IN-DEPTH ASSESSMENT OF NATIONAL HIGHER EDUCATION OFFER IN DRM AND HAZARD MAPPING IN SOUTH CAUCASUS COUNTRIES

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SUMMARY

The project “Strengthening the Climate Adaptation Capacities in the South Caucasus” (SCAC) aims at reducing the vulnerability of populations to climate-induced natural hazards and strengthening regional cooperation on climate change adaptation (CCA) and sustainable mountain development. Increasing learning and teaching capacities in higher education institutions in the domain of disaster risk management (DRM) in Armenia, Azerbaijan and Georgia is an expected output of this project.

One of the activities to reach this output consists in an in-depth assessment of the national higher education offer in DRM and hazard mapping. This report presents the results of the assessment, which included the following phases: i) conceptual framework design; ii) country data collection in Armenia, Azerbaijan and Georgia; iii) country data analysis and reports; iv) cross-country data analysis and synthesis. A team of researchers and national experts developed the conceptual framework which included knowledge, teaching, administrative, research, fieldwork, technical, economic capacities and educational governance. This framework builds on the approach used during the inception phase of the SCAC project, with some differences: we focused on DRM (and not exclusively on natural hazard and risk assessment, NHRA), we included new capacities (e.g. fieldwork capacities) and we addressed different topics. More precisely, we analysed strengths, weaknesses, training needs, priorities, barriers, and enablers of change for each capacity, by conducting a total of 50 interviews and 5 focus groups with academics, administrative staff and students in 6 higher education institutions (HEIs)—2 from each country. Concerning the knowledge capacities, we also conducted an in-depth analysis of available DRM courses, their contents and the students’ acquired knowledge and skills. This was the starting point to identify new modules or courses that might be developed to contribute to a common DRM curriculum at the regional level in the South Caucasus.

Before, during and after the country data collection, we organized several meetings to ensure the feasibility of cross-country data comparison. We discussed the preliminary results of the country reports at a regional e-workshop on “Teaching-Learning Practice Improvement”. Fourteen participants attended the event, including national DRM experts from the three countries. We discussed cross-country differences, common gaps in knowledge and teaching capacities, training needs, and enablers/barriers to improve DRM higher education.

The workshop results and country reports provided inputs to the cross-country analysis.

The results of the in-depth assessment reveal some common trends and differences.

Concerning knowledge capacities, we analysed a total of 77 courses in six different universities. For each course the national experts collected information about objectives and learning outcomes, schedule, readings, student grading, teaching methods and fieldwork, evaluation of the course by the students, strengths and weaknesses, planned improvements and students’ acquired skills. National experts also provided information about DRM topics addressed in the courses. Well covered topics include the ecological aspects of DRM, emergency management and recovery, and climate change. By contrast, less frequently addressed topics include the economic aspects of DRM, GIS and mapping, disaster medicine, and the social aspects of DRM. For some topics cross-country differences in course delivery are remarkable, including with respect to climate change, hazard/risk assessment, GIS and mapping.

The results about knowledge capacities reveal also that there is a need to improve language skills (especially English) for both students and teachers. These skills are necessary to understand up-to-date DRM literature, free online courses and webinars that ultimately are key tools to improve DRM knowledge capacities. One option could be to provide some compulsory course material in English. Indeed, the review of courses reveals that almost all books are in Russian or in the country language.

When asked to identify new modules or courses that need to be developed, the interviewees identified the following ones:

1. Digital modelling of risks;
2. Advanced geographical information system (GIS) hazard mapping;
3. Use of unmanned aerial vehicles (UAV) in DRM, including use of satellite images;
4. Multi hazard and risk assessment;
5. DRM social aspects;
6. DRM economic aspects;
7. Forest fire risk assessment and management;
8. Community based disaster risk management training;
9. Impact of environmental degradation on natural hazards;
10. Cases in DRM.

In this report we provide an assessment of the feasibility and barriers to developing teaching activities related to these topics, taking into account the results of the research, fieldwork, economic, technical, administrative and governance capacities. Our study reveals that these capacities are closely interlinked. For example, improvements in research, technical, fieldwork and economic capacities are also necessary to ensure the long-term sustainability of new modules or courses.

Moreover it is important to emphasize that only some topics are relevant for all the countries under study, namely digital modelling of risks and DRM social aspects. Advanced GIS hazard mapping and multi hazard and risk assessment are relevant for two out of three countries. Each of the other six courses mentioned above is relevant for only one country.

Teaching capacities are generally evaluated high, as revealed also by the SCAC inception phase results. Students particularly value courses taught by practitioners. This finding confirms the results of the international practice review carried out in the SCAC project, which revealed a trend towards practice-led teaching in several DRM Master programs.

Even if pedagogical training for teachers is already available in some universities, there is limited training with a focus on DRM teaching capacities, including innovative and up-to-date teaching methods and tools. There is also a need to foster interactive teaching and the strengthening of students' critical thinking skills. Online tools can be a support to foster interactive learning. However, the results about the role of online learning and teaching vary considerably across countries. In some countries (e.g. Armenia) distance learning seems to be already a common practice, while in others (e.g. Azerbaijan) this is not the case.

While teacher's knowledge and capacities are evaluated as high, significant improvement is needed in teaching methods, with emphasis on DRM focused teacher coaching. Training needs

are different across countries, ranging from hardware and software for remote sensing, to sharing of DRM best practices.

Our results also reveal that there is a need for improvement of laboratory and software/hardware equipment to conduct innovative research and teaching. The limited availability of equipment and financial support is also a barrier to strengthening fieldwork capacities. There is also a need for financing international research programs to foster collaboration among universities. Cooperation is mentioned especially with respect to universities in western countries. Interestingly enough, research collaborations across the three countries under study is not mentioned as a priority by the interviewees.

Another common finding is that there is an unbalance in funding for research and teaching, with the latter being privileged over the former. Moreover, there is a need to improve the mechanisms for distributing funding across university departments and faculties. The latter should also be able to increase their autonomy and independence in order to allow the overall development of DRM higher education capacities. Concerning research funding, it is suggested to explore private funding options for research.

Finally, some recommendations are relevant for the next phases of the SCAC project. First, during the workshop it was suggested to develop an online knowledge hub for DRM education including several components such as: methodological training for teachers; an advanced NHRA course for students; links to relevant open-access reading materials or platforms and other teaching support information; examples of DRM best practices and failures; and testimonials and snapshots with professors/practitioners about their views on DRM innovation. Second, it is critical to foster cross-country exchanges, for example by promoting visits of researchers and professors participating in the SCAC project to other countries/universities. Another recommendation concerns the development of cross-country research centres and DRM-related transnational institutional networks involving different universities.

ABBREVIATIONS

AR	Armenia
ARSPU	Armenian State Pedagogical University
AZ	Azerbaijan
AZU	Azerbaijan University
KU	Khazar University
AZSOIU	Azerbaijan State Oil and Industry University
BA	Bachelor's degree holder of such degree
CMSA	Crisis Management State Academy
DRM	Disaster risk management
DRR	Disaster risk reduction
ECTS	European credit transfer and accumulation system
ERASMUS	European program for the mobility of university students
EU	European Union
GE	Georgia
GIS	Geographical information system
GPS	Global Positioning System
HEI(s)	Higher education institution(s)
IA	In-depth assessment
IAF	In-depth assessment framework
ISU	Ilia State University
MA	Master's degree or holder of such degree
NE	National expert
NGO	Non-governmental organisation

NH	Natural hazard
NHRA	Natural hazards and risk assessment
PhD	Doctoral degree or Doctor of Philosophy
R&I	Research and innovation
RS	Remote sensing
SCAC	Strengthening the Climate Adaptation Capacities in the South Caucasus project
SD	Sustainable development
SDC	Swiss Agency for Development and Cooperation
SNC-mt	Scientific network for the Caucasus mountain region
TSU	Tbilisi State University
UNDP	United Nations Development Program
UN Environment	United Nations Environment Program
UNIGE	University of Geneva
UAV	Unmanned aerial vehicles
YSU	Yerevan State University (YSU)

1. INTRODUCTION

A significant part of the Caucasus countries' territory is covered by young Alpine mountains characterized by active tectonics, exogenic gravitational mass wasting, landscape forming, and other hazardous natural processes that currently worsen with ongoing climate change. Due to these circumstances, the countries quite often experience a large number of different kinds of disasters with extensive loss of life and properties, and infrastructure damage. Effective prevention, mitigation, and preparedness can greatly reduce the threat posed by hazards of all types. In turn, knowledge based on research and innovation (R&I) can greatly contribute to prevention and decision-making, as well as the design and implementation of risk reduction measures. The main institutions that contribute to the expansion of knowledge and R&I are Higher Education Institutions (HEIs), which by definition are public or private colleges, universities, training or technical institutes that offer higher education learning and an award/certificate in the end.

HEIs play a crucial and innovative role in the establishment of knowledge-based societies and establish direct links and close integration with other sectors, such as the private sector or non-governmental organizations (NGOs). Enhancing knowledge and R&I capacities in HEIs is becoming increasingly important so that they can adequately play their role as incubators of knowledge and ideas particularly in the Natural Hazards and Risk Assessment (NHRA), Disaster Risk Reduction (DRR) and Disaster Risk Management (DRM) domains.

In December 2018, the Caucasus Network for Sustainable Development of Mountain Regions (Sustainable Caucasus) and Swiss Cooperation South Caucasus signed an agreement that marked the start of the implementation phase for the project *Strengthening the Climate Adaptation Capacities in the South Caucasus (SCAC)*.

The project builds on the regional scientific cooperation developed and implemented since 2013 under the umbrella of the Scientific Network for the Caucasus Mountain Region (SNC-mt), which brings together scientific institutions from all six Caucasus countries. With support from the Swiss Agency for Development and Cooperation (SDC) and international partners, notably the University of Geneva (UNIGE) and UN Environment, as well as technical and coordination services provided by Sustainable Caucasus, SNC-mt has sought to foster regional dialogue in a challenging geopolitical climate and to mobilize scientific knowledge in support of sustainable mountain development (SMD).

The overall goal of the SCAC project is to reduce the vulnerability of populations to climate-induced natural hazards and to strengthen regional cooperation on climate adaptation and sustainable mountain development. The project has three declared outputs:

(1) increased learning and teaching capacities in the region's higher education institutions in the domain of disaster risk reduction;
(2) improved global, regional and national knowledge exchange and multi-stakeholder dialogue on climate adaptation and sustainable mountain development; and
(3) enhanced processes and tools for Caucasus data, information, and knowledge collection, analysis, and dissemination.

One of the activities of the SCAC project is defined as the elaboration of an "In-depth assessment

(IA) of national higher education offer in DRM and hazard mapping in South Caucasus countries" (Intervention 1.1.1.3 of Activity 1.1.1 of the project's Terms of Reference). The focus of this assessment is DRM, which is defined as "the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster" (UNISDR 2005).

This report describes the results of the work conducted in this intervention (1.1.1.3.) including:

- assessment report of teaching and learning practices in DRM and hazard mapping courses;
- gap identification and prioritization for improving existing or creating new courses;
- short list of courses to contribute to a common DRM curriculum at the regional level in the South Caucasus.

