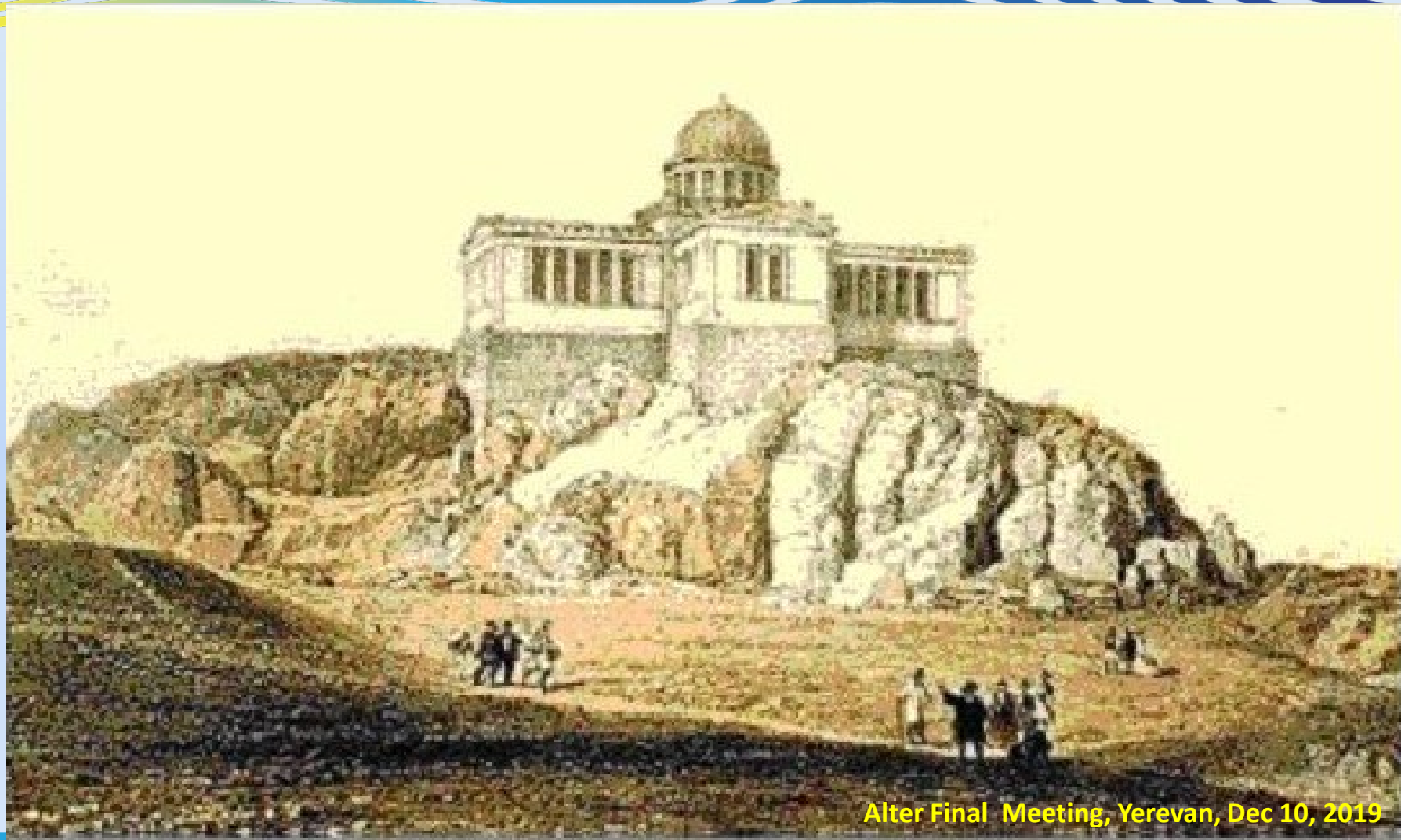


# ALTER

Alliance for Disaster Risk Reduction

PRIVATE - PUBLIC  
SECTORS ALLIANCE  
FOR DISASTER RISK  
REDUCTION IN  
ARMENIA:

THE ROLE OF ALTER  
PROJECT



Alter Final Meeting, Yerevan, Dec 10, 2019





# ALTER

Alliance for Disaster Risk Reduction

Dr. George Drakatos  
Seismologist  
Dep. Director of the  
Institute of Geodynamics  
National Observatory of Athens

