ARMENIAN
COUNTRY REPORT
2003

Contents

1. Introduction

The greater part of Armenia is situated on the southern flank of the Caucasian mountain range. The country covers approximately 29,800 square kilometers. The neighboring countries include: Turkey to the west, Georgia to the north, Azerbaijan to the east and southwest, and Iran to the southeast. Its territory is mostly mountainous, and the arable soil is very fertile. Its significant geographical features include Lake Sevan (elevation 2,000m.) and Mount Aragats (elevation 4,090m.). Most Armenia's territory lies between 1,000 to 2,500 meters above sea level. The climate in Armenia is continental with hot summers and cold, wet winters.

The majority of Armenia's 3.5 million population lives in urban areas (68%) and the country has a population density of 110.5 per sq. km. The capital of country Yerevan alone houses more than one-third of this total (about 1.3 million people). Other major cities include Gumri (formerly Leninakan) and Vanadzor (formerly Kirovakan). Armenia's administrative structure consists of 10 provinces (marz), which include 27 cities, 31 towns, and 921 villages.

On September 21, 1991, by referendum, Armenians almost unanimously voted for independence from Soviet Union. Since then, Armenia has acted quickly to reassert its sovereignty.

Generally there are about 350 types of natural disasters.

For the territory of Armenia is peculiar about 110 types of natural dangerous phenomena and only 11 of them represents as more usual and dangerous for life and health of the population according to sociological data during last century, in that number is earthquakes, floods, landslides, rock-falls, mudflows, lightning, hail, ground subsidence and forests fire.

The technological disasters divided to the following main types: accidents on the hydrotechnical structures; accidents on the highly fire-hydro -explosive dangerous facilities; accidents on the radioactive dangerous facilities; transport accidents; accidents on the biologically dangerous facilities.

The loss caused by various hazards in Armenia on percentage show to fig.1.

2. State management in emergency situations

In the country created and working State system of the prevention and actions in emergency situations. The Prime Minister heads the civil defense of the country. The direct management of activities by state bodies in emergency situations is assigned to the Head of the Emergency Management Administration (EMA) of the Republic of Armenia. The EMA is the management body responsible for prevention, reduction of the consequences and actions in case of technogen and natural disasters. Objectives of the EMA:

- To establish and vest governmental policy in Civil Protection and enhance the country's preparedness level;
- Mitigate the consequences of emergencies; prepare for possible consequences; establish, provide and implement Civil Protection programmes;
- Co-ordinate and organise Civil Protection system activities;
- Organise governmental expertise in solutions and projects concerning objects and processes as possible causes of emergencies;
- Organise government control over the secured implementation of industrial activities concerning civil protection and the utilisation of mineral resources;
- Organise and implement preparedness in government administrations, local self-government bodies and the administrative staff of organisations, to promote stable activities in the civil protection system in emergencies, and the training of professional personnel;
- Participate, organise and co-ordinate rehabilitation and rescue activities in emergencies and the invention of corresponding forces for that purpose. Promote co-operation between governmental, departmental (administrational) and public (volunteer) rescue organisations;
- Organise and provide resources for international co-operation in civil protection problems;
- Organise and certification of rescuers.

The EMA has local bodies at the provinces (marz) of country as well as at the large cities.

Civil Protection activities are regulated by a number of laws and legislative acts of the Republic of Armenia:

-"The Law of Local Self-government" accepted in 1977;
-"The Law of Civil Protection in Emergency Situation" accepted in 1998;
-"The Law of Civil Defense" accepted in 2002;
-"The Law of Seismic Protection" accepted in 2002;
-"The decree issued by President of RA concerning the implementation of state-government in the provinces " accepted in 1999;
-"The decree issued by President of RA concerning Civil Protection structure activity organisation" accepted in 1995.

Besides mentioned legislative documents the Civil Protection activities in emergency situations are regulated by a number of decisions by the Government of the Republic of Armenia, the Prime-Minister and the Head of EMA.

3. Seismic Protection Status in Armenia

The Caucasus, where situated Armenia, is one of the most active segments of the Alpine- Himalayan seismic belt. At the same time, it is a collision zone between the Arabian and Eurasian plates. This collision is responsible for the complex deformation and associated intense earthquake activity affecting this region, including active mountain building in the Caucasus in general and the territory of Armenia in particular.

