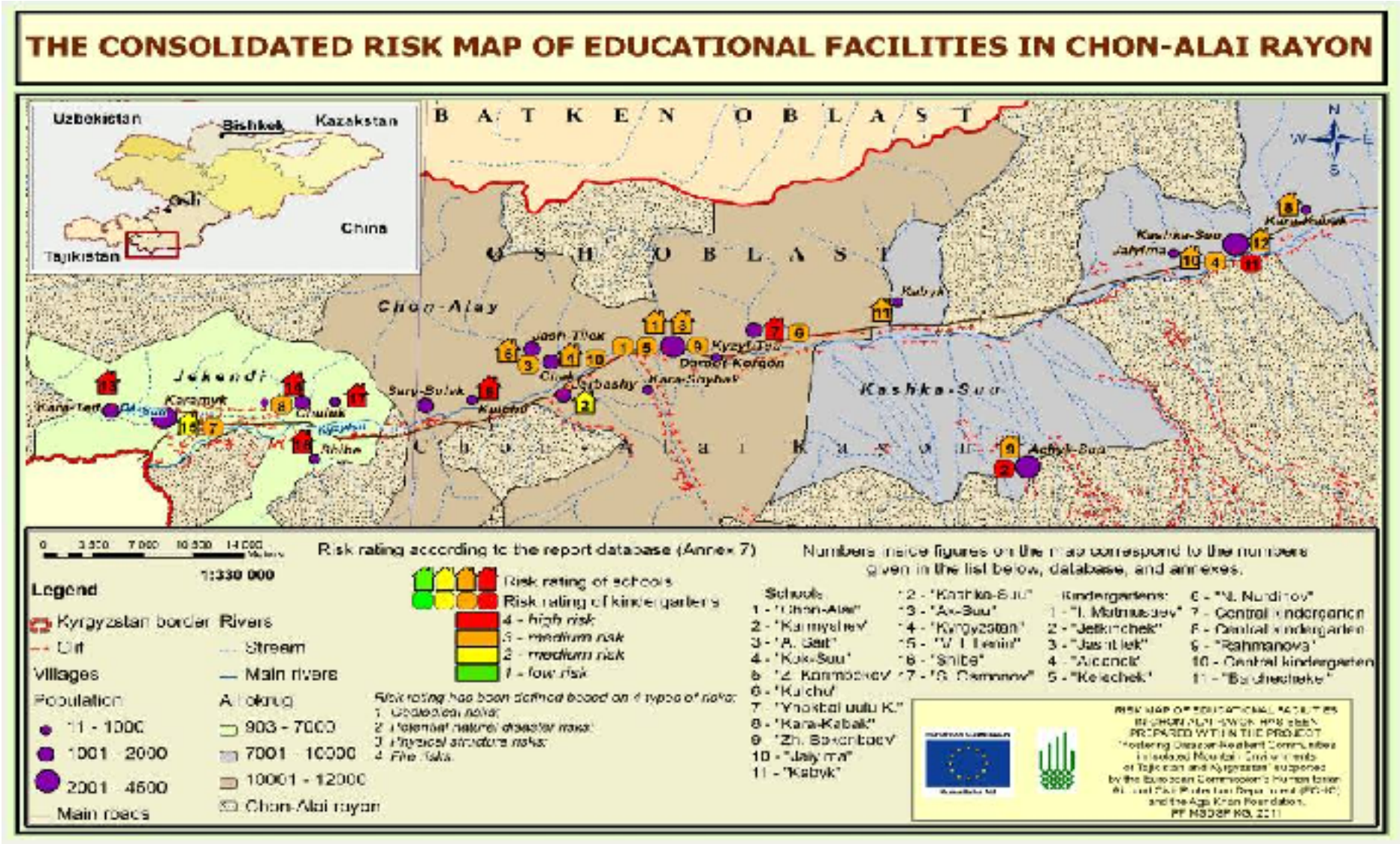
	Chong-Alai	N. Karmyshev	A. Sait	Kok-Suu	Z. Karimbekov	Kulchu	Ynakbai uulu K.	Kara-Kabak	J. Bokonbaev	Jayilma	Kabyk	Kashka-Suu	Ak-Suu	Kyrgyzstan	V.I. Lenin	Shibe	Osmonov
Risk level of engineering and geological factors (annex 1)	1	1	2	1	1	2	1	1	2	1	1	1	1	1	1	2	1
Total disasters risk (annex 2)	3	3	3	3	3	4	3	4	7	3	4	3	4	4	3	5	5
Total construction materials risk (annex 3)	2	2	2	2	3	3	3	2	2	2	2	3	3	3	2	3	3
Total fire risk (annex 4)	6	6	6	6	6	7	6	6	6	7	6	6	7	6	6	7	6

