

MINING POLICY DIALOG DISCUSSION PAPER

Challenges of Disaster Resilience in Mining Communities of Armenia

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1. Introduction (brief description of the document)

The issues of disaster resilience in the mining communities of Armenia are directly related to disaster risk reduction on the site and ensuring safe production processes (technical safety) in the mining industry. Improving disaster resilience is a key factor in the development of the state, whose key tasks are to improve the effectiveness of measures aimed at preventing, managing, responding to and eliminating the consequences of disasters. In particular, in mining communities, the latter requires comprehensive and coordinated action by the Government and a number of government agencies, local government, mining operators, scientific institutions, and civil society.

The research conducted on the presented topic included the current state of legislative and institutional regulations of the sphere, the processes carried out so far (including the draft legal acts which have not been approved by the government yet, and are available at www.e-draft.am), their analysis. The programs implemented in Armenia in terms of technical safety, as well as the disaster risk component and published reports. This paper attempted to present the current situation of disaster resilience in mining communities, identify legislative and institutional issues and key gaps, and provide some suggestions for improving the current situation.

2. Studies on disaster resilience issues in mining communities of Armenia

The conducted studies included various reports (national, international) published with the content of the technical safety component, disaster risk in the mining industry of the Republic of Armenia, as well as programs implemented in Armenia and their results, which were directly related to the enterprises of this field or mining communities.

From the point of view of increasing the resilience of communities, the [PPRD East](#) program "prevention, preparedness and response to natural and man-made disasters in the Eastern Partnership countries " (funded by the EU) can be considered a remarkable and starting point, at various stages of which (2011-2019) a number of activities were carried out to retrain personnel, protect the population, improve the legal framework (in particular, the implementation of the EU Floods Directive), develop the defense capabilities of the population in the field of prevention, preparation and response to disasters, in the direction of improving and developing electronic risk management maps, raising awareness of disasters, exercises were organized, and a regional electronic atlas on risk management was developed.

Currently, the Ministry of Emergency Situations is conducting the third phase of the program aimed at managing hydrometeorological disasters (landslide, mudslide, rockfall, flood, drought), risk assessment, planning of preventive measures, exchange of experts, formation and development of the volunteer rescue movement, improvement of public awareness mechanisms.

During 2018-2019, the [ALTER](#) (Alliance for Disaster Risk Reduction) project was implemented, in the framework of the working package "best resilience practice for cities and areas to dams against earthquake-induced flooding", together with colleagues from the public and private sectors, small-scale earthquake and dam collapse simulation exercises were conducted, including mine rescue operations.

During 2017-2020, the regional program "[Assistance to safety improvement of tailings management facilities in Armenia and Georgia](#)" was implemented (funded by the German Federal Environment Agency), within the framework of which studies and assessments were carried out in a number of tailings in Armenia using the methodology for assessing the safety of tailings, developed under the auspices of the agency. Appropriate suggestions have been made by the software team to improve the latter, in particular, to make it applicable to abandoned tailings. Among other activities, a field exercise was also organized with the simulation of the collapse of the tailings dam, the main purpose of which was to test the effectiveness of the information supply chain in the event of an accident with a transboundary impact.

3. Armenian legal regulations on disaster resilience in mining communities

In recent years, a number of valuable studies and analysis have been carried out on legislative gaps in the field, so they have not been addressed in detail in this work. However, in terms of increasing resilience in mining communities, it is necessary to implement a number of legal regulations related to the subsurface use sector, in particular.

- The law "[On Amendments and Additions to the RA Code on Subsurface Resources](#)" adopted on October 16, (2016) according to which, prior to the start of subsurface use activities, for subsurface waste management and processing, the subsurface user must;
 - develop a emergency action plan, indicating measures aimed at preventing accidents, reducing the consequences, protecting its employees and the population living in a potentially dangerous zone,
 - implement an internal emergency response plan indicating the measures to be taken in the event of an accident,
 - in order to implement the above-mentioned measures, appoint a safety manager or establish a subdivision that will be responsible for the implementation of accident prevention measures and regular monitoring in accordance with the emergency action plan.

The amendments have established that the population of the affected communities should be able to participate in the development and review of the emergency response plan. According to the transitional provisions of the law, the subsurface users are obliged to bring their activities into compliance with the new requirements of the law within 60 months, at the same time submitting the subsurface waste management / recycling plans and financial guarantees.

