Country Report

1. Introduction

Location: Southwest Asia, east of Turkey
Geographic coordinates: 40 00 N, 45 00 E
Land area:
Total 29.800 sq km
Land 28.400 sq km
Water 1.400 sq km
Border countries:
Azerbaijan – proper 566 km,
Azerbaijan-Naxcivan exclave 221 km
Georgia 164 km
Iran 35 km
Turkey 268 km
Climate: highland continental
Hot summers
Cold winters
Terrain: Armenian Highland with mountains;
Little forestland;
Fast flowing rivers
Elevation extremes:
Lowest point:
Debed River 400 m
Highest point:
Aragats Lerr 4.095 m
Natural resources:
Small deposits of gold, copper, molybdenum, zinc, alumina
Country name
Conventional long form: Republic of Armenia
Conventional short form: Armenia
Local long form: Hayastani Hanrapetutjun
Local short form: Hayastan
Former: Armenian Soviet Socialist Republic
Government Type: Republic
Capital: Yerevan
Administrative divisions:
10 provinces and 1 city
Independence:
28 may 1918 (first Armenian Republic)
23 September 1991 (from Soviet Union)
National holiday:
Referendum day, 21 September
Constitution:
Adopted by nationwide referendum 5 July 1995
Legal system:
Based on civil law system
The system of Government:
Presidental rule
Chief of state: President elected by popular vote for a five-year time
Head of Government: Prime Minister appointed by the President
Cabinet: Council of Ministers appointed by the Prime Minister elections
Legislative branch:
Unicameral National Assembly or Azgayin Zhogov
Judicial branch: Supreme Court; Constitutional Court
Military Branches:
Army, Air Force and Air Defense Aviation, Air Defense Force, Security Forces

Population:
3,344,386
Religions:
Christian 96%
Church:
Armenian Apostolic
Languages:
Armenian 96%
Russian 2%
Other 2%
Extended family system
Literacy rate:
Definition: age 15 and over can read and write
Economical Situation
Industries:
metal-cutting; machine tools; forging-pressing machines; electric motors; tires; knitted wear; hosiery; shoes; chemicals; trucks; instruments
Imports:
natural gas; petroleum; foodstuffs; tobacco products
Exports: diamonds; scrap metal; machinery; cognac; brandy; mineral water; beer

Major international humanitarian organizations in Armenia:

OCHA

Office for the Coordination of Humanitarian Affairs

USAID

US Agency for International Development

UNDP

United Nations Development Programme

ARCS

Armenian Red Cross Society

2. Armenian experience in seismic risk reduction

Caucasus countries are the regions of numerous natural and manmade hazards. Analysis of the loss caused by various hazards revealed that the most catastrophic ones for the region are **strong earthquakes**.

Caucasus countries are in the zone of high seismic hazard of Alpine-Himalayan and Balkan-Carpathian seismic belts. Strong earthquakes are known here from the 19th century B.C. up to present, for instance: Izmit (Turkey) in August 1999, M=7.4; Athens (Greece) in September 1999, M=5.8; Dyuzge (Turkey) in November 1999, M=7.2.

One of the most tragic seismic events in the history of the region was the Spitak earthquake that shook Armenia on December 7, 1988. More than 25,000 died, 20,000 were injured and 515,000 became homeless. Large-scale destruction of buildings and structures occurred almost in all the towns and settlements of Northern Armenia.

Before the 1988 Spitak earthquake, neither the leadership of the Republic nor the population had been prepared to protect the republic against a large earthquake in Armenia.

For a number of reasons this problem has not been considered at all. These reasons included the following:

- protection of people against earthquakes was not considered an all-Union problem in the USSR, because only an insignificant part of the Soviet population resided in seismically-active zones; consequently, only the USSR Academy of Science was considered with earthquakes, and they considered them merely as interesting natural phenomena;
- the solution of all problems in the USSR was strongly centralized, and the leadership of the Republic was not able to put forward or solve any large-scale problems requiring great material expenditure and resources.

The period following the Spitak earthquake coincides with the period of social order change in Armenia and its formation as an independent state. This allowed us to advance the problem of protecting the Armenia population against large earthquakes to the foreground of national problems.

According its the project proposed by Prof. Dr. S. Balassanian to the President, Parliament and Government of the Republic of Armenia, the National Survey For Seismic Protection (NSSP) was founded under the Government of the Republic of Armenia on July 17, 1991. Armenian NSSP was given special governmental status and ministerial powers. The President of the Armenian NSSP is directly subordinated to the Prime Minister.

The basic goal of Armenian NSSP is Seismic Risk Reduction in Armenia.

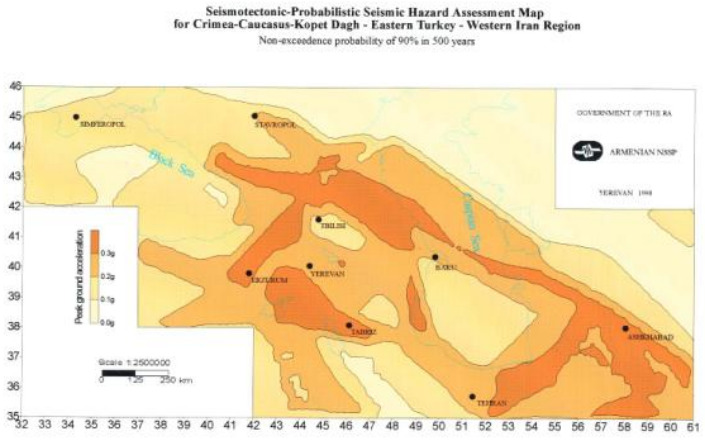
Armenian NSSP has developed two Strategic National Programs on "Seismic Risk Reduction in Armenia" and "Seismic Risk Reduction in Yerevan-city". The Programs, adopted by the Government of the Republic of Armenia on the 10^{th} and 7^{th} of July in 1999 are designed for 30 years. All the Ministries and other Governmental, non-Governmental and private organizations will implement these National Programs under the general co-ordination of Armenian NSSP assigned by the Government as a responsible body for the Seismic Risk Reduction Strategy development and implementation.