Annex 5. Gradation of main types of risk and complex risk for kindergartens



	I. Matmusaev	Jetkinchek	Jashtilek	Aidanek	Kelechek	N. Nurdinov	Central kindergarten	Central kindergarten	A. Rakhmanova	Central kindergarten	Baichechekei (school-based)
Risk level of engineering and geological factors (annex 1)	1	2	1	1	1	1	1	1	1	1	1
Total disasters risk (annex 2)	3	4	3	3	3	3	3	3	3	3	3
Total construction materials risk (annex 3)	2	2	2	2	3	2	2	2	3	3	3
Total fire risk (annex 4)	7	7	6	7	6	6	6	7	6	6	7

Annex 6. The consolidated risk map for educational facilities of Chong-Alai rayon, Osh oblast



TEXT ANNEXES

Information about the population of Chong-Alai rayon, Osh oblast

No.	Village council	No.	No.	Village	Households	People
1	**Chong-Alai**	1	1	Daroot-Korgon	947	4,484
		2	2	Kyzyl-Tuu	66	294
		3	3	Kyzyl-Eshme	250	1,079
		4	4	Chak	366	1,783
		5	5	Jash-Tilek	256	1,346
		6	6	Jarbashy	413	1,950
		7	7	Kulchu, Sary-Bulak	100	461
		8	8	Kara-Shybak	26	125
				Total	***2,424***	***11,522***
2	**Kashka-Suu**	9	1	Kashka-Suu	562	2,938
		10	2	Achyk-Suu	367	2,020
		11	3	Kabyk	116	678
		12	4	Jayilma	110	656
		13	5	Kara-Kabak	117	649
		14	6	Burgan-Suu	43	211
				Total	***1,315***	***7,152***
3	**Jekendi**	15	1	Karamyk	467	2,502
		16	2	Jekendi	274	1,385
		17	3	Karateyit	201	1,148
		18	4	Shibe	153	808
		19	5	Chuluk	132	832
				Total	***1,227***	***6,675***
	Total	**19**		**Total**	**4,966**	**25,349**

End of text annex 1

Information about pupils and teachers of Chong-Alai rayon, Osh oblast

No. of unit	Name of unit	Village	Village council	No. of pupils	No. of teachers
1	*3*	*4*	*5*	*6*	*7*
SCHOOLS					
1	Chong-Alai	Daroot-Korgon	Chong-Alai	412	55
2	Н. Кармышева	Jarbashy	Chong-Alai	497	55
3	A. Sait	Daroot-Korgon	Chong-Alai	731	78
4	Kok-Suu	Chak	Chong-Alai	433	51
5	Z. Karimbekov	Jash-Tilek	Chong-Alai	333	47
6	Kulchu (9 лет)	Kulchu	Chong-Alai	86	17
7	Ynakbai uulu K.	Kyzyl-Eshme	Chong-Alai	262	30
8	Kara-Kabak	Kyzoldon	Kashka-Suu	161	23
9	J.Bokonbaev	Achyk-Suu	Kashka-Suu	441	46
10	Jayilma	Jayilma	Kashka-Suu	145	26
11	Kabyk	Kabyk	Kashka-Suu	170	22
12	Kashka-Suu	Kashka-Suu	Kashka-Suu	588	70
13	Ak-Suu	Kara-Teyit	Jekendi	310	44
14	Kyrgyzstan	Jekendi	Jekendi	403	35
15	V.I.Lenin	Karamyk	Jekendi	709	57
16	Shibe	Shibe	Jekendi	260	24
17	S. Osmonov	Chuluk	Jekendi	167	22
Total				**6108**	**702**

KINDERGARTENS					
1	I. Matmusaev	Daroot-Korgon	Chong-Alai	57	4
2	Jetkinchek	Achyk-Suu	Kashka-Suu	59	4
3	Jashtilek	Jashtilek	Chong-Alai	60	4
4	Aidanek	Jayilma	Kashka-Suu	57	5
5	Kelechek	Daroot-Korgon	Chong-Alai	59	5
6	N. Nurdinov	Kyzyl-Eshme	Chong-Alai	60	4
7	Central kindergarten	Karamyk	Jekendi	67	4
8	Central kindergarten.	Jekendi	Jekendi	58	4
9	A. Rakhmonova	Daroot-Korgon	Chong-Alai	59	5
10	Central kindergarten	Chak	Chong-Alai	57	4
11	Baichechekei (school-based)	Kashka-Suu	Kashka-Suu	61	5
Total				**654**	**48**
GRAND TOTAL				**6762**	**750**

End of text annex 2

Summary table of key outcomes of engineering and geological studies at secondary educational units of Chong-Alai rayon, Osh oblast