Establishment: 1842

Alter Final Meeting, Yerevan, Dec 10, 2019



## ALTER CONTEXT

**Alliance for Disaster Risk Reduction (ALTER) project has been financed by European Commission (DG ECHO) 2018 – 2020, in order to formulate private – public sectors partnership for disaster risk reduction in Armenia.**

**Focus is on increasing resilience in areas of Armenia that face floods risks originating in dams' failure due to earthquakes.**

**Such alliances will be founded on transfer of good practices, methods, tools, knowhow and experience from Union Civil Protection Mechanism countries to Armenian government and key stakeholders**

## ALTER PARTNERS

**Lead Partner:** Institute of Geodynamics, National Observatory of Athens, Hellas

**Co-BF1:** European University of Cyprus

**Co-BF2:** Center for National Security and Defense Research, Bulgaria

**Co-BF3:** American University of Armenia

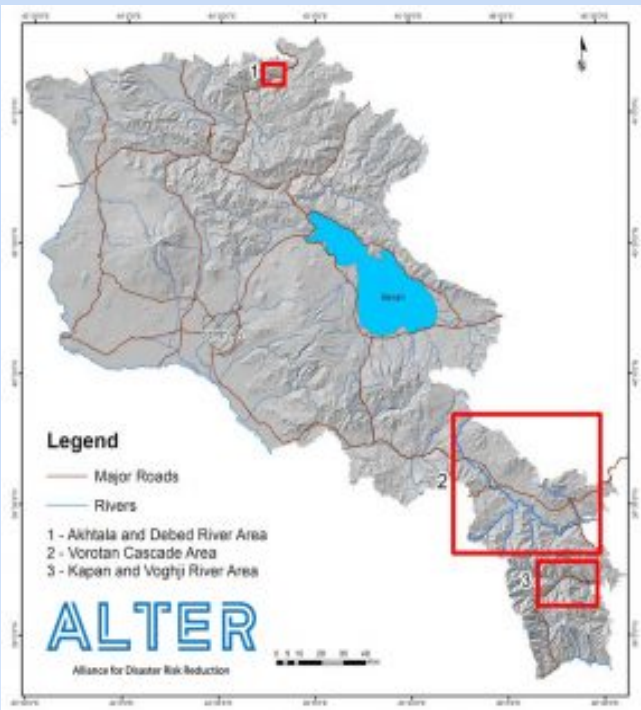
**Co-BF4:** Armenia National Platform for DRR, Armenia



## Objectives of the Project

- ALTER project aimed to create public private sectors' partnerships to increase resilience in Armenia
- Main objective was to implement a set of activities that will serve the Armenian disaster risk reduction strategy and be a success story for the countries outside the EU CP mechanism, transferring best practices, tools, methods , knowhow and experience, while avoiding mistakes made elsewhere.
- It focus on areas facing flood risks originating in earthquakes that can cause dams' failure