For the purpose of this report we use the following definitions of module, course and programme. A class is a temporally unified teaching unit, for example a one-hour practical exercise in a laboratory or a two-hour lecture in an auditorium. A module is a basic unit of a course, usually comprising at least 2 classes. A course is made up of one or more modules that build a consistent learning unit; total student investment in a course is typically expressed in ECTS, where 1 ECTS is equivalent to 25-30 hours. A programme includes several courses. For example, a lecture (a class) on warning behaviours can be included in a module on warning communication, which in turn forms part of a course on warning systems in a programme on disaster risk management. In contrast to classes and modules, courses and programmes may have the additional characteristic of leading to a diplomas or certificate.

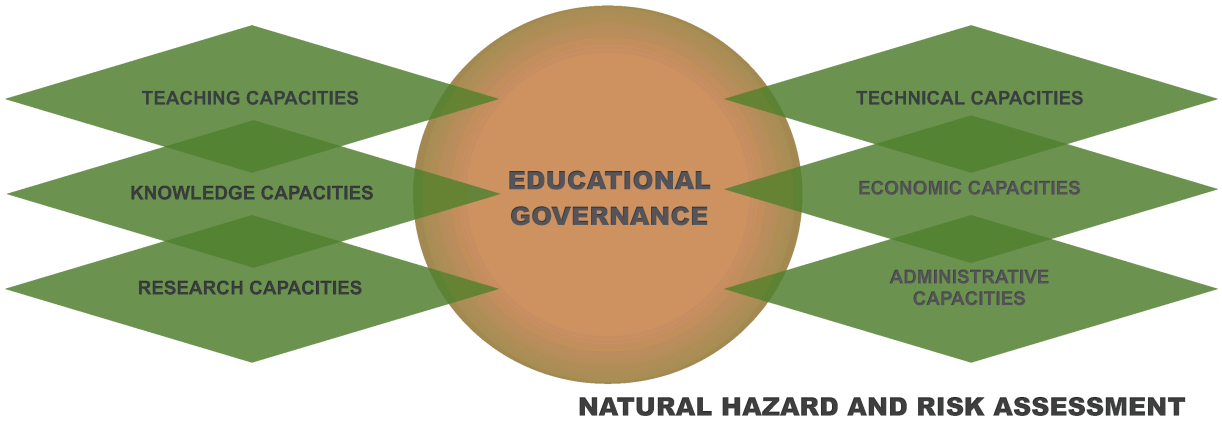
A common in-depth assessment framework (IAF) and methodology informed by state-of-the-art pedagogical and substantive knowledge was guiding this process. The development of the IAF was coordinated by UNIGE, in close collaboration with national experts from Azerbaijan, Armenia and Georgia with experience in the DRM education.

2. BACKGROUND

The IAF of national higher education offer in DRM and hazard mapping in South Caucasus countries is based on the results of a study conducted in the SCAC project's inception phase. The study aimed at providing an overview of higher education in NHRA in Armenia, Azerbaijan and Georgia and at evaluating university teaching, knowledge, research, technical, administrative and economic capacities and educational governance for NHRA. Educational governance was also a key component of the assessment. Figure 1 provides an overview of the conceptual framework used in the inception phase study.

The results identify opportunities as well as some weaknesses and needs in NHRA teaching and research. These in turn contributed to defining the scope of the in-depth assessment presented in this report.

Fig. 1: NHRA higher education assessment framework



Before commenting on the results, it is important to explain that the assessment of each subset of capacities included specific questions. Capacities have been defined as follows:

- Knowledge capacities: the set of NHRA information, skills, abilities, qualifications that students acquire at the HEI.
- Teaching capacities: the didactic offer aimed at transferring NHRA knowledge, skills and abilities to students or professionals (continuous education) at the HEI.
- Administrative capacities: the set of administrative and human resources available to conduct NHRA teaching and research activities at the HEI.
- Research capacities: the set of activities conducted to foster innovation in NHRA research at the HEI.
- Technical capacities: the set of NHRA technologies available to conduct teaching and research activities at the HEI.
- Economic capacities: the funding available to conduct NHRA teaching and research activities at the HEI.
- Educational governance: the set of principles (e.g. autonomy, transparency, stability) implemented at the HEI to conduct NHRA teaching and research activities.

Most of the capacities were assessed on a 1 (minimum) to 5 (maximum) Likert scale.

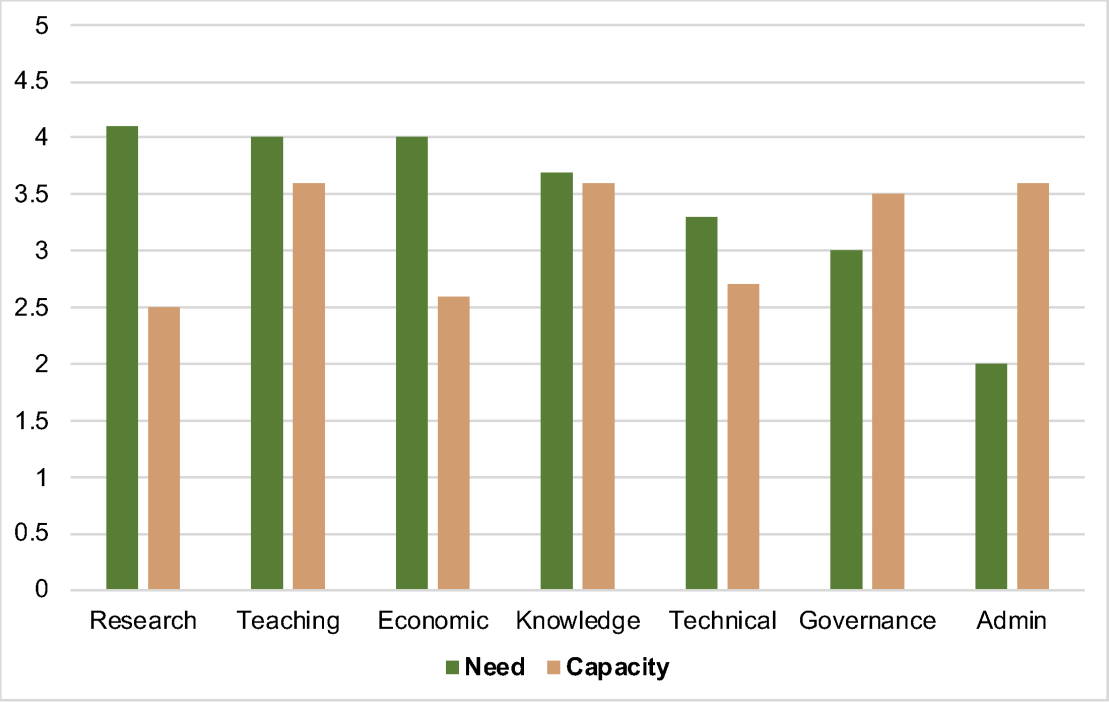
Depending on the formulation of the question, the scale could measure e.g. level of agreement, degree of availability, etc. An overall assessment and a needs assessment was included for all capacities. It is important to emphasize that these assessments, even if asked on an ordinal scale, are primarily a qualitative tool. For this reason, we will provide figures with mean values but comment the results in a qualitative way as one, among many others, sources of data and information. Other sources of data included a systematic collection of information about NHRA topics, methodologies and technologies (assessment grids provided in Scolobig and Balsiger, 2018).

The inception phase study covered a total of eight HEIs:

- Armenia: Yerevan State University (YSU), Crisis Management State Academy (CMSA), Armenian State Pedagogical University (ARSPU).
- Azerbaijan: the Azerbaijan University (AZU), Khazar University (KU), Azerbaijan State Oil and Industry University (AZSOIU).
- Georgia: the Ilia State University (ISU) and the Tbilisi State University (TSU) (Scolobig and Balsiger 2018 and single country/institution reports available upon request).

The assessments were carried out by national experts (NEs) who interviewed university professors, administrative officers and staff. They also conducted a desk study by collecting information on university websites and by consulting the available grey literature.

Fig. 2: Assessment (mean values on a 1-5 Likert scale) of needs and capacities



The results of the capacity assessment conducted in the inception phase reveals that administrative, teaching and knowledge capacities receive the highest scores (Fig. 2). Technical, economic and research capacities receive relatively low scores. When asked to assess the needs for each capacity, new NHRA research, enhanced economic resources and new teaching tools/methods emerged as key priorities.

In the following section we report the key implications and questions left open from the inception phase study. The questions have been identified by the UNIGE research team. This is meant to set the stage for the IAF (Section 3).

2.1. KNOWLEDGE CAPACITIES

Key implications: The overall assessment of NHRA knowledge capacities is relatively high, especially if compared with other capacities. All HEIs offer NHRA courses, from a minimum of 5 to a maximum of 83 courses addressing different topics linked to NHRA. In the majority of HEIs, courses cover all hazards and are hosted by different departments or faculties, ranging from geography to biology, chemistry, environmental protection and architecture. Some HEIs also have departments dedicated to crisis and emergency management.

New NHRA knowledge is considered a need. An open question enquired about the key topics/knowledge gaps to be addressed. These were subsequently classified as follows:

1. advanced NHRA methodologies;
2. advanced geographic information system (GIS) knowledge;
3. latest remote sensing technologies;
4. digital modelling;
5. multi-hazard risk assessment;
6. community-based disaster risk management training.

Concerning the type of hazards, there is a special need to develop courses about earthquakes, landslides, rockfall, sufosia, floods, forest fires and multi-risk/cascade effects. Land degradation and desertification are also mentioned as relevant aspects to address, especially in Armenia and Georgia. In order to develop this highly specialized knowledge it is critical to identify who can actually train the researchers and professors (e.g. on advanced methodologies) and what economic resources are needed to provide the basic technical/technological support to teach these new methodologies (e.g. for modelling, GIS). Moreover, there is a need to better train DRM professionals, especially for the private sector.

Questions for the IA

- Will the IA confirm the identified knowledge gaps?
- How to best provide new NHRA knowledge on the needed topics identified above? What are the barriers and enablers?
- What competences are needed to become a NHRA practitioner/professional in the private sector? What university courses should be developed?

2.2. TEACHING CAPACITIES

Key implications: The assessment of teaching capacities is medium. Cooperation between HEIs for NHRA teaching is limited. Teaching capacities need to be improved with respect to:

1. modelling courses (including modelling based on remote sensing data);
2. acquisition of new software programs;
3. improvement of geo- and hydro-hazards knowledge;
4. improvement of knowledge on land degradation, desertification, development of landslides in Armenia and Georgia, measures to combat land degradation and desertification.

The need for online courses and for remote and distance teaching methods is emphasized by several respondents.

Questions for the IA

- How to best improve teaching capacities in general and related to the topics identified above? What are the key barriers and enablers?
- What are the priorities concerning the knowledge domains of “geo- and hydro-hazards”?
- Should online options be included in DRM higher education at the regional level in the South Caucasus?
- What should be the balance between fieldwork, group work, case study oriented work and internships in DRM higher education at the national and regional level in the South Caucasus?

Knowledge and teaching capacities definitely play a key role for the in-depth assessment. However, the other capacities also provide useful background. Thus, we also briefly present the implications of the results linked to these other capacities.

2.3. RESEARCH CAPACITIES

Key implications: NHRA research capacities receive the lowest score of all capacities. In parallel there is a high need for NHRA research. Future research should be conducted on the following topics: full understanding of regional risk (mentioned for Armenia), disaster risk management and assessment; fire risk management; GIS, risk assessment and related data analysis; and forest fires, remote sensing, landslide modelling, marine disasters, and abrasion. There is low HEI involvement in international research programmes and little funding is made available.