GRADATION
2-high
1-low

No.	Name (No.) of school / kindergarten	Village	AO	First layer soil and its thickness, cm.	Second layer soil and its thickness, m.	Foundation depth, cm.	Foundation material	Total foundation height, cm.	Estimated resistance of carrier layer, kPa	Seismic intensity as per SNiP	Accurate seismic intensity	Maximum depth of frost penetration, cm.	Ground water level, m.	Geological processes	Recommendations:	Total risk level
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
SCHOOLS																
1	Chong-Alai	Daroot-Korgon	Chong-Alai	Filled 20-30	Loam 40-50, grav.-pebble, > 1000	175	Reinforced concrete	275	600	9	9	223	>10	-	no recommendations	1
2	I. Karmyshev	Jarbashy	Chong-Alai	Filled 300-500	Loam 110, grav.-pebble	0	Rubble concrete	0	loam - R0 -180, pebble R0 - 500	9	9	222	>10	subsid. type 1	Diverting thaw and rain water from the south	1
3	A. Sait	Daroot-Korgon	Chong-Alai	filled soil, 50-90	Grav.-pebble, filled sand, 200-220	170	Reinforced concrete	220	600	9	9	223	>3	-	Monitoring ground water level	2
4	Kok-Suu	Chak	Chong-Alai	Made 20-30	Crushed rock, filled loam	150	Reinforced concrete	320	400	9	9	220	>10	-	Diverting irrigation, thaw and rain water	1
5	Z. Karimbekov	Jash-Tilek	Chong-Alai	Loam 100-150	Grav.-pebble, зап. sand	35	Rubble concrete	60	500	9	9	220	>5	-	Diverting thaw and rain water	1
6	Kulchu	Kulchu	Chong-Alai	Sandy loam. 100	Grav.-pebble, filled sand, > 1000	70	Rubble concrete	90	600	9	9	220	1,5 - 2,0	-	Diverting thaw and rain water	2
7	Ynakbai uulu K.	Kyzyl-Eshme	Chong-Alai	Loam 50	Grav.-pebble, filled sand	50	Rubble concrete	75	600	9	9	225	>15	-	Diverting thaw and rain water	1
8	Kara-Kabak	Kyzoldon	Kashka-Suu	Sandy loam. > 600	Пес-чаник, > 1000	43	Rubble concrete	95	180	9	9	225	>5	-	Diverting thaw and rain water from C-side	1
9	J.Bokonbaev	Achyk-Suu	Kashka-Suu	Grav.-pebble, filled sand, > 500	-	43	Rubble concrete	90	450	9	9	227	>15	-	Diverting thaw and rain water from the south	2
10	Jayilma	Jayilma	Kashka-Suu	Loam 430	Grav.-pebble, filled sand	60	Rubble concrete	80	180	9	9	218	>15	subsid. type 1	Diverting thaw and rain water from C-side	1
11	Kabyk	Kabyk	Kashka-Suu	Loam 50	Grav.-pebble, filled sand	60	Rubble concrete	90	600	9	9	220	>15	-	Diverting thaw and rain water from C-side	1
12	Kashka-Suu	Kashka-Suu	Kashka-Suu	filled soil, 10-20. Loam, upto 360	Grav.-pebble, filled sand	0	Rubble concrete	0	150	9	9	225	>5	-	Diverting thaw and rain water from C-side	1
13	Ak-Suu	Kara-Teyit	Jekendi	Grav. - pebble	-	50	Rubble concrete	80	600	9	9	220	>5	-	Diverting thaw and rain water	1
14	Kyrgyzstan	Jekendi	Jekendi	Loam > 500	-	0	Rubble concrete	30	180	9	9	217	>15	subsid. type 1	Diverting thaw and rain water from B-side	1
15	V.I.Lenin	Karamyk	Jekendi	Loam 960	Grav.-pebble, filled sand	240	Reinforced concrete	280	450	9	9	212	5	subsid. type 1	Diverting thaw and rain water around the building	1
16	Shibe	Shibe	Jekendi	Loam > 1000	-	0	Rubble concrete	25	150	9	9	215	>15	subsid. type 2	Diverting irrigation, thaw and rain water	2
17	S. Osmonov	Chuluk	Jekendi	Loam 350-400	-	20	Rubble concrete	70	180	9	9	215	>15	subsid. type 1	Diverting thaw and rain water	1
Average																**1**
KINDERGARTENS																
1	I. Matmusaev	Daroot-Korgon	Chong-Alai	filled soil, 20-30. Loam, upto 150	Grav.-pebble, filled sand, >1000	60	Rubble concrete	90	180	9	9	180	>10	Watering of soil from irrigation channel	Diverting irrigation channel water from C-side of the building (from back side)	1
2	Jetkinchek	Achy-Suu	Kashka-Suu	filled soil, 20-30	Grav.-pebble, filled sand, >1000	60	Rubble concrete	150	500	9	9	277	>15	-	Diverting thaw and rain water from B-side (from one side)	2
3	Jashtilek	Jashtilek	Chong-Alai	filled soil, 20-30	Grav.-pebble, filled sand, >1000	50	Rubble concrete	110	500	9	9	220	>15	-	Diverting thaw and rain water from B-side	1