National Programme of Seismic Risk Reduction in the Territory of Armenia (Block-Scheme)

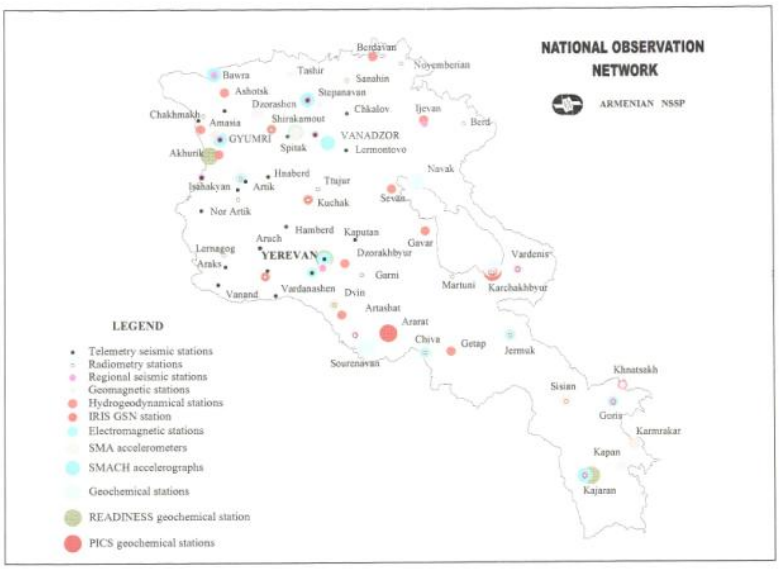
- Long-term Seismic Hazard Assessment
- Prediction of Secondary Hazards (fires, landslides, etc.)
- Seismic Risk Assessment (for people, their property and State)
- Current Seismic Hazard Assessment (Earthquake prediction)
- Population preparedness
- Territories' vulnerability reduction
- State Bodies' Preparedness
- Medical Preparedness
- Early Warning
- Establishment of the Centre for Emergency Situation Management
- Creation of Rapid Response Forces and Material Resources
- Preparedness to Rescue Activities
- Elaboration of Laws and Codes
- Establishment of Insurance Svstem
- Prevention of Population Migration

The Armenian NSSP has significant achievements in the filed of seismic risk reduction.
The main of them are:

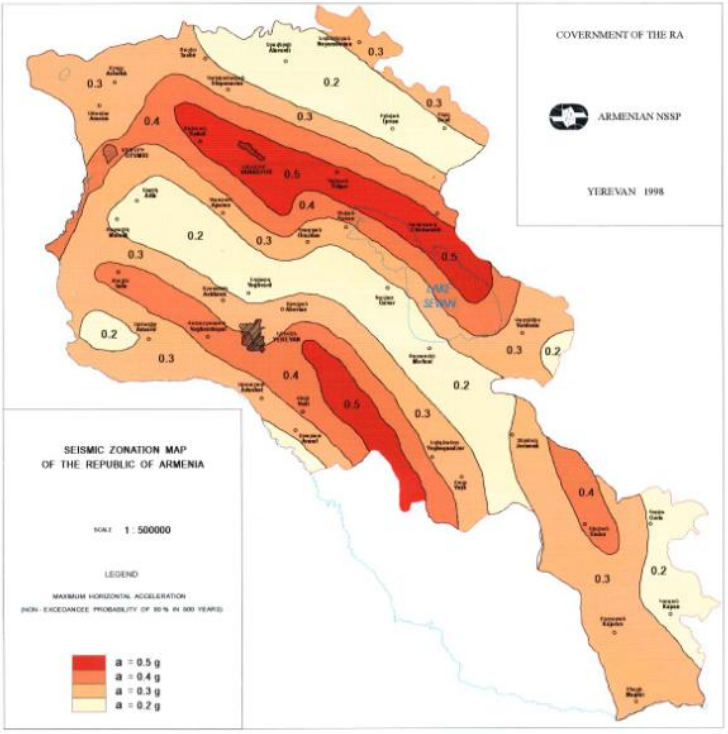
- **Seismic Hazard Assessment.** The **main goal** of the carried out work is to re-activate the seismic hazard assessment programme in the Crimea-Caucasus-Kopet Dagh region by establishing the "Caucasus" test are for multi-national, multi-disciplinary, multi-method assessment of seismic hazard, in co-operation with organizations in neighboring countries (Iran, Turkey) and with international scientific agencies and programmes – International Association of Seismology and Physics of the Earth Interior (IASPEI), the European Seismological Commission (ESC) and the Global Seismic Hazard Assessment Programme (GSHAP). These first probabilistic maps of SHA have been created.



- **Current Seismic Hazard Assessment.** A unique multi-parameter network has been established. It consists of 150 monitoring stations performing round-the-clock data acquisition and analysis. Expert systems for current seismic hazard assessment have been created.



- **New Seismic Zonation Map for the territory of Armenia** on the scale of 1:500000 was complied at the NSSP RA in collaboration with the Swiss Seismological Survey. In 1998 the map was finally approved by the NSSP and submitted to the Government of Armenia as a new strategic basis for the safe urbanization of the territory of Armenia.



- **New Methods for Reinforcement of Buildings and Structures.** New methods for increasing the earthquake resistance of buildings and structures have been developed and successfully tested and implemented in practice.
- **New Seismic Construction Codes.** Armenian NSSP took part in creation of the first seismic construction codes for Armenia.