Questions for the IA

- How can research better inform NHRA teaching and how can teaching better inform research?
- Which research (e.g. topics or specific projects) should be taught in DRM higher education? Are topics different across countries? How to improve the shared research agenda at the regional level in the South Caucasus?
- Which organisations could/should make funding for international research programmes available?

2.4. ECONOMIC CAPACITIES

Key implications: Economic capacities are assessed quite low and, at the same time, in high need. The results also reveal that there are definitely more economic resources available for teaching than for research. Most of the funding for teaching goes into salaries (usually up to 90%), with very limited resources dedicated to research or other activities such as fieldwork (from 10 to 30%). Finally, it is important to emphasize that there is a very high non-response rate/missing responses for this set of capacities.

Questions for the IA

- How can economic resources be made available? What type of co-funding mechanisms can be put in place?
- What are the main economic barriers and how can these barriers be overcome?
- What kind of managerial/administrative measures should be taken to guarantee an effective use of financial, human and economic resources?

2.5. TECHNICAL CAPACITIES

Key implications: The overall assessment of technical capacities is medium/low. The quality and efficiency of existing technologies do not receive a very positive assessment, while new technologies seem to be developed. There is certainly a need to develop technical capacities, technologies and infrastructures, including:

1. improvement of global positioning system (GPS) technologies
2. more capacity to develop the base GIS layer (*)
3. land use and land cover generation using machine learning
4. development of advanced 3D modelling, digital modelling, geological modelling (*)
5. capacity and skills to use software packages such as Pix4D and MIKe, including software packages availability (*)
6. availability of laboratory testing technologies (*)
7. disaster risk reduction laboratory

(The * denotes technologies/capacities mentioned by multiple HEIs)

Questions for the IA:

- (Among those mentioned above) What technical capacities and/or technologies and/or infrastructures are considered a priority?

2.6. ADMINISTRATIVE CAPACITIES

Key implications: Administrative capacities receive a medium/high overall score and there seems to be no need to further develop this capacity. The results also show that there is not (as could be expected) a directly proportional relationship between numbers of NHRA courses, students and research/teaching staff. This means, for example, that HEIs with higher NHRA staff capacities do not necessarily offer more courses.

Questions for the IA

- What administrative capacities are needed for improving higher education in DRM at the regional level in the South Caucasus?
- Are there any administrative barriers for such a regional initiative? What catalysts could be activated?

2.7. GOVERNANCE CAPACITIES

Key implications: The overall assessment score of educational governance is medium/high but there is also a perceived need to improve it. Most HEIs have a mandate to develop the NHRA sector. Most notably, TSU funded a scientific study centre for natural disasters and risks in 2010-2011. Also, the National Academy of Sciences of the Republic of Armenia is funding an academy for that purpose, whereas AZU has plans for the development of a Department of emergency situations and human life safety. Also, KU and the AZSOIU are positive about the development of the NHRA sector. HEIs generally have a medium level of autonomy in the decisions to develop the NHRA sector, with the government having limited influence on these decisions. There is a high degree of transparency in the decisions on the prioritisation of courses and curricula and the same is true for the stability of the HEIs.

Questions for the IA

- What are the key enablers and barriers for higher education in DRM at the regional level in the South Caucasus?
- What are the key governance characteristics of higher education in DRM at the regional level in the South Caucasus (e.g. partnerships, networks, relationships with national and local authorities, management)?

3. RESEARCH DESIGN

The IA of the national higher education offer in DRM and hazard mapping in Armenia, Azerbaijan and Georgia included the following phases:

3.1 IN-DEPTH ASSESSMENT FRAMEWORK CO-DESIGN

The first phase consisted in the co-design of the in-depth assessment framework with the NEs from the selected countries. We discussed a preliminary version of the framework at the Second Caucasus Mountain Forum held in Ankara (Turkey) in 2019. Subsequently the framework was revised several times, based on feedback from the NEs. The framework consisted in a detailed research design for the country data collection, including a summary of the inception phase results, a timeline for data collection, tasks, suggestions for data collection and the in-depth assessment grid (see Annex 1).

The IA grid reused the conceptual framework of the inception phase, but addressed different topics. Specifically, the conceptual framework expanded the capacities analysis to the DRM sector (not only NHRA). Capacities have been defined as in Section 2 (Fig. 1). We added fieldwork capacities (not included in the inception phase) because they have been considered particularly relevant by the NEs. We defined fieldwork capacities as the set of DRM fieldwork and practice-oriented activities (e.g. practical work, site visits of areas affected by natural disasters).

Another key difference from the inception phase regards the questions that were aimed at identifying strengths, weaknesses, training needs, priorities, barriers, catalysts/enablers for each capacity. With respect to knowledge capacities, an in-depth analysis of available courses, their contents and students' acquired knowledge and skills was also included.

The IA thus aimed at complementing data/information already collected in the context of the inception phase study, but also at providing new data and information.

For some selected questions, a numerical (Likert scale based) assessment allowed us to better identify the characteristics, strengths and weaknesses of the higher education systems and DRM topics covered in different universities. However, it is important to emphasize that these assessments are a qualitative tool primarily aimed at gaining a comparative overview of the capacities in the countries under study. For this reason, we will provide figures with mean values but comment the results in a qualitative way as one source of data and information. An overview of strengths and weaknesses of qualitative social science methods and tools is provided in Silverman (Silverman 2013).

The NEs carried out the assessments based on their judgments and fieldwork, including an extensive literature review/desktop research, interviews and focus groups (see section 3.2 for detailed information).

3.2 COUNTRY DATA COLLECTION

During the second phase, the NEs identified two HEIs in their country and collected data using the in-depth assessment grid. Each NE conducted the following tasks:

1. identification of relevant faculties, schools, and departments (respectively, CMSA and ARSPU in Armenia; AZSOIU and AZU in Azerbaijan; and TSU and ISU in Georgia);
2. selection of DRM courses and review of course syllabi (respectively, 11 courses in Armenia; 8 in Azerbaijan and 58 in Georgia);
3. semi-structured interviews and focus groups with academics, administrative staff and students to analyse capacities (respectively, 16 interviews and 2 focus groups involving a total of 14 students were conducted in Azerbaijan; 18 interviews in Georgia; 16 interviews with professors and administrative staff and 3 focus groups, involving 12 students in Armenia);
4. collection of data and information available online, in official university documents (e.g. study plans) or in the grey literature;
5. completion of the IA grid (see Annex 1).

3.3 COUNTRY DATA ANALYSIS AND REPORT

In the third phase, the NEs analysed the data and prepared country reports based on an outline that included the following key topics:

- reasons to improve higher education capacities in the DRM and hazard mapping sector in the country under study;
- overview of knowledge, teaching, research, fieldwork, technical, economic, administrative capacities and educational governance;
- analysis of strengths, weaknesses, barriers and enablers, training needs and priorities for each capacity;
- identification of critical gaps and opportunities for improving existing and creating new courses;
- top barriers, enablers and priorities for the development of DRM higher education.

Before and during the country data collection, several skype meetings were organized with the NE team to ensure reliability and comparability of the data collected at the national level. The meetings also allowed to build a common understanding of the research design, to inform each other about work in progress and to share experiences about data collection, including difficulties, open issues and questions.

3.4. CROSS-COUNTRY DATA ANALYSIS AND SYNTHESIS

In the fourth and last phase, based on the data and country reports, we conducted a further data analysis to provide a cross-country comparison and synthesis of the main results. The preliminary results were discussed at the First Regional Workshop on “Teaching-Learning Practice Improvement”. 14 participants attended the workshop, including national DRM experts from the three countries, the Executive Director and administrative assistant of Sustainable Caucasus and researchers from UNIGE. The workshop was organized online because of COVID-19.

The NE presented the three draft country reports. Two work sessions then served to identify cross-country commonalities and differences concerning: critical gaps for improving existing and creating new courses and top barriers and enablers for the development of DRM higher education (workshop agenda is available in Annex 2). The discussions in the work sessions were guided by the following questions:

- What are the common gaps in knowledge and teaching capacities?
- What are the common training needs?
- What gaps in research, fieldwork and technical capacities are critical for improving existing and creating new courses?
- What are the common enablers/barriers in DRM higher education?
- How can we leverage enablers for the SCAC project?

The results of the cross-country analysis and synthesis—including the workshop results—are presented in the following section. The synthesis was finalized during the COVID-19 outbreak and this circumstance partially affected the data collection and project deadlines.

4. IN-DEPTH ASSESSMENT RESULTS

This section presents the results of the cross-country comparison. The results are excerpts or synthesis of the information and data provided in the country reports. Individual country reports are available upon request.

4.1. KNOWLEDGE CAPACITIES

Knowledge capacities are at the core of this study. We investigated them using multiple analytical lenses. More precisely we investigated the DRM courses offered in the universities under study, and we asked for evaluations of the DRM topics addressed in the courses. On the basis of the interviews and focus groups results, the national experts identified new topics and courses to develop as well as weaknesses, barriers and enablers to develop knowledge capacities.

For each HEI, the NEs provided an overview of the DRM courses provided in the academic year 2019-2020. The overview included a total of 77 courses (see Table 1). The NEs collected the following information for each course: course objectives/learning outcomes, schedule/topics, readings, student grading, teaching methods and fieldwork, courses offered online, evaluation types, strengths and weaknesses, planned improvements/changes, and instructors' language skills. Information was also collected concerning students' acquired skills and knowledge. Detailed information about the courses are available upon request.

Tab. 1: Analysed courses (courses are offered at Bachelor level, unless specified differently)

Country	Courses
Armenia	Disaster risk management; crisis management; rescue operations; geological information systems; basics of psychotherapy (including psychology of disasters principles); climatology and climate change; firefighting measures in the forests of the Republic of Armenia; risk assessment and mountainous areas, including economic aspects; causes of desertification and principles of time-based assessment in the Republic of Armenia.
Azerbaijan	Environmental assessment; complex use and protection of water reservoirs; protection of atmospheric and water reservoirs from industrial pollution; ecological restoration; psychological resilience in emergencies; life safety theories; emergency management; industrial safety; theory of combustion and explosion; waste processing procedures and recycling; radioecology; civil defence and mobilization; monitoring and forecasting of emergency situations; basic of toxicology; environmental impact assessment and protection methods
Georgia	Basics of earth sciences I and II; natural catastrophes; remote sensing; introduction to applied ecology; basics of geo-ecology; basics of geomorphology; basics of hydrology; engineering and applied geophysics; basics of engineering-geology; seismic resistant construction and engineering

	seismology; MATHLab for geoscientists; physics of atmosphere and hydrosphere; cartography by means of GIS; basics of climatology; field mapping and GIS; introduction to the geomatics; introduction to geography; introduction to geology; geomorphology; hydrology; transformation of natural environment; remote sensing; practical geomorphology; natural disasters of Georgia; applied geography; hydrological processes; general geology; environment protection; engineering-geology; environment and natural catastrophes; geography for ecologists; geological aspects of ecology.
	(Master level, Georgia) Risk assessment of natural catastrophes; quantitative and qualitative analysis of natural processes; remote sensing; earth complex system; environment and its formation; geomorphology I and geomorphology II; geoenvironment modelling and analysis; global warming; introduction to applied ecology; earth and environment; seismotectonic; general geology; physics of earthquakes, focus volcanology; cartography and environmental dynamics; geoecological cartography; geography of climatic processes and forecasting; landscape dynamics of Georgia; physical-geographical assessment of environmental condition; anthropogenic landscapes; geoinformation systems; natural processes and risks; environment monitoring; natural disaster management; climate change; seismotectonic and environmental geology.