4	Aidanek	Jayilma	Kashka-Suu	filled soil, 20-30 Grav.-pebble, filled sand, 80-100	Loam 300-400	80	Rubble concrete	130	180	9	9	223	>15	-	Diverting irrigation channel water from C-side of the building (from back side)	1
5	Kelechek	Daroot-Korgon	Chong-Alai	filled soil, 20-30. Loam, upto 150	Grav.-pebble, filled sand, >1000	60	Rubble concrete	150	180	9	9	225	>10	-	Diverting irrigation channel water from C-side of the building (from back side)	1
6	N. Nurdinov	Kyzyl-Eshme	Chong-Alai	Grav.-pebble, filled sand, > 1000		100	Rubble concrete	200	500	9	9	225	> 15	-	Diverting thaw and rain water around the building	1
7	Central kindergarten	Karamyk	Jekendi	Loam >500		50	Rubble concrete	100	180	9	9	212	> 10	subsid. type 1	Diverting thaw and rain water around the building	1
8	Central kindergarten.	Jekendi	Jekendi	Loam 200-250	Grav.-pebble, filled sand	60	Rubble concrete	120	180	9	9	217	> 3	subsid. type 1	Diverting thaw and rain water from B-side	1
9	A. Rakhmonova	Daroot-Korgon	Chong-Alai	filled soil, 20-30	Grav.-pebble, filled loam, >1000	35	Rubble concrete	180	450	9	9	223	> 10	-	Diverting thaw and rain water from B-side	1
10	Central kindergarten	Chak	Chong-Alai	filled soil, 20-30	Crushed rock, filled loam > 1000	60	Reinforced concrete	120	400	9	9	220	> 10	-	Diverting irrigation, thaw and rain water from B and C sides of the building (from back side)	1
11	Baichechekei (school-based)	Kashka-Suu	Kashka-Suu	filled soil, 10-20. Loam, upto 360	Grav.-pebble, filled sand	20	Rubble concrete	90	90	9	9	225	>5	-	Diverting thaw and rain water from C-side	1
Average																**1**

End of text annex 3

Summary table of key outcomes of disaster risk assessments at secondary educational units of Chong-Alai rayon, Osh oblast

												GRADATION 7-high 1-low
No.	Name (No.) of school / kindergarten	Village	AO	Year of construction (no. of building)	Numbers and types of potenial natural disasters at the schools or kindergartens							
					1. Hazard of flooding due to slope flows and thaw water	2. Hazard of strong winds and whirlwinds	3. Hazard of intense snowfalls and snow drifts	4. Hazard of raising of ground water level	5. Hazard of landslides, debris flows	6. Hazard of snow avalanches	7. Hazard of bank erosion	Total risk potential
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
SCHOOLS												
1	Chong-Alai	Daroot-Korgon	Chong-Alai	1985	1	1	1	0	0	0	0	**3**
2	I. Karmyshev	Jarbashy	Chong-Alai	1990	1	1	1	0	0	0	0	**3**
3	A. Sait	Daroot-Korgon	Chong-Alai	1980 (1) 1982 (2)	1	1	1	0	0	0	0	**3**
4	Kok-Suu	Chak	Chong-Alai	2007 (1) 2009 (2)	1	1	1	0	0	0	0	**3**
5	Z. Karimbekov	Jash-Tilek	Chong-Alai	1991 (1) 1994 (2) 2001 (3)	1	1	1	0	0	0	0	**3**
6	Kulchu	Kulchu	Chong-Alai	1993	1	1	1	1	0	0	0	**4**
7	Ynakbai uulu K.	Kyzyl-Eshme	Chong-Alai	1961 (1) 1989 (2)	1	1	1	0	0	0	0	**3**
8	Kara-Kabak	Kyzoldon	Kashka-Suu	1993	1	1	1	1	0	0	0	**4**
9	J.Bokonbaev	Achyk-Suu	Kashka-Suu	1978 (1) 1985 (2,3)	2	2	2	0	0	0	1	**7**
10	Jayilma	Jayilma	Kashka-Suu	1975 (2)	1	1	1	0	0	0	0	**3**
11	Kabyk	Kabyk	Kashka-Suu	1988 (1) 1998 (2) 1990 (3)	1	1	1	1	0	0	0	**4**
12	Kashka-Suu	Kashka-Suu	Kashka-Suu	1967 (3)	1	1	1	0	0	0	0	**3**
13	Ak-Suu	Kara-Teyit	Jekendi	1975 (1) 1998 (2)	1	1	1	1	0	0	0	**4**
14	Kyrgyzstan	Jekendi	Jekendi	1969 (1) 2000 (2)	1	1	1	1	0	0	0	**4**
15	V.I.Lenin	Karamyk	Jekendi	1982 (1) 1985 (2)	1	1	1	0	0	0	0	**3**
16	Shibe	Shibe	Jekendi	2003 (1) 2004 (2)	1	1	1	0	1	1	0	**5**
17	S. Osmonov	Chuluk	Jekendi	2005 (1) 2007 (2)	1	1	1	1	0	1	0	**5**
Average												**4**
KINDERGARTENS												
1	I. Matmusaev	Daroot-Korgon	Chong-Alai	2007	1	1	1	0	0	0	0	**3**
2	Jetkinchek	Achy-Suu	Kashka-Suu	2006	1	1	1	0	0	0	1	**4**
3	Jashtilek	Jashtilek	Chong-Alai	2007	1	1	1	0	0	0	0	**3**
4	Aidanek	Jayilma	Kashka-Suu	1985	1	1	1	0	0	0	0	**3**
5	Kelechek	Daroot-Korgon	Chong-Alai	2005	1	1	1	0	0	0	0	**3**
6	N. Nurdinov	Kyzyl-Eshme	Chong-Alai	2008	1	1	1	0	0	0	0	**3**
7	Central kindergarten	Karamyk	Jekendi	2010	1	1	1	0	0	0	0	**3**
8	Central kindergarten	Jekendi	Jekendi	2010	1	1	1	0	0	0	0	**3**
9	A. Rakhmonova	Daroot-Korgon	Chong-Alai	1958	1	1	1	0	0	0	0	**3**
10	Central kindergarten	Chak	Chong-Alai	2009	1	1	1	0	0	0	0	**3**
11	Baichechekei (school-based)	Kashka-Suu	Kashka-Suu	1972	1	1	1	0	0	0	0	**3**
Average												**3**
Total units prone to natural disasters					**29**	**29**	**29**	**6**	**1**	**2**	**2**	**98**