In 1994 the former Building Code was substituted by the new Seismoresistant Construction Design Code. It has been developed by joint efforts of organizations involved in design and construction as well as seismic protection.
The main principal changes comparing with the previous Building Code are the followings:

1. Seismic impact intensity is estimated by the maximum horizontal ground acceleration according to the seismic zones as follows:

I_{zone} –200 cm/sec^2 (A=0.2)

II_{zone} -300 cm/sec^2 (A=0.3)

III $_{zone}$ – 400 cm/sec^2 (A=0.4)

2. Horizontal seismic loading S_{ki} which is corresponding to the i-th mode of building or structure free oscillations applied to the point k is calculated through the formula:

$S_{ki}=Q_kAK_o\eta_{ki}c$ comparing to the former

$S_{ki}=Q_kA^*\eta_{ki}\beta^*_i$

A* for the intensities of 7,8 and 9 was accepted 0.05, 0.1 and 0.2 correspondingly. Now they are equal to 0.2; 0.3; 0.4.

K_o- is conventional factor for soil conditions,

Ist soil cotegory – 0.8
IInd soil cotegory – 1.0
IIId soil cotegory – 1.2
IVth soil cotegory – 1.4

In the previous version of Building Code this factor has been taken into account by the coefficient β^*_i - the coefficient of dynamics.
In the new Code the coefficient of dynamics is calculated through the new formulas depending on the soil category and on the period of the i-th mode of the building free oscillations.

For example:
For Ist soil category

$\beta_i=1+7.5T_i$, when $0<T_i\leq 0.2$

$\beta_i=1+2.5$, when $0.2<T_i\leq 0.4$

$\beta_i=1.35.T_i^{-2/3}$, when $T_i= 0.4$

For II-nd and III-d categories

$\beta_i=1+3.75T_i$, when $0<T_i\leq 0.4$

$\beta_i=2.5$, when $0.4<T_i\leq 0.7$

$\beta_i=2.0T_i^{-2/3}$, when $T_i\geq 0.7$

3. The values of strains are accounted for “soil-structure” interaction.
4. For all seismic zones the residential buildings are allowed up to 5 storeys.
5. For hospitals and schools upper limit is 3 storeys.
6. Design of important objects are made under higher safety (using the increasing factor of up to 1.35)
7. The seismic resistance measures such as sizes of openings, counter-seismic seams and others are revised, depending on specific construction features.

Now by the initiative of the NSSP the Code for Seismic Microzonation is under preparation. Al the interested organizations in Armenia are involved in this work.

- **Early Warning Systems and Notification.** An Early Warning System based on the current seismic hazard assessment has been developed and is under realization. A project of Early Warning System based on automatic registration and determination of the parameters of destructive seismic wave propagation is under preparation. A project of Early Warning System based on the fast determination of earthquake parameters and estimation of possible destruction and human loss is under preparation.
- **Development of Large-scale Initiatives and Projects** for regional and international co-operation in the field of population protection against earthquakes, including all scientific and social aspects of the problem.
- **State Disaster Law and Regulations**. The Law on Seismic Protection has been prepared and submitted to Armenian Parliament and Government.

DRAFT

THE LAW OF THE REPUBLIC OF ARMENIA ON SEISMIC PROTECTION OF POPULATION

CHAPTER 1

GENERAL PROVISIONS

CHAPTER 2

THE GOVERNMENTAL REGULATION AND MANAGEMENT ON SEISMIC PROTECTION OF POPULATION

CHAPTER 3

THE GOVERNMENTAL CONTROL IN THE FIELD ON SEISMIC PROTECTION OF POPULATION

CHAPTER 4

THE RESPONSIBILITY OF THE VIOLATION IN THE FIELD ON SEISMIC PROTECTION OF POPULATION

CHAPTER 5

THE INTERNATIONAL COOPERATION IN THE FIELD ON SEISMIC PROTECTION OF POPULATION

CHAPTER 6

THE INSURANCE SYSTEM AGAINST EARTHQUAKE ON THE REPUBLIC OF ARMENIA

This law is available after the official adoption by Armenian Parliament and Government.

- **Risk Management**, **including Emergency Response and Rescue Operations**. The Rapid Response Forces were organized for operation in strong earthquake epicentral zone. They include rescuers and scientific staff for rescue activities and scientific investigations immediately after a strong earthquake.

Armenia Helps the Earthquake-Stricken India

Under the directive of the Prime Minister of the Republic of Armenia, on February 2, 2001 the Armenian NSSP fully equipped Task Force was sent to India to help earthquake-stricken population along with 200 kg of relief aid medicines.

The Task Forces arrived in Ahmedabad (Gujarat state) on February 3 and commenced to work. They already inspected about 130 buildings, installed the strong motion devices, and the local authorities and population were supported. The local authorities and dwellers render full assistance to Task Force.

Task Forces activities were highly appreciated by Indian government and local authorities. Indian minister of construction arrived in Ahmedabad to express his gratitude to Armenian experts specially emphasizing the activities of Armenian seismologists, geologists, structural engineers, physicians and psychologists in this post-earthquake operative stage.

The Indian mass media show a great interest in work carried out by Armenian NSSP multi-profile Task Force. “Headband Age” newspaper’s observer Anil Nairheadlined his news now report- “Armenian Team to Start Work in Headband”.

Task Force is headed by Prof. S. Nazaretyan

-a well-known seismologist, Head of the Northern Department of Armenian NSSP. The team comprise seismologists, structural and communication engineers, physicians and rescuers all together- 18 members.

Armenian NSSP Task Force solve the following tasks in disaster area:

1) measuring strong ground motions for the current seismic hazard assessment;
2) expert analysis of the character of collapsed buildings and structures for their effective restoration and rehabilitation;
3) long-term seismic hazard assessment (seismomicrozonation) for complete restoration of disaster area;
4) strong aftershocks prediction;
5) medical, psychological and rescue assistance.

The assistance during strong earthquake has 4 phases:

Operational (few days), short-term (one month), medium-term (a year), long-term (more than a year). The well-organized State Survey for Seismic Protection is very important in all stages -it guidelines the activities of the federal and local authorities during search & rescue and demolition works.

The Task Force goal is to promptly smooth down the consequences of disaster.

Their gratitude to Armenian NSSP Task Force Activities in Gujarat were expressed by:

Ambassador of India in Armenia, Indian Government officials to ambassador of Armenia in India, UN Under-Secretary General for Humanitarian Affairs to President of Armenian NSSP.