## PROJECT AREA AND MAPS

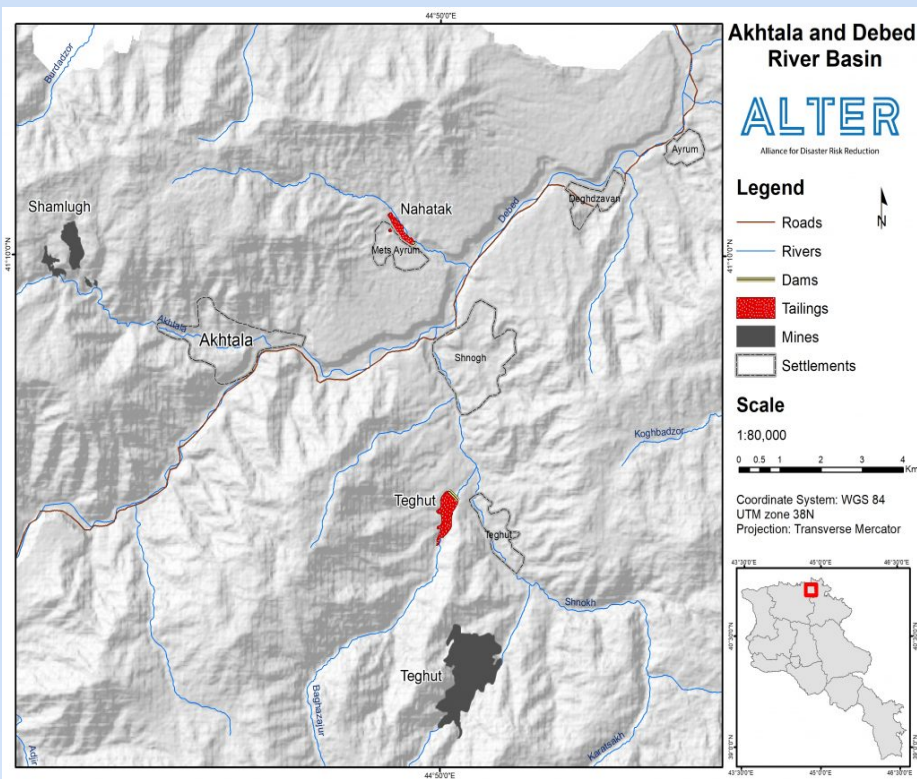


On the left is a map of the project areas and their relation to one another in the Republic of Armenia. These project sites were chosen due to their unique aspects as they relate to civil protection in Armenia

1. The Teghut and Debed River Area of Lori Marz and the mine tailing ponds located there
2. The Vorotan Cascade series of dams and hydroelectric infrastructure centered around the city of Sisian in Syunik Marz
3. The Voghji River and water and mine tailing dams affecting the Kapan area of Syunik Marz



## PROJECT AREA 1: AKHTALA AND THE DEBED RIVER

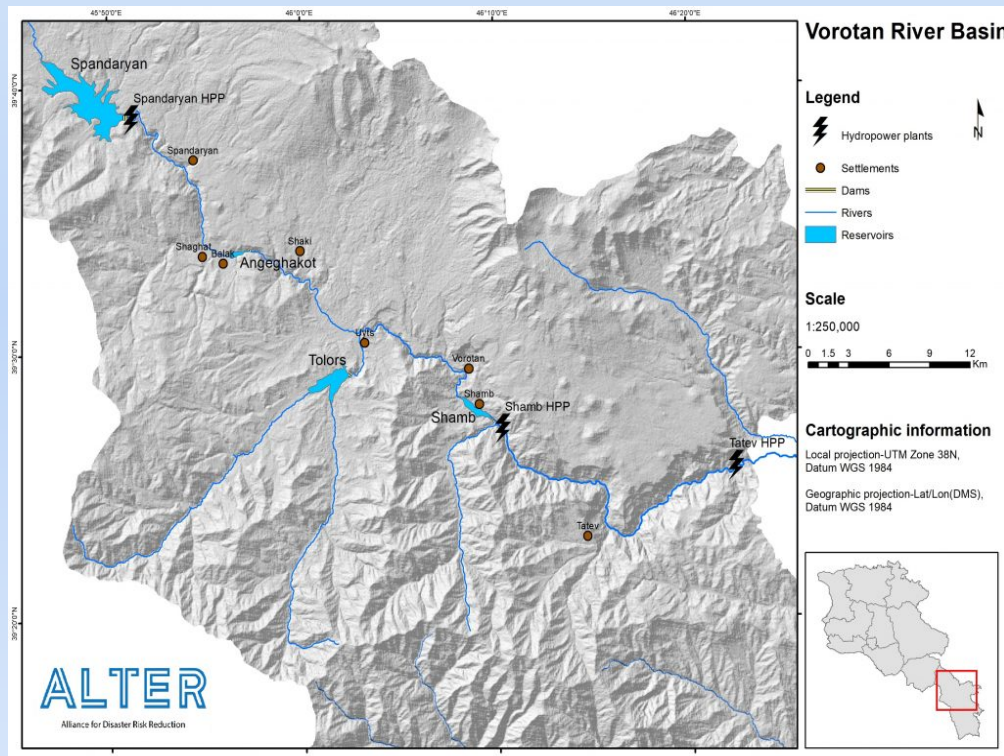


### Key Facts

- About 200 km from Yerevan (4 hours)
- Administrative District: Lori Marz
- Impacted Population: ~3000, not counting downstream in Georgia

Lori Marz is one of the three northern provinces of Armenia which border Georgia. This region is known for being very mountainous, green, and forested. During the soviet area there was much industry around Vandazor (the largest city in the region and the third largest in Armenia), although most industry has since left and the economy of the region has returned to mineral extraction and agriculture. Three of the facilities ALTER is focusing on are in the vicinity of Akhtala (Nazik, Paytutsikerni Dzor, and Nahatak) along with one potential site near the village of Teghut