Based on the results of the analysis, the national experts were asked to provide an evaluation (on a 1 min to 5 max Likert scale) of the topics addressed in the DRM courses. The list of topics is based on the international practice review conducted in activity 1.1.1.1. of the SCAC project (Scolobig and Balsiger, 2020). It included:

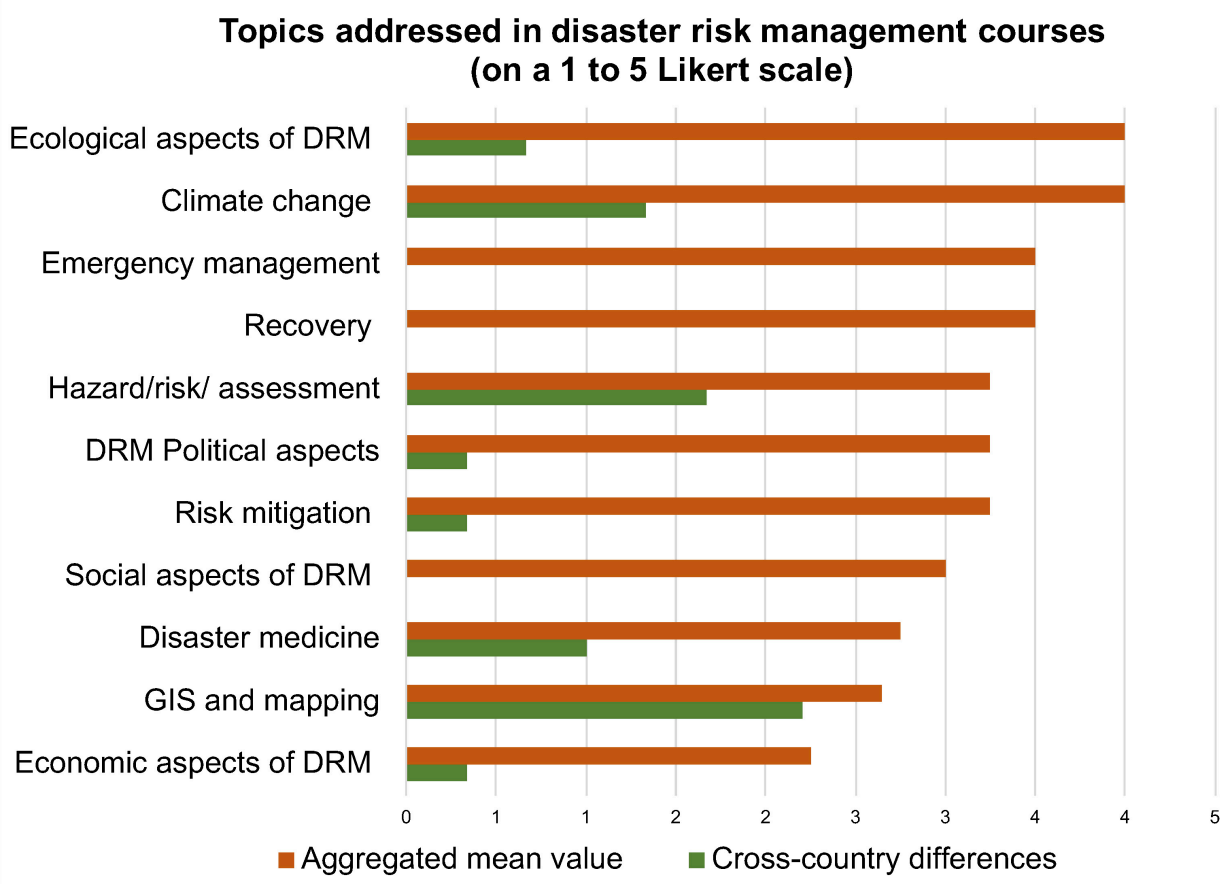
- hazard/risk/vulnerability assessment
- GIS and mapping
- warning systems, emergency management and response
- recovery (recovery planning, humanitarian aid for DRM)
- risk mitigation (building codes and legislation, structural mitigation measures, critical infrastructures)
- disaster medicine/health/health facilities
- economic aspects of DRM (insurances, loss and damage assessment, risk transfer)
- social aspects of DRM (risk perception, communication, social vulnerability and resilience, community based DRM)
- political/legal and institutional aspects of DRM (e.g. integration of risk maps in urban development, legislation)
- ecological aspects of DRM (ecosystem based approaches , Eco-DRR)
- climate change (atmospheric and climate science).

Figure 3 presents the results for each country under study.

Figure 4 presents the cross-country aggregated mean values. The figure shows that the least addressed topics are: economic aspects of DRM, GIS and mapping, disaster medicine, social aspects of DRM. By contrast, well covered topics include the ecological aspects of DRM, emergency management and recovery, and climate change.

Figure 4 also shows for which topics cross-country differences (in the provided evaluations) are most significant. These topics include climate change, hazard/ risk assessment, GIS and mapping. This means that some countries cover these topics really very well, others less so. For some topics, such as the social aspects of DRM, emergency management, and recovery, the evaluations do not differ across countries.

Fig. 3: Topics addressed in DRM courses per country (country mean values measured on a 1 min to 5 max Likert scale)



One section in the knowledge capacity assessment included questions about the key topics for new courses to be developed. On the basis of the interviews and focus groups, the national experts identified the following topics:

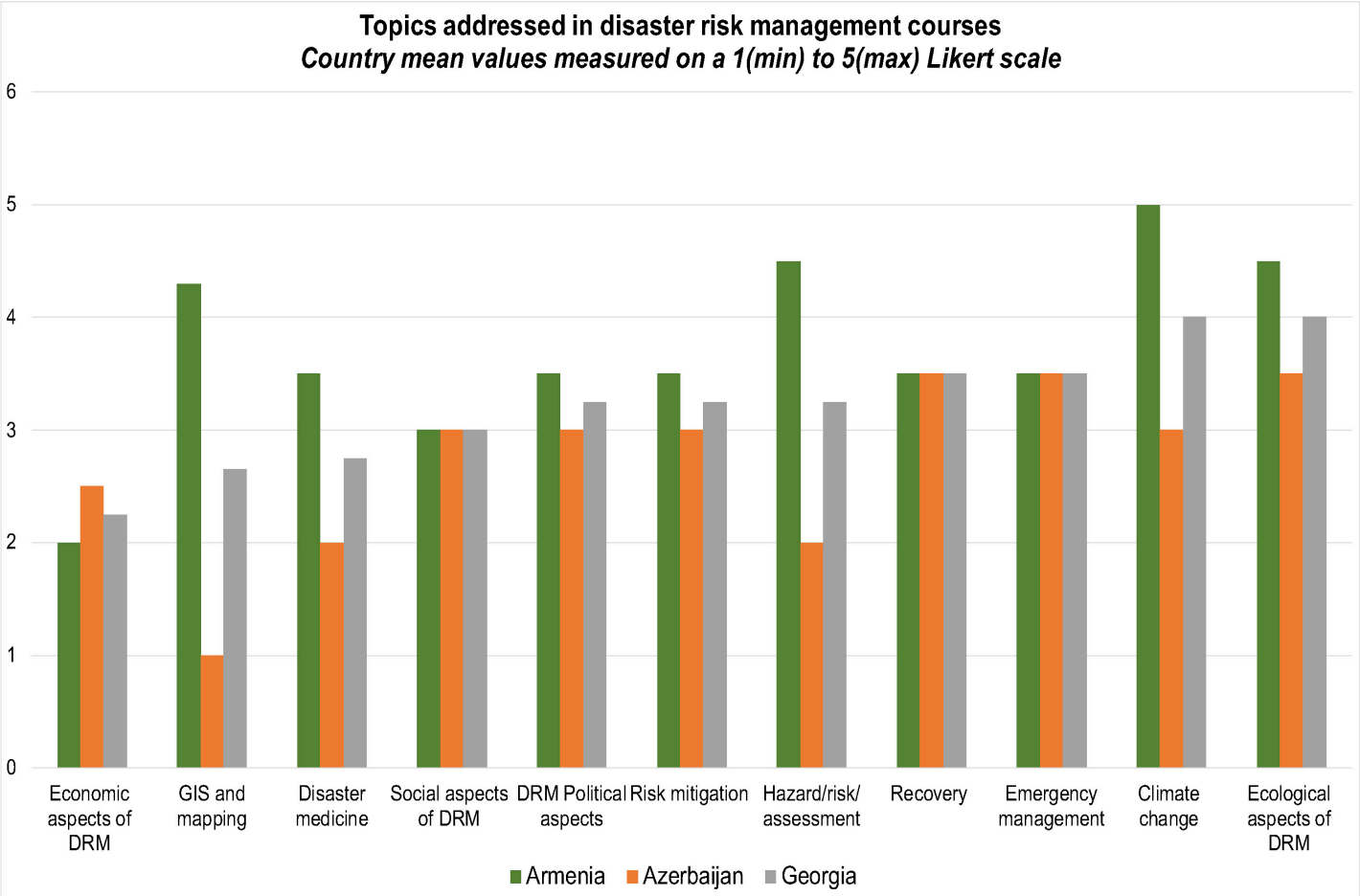
Armenia (AR): Social-economic aspects of DRM; advanced GIS knowledge; digital modelling; multi-hazard risk assessment; community-based disaster risk management training. There is especially a need to improve practical aspects and implementation of NHRA.

Azerbaijan (AZ): GIS mapping; advanced NHRA methodologies; digital modelling; social-economic assessment of natural disasters consequences.

Georgia (GE): Forest fires; DRM and remote sensing; social implications of DRM.

Finally, we identified weaknesses, barriers and enablers for capacity development:

Fig. 4: Cross-country topics addressed in DRM courses (aggregated mean values on a 1 min to 5 max Likert scale)



Weaknesses

AR: The logic of the topics addressed in a course is not always entirely clear for the students. This methodological aspect also affects the final results and student assessments. The economic aspect of DRR and DRM is poorly addressed.

AZ: Students gain a good overview of natural hazards and disasters; however, DRM training is mainly provided in a traditional format.

GE: No courses cover forest fires.

Barriers

AR: New investigations and publications outside the region are practically inaccessible due to language barriers and difficulties to access peer-reviewed publications (external DRR libraries or other sources not known). There is a need to revise educational plans and curricula, especially to better understand when a certain subject/methodological or theoretical skill should be acquired.

AZ: Language barriers, especially concerning English language.

GE: Low level of English language skills, lack of storage for equipment.

Enablers of change

AR: There is high motivation to improve knowledge capacities. Availability of large amount of information on the majority of natural hazards due to past experiences.

AZ: Government interest in the DRM sector at the highest level.

GE: Governmental support should also aim at supporting the development of knowledge capacities.

It is important to point out that the results concerning weaknesses, barriers and enablers vary considerably across countries. However, one shared finding is the need to improve language skills (especially English) for both students and teachers. This skill is necessary to understand up-to-date literature and to follow free online courses and webinars that ultimately are key tools to improve knowledge capacities (for a review of available open-access materials and courses in the DRM sector, see the Activity 1.1.1.1. report, Scolobig and Balsiger 2020).

Another shared finding concerns the enablers: government support and commitment to improve HEI knowledge capacities is considered a key catalyst to develop new knowledge domains in the DRM sector.