- **Population Education**. The Center for people education and training in the field of protection against earthquakes has been established in Armenian NSSP. Education system involves instructors, mass media, TV and radio.

In 1998 in Geneva the Armenian NSSP has been awarded by the “Certificate of Distinction” of the United Nations Sasakawa Disaster Prevention Award in appreciation for its distinguished contribution to disaster prevention, mitigation and preparedness, and furthering the goals of the International Decade for Natural Disaster Reduction.

1998

UNITED NATIONS
SASAKAWA DISASTER PREVENTION AWARD

CERTIFICATE OF DISTINCTION

presented to

The National Survey for Seismic Protection,
Armenia

In appreciation for its distinguished contribution
to disaster prevention, mitigation and preparedness
and furthering the goals of the

International Decade for Natural Disaster Reduction

Geneva
14 October 1998

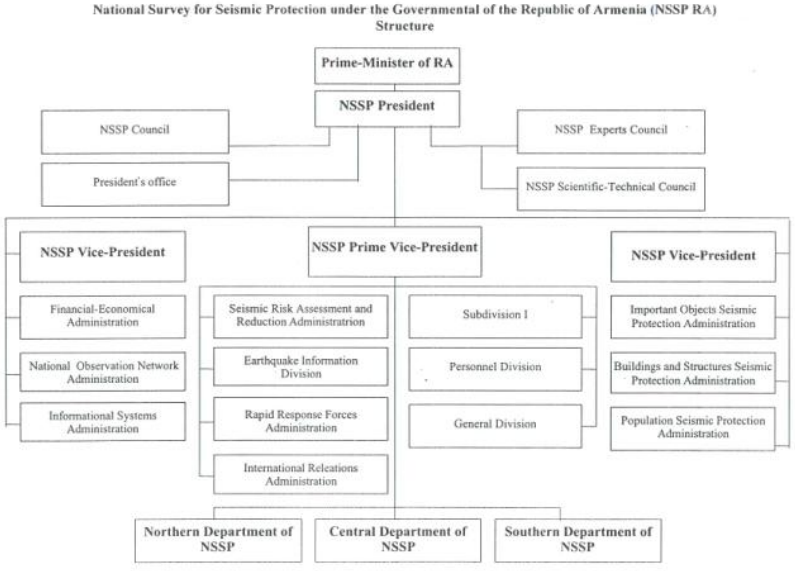
Mr. Sergio Vieira de Mello
Under-Secretary-General for Humanitarian Affairs

NSSP STRUCTURE

Armenian NSSP has staff of nearly 1700, out of which are 300 scientists, 300 engineers and technicians. Armenian NSSP combines all seismic risk reduction related scientific studies including geophysics, geology, geochemistry, geodesy and earthquake engineering, sociology, psychology. Armenian NSSP has a unique multi-parameter observation network for monitoring of Earth lithosphere and atmosphere consisting of 150 stations. Armenian NSSP is divided into 3 regional departments with appropriate centers organized according to research directions and basic goals.
Armenian NSSP has a **unique structure**:

- The NSSP is lead by the President, assigned by the Prime Minister of Armenia;
- The President of the NSSP makes important decisions in the field of seismic protection of the population, based on the three Councils:

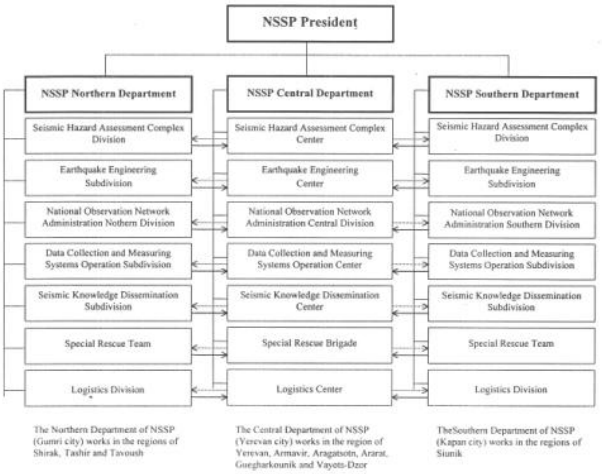
NSSP Council is reviewing and confirming the internal problems and documents of the NSSP;
Expert Council is reviewing and confirming the normative documents in the field of seismic protection of the population;
Scientific-technical Council is forming the scientific-technical policy and developing the International collaboration in the field of seismic risk reduction.



The President of the NSSP is managing the NSSP through the Management Institution, which coordinates the activities of the NSSP Departments, making connection between the NSSP and other Governmental Institutions, private and public organizations.
Armenian NSSP includes three administrative departments:

- The Northern Department (center is Giumri city);
- The Central Department (center is Yerevan city);
- The Southern Department (center is Kapan city).

Structure of the Regional Department of the National Survey for Seismic Protection under the Government of the Republic of Armenia (NSSP)



Each administrative department has uniform subdivisions, solving the whole spectrum of problems, connected with seismic protection of the population (from seismic hazard and risk assessment to earthquake-engineering and earthquake-resistant construction code development, from seismic knowledge dissemination and training of the population to prompt response and rescue operations etc.). The uniform subdivisions of the NSSP departments are connected with each other horizontally by the same problems and have strict vertical subordination to the Head of Department, who is under the NSSP President subordination.

International Conferences, Workshops organized by the Armenian NSSP

- Under the harshest conditions for Armenia in 1991-1993, on 1-6 October, 1993 NSSP organized the First International Conference on "Continental Collision Zone Earthquakes and Seismic Hazard Reduction", devoted to the 5th Anniversary of the Spitak earthquake where about 200 experts from more than 20 countries of the world participated.
- On July 11-15, 1996 the NATO Advanced Research Workshop on "Historical and Pre-Historical Earthquakes in the Caucasus " was conducted under the aegis of NATO, where experts in the field of strong earthquakes on the territory of the Caucasus from different countries came together.