## PROJECT AREA 2: THE VOROTAN CASCADE



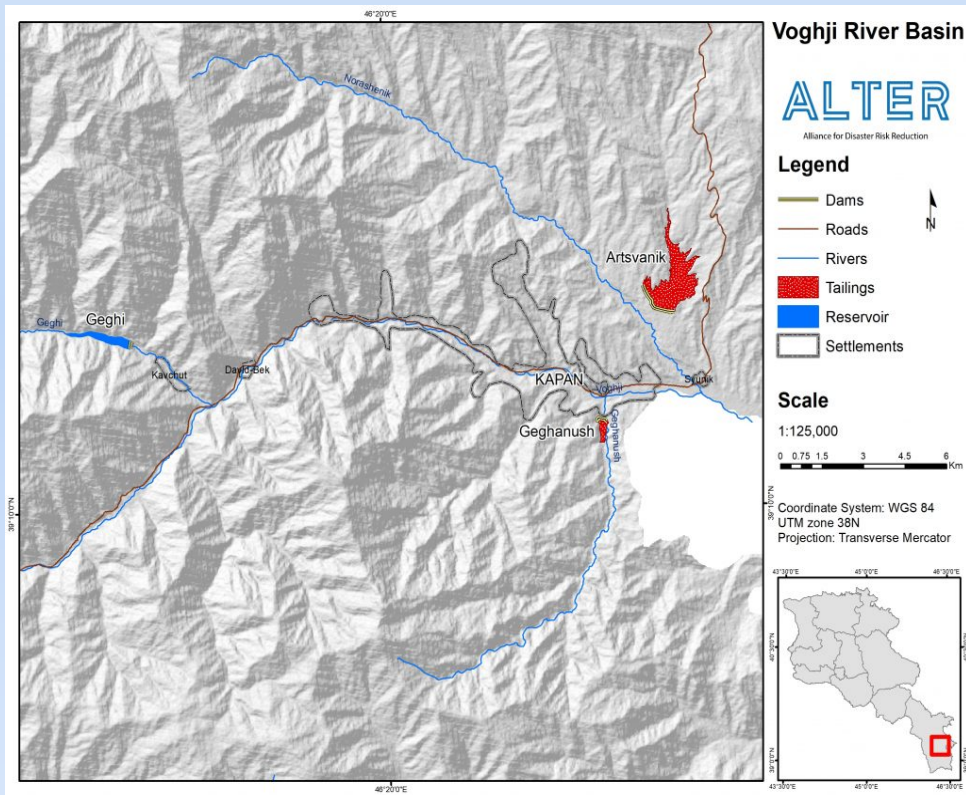
### Key Facts

- About 200 km from Yerevan (3 hours)
- Administrative District: Syunik Marz
- Impacted Population: ~20,000

The Vorotan Cascade Area is one of Armenia's largest electric production infrastructure projects and is vital to the nation's stability and economy. Electrical production along the Vorotan Cascade occurs at the Spandaryan, Shamp, and the Tatev hydroelectric production facilities. The city of Sisian and its surrounding villages would be at risk of a catastrophic flood in the event of a dam failure. Cities such as Goris (~20,600), Kapan (~43,000), and the surrounding villages would be isolated and lose power in the event of a dam failure or major seismic event



## PROJECT AREA 3: KAPAN AND THE VOGHJI RIVER BASIN



### Key Facts

- About 300km from Yerevan
- Impacted Population: 45,000

Project Area 3 contains some of Armenia's most intensive mining activities and two of Armenia's largest tailing dams. Additionally, the Geghi Reservoir upstream of Kapan is also included. The villages of Kavchut, Andiokavan, Hamletavan, Shgharjik and the cities of Kapan and Syunik lie in the immediate floodplain of the Geghi river and the Voghji River (below the confluence of the rivers).

The villages of Verin Giratagh and Nerkin Giratagh are not in the floodplain, however the only road access to these villages is through the floodplain below the Geghi dam. The two tailing dams also pose a major risk to the highway connecting Armenia to Iran and Kapan's airport which would be needed in the case of an emergency

## Work Packages

**Work Package 0:** Management and Coordination of the Action

**NOA**

**Work Package 1:** Raising Awareness & Dissemination Campaigns

**AUA**

**Work Package 2:** Best Practices on Resilience for Cities & Areas with  
Dams against Earthquake originated Floods

**EUC**

**Work Package 3:** Increasing Resilience of Local Communities Through Public  
– Private Partnerships – Small Scale Exercise & Training