4.2 TEACHING CAPACITIES

Strengths, weaknesses, training needs, barriers and catalysts/enablers were the focus of the teaching capacities analysis. This section presents a summary of the key findings. It concludes with some considerations about cross-country commonalities and differences.

Strengths

AR: Professionals in DRM, rescue services, and other relevant spheres are involved in the educational process, providing up-to-date knowledge and information. Students particularly appreciate when the teachers are also practitioners.

AZ: Teachers/professors have a high level of pedagogical knowledge, skills and capacities. Materials are often available to students via e-course platforms of HEI websites. Practitioners are often hired as lecturers (considered particularly positive by students). Availability of books in university libraries.

GE: Teachers/professors are well qualified. There is a course entitled “Educate the educators” aimed at pedagogical training and capacity building. Availability of some modern equipment is also a strength.

Weaknesses

AR: Traditional teaching methods – where students are not involved in the development of the topic – tend to prevail. This results in very poor post-exam knowledge retention. Another weakness is the poor practical implementation of knowledge obtained in the DRM sphere. Improvement of teaching capacities is especially needed with respect to the modern natural and technological challenges. There still exists a large number of teachers and professors that work applying old, traditional teaching methods. However, interactive teaching and encouragement of critical reasoning are also observed in several courses.

AZ: Limited modelling courses based on remote sensing data and limited technical support.

GE: Some modern remote sensing equipment (hardware) and software are needed as well as additional space for laboratories.

Training needs

AR: Training in new scientific methodologies in relation to multiple topics, key studies from various countries and various hazards, including best practices and failures. Methods and tools for involving students in interactive learning processes are also needed.

AZ: English language; GIS mapping; modern methods risk assessment; teacher motivation improvement; interactive teaching methods and tools.

GE: Modern DRM and remote sensing technology; hardware and software for remote sensing.

Barriers

AR: Traditional/old way/frontal and top-down teaching.

AZ: Language skills; workload of teachers in other courses; limited opportunities to visit places where a natural disaster occurred; heavy teaching workload. Lack of additional time to spend with students. Lack of training for teachers (traditional methods of teaching are a priority for universities).

GE: Language skills.

Enablers of change

AR: There are professors who involve students in active discussion and topic development, emphasizing critical reasoning and analysis. Online and distance teaching have become crucial and widely practiced recently. This can promote the application of interesting visual supportive materials, such as videos and online courses. Professors mention that because students read less, the results of educational processes are not fully satisfactory. The possibility to raise the students' interest and efficiency of their work will motivate them to work together for better future results.

AZ: Teachers' agreement to cooperate with the SCAC project. The teachers and SCAC collaboration is key to improve DRM teaching capacities. To provide a choice of topics for individual student work.

GE: Governmental support.

We conclude this section with a presentation of some cross-country commonalities and differences. A commonality is that students particularly value courses taught by practitioners. This

finding reinforces the results of the international practice analysis conducted in Activity 1.1.1.1. of the project (Scolobig and Balsiger 2020). The results already revealed a trend towards practice-led teaching in several DRM Master's programs.

Even if pedagogical training for teachers is already available in some universities, there is limited training with a focus on DRM teaching capacities. There is also a need to foster interactive teaching and the strengthening of students' critical thinking skills. Online tools can be a support to foster interactive learning.

Training needs concerning specific topics are different across countries, ranging from hardware and software for remote sensing, to sharing of DRM best practices and failures.

4.3 RESEARCH CAPACITIES

We analysed strengths, weaknesses/barriers and enablers of research capacities. The two key findings concern the need for improvement of present equipment to conduct innovative research and for financing international research programs to foster collaboration among HEIs. Cooperation is mentioned especially with respect to universities in western countries. Interestingly enough, research collaborations across the three countries under study is not mentioned as a priority by the interviewees.

Strengths

AR: Scientific and research activities are carried out by a large number of professors.

AZ: Teaching staff publish scientific papers in different journals (local and international); faculties organize scientific conferences (in three languages Azeri, English, Russian).

GE: Several labs already exist; space for additional labs is available, if needed.

Weaknesses/barriers

AR: The research process does not involve students (in the majority of subjects); research labs need upgrades and improvements of both equipment and software. The former educational system did not consider HEIs as research institutions (changes are in progress but develop slowly).

AZ: Scientific laboratories are not updated; universities participate more in national or regional than in international research programs.

GE: Mainly old Soviet era equipment and facilities; lack of research funds.

Enablers of change

AR: The CMSA is now in the process of developing active research programs, and the results of the latter should be included in the academic curricula. Better integration of research topics in teaching activities will certainly act as a catalyst. Certain ASPU (non-professional DRM education) professors are involved in research and international collaboration on research issues with other HEIs. Professors will willingly cooperate knowing that the results of their research can be published in western scientific publications.

AZ: The relevance of studying the DRM sector; interest of international organizations in Azerbaijan DRM sector.

GE: High motivation of professors and students.

4.4. FIELDWORK CAPACITIES

Fieldwork capacities were defined as the set of DRM fieldwork and practice-oriented activities (e.g. practical work, site visits of areas affected by natural disasters). This set of new capacities has been included after the inception phase, because it is considered as a particularly important component of DRM education. Below we present the key results of the analysis.

Strengths

AR: In the majority of subjects, DRM education involves fieldwork, sometimes students get involved in fieldwork in communities together with local and international organizations (through the National Platform for DRR). Professors are eager to develop fieldwork capacities. Own bases and facilities of institutions are also a strength (mostly CMSA).

AZ: Field research takes place both at industrial facilities and in areas exposed to different natural hazards. There is collaboration involving universities, governmental and non-governmental organizations.

GE: Having a solid regional scientific/research system; the willingness of the staff and students to participate in fieldwork.

Weaknesses/barriers

AR: For some courses, fieldwork is organized at professors' own initiative and through their own connections; hence, fieldwork sustainability is always under question. Lack of funding and unavailability of modern equipment. Where fieldwork is limited or lacking, insufficient materials or equipment, or insufficient funding (mentioned by ASPU) are the main reasons.

AZ: Lack of international practice; old equipment; inaccessibility of case study sites. Financial support (field research funding is approved solely by the rector's administration); administrative barriers (changes in the location of fieldwork).

GE: The tight teaching time-schedule; need of additional field-work equipment (camps, sleeping-bags, etc.).

Priorities

AR: Realization of simulation training on a regular basis regarding practical application of knowledge obtained during theoretical courses; involvement of students in real assessments, measurements and documentation activities.

AZ: Defining clear targets; international cooperation.

GE: More practical approach.

Enablers of change

AR: CMSA has a large fieldwork base not far from Yerevan, where all students follow compulsory training courses during the entire educational process. ASPU professors organize fieldwork with students of advanced courses in organizational leadership in the sphere of hydrometeorology and seismology, as well as landscape planning and risk reduction. At the regional level, involvement of students in practical, ongoing DRM projects, at least for a short time. This means cooperation of educational institutions with the country's DRM organizations.

AZ: The presence of interesting places to study natural disasters and their consequences in the region. Creation of international DRM programs.

GE: Willingness to conduct fieldwork.

The results reveal that a common barrier to fieldwork is limited equipment availability and financial support. However, students tend to be enthusiastic about fieldwork. Thus these activities should be promoted, also through national and international cooperation, e.g. national DRR platforms.

4.5 TECHNICAL CAPACITIES

The inception phase results reveal that the overall assessment of technical capacities was medium/low. The in-depth assessment confirms this and provides detailed information about strengths and gaps, as described below.

Strengths

AR: The existence of a professional institution providing DRM education has enabled significant access to DRM technical resources. There are fully equipped auditoriums to deploy even emergency command centers, which are used for student training and education.

AZ: There are laboratories for the analysis of various materials. Also there are rooms with projectors, access to Wi-Fi, etc.

GE: Well trained staff and laboratories.

Weaknesses/barriers

AR: Technical means exclusively for DRM activities are few and they are not accessible to non-professional educational institutions. Existing facilities do not have laboratories for chemical, physical or biological studies, or their equipment and materials are outdated. In terms of capacities related to GIS, resources for 3D modelling and other advanced methodologies are also very scarce. Insufficient funding.

AZ: Limited resources and support from administrative staff.

GE: Modern remote sensing equipment (hardware) and software are needed; limited space for laboratories; old Soviet equipment needs upgrading; some modern remote sensing equipment (hardware) and software are needed. Limited economic/financial resources.

Priorities

AR: Development of research laboratory capacities; development of advanced 3D modelling, digital modelling, disaster risk assessment and simulation programs licensed software.

AZ: Fostering student interest in new technologies; acquisition of new equipment; GIS layer; advanced 3D modelling, digital modelling, geological modelling; software packages such as Pix4D and other licensed software training needs.

GE: Need of additional funds for technical upgrade of hardware and software (e.g. for remote sensing).

Enablers of change

AR: CMSA has a new auditorium for online conferences, which is in active use now. They also have a new lab for various investigations connected with the use of unmanned aerial vehicles (UAVs such as drones); 2 UAVs are currently at their disposal. At the regional level, development/acquisition of advanced 3D modelling, digital modelling, disaster risk assessment and simulation programs, licensed software would be a significant catalyst for higher education in DRM.

AZ: The presence of technical support will help students to become professionals in the DRM sector. All departments have the opportunity to allocate space for laboratories.

GE: Administrative support.

Modern equipment and their financing is a recurring challenge in the technical capacities assessment. The results also reveal that the strengthening of technical capacities is strongly interlinked to knowledge, research and economic capacities.

4.6 ECONOMIC CAPACITIES

The results about the analysis of economic capacities are perfectly in line with the outcomes of the inception phase. More precisely:

Strengths

AR: CMSA is mostly independent concerning the allocation of their funds and they mention no problem related to economic issues. For other institutions such as ASPU, there is no specific funding for DRM education.

AZ: The staff of teachers has the opportunity to participate in local and international projects.

GE: State funding.

Weaknesses/barriers

AR: There is no clear understanding on this matter as there is no exact data; financial data are not fully open for such an investigation. Generally, however, teaching gets more funding than research. Most of the funding for teaching goes into salaries, with very limited funding for research or fieldwork. Funding for non-professional DRM institutions in the development of specified DRM education is limited.

AZ: Faculties and departments do not have their own funding.

GE: Internal university funding, especially at the department/faculty level, for DRM research and publications, is limited.

Priorities

AR: Funding for the development of research and technical capacities; renovation of laboratory facilities (this priority is also relevant for technical capacities).

AZ: Resource management; opportunity to have own budget.

GE: Additional funds for research and cooperation.

Enablers of change

AR: HEIs are trying to find solutions themselves; Self-funding, cooperation and collaboration programs with other organizations; international cooperation; research and capacity building grants.

AZ: Chance to distribute funding between scientific research, technical support, etc. themselves.

GE: Simple taxation system, independence during the universities internal budget planning.

There is an unbalance in the funding for research and teaching, with the latter being privileged in comparison to the former. Moreover there is a need to improve the mechanisms for distributing funding across university departments and faculties that often aim at increasing their independence. This will allow a better development of DRM capacities.

4.7 ADMINISTRATIVE CAPACITIES

The in-depth analysis of administrative capacities reveals the following trends:

Strengths

AR: All staff consists of experienced professionals and practitioners. Institutions also have scientific committees, consisting of administrative staff, teachers/professors as well as student representatives. They discuss many issues including educational processes, organization of conferences and roundtable discussions.