End of text annex 4

Summary table of key outcomes of seismic resistance inspections at buildings of secondary educational units of Chong-Alai rayon, Osh oblast

No.	Name (No.) of school / kindergarten	Village	AO	Year of construction	Carrying structure made of:				GRADATION 3-high 1-low Potential risk of construction material	Recommendations on structural risk reduction			%	Detailed recommendations:
					compacted clay	burnt brick	wood panels	reinforced concrete		subject to demolish	needs repair works	restructure		
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
SCHOOLS														
	Chong-Alai								**2**					
	building No.1			1985		1			2		1			replace roof, divert water
1	buildingNo.2	Daroot-Korgon	Chong-Alai	1985		1			2		1			strengthen roof carriers, replace heat insulation, divert water
	building No.3			1985				1	1		1			remove roof defects, repair external finishing of the building, divert water
	I. Karmyshev								**2**					
	building No.1			1990		1			2		1			guniting walls
2	buildingNo.2	Jarbashy	Chong-Alai	1990		1			2		1			guniting walls
	buildingNo.3			1990				1	1		1			guniting walls
	buildingNo.4			1990				1	1		1			replace roof, strengthen by metal frames
	A. Sait								**2**					
3	building No.1	Daroot-Korgon	Chong-Alai	1980		1			2		1			guniting walls, replace attic roof
	building No.2			1982		1			2		1			guniting walls, replace attic roof
	Kok-Suu								**2**					
4	building No.1	Chak	Chong-Alai	2007		1			2		1			guniting walls
	building No.2			2009		1			2		1			divert surface and thaw water
	Z. Karimbekov								**3**					
	building No.1			2001	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
5	building No.2	Jash-Tilek	Chong-Alai	1991	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
	building No.3			1994	1				3	1				considering the acting norms and current condition, this building is recommended for demolishing
6	Kulchu	Kulchu	Chong-Alai	1993	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
	Ynakbai uulu K.								**3**					
7	building No.1	Kyzyl-Eshme	Chong-Alai	1961			1		3		1			replace roofing, strengthen foundation, replace fronton filling with light frame-based materials, заменить оконные и дверные проемы

	buildingNo.2			1989	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
8	Kara-Kabak	Kyzoldon	Kashka-Suu	1993		1			2		1			strengthen foundation,replace roofing, guniting walls, divert water
9	J.Bokonbaev	Achyk-Suu	Kashka-Suu						**2**					
	building No.1			1978			1		3	1				considering the acting norms and current condition, this building is recommended for demolishing
	buildingNo.2			1985		1			2		1			guniting walls, provide heat insulation of the ceiling using light materials
	building No.3			1985				1	1		1			ncomplete roof replacement
10	Jayilma	Jayilma	Kashka-Suu						**2**					
	building No.1			1975		1			2		1			guniting walls, replace roofing
	buildingNo.2			1975		1			2		1			strenghen door aperture, provide cross-frame device, replace fronton filling with light frame-based materials
11	Kabyk	Kabyk	Kashka-Suu						**2**					
	building No.1			1998		1			2		1			remove roof leakage, divert water, ensure good contact of slab joints in axes Б-В/1-5
	buildingNo.2			1988		1			2		1			remove roof leakage, divert water, ensure good contact of slab joints in axes Б-В/1-4
	building No.3			1990	1				3	1				considering the acting norms and current condition, this building is recommended for demolishing