Practically all the territory of Armenia is situated in a seismic active zone. The size of earthquakes ranges up to M=7.1 (according to instrumental recordings) and M=7.5 (according to historical and paleoseismic estimations). Focal depth is 10 km. on average. The average recurrence interval of large earthquakes (M>5.5) comprises 30-40 years both in the territory of Armenia and in the whole region, i.e. the Arabian and Eurasian plates collision zone.

Consequences of the catastrophic Spitak earthquake of 1988 forced the government of Armenia to pay great attention to seismic protection in his policy. A number of important steps for improving the situation have been made, since it became obvious, that seismic risk in the Republic is very high and has reached its maximum level for all history.

The first main step was the creation of National Survey for Seismic Protection under the Government of RA (NSSP RA), as a state responsible body for Seismic Risk Reduction Strategy development and implementation.

The second main step was acceptance in 1999 of two long-term Strategic National Programs on seismic risk reduction in Armenia and in Yerevan city, which were developed by the NSSP RA.

The third essential event was acceptance in 2002 by the National Parliament of "The Law on Seismic Protection of the RA".

According to the law seismic protection is meant as a complex of legal, social, economic, educational, organizational, scientific and other measures directed to seismic safety and sustainable development of the state.

3.1 Conception and strategy of seismic risk reduction in Armenia.

Seismic risk, in general, is probable human, material damage and other losses stipulated by strong earthquake for the given territory. Seismic risk is determined by a level of seismic hazard, vulnerability of existing buildings and structures, density of population, time (hour, season of a year) of event, probability of origin of fires, formation of the geological phenomena (falls, landslides, liquefaction, etc.), destruction, especially of dangerous objects (nuclear power plants, chemical plants, dams etc.), failure of life-support and many other factors.

The main purpose of seismic risk reduction is diminution of probable losses by increase of readiness, prompt and effective reaction to earthquake on the basis of improvements of a state system of risk reduction with involvement of all levels of authorities and society.

The concepts of seismic risk reduction in Armenia include the following main positions:

- Uniform state and agreed interstate policy in region Anatoly- Caucasus-Iran.
- Priority of "readiness and prevention " above " liquidation and recovery ".
- Equal priority of all the elements of risk reduction in the sphere of "readiness and prevention ".
- Seismic risk reduction on the basis of the state programs involving the state and local authority decision-makers and public.
- Internationalization of the state programs on seismic risk reduction with the purpose of attracting the investors.

The strategy of seismic risk reduction envisages solution of the three primary tasks:

- Seismic hazard prediction
- Seismic risk assessment
- Seismic risk reduction

Seismic hazard prediction is divided into two parts: the primary hazard prediction (common and detail seismic zoning, seismic microzoning, current hazard assessment) and secondary hazard prediction (falls, landslides, liquefaction, technogenic failure, fires etc.).
The rather reliable probabilistic map of seismic zoning of the territory of Armenia in scale 1:500000 (fig.2) is now compiled, and a number of maps of detail seismic zoning of 1:200000 scale (the territory of Armenian NPP, epicentral zone of Spitak earthquake etc.) are composed. For the main densely populated areas, especially in the Northern and Central Armenia, the seismic microzoning maps of scale 1:5000 to 1:10000 have been developed. Compilation of such maps is planned for other territories and cities.
On the basis of data obtained by the National Observation Networks (fig.3) the current seismic hazard is evaluated daily using developed in NSSP RA computer programs.
The secondary hazard of strong earthquakes is evaluated for specified populated areas, important and dangerous facilities, as well as for all the territory of Armenia (fig.4). The main part of technogenic phenomena (failure, fires) is evaluated in Emergency Management Administration (EMA), and natural phenomena (falls, landslides, liquefaction) – by NSSP R?, EMA, Institute of Geological Science (IGS) of National Academy of Sciences. During the last years, on the basis of studies of the consequences caused by Spitak earthquake in 1988, large scale practical steps were done in this direction.
Seismic risk assessment is carried out both for separate objects, and for all the territory of Armenia. The schematic maps of seismic risk for the territory of Armenia (fig.5), Yerevan (fig.6) and Gyumri cities are already composed.
Seismic risk reduction is carried out on the basis of two long-term Strategic National Programs accepted in 1999: a) "Seismic risk reduction in the territory of Armenia"; b) "Seismic risk reduction in the territory of Yerevan city". All the Ministries, other governmental, non-governmental and private organization, local state authorities (regional administrations), local government bodies (city administration, village administrations) participate in the program. Practically, all the important elements of risk reduction are taken into account in the program. The implementation schedule of the separate items of the program is composed; the expected outcomes on each item are indicated. Seismic Risk Reduction Strategy includes solution of a number of important problems, beginning with a development of law and regulation, finishing with the public awareness, people education and training.