- Decision No. 984-N of the Government of the Republic of Armenia "[On Defining the Criteria and Technical Requirements for the Construction of Subsurface Waste Facilities](#)" adopted on August 10 (2017), which defined the technical requirements and criteria for the construction of a tailings, platform and heap leach platform. It should be noted that, according to this decision, when constructing tailings, the possibilities of further use of the waste contained in it, freezing of the tailings, further use of the area, safety of its existence for the affected settlements after filling, conservation and reclamation should be taken into account. In addition, the company operating the tailings storage facility must develop a certificate of technical safety of the facility and submit to the Ministry of Emergency Situations, as well as develop a plan of action in the event of emergencies as a result of accidents at the tailings storage facility:

- The law ["On Amendments and Additions to the RA Code on Subsurface Resources"](#) adopted on October 16 (2016), according to which Armenia rejects to build upstream tailings dams. The proposed change, however, only applies to new subsurface use permits. This means that from now on the construction of tailings will be allowed by downstream or center line method. It should be noted that the exclusion of the upstream option can not be a guarantee for the safety (construction, operation) of tailings, as the RA legislation does not define the norms of construction of tailings (of any kind) and rules of operation. This is a problem for proper control over the construction and operation of tailings.
- On March 30 (2018) [the Order of the Minister of Emergency Situations of the Republic of Armenia No. 302-N](#) "On the Procedure for informing the population of the Impact community in order to ensure the participation of the population in the processes of developing and revising the emergency response plan in accidents caused by the the facilities of subsurface waste and recycling of subsurface waste, and, submitting proposals by the population of the impact community and discussing these proposals" was approved., and on April 3 (2018), [the Order of the Minister of Emergency Situations of the Republic of Armenia No. 316-A](#) "On the Definition of methodological guidelines for the development of an emergency response plan in accidents caused by the facilities of subsurface waste and recycling of subsurface waste" was approved.
- In order to improve the legislation in the field of technical security and tighten state control, [the RA draft law of "On Amendments and Additions to the Law of the Republic of Armenia "On State Regulation of Technical Security" "](#) was developed. Although the proposed amendments clarify the concept of "particularly hazardous production facility", which, according to the wording, is subject to compulsory insurance, however, it is unclear why **attempts were made** to normalize the relationship with the insurance of particularly hazardous production facilities. On the other hand, if the draft decision of the Government of the Republic of Armenia ["On approval of the list of particularly hazardous production facilities subject to compulsory insurance"](#) is adopted, then such dangerous objects in the mining industry as underground minerals, mines, boreholes, processing plant facilities, facilities of drilling sites, objects of in-mine (mine) transport and lift installation, facilities of tailings (sludge) economy, facilities of rock dumps, facilities for the production, transportation, and storage of industrial explosives and explosive devices, including underground facilities will be subject to mandatory insurance. Here is another question on the basis of which criteria the object is classified as a "particularly hazardous production object".
- It is a matter of serious concern that if the Ministry of Economy adopts the draft decision ["On Invalidating a number of decisions of the Government of the Republic of Armenia"](#), the following decisions of the Government will also be considered invalid;
 - Decision N 1277-N of the Government of the Republic of Armenia of October 29, 2009 "On Approval of the technical regulation on safety rules for the crushing, sorting and enrichment of minerals",
 - Decision N 1083-N of the Government of the Republic of Armenia of August 27, 2009 "On Approval of the technical regulation on Safe operation of mineral deposits developed by underground mining",
 - Decision No. 51-N of the Government of the Republic of Armenia of January 21, 2010 "On Approval of the technical regulation on Safe operation of Mineral deposits developed by Open-pit mining".

The draft decision is based on the fact that the **EAEU member states can not establish mandatory requirements for products not included in the unified list by their legislation** (EEC Decision No. 526 of 28 January 2011). In case of adoption of the draft decision, the question will remain open as to what criteria should be used in the future to ensure and regulate the above issues.