On September 15-21, 1998 The Second International Conference on "Earthquake Hazard and Seismic Risk Reduction" - the IDNDR Regional Conference for the Countries of the Commonwealth of Independent States (CIS) and Central and Eastern Europe, Commemorating the 10th Anniversary of the Spitak Earthquake was held, where more than 300 experts from 43 countries participated. The Conference adopted following Declaration:

YEREVAN DECLARATION

The Second International Conference on “Earthquake Hazard and Seismic Risk Reduction”

- The International Decade for Natural Disaster Reduction (IDNDR) Regional Conference for the Countries of the Commonwealth of Independent States (CIS) and Central and Eastern Europe -

Commemorating the 10th Anniversary of the Spitak Earthquake
15-21 September 1998
Yerevan, Armenia

The Second International Conference on "Earthquake Hazard And Seismic Risk Reduction" - The International Decade for Natural Disaster Reduction (IDNDR) Regional Conference for the Countries of the Commonwealth of Independent States (CIS) and Central and Eastern Europe - dedicated to the 10th Anniversary of the Spitak Earthquake (later referred to as Yerevan Conference), summarized the experiences and achievements of different countries in the field of seismic risk reduction and other natural disaster reduction, as well as discussed possible strategies for disaster reduction in the 21st century. The participants of the Conference would like to draw the attention of the General Assembly of the United Nations and the Armenian Government to the following:

1. The meeting brought together more than 300 participants from 43 countries, including all the countries of the CIS, several countries from Central and Eastern Europe and Asia, and Greece, Germany, the US and others. The participants included local and national decision-makers, scientists, disaster reduction experts and representatives from research institutes. There were also representatives from the private sector and the media. The Conference was sponsored by the Government of the Republic of Armenia and the IDNDR Secretariat. The conference was organized by the National Survey for Seismic Protection (NSSP) of the Republic of Armenia.

2. The conference was inaugurated by the Prime Minister of the Republic of Armenia, the All-Armenian Patriarch and the Director of the IDNDR Secretariat. Both the PM and the Patriarch of RA noted in their keynote addresses that in order to overcome the obstacles that disasters pose to national and regional sustainable development, technically consistent disaster prevention measures should be adopted. They also noted that with the increasing scale of disasters that experts project for the 21st century, scientists, local, regional and national authorities and religious community leaders must come together in order to devise a strategy for the prevention of the impacts of hazards on the population, vital infrastructure and property. Particular emphasis must be placed on the protection of vital social and economic infrastructure because these are intimately linked to the ability of a country to function appropriately, for the guarantee of business continuity and hence economic growth, and the potential of a country to prosper and develop. The subsequent discussions and presentations at the conference stressed that disaster reduction should continue to be a major priority in regional, national and international development and civil protection strategies.

3. While there have been notable achievements in natural disaster reduction during the Decade, and while awareness of risk from natural disasters has increased considerably at the global scale, there remain areas where loss of life and the impoverishment of large communities continue to increase at an alarming rate. The participants anticipate that the severity and frequency of natural and environmental disasters, and their impact on society, will intensify in near future. The participants reaffirmed the central importance of disaster reduction as an essential element of government policy. Recent events and disasters have again demonstrated the need for permanent sustained strategies to reduce disaster risk in order to save lives and protect economic and social assets.

4. Within the framework of the Yerevan Conference, the 5th Conference on Cooperation of Central, Eastern and South-Eastern European Countries on the Protection Against Natural and Other Disasters (The "Magdeburg Process") was held from 15-17 September. The 5th Magdeburg Conference brought together all the Ministers and Heads of Departments for Civil Protection from the countries of the CIS, and many representatives from Central and Eastern Europe, including Hungary, Slovenia, Germany, Croatia and Austria. The 5th Magdeburg Conference provided the necessary political backdrop for the discussions on disaster prevention, reduction and response taking place on the 10th Anniversary of the Spitak Earthquake. The 5th Magdeburg Conference held rescue exercises in Gyumri, Armenia as well as discussions on the future of the IDNDR. The 5th Magdeburg Conference was organized by the Emergency Management Administration of the Republic of Armenia.

5. Another important component of the Yerevan Conference was the organization and hosting of the RADIUS Initiative mid-term Workshop for the evaluation of progress in the RADIUS Case Studies and for discussions on urban seismic risk reduction practices. The RADIUS Initiative was launched by the IDNDR Secretariat, aiming to prepare earthquake disaster scenarios and the risk management plans in 9 selected cities worldwide and develop manuals for seismic risk assessment in urban areas. The progress of the RADIUS Case Studies was reported during the session as well as the achievements of similar effects in other cities. It was stressed in the session that the scientific knowledge should be applied in an appropriate way, involving various sectors of the community such as the decision makers, press, public and private sectors.

6. The participants noted the need for the exchange and transfer of up-to-date scientific technology and the strengthening of international cooperation in the field of disaster reduction, in particular in the field of seismic risk reduction. A forum for this cooperation, in the form of an international coordinated framework, was proposed as a desirable initiative for the improvement of scientific and technical cooperation in the field of disaster reduction.

7. The participants reiterated the need to move away from a disaster response oriented approach towards disaster prevention and reduction methodologies. The participants stated their appreciation for the important work that the IDNDR has carried out over the past decade in order to reduce the vulnerability of communities around the world to natural disasters, through the promotion and coordination of Disaster Reduction worldwide.

8. The participants expressed their belief that effective disaster reduction depends upon a multi-sectoral and interdisciplinary collaboration among all concerned actors, as successfully demonstrated during the Yerevan Conference.

9. Strategies for seismic risk reduction in 21st century must focus more on "Preparedness and Prevention" rather than only the "Recovery" approach.

10. One of the most important elements for the implemention of “Preparedness and Prevention” is the development of long-term Government policies in the field of disaster risk reduction.

11. The participants of the Conference fully recognized and acknowledged the significant achievements of the NSSP RA in the field of seismic risk reduction and international cooperation in this field. The program of future work of the NSSP RA is appropriate and well planned.