	Kashka-Suu								**3**					
12	building No.1	Kashka-Suu	Kashka-Suu	1967			1		3			1		considering the acting norms and current condition, this building is not recommended for further public use
	buildingNo.2			1967			1		3			1		considering the acting norms and current condition, this building is not recommended for further public use
	building No.3			1967			1		3			1		considering the acting norms and current condition, this building is not recommended for further public use
	Ak-Suu								**3**					
13	building No.1	Kara-Teyit	Jekendi	1998	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
	building No.2			1975			1		3			1		considering the acting norms and current condition, this building is not recommended for further public use
	Kyrgyzstan								**3**					
14	building No.1	Jekendi	Jekendi	1969			1		3			1		considering the acting norms and current condition, this building is not recommended for further public use
	building No.2			2000			1		3		1			repair roof, replace interbeam filling
	V.I.Lenin								**2**					
	building No.1			1982-85		1			2		1			replace roof
15	building No.2	Karamyk	Jekendi	1982-85		1			2		1			guniting walls
	building No.3			1982-85		1			2		1			strenghen bariers
	building No.4			1982-85				1	1		1			repalce floorings
	Shibe								**3**					
16	building No.1	Shibe	Jekendi	2003	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
	building No.2			2004	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
	S. Osmonov								**3**					
17	building No.1	Chuluk	Jekendi	2005	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
	building No.2			2007	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
	No. of schools	**17**												
	No. of inspected buildings	**41**											**100**	
	Carrying structure made of:													
	compacted clay				**11**								**26.8**	
	burnt brick					**17**							**41.5**	
	wood panels						**8**						**19.5**	
	r/c framework							**5**					**12.2**	
	Condition of buildings													
	subject to demolish									**3**			**7.3**	

	needs repair works										**24**		**58.5**	
	restructure											**14**	**34.1**	
Average									**2**					
KINDERGARTENS														
1	I. Matmusaev	Daroot-Korgon	Chong-Alai	2007		1			2		1			strenthen coating by diagonal boards, replace heat insulation with basalt slabs, divert water
2	Jetkinchek	Achy-Suu	Kashka-Suu	2006		1			2		1			diagonal boards, replace heat insulation, divert water
3	Jashtilek	Jashtilek	Chong-Alai	2007		1			2		1			strenthen coating by diagonal boards, replace heat insulation with basalt slabs, divert water
4	Aidanek	Jayilma	Kashka-Suu	1985		1			2		1			guniting walls, replace heat insulation, divert water
5	Kelechek	Daroot-Korgon	Chong-Alai	2005	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
6	N. Nurdinov	Kyzyl-Eshme	Chong-Alai	2008		1			2		1			diagonal boards, replace heat insulation divert water
7	Central kindergarten	Karamyk	Jekendi	2010		1			2		1			diagonal boards, replace heat insulation, divert water
8	Central kindergarten	Jekendi	Jekendi	2010		1			2		1			diagonal boards, replace heat insulation, divert water
9	A. Rakhmonova	Daroot-Korgon	Chong-Alai	1958			1	1	3			1		considering the acting norms and current condition, this building is not recommended for further public use
10	Central kindergarten	Chak	Chong-Alai	2009	1				3			1		considering the acting norms and current condition, this building is not recommended for further public use
11	Baichechekei(school-based)	Kashka-Suu	Kashka-Suu	1972			1	1	3	1				considering the acting norms and current condition, this building is recommended for demolishing
	Total kindergartens	**11**												
	No. of inspected buildings	**11**											**100**	
	Carrying structure made of:													
	compacted clay				**2**								**18.2**	
	burnt brick					**7**							**63.6**	
	wood panels						**2**						**18.2**	
	r/c framework							**2**					**18.2**	
	Condition of buildings													
	subject to demolish									**1**			**9.1**	
	needs repair works										**7**		**63.6**	
	restructure											**3**	**27.3**	
Average									**2**					

End of text annex 5

Summary table of key outcomes of fire safety inspections at secondary educational units of Chong-Alai rayon, Osh oblast