**ARNAP**

**Work Package 4:** Transfer of Methods, Tools, Knowhow & Experience for Risk  
Preparedness and Management

**Center NSD**



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## Kick-Off Meeting

NOA-Athens  
12-13 Feb 2018





## Work Package 1

### Raising Awareness & Dissemination Campaigns

- ✓ A Communication Plan for the project
- ✓ A fully developed Project Identity including a website, logos, and other branding materials
- ✓ A variety of dissemination and communication tools including project leaflets, press releases, popular articles, and project social media presence
- ✓ The organization of a training workshop and a summer school targeted at early career scientists and civil protection personnel
- ✓ A final dissemination report in multiple languages covering the accomplishments and lessons learned for the project



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## Posts to Website:

<http://alter-project.eu/alter-project-launched/>  
<http://alter-project.eu/alters-abstract-for-the-36th-general-assembly-of-the-european-seismological-commission/>  
<http://alter-project.eu/alter-armenia-team-visits-akhtala/>  
<http://alter-project.eu/alter-armenia-team-visits-syunik-marz-site-areas/>  
<http://alter-project.eu/alter-publishes-project-leaflet/>  
<http://alter-project.eu/press-release-alter-team-conducts-first-site-visits-in-armenia/>

## Social Media Links

**LinkedIn:** <https://www.linkedin.com/company/alter-alliance-for-disaster-risk-reduction/>

**Facebook:** <https://www.facebook.com/ALTERProjectEU/>

# ALTER

Alliance for Disaster Risk Reduction

## Alliance for Disaster Risk Reduction (ALTER)

*An EU-funded project on the establishment of public-private partnerships in Armenia to address flood risks that stem from water and mine dam failures.*

The Alliance for Disaster Risk Reduction project, or ALTER for short, focuses on establishing public-private partnerships to understand and address flood risks that stem from water and mining dam failures. Know-how, technology and experience from the European Union will be transferred to Armenia. Activities will stress the importance of full cooperation between local communities, non-governmental organizations, government ministries, and private-sector companies. The project's duration is 24 months and is co-financed by the European Union's Humanitarian Aid & Civil Protection Directorate.

The project will focus on three pilot areas where dams and other activities present risks to local communities. The areas are the Akhtala area of Lori Marz along the Shamlugh and Debed rivers, the Vorotan Cascade and its associated dams in Syunik Marz, and the



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European Union  
Civil Protection

## Synergies with other EU Projects

Prevention Preparedness and Response  
to Natural and Man-made Disasters  
in the Eastern Partnership Countries,  
PPRD East2

# SERA

Seismology and Earthquake Engineering  
Research Infrastructure Alliance for Europe





## Training of young Professionals Yerevan, Dec 2018

PPRD East 2 – Civil Protection Capacity Building – An Overview, **Sergej Anagnosti**

Macroseismic Effects of Earthquake, **Prof. Theodoros Tsapanos**

Seismic Monitoring of Large Dams, **Dr. Christos Evangelidis**

Monitoring of volcano, faults, and man-made structures using continuous ambient seismic noise records,  
**Dr. Christos Evangelidis**

Dealing with flood events at Hydroelectric Plant areas in western Greece, **Msc. Christos Roilos**

Risk Management, **Dr. Christodoulos Efstathiades**

Cross Border Cooperation in Civil Protection. The cases of EU-CIRCLE and IMPRESS,  
**Dr. Christodoulos Efstathiades**

Using Drones and 3D Models to Assess Risks Related to Mines in Armenia, **Mr. Sean Reynolds (Presentation)**

Crustal Deformation Monitoring using Satellite Techniques, **Dr. George Drakatos**

Landslide risk assessment model for disaster prevention and mitigation “LANDSLIDE”, **Dr. Nina Dobrinkova**

## Training of young Professionals Yerevan, Dec 2018

Emergency Logistics (Best Practices, Operational Environment, Tools and Methods, Logistic Processes, Exercises): Mr. Evangelos Katsaros

Disaster Risk Reduction at Local Levels, Mr. Evangelos Katsaros

EPICURO -> Community Engagement in Building Resilience of Local Societies, Mr Evangelos Katsaros

Disaster Risk Reductions Concepts – Urban Risks: Making Cities resilience, Mr. Evangelos Katsaros

Urban Heating Islands. Mr. Evangelos Katsaros

Public-Private Partnership in Disaster Risk Reduction in Kapan City, Mr. Armen Chilingaryan

Fire modeling data preparation for test area of Zlatograd municipality, Bulgaria, Dr. Nina Dobrinkova

Topic: Modelling Mine Tailing and Water Dam Failures in Armenia, Dr. Alexander Arakelyan

Flood risk mapping approach in Smart Water project for municipal area of Svilengrad, Bulgaria, Dr. Nina Dobrinkova

Flood risk Management, Mr. Evangelos Katsaros



## Work Package 2

### Best Practices on Resilience for Cities & Areas with Dams against Earthquake originated Floods

The objective of the work package was to:

- ✓ identify and analyse the most suitable best practices on earthquake originating risks in areas near dams,
- ✓ analyse relative past events worldwide and provide structured suggestions for adaptation and adoption of selected best practices in the Armenian case.