12. The importance of consolidating the final phase of the Decade on a regional scale was recognized as appropriate since countries of the same region share a common history, types of risk and often have coordinated strategies for disaster reduction. The participants noted in particular that the Yerevan Conference, which is the IDNDR Regional Conference for the Countries of the CIS and Central and Eastern Europe has been a very useful forum for the exchange of disaster reduction information and the coordination of future disaster reduction strategies in the region.

13. The participants of the Conference highly appreciate the agreements on cooperation reached between the Seismological Surveys of Armenia, Azerbaijan and Georgia based on the understanding that the nature of seismic hazards is trans-boundary and trans-regional and that close collaboration between the countries of the region is absolutely necessary for protecting the population against strong earthquakes.

14. The participants of the Conference express their gratitude to the Government of Armenia, UN/IDNDR, and NSSP of Armenia for organizing and holding a very successful Conference.

RECOMMENDATIONS

- The participants of the Conference recommend that NSSP be used as a model for seismic risk reduction initiatives in other countries of the region.

- The participants of the Conference recommend that Armenia be considered as one of the international test areas for the carrying-out of comprehensive scientific engineering and technical investigations for the protection of populations against strong earthquakes.

- The participants of the Conference recommend that NSSP of Armenia act as the UN Caucasus Regional Center for Seismic Risk Reduction in close cooperation with focal points in Azerbaijan, Georgia and Russia.

- The participants of the Conference recommend that a distinct and visible capacity within the UN system be set up as a successor to the IDNDR Secretariat in order to ensure an effective and continued international support to ongoing efforts in disaster reduction after the close of the Decade. This permanent disaster reduction capacity should have a multi-disciplinary mandate and global geographic coverage, to act as a catalyst for environmentally and socially sustainable development through effective disaster reduction.

- The participants of the Conference recommend that RADIUS-type projects be carried-out in other cities that are facing the threats of strong earthquakes. Similar efforts should be initiated in as many communities as possible, following the manual, which will be developed through RADIUS, based on the experiences of the Case Studies. The projects should set up the conditions for the initiation of long-term risk management processes, which should be institutionalized. The final goal is to make the cities and their people capable to solve, by themselves, the problems affecting their communities.

- The participants of the Conference recommend that RADIUS-type initiatives be administered (by the successor to the IDNDR Secretariat, should one be formed) for other types of hazards, including floods and forest fires. These initiatives should be limited in time (suggested time frame 3 or 4 years) and have clearly defined measurements of success. They should each have independent funding arrangements and country participation. The participants also recommend that the scope of these initiatives not be limited to hazard risk assessment and risk management plans, but also include the development and use of early warning systems. A closer cooperation with the private sector in order to improve economic impact reduction should also be introduced into the above-mentioned initiatives.

- The participants of the Conference recommend that, for the development and realization of Government policies in the field of seismic risk reduction, coordination and management bodies at both the national and international levels are necessary. A model for such a body on the international level could be a distinct seismic risk reduction subprogram of a cross-cutting disaster reduction organization such as the IDNDR Secretariat, and, on the national level, an interagency governmental body which would act as the focal point for seismic risk reduction activities. The latter organization should benefit from contributions and participation from all sectors of the Government and society relevant to seismic risk reduction.

- The participants of the Conference recommend that the UN and the Governments of different states promote the collaboration of authorities responsible for the protection of cultural heritage from natural disasters, technical institutes, and humanitarian actors in order to prevent the deterioration of cultural heritage monuments.

- The participants of the Conference recommend that the international community answer the calls for assistance from the three Governors of Northern Armenia who have requested help in rehabilitating the Spitak disaster zone, where roughly 1 million people continue to live in very difficult conditions.

Nowadays the NSSP RA takes part in the following international agreements and programs:

INTERNATIONAL PROJECTS

- INTAS (International Test Area for SHA in the Caucasus), and GSHAP (Global SHA Program), "Short period time dynamics of the seismicity " Italy and Russia.
- "COPERNICUS" " Tectonic early warning system through real time radon (RN) monitoring; a geophysical method for forecasting earthquakes", with Greece, UK, Russia and Albania.
- PICS (Program International Cooperation on Scientific) of the National Center of Scientific Research. "Intensity fields, hydrogeochemical variations of underground water and kinematics of faults in a seismic zone: on the example of the Lesser Caucasus (Armenia)", with France.
- GPS (Global Positional Satellite Geodesic System). Study on Regional Deformations on the Territory of Armenia, with Bulgaria, Germany, Georgia, Greece, Egypt, Russia, Turkey, the USA and Switzerland. The Study of strong movements of the ground on the territory of Armenia on the basis of Swiss stations
- SMACH-1 with Switzerland. The study of strong movements of the ground on the territory of Armenia and Georgia with Georgia and Russia. Cooperation in the field of historical earthquakes catalogues with Italy.
- NATO Science for Peace Programme. Draft programs: "Oil Pollution Detection in Ground Water from Real Time Early Warning to Overall Assessment" with Greece, Macedonia. "Archaeo-tomographer: design, development and evaluation of a high-tech geophysical system for the three-dimensional imaging of the archaeological sites", with Albania, Bulgaria Georgia, Greece, Russia, Turkey. "Risk assessment of natural and manmade disasters and planning of countermeasures for prevention or mitigation of losses for big cities in the Caucasus", with Azerbaijan, Georgia, Russia.