												GRADATION 7-high 1-low	
No.	Name (No.) of school / kindergarten	Village	AO	State of school and kindergarten buildings on compliance with the key fire safety requirements							Official assessment of the institution regarding fire-fighting preparedness in 2010	Total risk potential	Recommendations:
				Availability of external fire water supply in schools or kindergartens with special fire water reservoirs	Availability of fire breaks in the buildings of schools or kindergartens with other buildings and structures	Equiped school or kindergarten premises with fire alert system	Electric wiring according the EWR (electric wiring rules)	Availability the basic fire fighting assets in the buildings of schools or kindergartens as per the acting standards and norms	Treatment of wooden constructions in attic premises of schools or kindergartens with flame retardant	Provided secondary evacuation routes from the school buildings or free passage ways between the beds to evacuate children from kindergartens			
SCHOOLS													
1	Chong-Alai	Daroot-Korgon	Chong-Alai									6	
	building No.1		Chong-Alai	0	1	0	0	0	0	1	unsatisf.	5	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
	building No.2		Chong-Alai	1	0	0	0	0	0	0	unsatisf.	6	provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
	building No.3		Chong-Alai	0	0	0	0	0	0	0	unsatisf.	7	provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
2	I. Karmyshev	Jarbashy	Chong-Alai	0	0	0	not in corpore	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant

3	A. Sait	Daroot-Korgon	Chong-Alai	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
4	Kok-Suu	Chak	Chong-Alai	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
5	Z. Karimbekov	Jash-Tilek	Chong-Alai	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
6	Kulchu	Kulchu	Chong-Alai	0	0	0	0	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
7	Ynakbai uulu K.	Kyzyl-Eshme	Chong-Alai	0	1	0	not in corpore	0	0	0	unsatisf.	6	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
	building No.1	Kyzyl-Eshme	Chong-Alai	0	1	0	0	0	0	0	unsatisf.	6	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
	building No.2	Kyzyl-Eshme	Chong-Alai	1	0	0	0	0	0	0	unsatisf.	6	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes

8	Kara-Kabak	Kyzoldon	Kashka-Suu	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
9	J.Bokonbaev	Achyk-Suu	Kashka-Suu	0	1	0	0	0	0	1	unsatisf.	5	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
	building No.2	Achyk-Suu	Kashka-Suu	0	0	0	not in corpore	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
10	Jayilma	Jayilma	Kashka-Suu	0	0	0	0	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
11	Kabyk	Kabyk	Kashka-Suu	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
12	Kashka-Suu	Kashka-Suu	Kashka-Suu	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
13	Ak-Suu	Kara-Teyit	Jekendi	0	0	0	0	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
14	Kyrgyzstan	Jekendi	Jekendi									6	

	building No.1		Jekendi	0	1	0	0	0	0	1	unsatisf.	5	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
	building No.2		Jekendi	1	0	0	0	0	0	0	unsatisf.	6	provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
15	V.I.Lenin	Karamyk	Jekendi	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
16	Shibe	Shibe	Jekendi	0	0	0	0	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation routes
17	S. Osmonov	Chuluk	Jekendi	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant
Average												**4**	
KINDERGARTENS													
1	I. Matmusaev	Daroot-Korgon	Chong-Alai	0	0	0	0	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation exit and passage ways between beds

2	Jetkinchek	Achy-Suu	Kashka-Suu	0	0	0	0	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation exit and passage ways between beds
3	Jashtilek	Jashtilek	Chong-Alai	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide passage ways between beds
4	Aidanek	Jayilma	Kashka-Suu	0	0	0	0	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation exit and passage ways between beds
5	Kelechek	Daroot-Korgon	Chong-Alai	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide passage ways between beds

6	N. Nurdinov	Kyzyl-Eshme	Chong-Alai	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide passage ways between beds
7	Central kindergarten	Karamyk	Jekendi	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide passage ways between beds
8	Central kindergarten	Jekendi	Jekendi	0	0	0	0	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide passage ways between beds
9	A. Rakhmonova	Daroot-Korgon	Chong-Alai	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide passage ways between beds

10	Central kindergarten	Chak	Chong-Alai	0	0	0	0	0	0	1	unsatisf.	6	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide passage ways between beds
11	Baichechekei	Kashka-Suu	Kashka-Suu	0	0	0	0	0	0	0	unsatisf.	7	provide water supply with fire water reservoirs, provide for fire breaks, install automatic fire alert system, conduct electric wiring work according to EWR, provide primary fire-fighting assets, treat wood construction with flame retardant, provide secondary evacuation exit and passage ways between beds
Average												6	

End of text annex 6

Consolidated data base of assessed educational facilities risks in Chon Alai rayon, Osh oblast