AZ: The selection of personnel is carried out by the administration's and the faculty's management. Good process of coordination for the recruitment of academic staff.

GE: Good level, no additional administration is needed; almost fully computerized administration.

Weaknesses

AR: Language barrier for the majority of administrative staff hinders them from getting acquainted with new investigations, achievements, and international experiences.

AZ: Limited transparency; insufficient funding.

GE: The gender balance is uneven (only one male); for new courses additional administrative staff will be needed.

Priorities

AR: Cooperation with international institutions for best administrative practice sharing.

AZ: Facilitate access to administrative procedures.

GE: Limiting barriers between departments; working without additional administration; additional funds for research.

Barriers

AR: Barriers are not mentioned. There seem to be no definite administrative barriers, as the decision makers of the institutions are ready for innovations

and improvements. Well-defined and justified programs will be accepted willingly.

AZ: Accreditation of new courses requires some documentation procedures. Accreditation of new courses at universities has to be approved by the Ministry of Education of the Republic of Azerbaijan

GE: Complicated and long accreditation procedure.

Enablers

AR: (Recommendation) There is a demand for more flexible administration. Educational planning should be improved in order to guarantee the effective use of financial, human and economic resources. Only after that, the funds should be allocated accordingly, meeting the demands of the program/plan. The administration of institutions should support the professors in new initiatives towards more effective educational activities.

AZ: Administrative effectiveness can be improved by decentralising resources management and allowing faculties and departments to manage resources autonomously. A suggestion is to create a work plan and budget at the beginning of the educational year.

GE: Improving universities internal administration (TSU) (e.g. by adopting standard and computerized procedures).

One important aspect for the SCAC project is that in some countries the accreditation of new courses requires approval by the Ministry of Education. As in the case of teaching capacities, language barriers are an issue for administrative capacities, hindering progress or modernization of the administration. Another common finding regards the decentralization of resources and administration management to the faculties and departments. This is in line with the results of the economic capacities in-depth assessment.

4.8. GOVERNANCE CAPACITIES

Governance capacities vary considerably in the countries under study. We analysed the following aspects:

Strengths

AR: Educational governance is transparent in both institutions studied; students take part in certain decision-making processes through representatives in scientific committees.

AZ: Decision-making with regard to courses and training programs is carried out in the university's scientific committee; proposals are then discussed by the faculty's academic committee. The whole process is transparent.

GE: Strong motivation and priority of NHRA/DRM; proven autonomy and stability.

Weaknesses

AR: Limited autonomy in decisions to develop the DRM sector.

AZ: Influence of a change in the university's rector on university policy; limited autonomy in decisions to develop the DRM sector.

GE: Need for stronger stability; new accreditation of courses is needed and the process is currently ongoing.

Priorities

AR: Involvement of students in educational governance activities; stability of educational processes.

AZ: DRM is a priority area at the state level; need of rational educational governance.

GE: Independence of the university (ISU); possibility to easily change the structure.

Barriers

AR: There is not much known about international experience regarding educational governance, which could help improve existing systems. Influence of higher administrative staff concerning the autonomy of educational governance.

AZ: Misunderstanding between management and academic staff, e.g. lack of training and development, lack of skills in managing research projects.

GE: Not significant barriers from the educational governance point of view.

Enablers of change

AR: Annual anonymous investigations are being conducted among all students where they evaluate all of the capacities of the institution, including the professors' efficiency, quality of teaching materials, availability of resources, teaching conditions, etc. These evaluations serve as the basis for improvements or changes (if necessary). Availability of materials in modern ways of educational governance from various successful cases: all of the institutions of the post-soviet countries mostly inherited the traditional systems and certain innovations or solutions are simply unknown to them. Cooperation with DRM educational institutions, experience sharing both for professors and administrative staff.

Collaborative research centres between various institutions would give not only good and interesting research results but also will enhance motivation among both professors and students.

AZ: Transparency in management at a high level.

GE: Good cooperation between the different faculties and departments.

The results do not reveal the existence of transnational academic networks. However, during the workshop discussion and on the basis of the international practice analysis conducted for activity 1.1.1.1. (Scolobig and Balsiger 2020), transnational academic and learning networks such as AUEDM (Asian University Network of Environment and Disaster Management) and PERIPERI U (Partners enhancing resilience for people exposed to risks) can represent a good model to foster partnerships between universities in the South Caucasus. For example, the PERIPERI U partners conceptualized together not only academic programmes but also short courses that reached thousands of practitioners in different African countries. Yet, the question of long-term sustainability of these voluntary and non-binding initiatives still remains open.

5. FINAL RECOMMENDATIONS: IMPROVING EXISTING AND CREATING NEW COURSES

This chapter highlights the critical gaps, barriers and opportunities for improving existing and creating new courses. Based on the interviews and focus group results in the three countries under study, it explains which topics should deserve to be further developed and why.

In *Armenia*, there is a need to strengthen existing knowledge and research capacities, by suggesting more advanced methods/tools to best implement the known methodologies and techniques. Significant improvement is also needed in teaching methods, by strengthening the already adopted practice-oriented approach. With the shift of emphasis to prevention and preparedness, it becomes evident that more knowledge on the nature of hazards, assessment methodologies and tools, and early warning systems is as important as emergency management and training.

Some topics for new courses that have been mentioned by the interviewees include:

- digital modelling of risks, simulations and community-based assessments;
- multi-hazard risk assessments;
- disaster risk mapping as well as work with satellite imagery and other geospatial data;
- geophysical and hydrometeorological investigations;
- impact of environmental degradation on the growth and triggering of natural hazards (climate change related issues);
- use of UAV's in DRM (monitoring, documentation and mapping, outreach in inaccessible, polluted and dangerous areas, etc.).

Research programs in these directions will not only support interesting and informative educational courses, but will also be very important at the national and regional levels, providing innovative solutions and good specialists able to cope with modern DRM challenges.
According to the collected data, it becomes evident that a generic NHRA course would also be relevant. Such a course should include advanced methodologies, digital mapping, work with satellite maps and capability of working with sources like the Copernicus Emergency Management Service (EMS) or Disasters Charter to use satellite imagery and other geospatial data which can be provided free of charge in cases of natural disasters, human-made emergency situations and humanitarian crises.

In *Azerbaijan*, in all the analysed courses, teachers have great pedagogical experience. The critical gaps are related to financial management and support in the faculty, administrative barriers, old technical capacities, and gaps in field research. Students probably have a general understanding of natural disasters but training in DRM is mainly provided in a traditional way. Innovation in teaching tools is considered a need. One of the main recommendations concerns distance learning. The administration, teachers and students positively inclined to introduce it. Meetings were organized with representatives of the administration that will also support as much as possible the development of distance learning.

Moreover, the results reveal that almost all the analysed courses (including environmental assessment; complex use and protection of water reserves; protection of atmospheric and water reservoirs from industrial pollution; ecological bases of melioration and reclamation work;

psychological resilience in emergencies; theoretical bases of life safety; hazardous factors of emergency situations; and industrial safety) deserve further development. Each of these courses contains topics that are critical to managing risk and exploring the effects of natural disasters. But there are also courses that would be advisable to include in distance learning such as: GIS hazard mapping, digital modelling, NHRA methodologies, and multi-hazard risk assessment.

Tab. 2: Suggestions for new modules and courses, including feasibility and barriers

		Mentioned by N countries	**Course (C) /module (M)**	**Inclusion in SCAC 1.1.1.1. review**	**Feasibility and barriers**
1.	Digital modelling of risks	3	M/C	√	Financial resources needed for acquiring the program software and hardware and maintaining the licenses
2.	Advanced GIS hazard mapping	2	M/C	√	n/a
3.	Use of UAV's in DRM, satellite images	1	M/C		Financial resources needed for acquisition of UAV
4.	Multi hazard and risk assessment	2	M	√	Identification and number of case studies/fieldwork locations exposed to multiple hazards
5.	DRM social aspects	3	C	√	Need of teachers with background/expertise on these topics
6.	DRM economic aspects	1	C/M	√	Need of teachers with background/expertise on these topics
7.	Forest fire risk assessment and management	1	M		Need to integrate in existing courses, only one country is missing this expertise
8.	Community based disaster risk management training	1	M/C	√	n/a
9.	Impact of environmental degradation on natural hazards	1	M		n/a
10.	Cases in disaster risk management (focus on good practices and failures)	1	C	√	This course may enable inter-faculty and department dialogue

In *Georgia,* the main recommendation consists in dedicating more resources to fieldwork, modelling, and practice-related aspects, including the lab components. It is suggested to improve these components in the framework of existing courses. The translation to Georgian of modern textbooks and/or teaching materials is also highly recommended. Concerning the development of new courses, the recommendations concern:

- the development of new courses focusing on the social aspects of NH and DRM;
- the creation of a new course on forest Fires or adding this topic to an existing course.

In one University (ISU) there is a MSc program on forest management but for the time being, it does not touch upon forest fires. For both assessed universities there is also a strong need for improving remote sensing application in DRM and for additional funds to expand R&I and the fieldwork component in DRM teaching. The absence of modern textbooks and/or teaching materials in native language is also another common gap.

Table 2 summarises the suggestions for topics to be included in new modules or courses. It also includes relevant aspects to take into account for the next project phases, namely possible barriers (as emerging from the capacity analysis conducted in section 4). It also provides information on whether the topics has been included in the international practice analysis conducted in SCAC Activity 1.1.1.1.

6. CONCLUSION

This concluding chapter describes some key findings emerging from the cross-country analysis. It also includes some reflections on the implications of the findings, both for the SCAC project and for future research that is needed.

The cross-country results reveal the need to strengthen existing knowledge and research capacities, by suggesting more advanced methods/tools to best implement known methodologies and techniques. Significant improvement is also needed in teaching methods, with emphasis on teacher coaching to introduce innovative ways of teaching and learning. In some countries a more practice-oriented approach is envisaged. Economic support for increased cooperation and for exchange opportunities with other countries is another common denominator.

The following table summarises the top catalysts at the cross-country level for the capacities under study.

Tab. 3: Cross-country top catalysts

Capacity	Catalysts
Knowledge	Enhance critical thinking skills; strengthen the links between research and practice; invest in distance learning.
Teaching	Improve English skills of teaching teams and students; diversify teaching teams to include practitioners; enhance cooperation; enhance accessibility.
Research	Facilitate participation in international research projects; provide funding for international collaboration; enhance student research capabilities.
Fieldwork	Increase availability of funding for fieldtrips for students.
Technical	Improve laboratories; increase budgets for new equipment and technologies.
Economic	New self-funding options; explore private funding options.
Administrative	Increase flexibility; increase autonomy of faculties and departments.
Governance	Develop cross-country research centres and collaborative institutions/networks; increase transparency.

On the basis of the in-depth assessment, several actions and initiatives are recommended, including:

– online knowledge hub for DRM education with several components including:

methodological training for teachers; an advanced NHRA course for students; links to relevant reading materials or platforms and other teaching support information; examples of best and worst practices, e.g. for hazard/risk assessment; testimonials and snapshots with professors/practitioners about their views on DRM innovation

- visits of researchers and professors participating in the next SCAC project phases to other countries/universities
- preparation of new course(s) in tight cooperation with external professors and practitioners; improve technical solutions (hardware and/or software) for DRM research and analytics.
- preparation (translation or writing) of modern textbooks (mentioned especially for Georgia) on NHRA and DRM

It is also recommended to conduct additional research to better understand gaps and needs among the employers and possible other beneficiaries (governmental agencies, NGOs, and companies).