The outcomes help to improve the emergency plans and risk management procedures, based on:

- A questionnaire on the collection and analysis of best practices
- A methodology on adaptation and adoption of best practices as well as a document detailing the best practices collected

## Work Package 3 Increasing Resilience of Local Communities Through Public – Private Partnerships – Small Scale Exercise & Training

- ✓ The main objective was to prepare and establish public – private sectors partnerships that will increase resilience of local communities.
- ✓ The work was focused on the private companies that own/manage dams in Armenia and local communities that face the risks of a potential dams 'failure due to earthquake hit



## First visit in Armenia June 17-22, 2018





## From south ...

## Meeting with private companies





... to north

### Visiting dams





## Meeting with local authorities



## Visiting tailing dams





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with local people



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Third visit in Armenia,  
28 Feb - 3 March 2019



Meeting with MES

## Work Package 3

### Increasing Resilience of Local Communities Through Public – Private Partnerships – Small Scale Exercise & Training

- Signed agreements on Public-Private partnerships
- A documentation package aimed at improved local communities resilience
- 3 training programs and training materials related to best practices
- Small scale exercises (table top and on field) in each of the 3 project areas based on realistic scenarios including all materials

## Training and Exercises

- ✓ Three training programs took place in each one of the three ALTER project pilot sites. These training programs involved stakeholders from national, local, and regional governments, private sector companies, and citizens of the surrounding areas. Trainings took place in June 2019 during table top exercises
- ✓ Training school in Yerevan, December 2018 (full week)
- ✓ Table Top and Field Exercises conducted 24-28 June and 28<sup>th</sup> of October to November 3<sup>rd</sup> 2019 respectively



## Training and Table Top Exercises

On June 24-28 within the frame of EU supported ALTER project, Tabletop Exercises (TTE) were carried out in the Sisian, Kapan and Akhtala target communities of Armenia.

Preliminary the ALTER team of ARNAP, **jointly with professionals of MES** RS Population Protection and Elimination of Disaster Consequences Department and members of local self-government bodies of the target communities, implemented activities related to elaboration and revision of Disaster Risk Management Plans, necessary for the development of TTE scenarios.

The **scenarios** consider simulation of population protection activities in case of damage of water reservoir/tailings dam, because of strong earthquake

## Training and Table Top Exercises





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## Training and Table Top Exercises