AGREEMENTS

- USA
  - Agreement with the US Geological Survey (USGS) on "Creation of the Station of Global Seismographic Network" (IRIS)
  - Agreement with the National Aeronautics and Space Administration (NASA) about cooperation in the field of space geodesy
  - Agreement with the Massachusetts of Technology Institute (MIT) on "Study of Regional Deformations in the Territory of Armenia"
- Germany
  - Agreement with the GeoForschungsZentrum (GFZ, Potsdam) about joint works on studies of large scale interactions of fault zones in E. Mediterranean and seismic risk mitigation in Armenia
  - Works within the framework of the international program READINESS (Real Time Data Information Net in Earth Sciences) and in connection with IDNDR (International Decade for Natural Disaster Reduction)
- Italy
  - Agreement with the National Institute of Geophysics of Italy about collaboration in the field of seismic risk reduction in Armenia and Italy
  - Agreement with Italy (Storia Geofisica Ambiente, Dr. E. Guidoboni) about cooperation in the field of historical earthquakes catalogs
- Switzerland
  - Collaboration with the Swiss Federal Institute of Technology (ETH, Zurich) and operating at the same Institute the Swiss Seismological Service (SSS). SMACH accelerographs
  - Collaboration with the Swiss Disaster Relief (SDR)
- France
  - Agreement with France within the framework of PICS (International Program on Scientific Cooperation) of the National Center of Scientific Research
- Greece
  - Agreement with EPPO (Earthquake Planning and Protection Organization on "Cooperation in the Field of Seismic Risk Reduction in Armenia and Greece"
  - Agreement with Athens University on collaboration in the field of current SHA (including problem of earthquake prediction) and long-term SHA, including some aspects of seismotectonics

- Iran
  - Memorandum of mutual understanding between the NSSP RA and the Geophysical Institute of Tehran University.
- Russia
  - Agreement on Scientific Technical Cooperation with the Institute of the Earth's Physics of the Russian AS. Agreement on Scientific Technical Cooperation with Test-Methodical Expedition of Institute of the Earth's Physics of the Russian AS.

The Foundation of Seismic Protection of Armenia is a charitable public organization established to render public assistance in enlargement and development of activity of the Armenian NSSP. In its activity the Foundation proceeds from national interests and social signification of the projects and programs to be carried out on increasing the level of seismic safety of the republic's population.

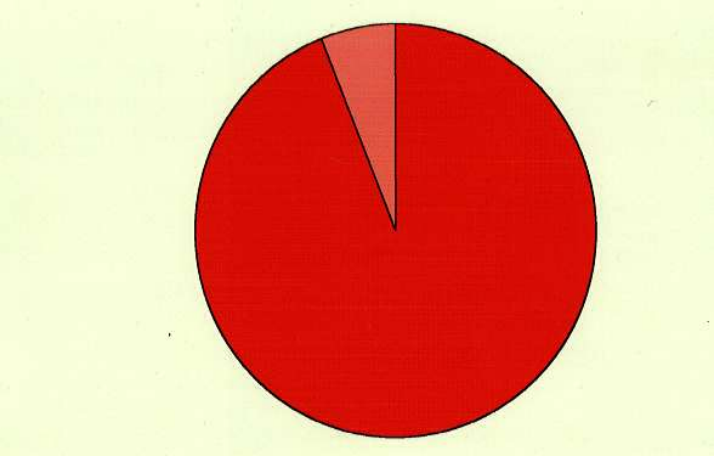
Goals and Tasks of the Foundation

- The main goal of the Foundation is assistance to increasing the level of the population seismic safety. To achieve that, the Foundation sets the following tasks
  - assistance in enlargement and development of the Armenian NSSP activities
  - assistance in training and retraining of specialists of the Armenian NSSP in the Republic and abroad
  - assistance in the works on upgrading seismic safety of dwelling buildings, industrial objects and other structures in the Republic's territory
  - assistance in conduction of the works on training of the population and organization of evacuation of the population in case of earthquake hazard
  - assistance in organization of rescue teams and equipping them with necessary technical means
  - rendering financial and material support to seismic protection and rescue works in the Republic
  - rendering financial and material support to the victims of earthquakes

Councils

- The Scientific-Technical Council, headed by the Armenian NSSP president, consists of the managers of the large departments of the NSSP and the other profiling organizations of the republic. The Scientific-Technical Council solves strategic issues of development of the Armenian NSSP.
- The Expert Council, headed by the Armenian NSSP president, consists of the scientists and engineers invited from other organizations as experts of the Armenian NSSP.The Armenian NSSP Expert Council, consisting of three levels - national, regional and international, solves the following main tasks
  - periodic expertise of current seismic hazard
  - urgent expertise of signs of seismic hazard increase
  - form and content of the information reported to the Government RA and mass media at different levels of seismic hazard