Issues related to the resilience of communities in Armenia have received more attention, mainly over the past decade. Among the works carried out in that direction we can single out [Decision N281-N of the Government of the Republic of Armenia of March 7, 2012](#) "On approval of the Disaster Risk Reduction National Strategy of the Republic of Armenia - the Action Plan for the Implementation of the Disaster Risk Reduction National Strategy".

[The program of the Government of the Republic of Armenia for 2017-2022](#) states the importance of implementing a number of processes, in the direction of which work is already underway. In particular;

- Establish and launch a unified electronic disaster risk reduction management system.
- Introduce a modern system of early warning and disaster awareness for the population using digital communication.
- Expand the powers of local governments in disaster risk reduction, disaster response, early recovery and post-disaster recovery. In the direction of the latter, the powers of state and local self-government bodies (territorial administration bodies - governors, community leaders) as well as organizations are established in [the draft Law of the Republic of Armenia "On Disaster Risk Management and Defence of Population"](#), which aims to improve the legal framework regulating the sphere of emergency situations.
- Introduce a crisis management system in urban communities of border regions by involving the private sector in disaster risk management processes to strengthen the capacity of the community disaster risk management. This is also stated [in the draft decision](#) of the Government "On approval of the development strategy of the Ministry of Emergency Situations and its Action Plan for 2020-2030" (see the appendices to the draft decision).
- [The draft decision](#) of the Government of the Republic of Armenia "On approval of the action plan for the management of uncontrolled human flows resulting from major disasters or military operations" has also been developed, which is expected to regulate the activities of public administration, local self-government bodies and organizations and the procedure for their implementation. According to this decision, the Ministry of Emergency Situations, with the involvement of stakeholders, should organize staff (every year) and complex (every three years) exercises.
- In 2019, the Ministry of Emergency Situations developed [a draft Government decision "On establishing and developing the structure of disaster risk management plans for regions, communities and organizations."](#) based on the Sustainable Development Goals, the Action Plan Sendai Framework for disaster risk reduction and a number of government decisions that it is necessary to develop and implement disaster risk management plans at all levels of the population protection system (regional administration, communities, organizations), which should be aimed at reducing threatening hazards, rapid and effective response and management in emergency situations.

4. Institutional frameworks in Armenia related to disaster resilience in mining communities

In the communities (including mining), the following departments perform the main functions in terms of ensuring resilience:

- **The Ministry of Emergency Situations of the Republic of Armenia**, which develops, implements and coordinates the policy of the Government of the Republic of Armenia in the areas of civil defense and protection of the population in emergency situations referred to its competence by law and other legal acts:

The following subdivisions of the RA Ministry of Emergency Situations:

- The Rescue Service of the Ministry of Emergency Situations of the Republic of Armenia, which provides civil protection and protection of the population in emergency situations, as well as coordinates the work on the prevention of emergency situations, minimizing and eliminating their consequences,
- The National Center for Crisis Management, which ensures the efficiency of emergency management, the centralization of information processes for the protection of the population and civil defense in emergency situations, the rapid reflection of information, as well as improving the efficiency of the management of the process of population protection and civil defense,
- "National Center for Technical Safety" SNCO of the Ministry of Emergency Situations of the Republic of Armenia, which carries out expertise on ensuring technical safety at hazardous production facilities (including giving a conclusion on the technical safety of safe operation of tailings, underground or open mineral deposits),
- "Territorial Seismic Protection Service" SNCO of the Ministry of Emergency Situations of the Republic of Armenia, which coordinates the work to reduce seismic risks in the territory of Armenia, as well as the management of systems for possible earthquakes prediction,
- The State Reserves Agency of the Ministry of Emergency Situations of the Republic of Armenia, which ensures the creation, preservation and renewal of the material reserves necessary for the implementation of measures of population protection.

➤ **Ministry of Health of the Republic of Armenia:**

- ensures awareness of the population about the health threats, gives an appropriate conclusion on the sanitary and epidemiological situation after the disaster,
- carries out expertise within its competence and gives appropriate conclusions on possible health risks,
- in the case of chemical and biological accidents, monitors the evacuated population, drinking water in temporary shelters, and sanitary living conditions,
- carries out anti-epidemic and quarantine measures, organizes the timely arrival of operative medical groups in the disaster zone and provides primary measures,
- provides medical care to the affected population, accompanies and provides medical care to the evacuated population during evacuation (including in intermediate and final evacuation terminals).