## Field Exercise at Syunik region



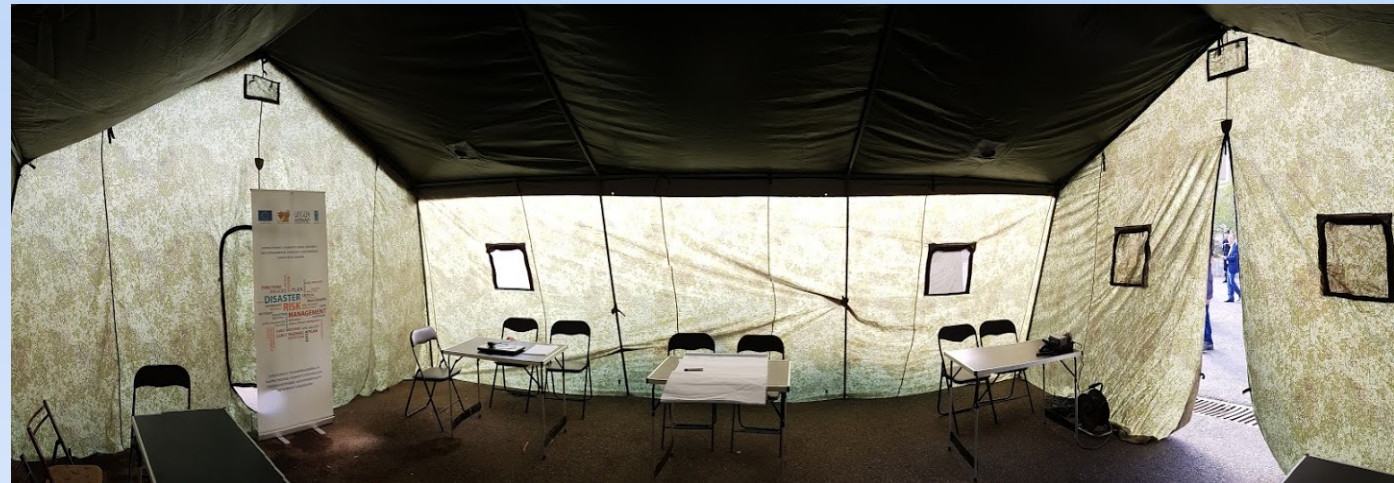


## Field Exercise at Kapan region





## Field Exercise at Kapan region





## Field Exercise at Akhtala region





## Field Exercise at Akhtala region



## Work Package 4 Transfer of Methods, Tools, Knowhow & Experience for Risk Preparedness and Management

The objective of this work package is **the real transfer of methods, tools, knowhow and experience for risk preparedness and management in the Armenian authorities** in a way that will be most suitable to cover specific needs, address local / regional challenges and at the same time be in the forefront of research and operation



- ✓ A package of sensors to monitor dam stability and integrate into existing warning systems (4 in Geri dam – **3 financed by ALTER, 1 by the private company managing the dam) – Armenian seismological institute supported – early warning functionality**
- ✓ A Web GIS system to assist non-technical users in decision making
- ✓ Selection and setup of flood evolution prediction software
- ✓ A web tool for supporting evacuations in case of flood
- ✓ A web tool for supporting the provision of goods post-flood
- ✓ An alarm system of 7 sirens in Kapan city (where evacuation may be done without coordination due to lack of time)
- ✓ 1 Siren in the city of Sisian

**The systems has been exploited by ALTER, while they have been bought by UNDP initiative and donated to ARNAP**

## ALTER – private Sector Cooperation

Private companies, managing dams and tailing dams at pilot areas of Armenia, already participate in local councils for disaster risk reduction, and in exercises conducted each year by civil protection authorities. However they do it in an isolated manner and not as an integral part of a complete disaster risk reduction strategy. That's why ALTER invited the private sector to participate in ALTER's activity.

The results of the ALTER's team efforts (mainly of ARNAP team) towards the participation of the private sector in the project activities are visible.

ALTER addressed an invitation to the following Mining – Processing and Hydro-electric Power Enterprises:

- Akhtala Mining and Processing Enterprise, CJSC
- Kapan Mining and Processing Enterprise CJSC
- Zangezur-Copper Molybdenum Combine, ZCMC
- Contour Global Vorotan Cascade, CJSC



## ALTER – private Sector Cooperation (2)

As a result, we underline the following response:

- ZCMC: information about Geghi reservoir and confirmation letter on partnership (directed to G. Drakatos) from ZCMC General Director Mr. Poloskov
- ContourGlobal: Report on the "Study of Dam Safety and Civil Structures of Vorotan Hydropower Cascade" (prepared by FICHTNER Company)
- POLYMETAL: a positive answer to participate in the activities of the ALTER Project.
- Representatives of the ZCMC and Contour Global private company accepted the invitation of the LB to attend the training course activities in Yerevan as well as the meeting in RA MES.

## ALTER – Public Sector and Local Authorities Cooperation

Mainly with the contribution of ARNAP team, a very strong relation is established between Armenian Public Sector/Local Authorities and ALTER. They contribute in ALTER's activities:

- Ministry of Emergency Situations (MES)
- Lori Regional(Marz) Rescue Service DPT
- Syunik Regional(Marz) Rescue Service DPT
- Local self-government
- Akhtala Municipality, Marz of Lori,
- Kapan Municipality, Marz of Syunik,
- Sisian Municipality, Marz of Syunik,



## ALTER – Public Sector and Local Authorities Cooperation (2)

Besides the contribution to the tabletop and small scale exercises as well as to training activities they provided ALTER with very useful data:

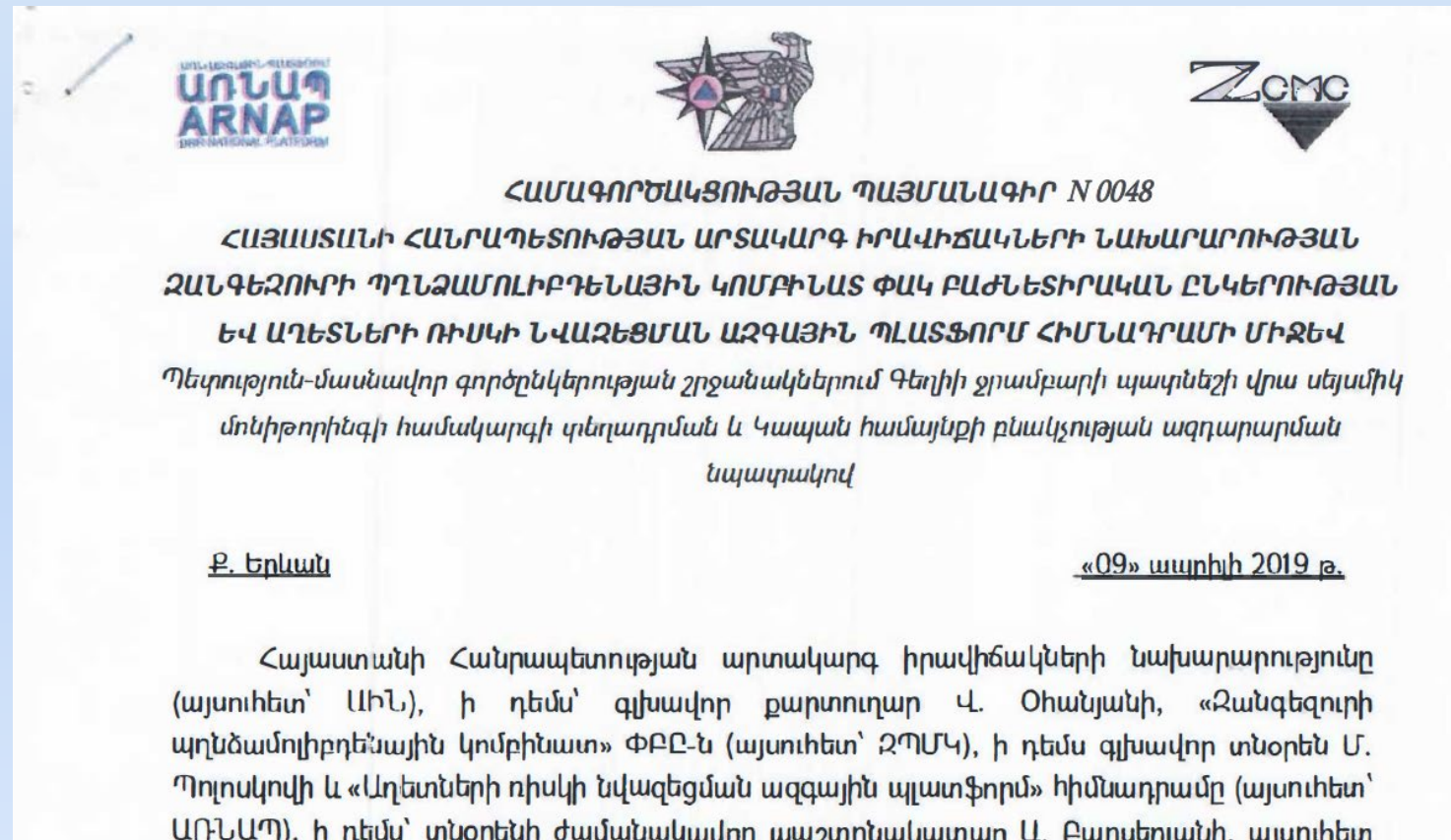
- ✓ RA MES "Seismic Protection Territorial Survey" SNCO provided ALTER with the link of a seismic catalog of  $M \geq 2.5$  magnitude earthquakes recorded within 50 km radius around the ALTER project targets in the period 1962-2018, as well as the link of monthly seismic waveform data of Yeghvard and Saratovka seismic stations related to these targets.
- ✓ RA MES ARMSTATEHYDROMET provided the meteorological data for meteo stations and hydroposts located within the Voghji and Geghi River basins, as well as other data related to pilot area.
- ✓ RA MES Crisis Management National Centre provided with DEM \_ MAPS\_FLOOD AREA.

## Trilateral Agreement between the ARNAP, ZCMC and MES

The ZCMC private company accepted the installation of the instrumentation on one of the dams. Moreover, (ZCMC bought by its own expenses one more instrument) according to the signed trilateral Agreement between the ARNAP, ZCMC and MES, the ZCMC transferred the cost of 1 of 4 packages of instrumentation to ARNAP.



## Signed agreements on Public-Private partnerships



# ALTER

## Thank you

**Dr. George Drakatos**  
**Dep. Director of IG/NOA**



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