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ANNEX 1: IN-DEPTH ASSESSMENT GRID

General explanations: i) The formulation "To what extent" means: [on a 1(min) to 5 (max) Likert scale] The scale can measure e.g. level of agreement, degree of availability etc. depending on the question formulation; ii) if not specified differently, the unit of analysis is the university; iii) if not specified differently, the assessment refers **to the Disaster Risk Management (DRM) sector** (and not e.g. research or knowledge capacities in any sector); iv) if not specified differently, DRM includes both **teaching and research;** v) this grid is for the **SOLE USE** of the National experts (NE). Please also note that NE will have to fill in the data in an Excel sheet that will be provided to NE once the final version of the In-depth Evaluation Grid will be available.

Key concepts
The focus of this evaluation is DRM and its final aim is to identify courses to improve higher education in DRM at the regional level in the South Caucasus. DRM is defined as "*the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster*" (UNISDR 2005). Therefore, the focus is on courses that include DRM aspects as listed in the second table under DRM Knowledge Capacities. Also courses that include DRM as one module/topic should be included.

The focus of this evaluation is also to identify barriers and catalysts for the development of higher education in DRM at the regional level in the South Caucasus. The key focus should be on the identification of DRM related courses that fill weaknesses present in different countries.

Please note that the version presented below is a working version. The final version will be formatted (e.g. question numbers, better format etc.)

DRM Knowledge capacities
Knowledge capacities are defined as the set of DRM information, skills, abilities, qualifications that students acquire in the university. The focus here is on University courses aimed at improving the DRM knowledge base.

<table>
<tr><td>1.Courses-General</td><td>Provide information about the DRM courses in the academic year 2019/2020. As mentioned above, also courses that include DRM as one module/topic should be included. Please search or ask for courses with the following key words: natural (including climate induced) and/or technological hazard, risk, vulnerability, disaster, hazard/risk/vulnerability assessment, risk analysis, risk management, disaster risk reduction, disaster risk mitigation, warning systems, emergency management, disaster response, recovery and reconstruction, disaster preparedness, risk awareness and perception, risk communication, risk governance.
<table>
<tr><td>Course title</td><td>Key words</td><td>Belonging (Faculty/Department/ School)</td><td>Professor in charge</td><td>ECTS**</td></tr>
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	*Please note that this and all the other tables will have to be filled in in a separate file (word or excel). Depending on the country, some information are already available from the inception phase. ** European Credit Transfer and Accumulation System
2.Courses-Contents	Provide information for each course

Course title	
Course objectives / Learning outcomes	
Schedule/topics	
Readings	
Student grading	
Teaching method/fieldwork	
Course offered on-line	
Evaluation of the course and instructors by students	
Strengths of the course	
Weakness of the course	
Planned improvements/changes	
Professor language skills	

3.Courses-Acquired knowledge and skills	Provide information/key points for each course [examples for a climate adaptation course]

At the end of the course, the students	
Understand (knowledge)	[understand the root causes of climate change and the urgent need for change from unsustainable practices towards advancing quality of life, equity, environmental sustainability]
Are able to (skills)	[use scientific evidence to support his/her arguments; identify climate adaptation options and evaluate potential consequences of decisions and actions]
Are ready to (practice oriented skills)	[are able to design a climate adaptation plan; are able to communicate a sense of urgency in relation to climate change]

4. [On a 1(min) to 5 (max) Likert scale] Are the following topics generally addressed in the courses mentioned above? [please note that this is an evaluation across-courses/collective. The answer to these questions can be based on focus groups results or the NE own judgement, based on his/her review]			
	Geological hazards (e.g. earthquakes, volcanic eruptions)	Meteorological hazards (e.g. floods, extreme wind)	Other

Hazard/risk/vulnerability assessment			
GIS and mapping			
Warning systems, emergency management and response			
Recovery (recovery planning, humanitarian aid for DRM)			
Risk mitigation (building codes and legislation, structural mitigation measures, critical infrastructures)			
Disaster medicine/health/health facilities			
Economic aspects of DRM (insurances, loss and damage assessment, risk transfer)			
Social aspects of DRM (risk perception, communication, social vulnerability and resilience, community based DRM)			
Political/legal and institutional aspects of DRM (e.g. integration of risk maps in urban development, legislation)			
Ecological aspects of DRM (ecosystem based approaches , Eco-DRR)			
Climate change (atmospheric and climate science)			

5.Strengths	What are the main strengths in the knowledge capacities/course offer? [This reply should be based on the courses collective overview/not on one single course]
6.Weaknesses	What are the main weaknesses in the DRM course offer? [This reply should be based on the courses collective overview/not on one single course] Should existing courses be improved? If so, which ones?
7.New topics/courses and priorities	Should new topics/courses be developed? If so, which ones? Please not that during the inception phase the following new topics have been identified and can be used as background for the discussion. • advanced NHRA methodologies • advanced GIS knowledge • latest remote sensing technologies • digital modelling • multi-hazard risk assessment • community based disaster risk management training What new skills will these new topics/ courses provide? Why are these new topics/courses relevant? Among the new topics/courses, which ones — if any — would provide students with competences and skills for becoming DRM practitioners in the private sector (e.g. insurance sector, private engineering companies)? Among the new topics/courses, what are the 2 key priorities?
8.Barriers	What are the knowledge barriers related to the development of DRM higher education in the selected organisation/university?

	What could be the main knowledge barriers related to the development of DRM higher education at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate knowledge barriers related to the development of DRM higher education at the regional level in the South Caucasus?
9.Catalysts/enablers	What are the knowledge-related catalysts/enablers for the development of DRM higher education in the selected organisation/university? What could be the main knowledge-related catalysts/enablers for the development of higher education in DRM at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate knowledge catalysts/enablers related to the development of DRM higher education at the regional level in the South Caucasus?

DRM Teaching capacities

Teaching capacities are defined as the didactic offer aimed at transferring DRM knowledge, skills and abilities to students or professionals (continuous education) in the university.

10.Strengths	What are the main strengths in teaching capacities? Are individual needs of learners addressed? If so, how?
11.Weaknesses	What are the main weaknesses in teaching capacities? During the inception phase the following weaknesses have been identified and can be used as background for the discussion. • Modelling courses (including modelling based on remote sensing data); • Acquisition of new software programs; • Improvement of geohazards knowledge; • Improvement of knowledge on land degradation, desertification, development of landslides in Armenia and measures to combat it/seismic risk and way to combat it/hydro meteorological disasters.
12.Training needs	Do Professors/lecturers/teachers need training? If so, in what sector?
13.Priorities	What are the 2 key priorities?
14.Barriers	What are the teaching related barriers to the development of DRM higher education in the selected organisation/university? What could be the main barriers related to teaching for the development of DRM

	higher education at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate barriers related to teaching for the development of higher education in DRM at the regional level in the South Caucasus?
15.Catalysts/enablers	What are the teaching related catalysts/enablers to the development of DRM higher education in the selected organisation/university? What could be the main catalysts/enablers related to teaching for the development of DRM higher education at the regional level in the South Caucasus? What would motivate Professors to cooperate and create a joint Programme? [On a 1(min) to 5 (max) Likert scale] How would you evaluate the strength of teaching catalysts/enablers related to the development of DRM higher education at the regional level in the South Caucasus?

DRM Research capacities

Research capacities are defined as the set of activities conducted to foster innovation in DRM research.

16.Strengths	What are the main strengths in research capacities?
17.Weaknesses	What are the main weaknesses in research capacities?
18.Priorities	What are the 2 key priorities?
19.Barriers	What are the research related barriers to the development of DRM higher education in the selected organisation/university? What could be the research-related barriers for the development of higher education in DRM at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate research related barriers for the development of higher education in DRM at the regional level in the South Caucasus?
20.Catalysts/enablers	What are the research related catalysts/enablers to the development of DRM higher education in the selected organisation/university? What could be the research-related catalysts/enablers related for the development of higher education in DRM at the regional level in the South Caucasus? What would motivate Professor to cooperate and create a joint Programme? [On a 1(min) to 5 (max) Likert scale] How would you evaluate the strength of research catalysts/enablers related to the development of higher education in DRM at the regional level in the South Caucasus?

DRM Fieldwork capacities

Fieldwork capacities are defined as the set of DRM fieldwork and practice oriented activities (e.g. practical work, site visits of areas affected by natural disasters). These capacities are related to DRM courses, not Master nor PhD related fieldwork.

21.Strengths	Is DRM fieldwork conducted in the context of DRM education? If DRM fieldwork is NOT conducted, why? Are Professors willing to develop fieldwork capacities? If DRM fieldwork is conducted, what are the main strengths in fieldwork capacities?
22.Weaknesses	If DRM fieldwork is conducted, what are the main weaknesses in fieldwork capacities?
23.Priorities	What are the 2 key priorities to develop DRM fieldwork capacities?
24.Barriers	What are the fieldwork related barriers to the development of DRM higher education in the selected organisation/university? What could be the fieldwork-related barriers for the development of higher education in DRM at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate fieldwork related barriers for the development of higher education in DRM at the regional level in the South Caucasus?
25.Catalysts/enablers	What are the fieldwork related catalysts/enablers to the development of DRM higher education in the selected organisation/university? What could be the fieldwork-related catalysts/enablers related for the development of higher education in DRM at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate the strength of fieldwork catalysts/enablers related to the development of higher education in DRM at the regional level in the South Caucasus?

DRM Technical Capacities

Technical capacities are defined as the set of DRM technologies available to conduct teaching and research activities in the university.

Technologies can include e.g.: i) data collection/monitoring (ranging from laboratory testing, on-site testing, remote sensing of natural processes, and of potentially vulnerable elements), ii) modelling (including different types of numerical modelling- deterministic and stochastic, and, where available, physical modelling, at reduced-scale and/or full scale), and iii) forecasting technologies.

26.Strengths	What are the main strengths in technical capacities?
27.Weaknesses	What are the main weaknesses in technical capacities? During the inception phase the following weaknesses have been identified and can be used as background for the discussion. • improvement of GPS technologies • more capacity to develop the base GIS layer • land use and land cover generation using machine learning • development of advanced 3D modelling, digital modelling, geological modelling • software package as Pix4D and MIKe and other licensed software • laboratory testing technologies • disaster risk reduction laboratory
28.Priorities	What are the 2 key priorities?
29.Barriers	What are the technical barriers to the development of DRM higher education in the selected organisation/university? What could be the technical barriers for the development of higher education in DRM at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate technical barriers for the development of higher education in DRM at the regional level in the South Caucasus?
30.Catalysts/Enablers	What are the technical catalysts/enablers to the development of DRM higher education in the selected organisation/university? What could be the technical catalysts/enablers (e.g. catalysts related to the development of technical capacities) for the development of higher education in DRM at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate the strength of technical catalysts/enablers related to the development of higher education in DRM at the regional level in the South Caucasus?

DRM Economic Capacities

Economic capacities are defined as the funding available to conduct DRM teaching and research activities in the university.