➤ **Ministry of Territorial Administration and Infrastructure of the Republic of Armenia:**

- develops mining policy and ensures its implementation, manages and administers applications for subsurface permits, studies and approves calculations of mineral reserves required for applications for subsurface permits,
- within its powers, monitors the operation of open-pit and underground mines both in everyday conditions and in the event of disasters,
- participates in the implementation of disaster risk reduction activities by regional administrations, communities, coordinates the current activities of regional governor, as well as their work with other authorities of the state administration system,
- organizes the development of territorial development programs.

- **Ministry of Environment of the Republic of Armenia:**
 - regulates and controls ecological safety, ensures environmental protection and monitoring, as well as functions related to eco-education,,
 - "Center for Environmental Impact Assessment" SNCO conducts the EIA examination of mining and urban development projects,
 - “State Hydrometeorology and Monitoring Service of Armenia” SNCO develops and implements the state policy and strategy in the field of hydrometeorological activities, works on routine and special observations, studies, forecasts of hydrometeorological phenomena.

- **Ministry of Economy of the Republic of Armenia:**
 - develops and implements policies for expanding industrial capacity and increasing competitiveness, technological upgrading of the industry and introducing innovative solutions, ensures the use of tools that stimulate private sector programs in the direction of technological upgrading and innovative solutions,
 - develops a public-private partnership policy and programs for long-term industry development in accordance with global challenges,
 - coordinates and monitors the integration of disaster risk reduction sub-programs into various development programs

- **Ministry of Foreign Affairs of the Republic of Armenia:**
 - coordinates cooperation with international partners, the implementation of international humanitarian programs and the process of providing mutual assistance,
 - ensures international cooperation: the development and signing of interstate agreements and treaties, the organization of humanitarian aid, the participation of international rescue forces and structures in the work to eliminate the consequences of emergency situations.

- **Urban Development Committee of the Republic of Armenia:**
 - carries out the organization and coordination of the development of normative technical documents in the field of earthquake engineering, research areas and engineering protection,
 - implements the state management of the RA land resources,
 - organizes and carries out the comprehensive state examination of project documentation of objects with high and highest degree of risk (category),
 - develops programs for the protection of urban objects from dangerous geological phenomena and ensures their monitoring,
 - develops plans and programs in the field of civil defense, and carries out the main activities.

- **Ministry of Education and Science of the Republic of Armenia** organizes training on civil protection in disaster management in all educational institutions of the country.
- **Ministry of Justice of the Republic of Armenia** carries out activities to regulate the legal field.
- **Urban Development, Technical and Fire Safety Inspectorate of the Republic of Armenia** carries out the control over the observance and fulfillment of the requirements of the normative documents of urban development, fire and technical safety, risk management in those spheres, applies sanctions for violation of the requirements defined by law.
- **Inspectorate of Nature Protection and Mineral Resources of the Republic of Armenia** ensures risk management in the field of nature and mineral resources protection, controls compliance with the requirements of the RA legislation, as well as organizes preventive measures within the framework of the control, implements preventive or reducing measures for negative environmental impact, illogical use of natural resources, applies liability measures for violations of the requirements established by law.

5. Examples of best international practice and standards on the issue under discussion:

International best practice. On the one hand, the issues of increasing resilience in mining communities are related to the application of modern technological solutions by the subsurface user (for example: dry tailing technology, circulating water system, tailings coating, gas removal, biological reclamation using special plants, etc.), on the other hand, at all stages of subsurface use: design, construction, operation, monitoring, control, decommissioning, closure, reclamation, etc., the introduction of the best international tools and the adoption of a consistent approach.

[Best Available Techniques \(BAT\) Reference Document for the Management of Waste from Extractive Industries](#), as well as the new [World Industrial Standard for the Management of Tailings Storage Facilities \(2020\)](#), which is also based on the guidelines and manuals developed by the [Joint Expert Group on Water and Industrial Accidents of the UNECE](#), in particular, are noteworthy in terms of best international practice:

- [UNECE Safety guidelines and good practices for Tailings Management Facilities](#),
- [UNECE Checklist for contingency planning for accidents affecting transboundary waters](#),
- [An overview of methodologies for hazard rating of industrial sites](#),
- [UNECE Safety guidelines and good practices for Pipelines](#),
- [UNECE Guidance on Land-Use Planning, the Siting of Hazardous Activities and related Safety Aspects](#),
- [UNECE Safety guidelines and good practices for the management and retention of firefighting water](#).