								RISK LEVELS				4-high	5-high 4 3 2 1-low
								2-high 1-low	7-high 1-low	3-high 1-low	7-high 1-low	3 2 1-low	3 2 1-low
								1	2	3	4	5	6
# unit	**# building**	**Name of unit**	**Village**	**Ail Okrug**	**Year of construction**	**X**	**Y**	**Risk level of engineer-geological factors (annex 1)**	**Total disasters risk (annex 2)**	**Total construction materials risk (annex 3)**	**Total fire risk (annex 4)**	**Total hazards risk of units**	**Total hazards risk of buildings**
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***
SCHOOLS													
1	1	Chon-Alai	Daroot-Korgon	Chon-Alai	1985	4383114	262229	1	3	2	5	**3**	**3**
	2				1985	4383114	262229			2	6		**3**
	3				1985	4383114	262229			1	7		**3**
2	4	Karmyshev	Jarbashy	Chon-Alai	1990	4379567	252255	1	3	2	6	**2**	**3**
	5				1990	4379567	252255			2			**3**
	6				1990	4379567	252255			1			**3**
	7				1990	4379567	252255			1			**3**
3	8	A.Sait	Daroot-Korgon	Chon-Alai	1980	4383571	259653	2	3	2	6	**3**	**3**
	9				1982	4383571	259653			2			**3**
4	10	Kok-Suu	Chak	Chon-Alai	2007	4382655	250928	1	3	2	6	**3**	**3**
	11				2009	4382655	250928			2			**3**
5	12	Z.Karimbekov	Jash-Tilek	Chon-Alai	2001	4385194	246222	1	3	3	6	**3**	**3**
	13				1991	4385194	246222			3			**3**
	14				1994	4385194	246222			3			**3**
6	15	Kulchu	Kulchu	Chon-Alai	1993	4379020	245807	2	4	3	7	**4**	**4**
7	16	Ynakbai uulu K.	Kyzyl-Eshme	Chon-Alai	1961	4384778	265610	1	3	3	6	**4**	**3**
	17				1989	4384778	265610			3	6		**3**
8	18	Kara-Kabak	Kara-Kabak	Kashka-Suu	1993	4395059	304836	1	4	2	6	**3**	**3**
9	19	Zh. Bokonbaev	Achyk-Suu	Kashka-Suu	1978	4374208	284756	2	7	3	6	**3**	**5**
	20				1985	4374208	284756			2			**4**
	21				1985	4374208	284756			1			**4**
10	22	Jayilma	Jayilma	Kashka-Suu	1975	4390067	293756	1	3	2	7	**3**	**3**
	23				1975	4390067	293756			2			**3**
11	24	Kabyk	Kabyk	Kashka-Suu	1998	4387330	275387	1	4	2	6	**3**	**3**
	25				1988	4387330	275387			2			**3**
	26				1990	4387330	275387			3			**4**
12	27	Kashka-Suu	Kashka-Suu	Kashka-Suu	1967	4391640	299538	1	3	3	6	**3**	**3**
	28				1967	4391640	299538			3			**3**
	29				1967	4391640	299538			3			**3**
13	30	Ak-Suu	Kara-Teit	Jekendi	1998	4376835	736525	1	4	3	7	**4**	**4**
	31				1975	4376835	736525			3			**4**
14	32	Kyrgyzstan	Jekendi	Jekendi	1969	4378252	749893	1	4	3	5	**4**	**3**
	33				2000	4378252	749893			3	6		**4**
15	34	V.I.Lenin	Karamyk	Jekendi	1982-85	4376387	740180	1	3	2	6	**2**	**3**
	35				1982-85	4376387	740180			2			**3**
	36				1982-85	4376387	740180			2			**3**
	37				1982-85	4392850	740180			1			**3**

16	38	Shibe	Shibe	Jekendi	2003	4373720	751156	2	5	3	7	4	4
	39				2004	4373720	751156			3			4
17	40	S.Osmonov	Chuluk	Jekendi	2005	4378333	751597	1	5	3	6	4	4
	41				2007	4378333	751597			3			4
Average								**1**	**4**	**2**	**4**	**3**	**3**
KINDERGARTENS													
1	42	I.Matmusaev	Daroot-Korgon	Chon-Alai	2002-03	4383708	258590	1	3	2	7	3	3
2	43	Jetkinchek	Achyk-Suu	Kashka-Suu	2006-06	4374208	284756	2	4	2	7	4	4
3	44	Jashtilek	Jash-Tilek	Chon-Alai	2006-07	4385039	246864	1	3	2	6	3	3
4	45	Aidanek	Jayilma	Kashka-Suu	1980-85	4390287	29349	1	3	2	7	3	3
5	46	Kelechek	Daroot-Korgon	Chon-Alai	2005	4383333	261722	1	3	3	6	3	3
6	47	N.Nuridinov	Kyzyl-Eshme	Chon-Alai	2007-08	4384881	265482	1	3	2	6	3	3
7	48	Central kindergarten	Karamyk	Jekendi	2008-10	4376292	740086	1	3	2	6	3	3
8	49	Central kindergarten	Jekendi	Jekendi	2008	4377837	749472	1	3	2	7	3	3
9	50	Rahmanova	Daroot-Korgon	Chon-Alai	1958	4383719	259852	1	3	3	6	3	3
10	51	Central kindergarten	Chak	Chon-Alai	2009	4382655	250928	1	3	3	6	3	3
11	52	Baichechekei	Kashka-Suu	Kashka-Suu	1972	4391640	299538	1	3	3	7	4	4
Average								**1**	**3**	**2**	**6**	**3**	**3**

End of annex 7