31. Strengths	What are the main strengths in economic capacities?
32.Weaknesses	What are the main weaknesses in economic capacities? Are resources allocated efficiently?
33.Priorities	What are the 2 key priorities?
34.Barriers	What are the economic barriers to the development of DRM higher education in the selected organisation/university? What could be the economic barriers for the development of higher education in DRM at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate economic barriers for the development of higher education in DRM at the regional level in the South Caucasus?
35.Catalysts/Enablers	What are the economic catalysts/enablers to the development of DRM higher education in the selected organisation/university? What could be the economic catalysts/enablers (e.g. catalysts related to the development of technical capacities) for the development of DRM higher education at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate the strength of economic catalysts/enablers related to the development of DRM higher education at the regional level in the South Caucasus?

DRM Administrative Capacities

Administrative capacities are defined as the set of administrative and human resources available to conduct DRM teaching and research activities.

36.Administrative capacities	What are the main strengths in administrative capacities?
37.Weaknesses	What are the main weaknesses in the administrative capacities?
38.Priorities	What are the 2 key priorities?
39.Barriers	What are the administrative barriers to the development of DRM higher education in the selected organisation/university? What could be the administrative barriers for the development of higher education in DRM at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate economic barriers for the development of higher education in DRM at the regional level in the South Caucasus?
40.Catalysts/enablers	What are the administrative catalysts/enablers to the development of DRM higher education in the selected organisation/university? What kind of managerial/administrative measures should be taken to guarantee an effective use of financial, human and economic resources? What could be the administrative catalysts/enablers for the development of higher education in DRM at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate the strength of administrative catalysts/enablers related to the development of higher education in DRM at the regional level in the South Caucasus?

DRM Educational Governance

Educational governance is defined as the set of principles (e.g. autonomy, transparency, stability) implemented in your university to conduct DRM teaching and research activities

41.Strengths	What are the main strengths in educational governance?
42.Weaknesses	What are the main weaknesses in educational governance? During the inception phase the following Weaknesses have been identified and can be used as background for the discussion. • Transparency in decisions about teaching directions or courses prioritization (in some countries more prominent than in others) • Influence of University rector change on university policy • Limited autonomy in decisions to develop the DRM sector
43.Priorities	What are the 2 key priorities?
44.Barriers	What are the governance barriers to the development of DRM higher education in the selected organisation/university? What could be the governance barriers for the development of DRM higher education at the regional level in the South Caucasus? [On a 1(min) to 5 (max) Likert scale] How would you evaluate governance barriers for the development of higher education in DRM at the regional level in the South Caucasus?
45.Catalysts/enablers	What are the governance catalysts/enablers to the development of DRM higher education in the selected organisation/university? What could be the governance catalysts/enablers for the development of higher education in DRM at the regional level in the South Caucasus? What partnerships or networks should be leveraged? Should new research centres /organisations be established? If so, which ones? [On a 1(min) to 5 (max) Likert scale] How would you evaluate the strength of governance catalysts/enablers related to the development of DRM higher education at the regional level in the South Caucasus?

ANNEX 2: AGENDA OF THE FIRST REGIONAL WORKSHOP ON TEACHING-LEARNING PRACTICE IMPROVEMENT

EVENT: The First Regional Workshop on Teaching-Learning Practice Improvement

PROJECT: Strengthening the Climate Adaptation Capacities in the South Caucasus (SCAC)

DATE: 30 March and 1 April 2020

VENUE: ZOOM teleconference

ABOUT THE MEETING:
The meeting will be focused on evaluation of progress and further planning of the following interventions under the Activity 1.1. on Study of international and local teaching-learning practices and establishment of DRM & hazard mapping module in Armenia, Azerbaijan and Georgia:

(a) In-depth assessment of national higher education offer in DRM and hazard mapping in South Caucasus countries and
(b) Distance-learning module for hazard mapping.

The first part of the workshop on 30th of March will be dedicated to the *In-depth assessment of national higher education offer in DRM and hazard mapping in South Caucasus countries*, while 1st of April – on the *Distance-learning module for hazard mapping*.

THE FIRST PART OF THE WORKSHOP: In-depth assessment of national higher education offer in DRM and hazard mapping in South Caucasus countries:

Background and Ambition (from the SCAC proposal): The inception phase assessment of DRM and hazard mapping education at selected South Caucasus higher education institutions has served to identify a significant number of relevant courses and teaching approaches, as well as indications of the institutional environment, lecturer and administrative staff availability and competences and budgetary conditions. While this information has helped to identify priority partners for the SCAC project, more in-depth information is needed to identify precise Weaknesses.

This intervention will address these Weaknesses through an in-depth assessment that takes into account international experience. It will involve participant observation, interviews and focus groups with lecturers and students, and analysis of syllabi; to the extent possible, summary information of student course evaluation will also be used. A common assessment framework and methodology informed by state-of-the-art pedagogical and substantive will guide the process. The development of the assessment framework will be coordinated by the University of Geneva, in close collaboration with educational experts from the respective countries, ideally with experience in the DRM sector. Results and follow-up actions for Intervention 1.5 will be discussed at a regional workshop. An important outcome of this intervention is the pre-identification of courses to be adapted or newly developed for the possible higher education in DRM at the regional level in the South Caucasus.

Expected results of the Intervention:

- Assessment report of teaching and learning practices in DRM and hazard mapping courses
- Gap identification and prioritization for improving existing or creating new courses
- Short list of courses to be included in the possible Higher education in DRM at the regional level in the South Caucasus

Compulsory participation:

- National Experts (NE): Armine Hayrapetian, Natavan Jafarova, Archil Magalashvili
- University of Geneva (UNIGE) Team: Jörg Balsiger, Simon Allen, Anna Scolobig

Other participants: Sustainable Caucasus staff, Ilia State University Staff

Preparation:

- National experts' country draft reports and power points will be circulated before the meeting. Deadline for the country report is March 23rd and for the power point is March 27th.

- NE: gap identification and prioritization for improving existing or creating new courses/ collate top 2 priorities for the courses; collate top 3 barriers and 3 enablers related to the development of DRM higher education at the regional level in the South Caucasus

Objectives:

- Presentation of the draft national country reports "In-depth assessment of national higher education offer in DRM and hazard mapping"
- Identification of critical gaps for improving existing and creating new courses
- Identification of barriers and enablers related to the development of DRM higher education at the regional level in the South Caucasus

THE SECOND PART OF THE WORKSHOP: Distance-learning module for hazard mapping

Background and Ambition (from the SCAC proposal): A growing number of educational offers are in the form of distance learning. The advantages of distance learning include accessibility from anywhere in the world, affordability, self-paced learning, flexible scheduling, diversity of high-quality programmes, and value-added for employability. Based on a review of DRM teaching at selected South Caucasus universities, distance learning is not yet widely used. While distance learning can include costly techniques such as the creation of Massive Open Online Courses (MOOCs), affordable yet effective techniques are widely deployed.

This intervention seeks to establish a hazard mapping distance-learning module based on best practices identified under Intervention 1.1.1.1, drawing on methodological approaches already tested in Georgia (in the context of a pilot project to align national methods with Swiss and European standards), and considering the needs and gaps identified in Intervention 1.1.1.3. The module will incorporate existing materials as much as possible but offer them in a new form. Existing materials include courses offered at the University of Geneva, training already provided in Georgia, selected teaching materials from Caucasus countries, and already available MOOC excerpts. Access to such material will be secured through partnerships with content providers (see Partners below). Module development will be coordinated by the University of Geneva, in collaboration with partner institutions in the Caucasus for testing and monitoring.

The module will be developed in English; then, to maximise usability, it will be translated into Georgian, Armenian, and Azeri. A development and testing phase, coordinated by the University of Geneva in close collaboration with selected lecturers from Caucasus higher education institutions, will conclude with a regional workshop, where lessons from the testing phase are discussed and the distance module finalization defined.

The module will consist of two parts. At the conclusion of Part One (1 ECTS: 25-30 hours of total student investment), participants will be able to identify and understand key DRM concepts and definitions as well as locate DRM in national and international institutional contexts. At the conclusion of Part Two (2 ECTS 50-60 hours of total student investment), students will be able to apply DRM concepts using GIS tools to produce risk maps. While the intended target audience will be advanced undergraduates and beginning graduate students, the distance-learning module will be open to a wider audience, including professionals.

Expected results of the Intervention

- A two-part distance-learning module: basics (context, concepts, definitions), mapping (concepts, tools, applications, practice)

Preparation:

- National experts will receive access to distance learning module (DLM) ahead of the meeting, to begin reviewing.
- Participants should be familiar with the scope and style of the material, but detailed testing is not expected to begin until after the workshop.
- Power point slides to be presented in the meeting will be shared beforehand (deadline March 27th).

Objectives:

- Introduction and presentation of the main components of the DLM.
- Identification and discussion of any gaps in the module, and discussing opportunities where further locally tailored material could be integrated.
- Planning and preparation of the testing phase.

Compulsory participation:

- National Experts (NE): Zurab Javakhishvili, Natavan Jafarova, Ashot Sargsyan
- University of Geneva (UNIGE) Team: Simon Allen, Anna Scolobig

Other participants: Sustainable Caucasus staff, Ilia State University Staff

EVENT:	**The First Regional Workshop on Teaching-Learning Practice Improvement**
PROJECT:	**Strengthening the Climate Adaptation Capacities in the South Caucasus (SCAC)**
DATES:	**30 March – 1 April 2020**
VENUE:	**Virtual meeting. Please note the time is local Georgia/Tbilisi time.**

DRAFT AGENDA:

DAY 1: Monday, 30th of March

14:00-14:15	**Workshop roadmap and National Experts expectations - First Part** *UNIGE and intervention by each National Expert*
14:15-14:45	**Draft country report presentation: Armenia** *15 min presentation by National Expert, 15 min discussion*
14:45-15:15	**Draft country report presentation: Azerbaijan** *15 min presentation by National Expert, 15 min discussion*
15:15-15:45	**Draft country report presentation: Georgia** *15 min presentation by National Expert, 15 min discussion*
15:45-16:00	***Coffee break***
16:00-16:30	**Work session to identify critical gaps for improving existing and creating new courses: cross-country commonalities and differences** *Discussion moderated by UNIGE*

16:30-17:00	**Work session to identify top barriers and enablers for the development of DRM higher education at the regional level in the South Caucasus: cross-country commonalities and differences** *Discussion moderated by UNIGE*
17:00-18:00	**Next steps** Discussion of the Intervention 1.1.1.3. timeline: impact of COVID-19 on timeline, preliminary reflections about new (post COVID-19) practices of on-line teaching, country report finalisation, cross-country commonalities and differences, preliminary ideas about the synthesis report *Discussion moderated by UNIGE*

DAY 2: Tuesday, 31st of March

14:00-15:00	**Continuation of DAY 1 discussion (if needed)**

DAY 3: Wednesday, 1st of April

14:00-14:15	**Workshop roadmap – Second Part** *Incl. general introduction to the DLM; Presentation by UNIGE*
14:15-14:30	**Country expectations for the DLM** *Round table discussion; 5 minutes intervention by each National Expert*
14:30 -15:30	**Part 1 of the Distance Learning Module** *Presentation by UNIGE; feedback and discussion by National Experts*
15:30-16:00	***Coffee break***
16:00-16:45	**Part 2 of the Distance Learning Module** *Presentation by UNIGE; feedback and discussion by National Experts*
16:45-17:15	**Design of testing phase (who, how, when)** *Discussion by UNIGE and National Experts*
17:15 -17:45	**Towards implementation** *Discussion by UNIGE and National Experts*
17:45-18.00	**Summary remarks and next steps** *by UNIGE and National Experts*

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