In the case of industrial accidents with a transboundary impact, the importance of the activities of the international committees for the protection of the [Elbe](#), [Rhine](#) and [Danub](#) Rivers in connection with the formation of a unified warning system at the river level is attached.

Standards: Armenia has been a member of the [Extractive Industries Transparency Initiative](#) since 2017, which is a world standard, and its goal is to improve transparency and accountability in the oil, gas and mining industries.

One of the standards for community resilience is, for example, [the Australian state of Queensland](#) risk management standard based on national law.

Armenia does not apply any standard, although international and world standards are applied in this direction, in particular:

- [ISO 37120: 2018 international standard](#). Resistant cities and communities- Indicators of the quality of urban services and life (ISO 37122: 2018 Smart Cities Indicator, ISO 37123: 2018 Resistant Cities Indicator),
- [ISO 22328-1: 2020](#) Safety and Resilience-Emergency Management-Part 1. General guidelines for the introduction of a natural disaster early warning system at the community level,
- [HSO 9002: 2020](#) Emergency and Disaster management (world standard), which focuses on building a framework for emergency and disaster management, assessing and reducing their risks, preparing for emergency and disaster response, and post-disaster recovery and implementation.

6. The main legislative and institutional issues and gaps identified

The conducted studies show that there are a number of challenges for increasing resilience in the RA communities (especially in mining communities), which, in addition to gaps in the legislative and institutional framework, are also related to compliance with the basic rules of the daily activities of mining operators and their control.

The issues and gaps identified in the *state-subsurface user-community* chain are conditionally divided into 2 groups:

- **common issues related to resilience**, that affect all communities of the Republic of Armenia, including mining facilities, hazardous production facilities, communities with reservoirs or located in their impact area. Those issues are:
 - lack of legal basis (powers, obligations, criteria, standards) for declaring a state of emergency at all levels of public administration in case of disasters,
 - in the direction of disaster prevention, management, response and elimination of consequences; (a) the imperfection of the legal field, (b) the uncertainty of the functions of specific actors in these matters; (c) lack of clearly separated powers and responsibilities between public administration bodies (republican, territorial and local self-government bodies) and organizations; (d) lack of necessary material and technical resources, technical means and qualified personnel, (e) lack of effective interaction between government agencies,
 - neglect of the disaster resilience component in socio-economic development programs / policies,
 - lack of an integrated educational system aimed at improving the resilience of communities,
 - low level of community training in disaster resilience and low level of awareness and education of the population in building a disaster-resistant society.
- **specific issues related to resilience** that directly affect mining communities and their impact areas. They are:
 - inadequate state control over mining processes (insufficient work of inspection bodies, lack of capacity and qualified specialists),
 - limited powers of the Ministry of Emergency Situations in the process of approval of design documentation for subsurface use (examination of urban planning documentation), given that a significant part of mining communities are not provided with urban planning documents, natural construction, the wrong choice of territories and other undesirable phenomena, are a serious threat to provide community-based security,
 - lack of classification of tailings, according to the degree of hazardous waste accumulated in them,
 - lack of risk/safety assessment of hydraulic structures, in particular tailings (lack of methodologies),

- insufficient capacity and technical means for disaster prevention and detection of problems in the technological chain by mining operators,
- ignorance of the problems identified in the production process by the mining operators or late implementation of technical and / or organizational measures aimed at their solution,
- use of obsolete technologies and equipment with low technical efficiency by mining industry operators (the legislation of the sphere requires the subsurface user to use the best available technologies, but the requirement is declarative, since there are no mechanisms to guarantee this, and the level of technological conditions is not established, the failure of which can become the basis for denial of the right to subsurface use),
- further implementation of safety issues / measures for the population of the extracted mineral area and adjacent communities in case of termination of the subsurface use right by the state, which falls on the shoulders of the state (to be implemented at the expense of state funds or through grant programs).