DISASTERS IN ARMENIA

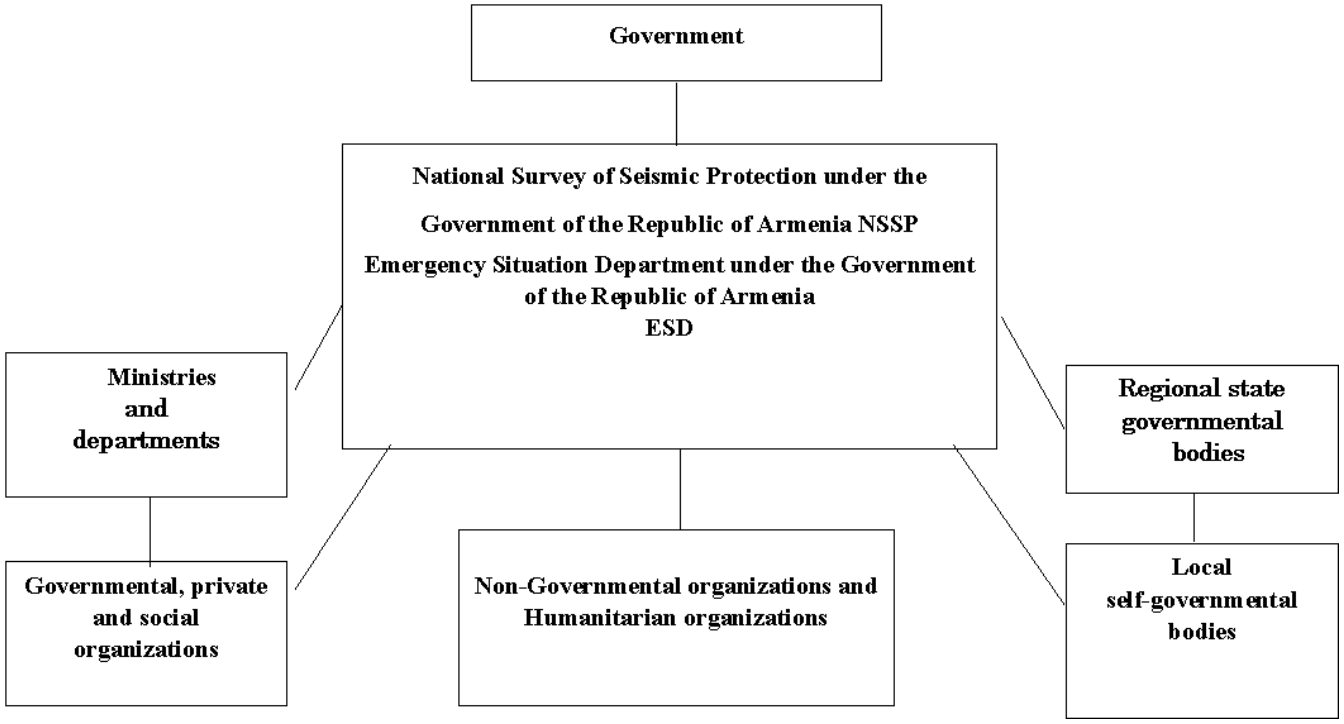


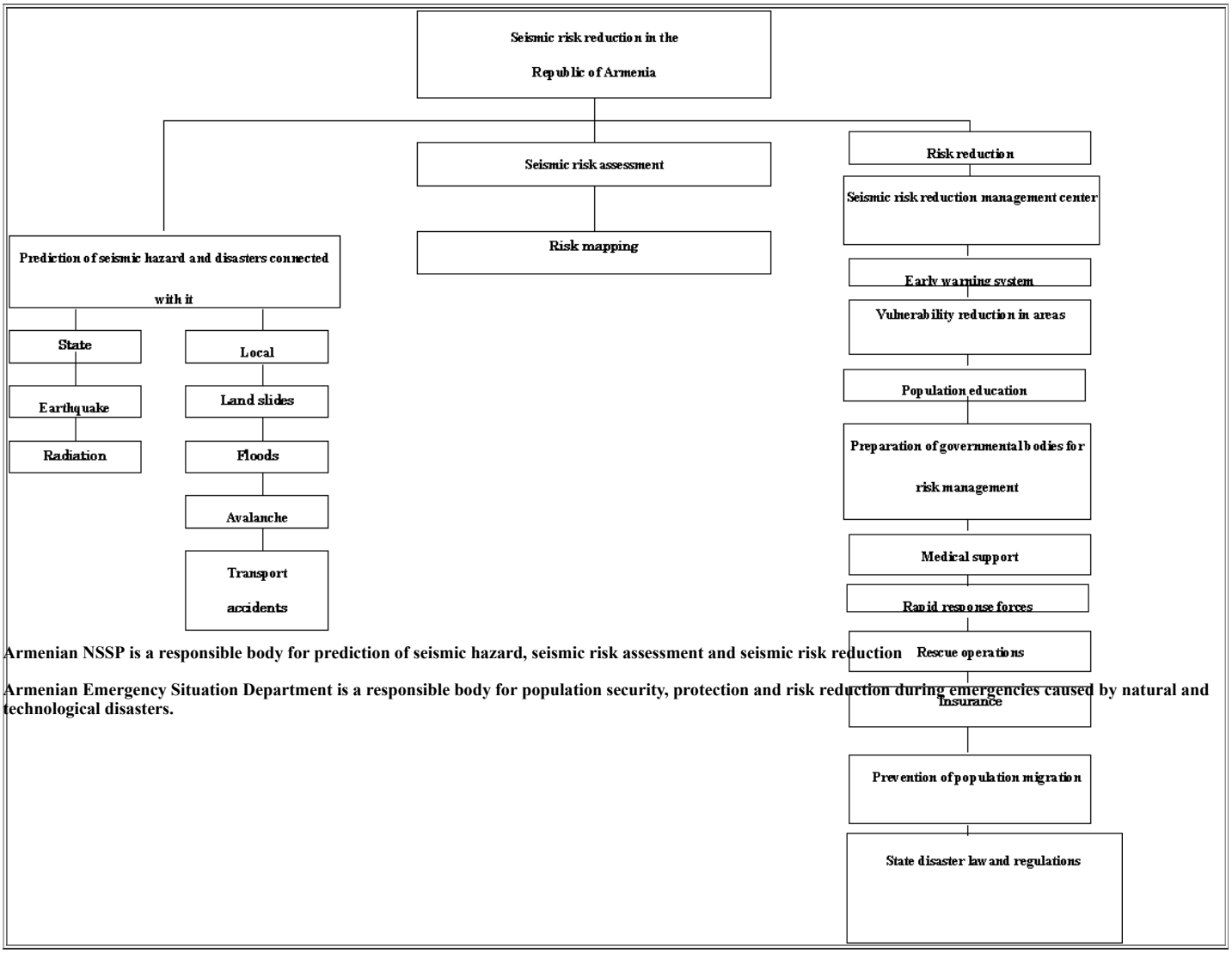
Earthquakes 94% / Other hazards 6%

The human loss caused by different types of disaster in Armenia

Earthquakes – 94 %
Mudslides – 3.15 %
Transport accidents – 1.5 %
Landslides and rockfalls – 1.2 %
Floods – 0.15 %
Irradiation – 0 %

DISASTER REDUCTION MANAGEMENT SYSTEM IN THE REPUBLIC OF ARMENIA





Armenian NSSP is a responsible body for prediction of seismic hazard, seismic risk assessment and seismic risk reduction

Armenian Emergency Situation Department is a responsible body for population security, protection and risk reduction during emergencies caused by natural and technological disasters.