The studies conducted show that a number of mandatory institutional processes related to the state of emergency are currently not regulated in Armenia, which relate to the following issues:

- what are the cases, the severity of the consequences, or under what circumstances can a state of emergency be declared and a legal regime of emergency be introduced at the level of communities, regions or the republic?
- the scope of state bodies with the power to declare a state emergency is not clear, and in what terms and how a state of emergency should be declared,
- the legal relations of the responsible bodies, organizations, population, the restrictions and measures applied to declare a state of emergency and establish a legal regime are not regulated.

These issues will be clarified to a certain extent, in case of adoption of [the RA draft law “On Disaster Risk Management and Defence of Population”](#), and it can be said that the adoption of the draft law will be a step forward in increasing the resilience of communities. However, the concern is that according to the draft law, organizations will develop their own disaster risk management plan to ensure its implementation and control, after coordination with the authority. Such plans, especially in mining communities, should be developed with the real involvement of relevant disaster risk specialists and local governments, rather than by providing a model plan form. It is also problematic that control over the implementation of the disaster risk management plan is vested in this organization.

The draft law also states that the organization, based on the specifics of its activities, creates an alarm system for impact communities and ensures its smooth operation. However, there is no clear requirement for the organization to have internal and external warning plans, especially since the actual participation of the local governments and their approval of this plan is very important when developing an external warning plan. In this case, it is necessary to clarify who will control the functionality of the alarm system, in what format and with what frequency.

7. Preliminary recommendations for policy development to improve the current situation

➤ Short-term

1. Close cooperation with scientific, research organizations, educational institutions that train specialists in the field (design, construction, operation or closure of mines, reclamation, etc.), obtaining and taking into account their professional opinion.
2. Exclusion of the involvement of non-specialists and / or unqualified specialists in the state system in the process of examination and approval of programs (expert processes, etc.) related to the subsurface use sector (for

specialists involved in the field of professional orientation, the definition of clear professional standards or a minimum level of knowledge, in the case of non-provision of which a person cannot be involved in any activities related to the mining sector).

3. Continuous training of specialists in the field (including the staff of the mining operator) and proper control over its implementation.
4. Increasing the level of training of enterprises in the field of subsurface use by carrying out scheduled exercises (preferably twice a year) and proper control over its implementation.
5. Conducting open field training for the public in the mining communities (on an annual basis) with the involvement of local self-government bodies and relevant government agencies, which will contribute to the gradual increase of community awareness and preparedness for disaster resilience.

➤ **Medium-term**

1. Review of the legislative framework in the field of subsurface use, including analysis, review and synthesis of the powers, functions, of the state administration and local authorities, and procedures established for their implementation.
2. Development of norms and rules of operation of tailings (this will become the basis for the implementation of the point 3, which in turn will improve the efficiency of inspections)
3. Development of methodologies for the safety assessment of subsurface waste facilities, including tailings (active, temporarily suspended, conserved) (this will be the basis for the implementation of point 4 on a regular basis).
4. Carrying out a comprehensive safety assessment of active, temporarily suspended, conserved tailings (technical safety studies, environmental studies, assessment of dam stability taking into account the risk of natural disasters).
5. Establishment of mechanisms to ensure the introduction of the best available technologies by defining the minimum level of technological conditions / standards, taking into account their feasibility (eg underground mining, dry tailings method, tailings coating, water circulation system, etc.), the failure of which will be the basis for the denial / termination of the right to subsurface use
6. Inclusion of the disaster resilience component in socio-economic development programs (community, regional, republican).

➤ **Long-term**

1. Establishment of a separate state body dealing only with mining issues, who will be entrusted with key functions in the mining sector (risk identification, issuing permits, expert processes, assistance to the mining operator, local governments in developing realistic emergency plans, etc.), which will make the work of the sphere more coordinated.
2. Continuous improvement of the material and technical equipment of communities / regions in order to develop resilient mining communities (for example, mobile laboratories equipped with appropriate equipment to quickly assess water, air, soil pollution levels, all-terrain vehicles, modern ambulances, fire trucks, other technical means and equipment used for the elimination of the consequences of disasters).
3. Review of the action plans of the companies in the field of subsurface use in emergency situations with the involvement of potential impact communities to make those plans realistic.
4. Introduction of an integrated education system aimed at increasing the resilience of communities at different levels of education: kindergartens, schools, universities.