3.2 Laws and regulations

As a legal basis for organization of seismic risk reduction activities in Armenia serve two important laws in Armenia:
a) "The law on Seismic Protection of the RA"(Annex 1).
b) "The law on Protection of the Population in Emergency Situations".
Other normative documents, regulating organization of seismic protection have been also developed. Some of them are as follows: ?) New seismic building codes; b) Principles of Seismic Microzoning; c) Instruction on conducting of observations in seismic, geophysical and other stations; d) The procedure of the expert analysis and providing the information about earthquake threat to the Government of R? .
These laws are the important part of preparatory stage and adjust the main operations after disaster. Sometimes a question emerges, whether it is possible to solve the problems of seismic protection only on the basis of the law on emergency situations, since the earthquake is one kind of natural disasters. For those countries, where seismic hazard and seismic risk are low, such statement of a

problem is correct. But for Armenia, without a separate law on a seismic protection, it is impossible to organize the activities effectively and operatively due to the following reasons:

- The struggle against any disaster is not so complicated and doesn't require so much mobilization, forces and resources, as against strong earthquakes.
- The consequences of strong earthquakes are not comparable to consequences of other disasters. The disaster involves large territories and all spheres of life.
- Seismic protection unlike other natural disasters has features that require specific and differentiated approaches.

3.3 Common Approaches to Seismic Hazard and Risk Assessment.

For reliable hazard and risk assessment the following main tasks are applied:

- Creation of a reliable and comprehensive database for the territory larger, than the territory, for which the assessment is carried out.
- Assessment on the basis of modern advanced technologies.
- Hazard assessment for the territory of Armenia against the background of entire Caucasian region.

NSSP has created the certain database for an assessment of hazard and risk both for entire territory of Armenia, and for separate objects:

- Prehistorical and historical earthquake catalogues for Caucasus
- Earthquake catalogues for instrumental period (catalogues were checked and cleared from industrial explosions, parameters of the events should be recalculated)
- Focal mechanisms catalogue for earthquakes occurred in the territory of Armenia (focal mechanisms are determined for lower hemisphere)
- Macroseismic database for Armenia and adjacent territory. Epicentral maps, isoseismal maps for events with intensity I>7 (EMS scale) have been compiled, peculiarities of attenuation of macroseismic field have been analyzed. Macroseismic information for this territory has been revised. It contains data on macroseismic intensity in each populated locality in the area.
- The waveform database consists of digital seismograms, strong motion accellerograms. The records of large industrial explosions and nuclear explosions have been digitized as well.
- Database on geology, active tectonics, and geophysical parameters
- The following maps were collected and their systematization has been carried out:
  - geological maps for Armenia and adjacent territories (1:100000, 1:200000, 1:500000)
  - tectonic maps (age of deformation and origination, faults, deep structure)
  - map of vertical movements for last 2.000.000 years
  - map of earth crust strain on the bases of fault plane solutions and GPS observations (map of compression, map of probable ruptures)
  - schematic maps for possible faults (that is N1, N2 nodal planes) generated in the source of earthquakes
  - gravitational maps and maps of magnetic anomalies of 1:200000 scale
  - Digital Elevation Maps for big cities and bordering countries of various scales
- Seismic Prospecting database
- Digital databases in GIS format for the territory of Armenia: administrative-territorial division; main roads; settlements and population density; building stock; maps of seismic microzonation of cities; damaged buildings

Seismic hazard and risk assessment is carried out using modern technologies. A large place is given to probability assessment and compilation of probabilistic maps. NSSP has a good experience of

application of advanced technologies for compilation of seismic zoning map for the Caucasus in the framework of the GSHAP program (fig.7).
The current seismic hazard is evaluated daily using the developed software on the basis of data obtained from National Observation Networks that consists of 150 stations.
Comparative analysis of well-known methodologies of risk assessment showed, that these methods will encounter problems due to lack of databases for different components. Compilation of these databases is very expensive and time consumable. NSSP has suggested simplified method of risk assessment based on the main factors of risk: seismic hazard, vulnerability of buildings and population density. For seismic risk assessment of life-support systems geological phenomena (rock falls, landslides, active faulting etc.) are taken into account. These works in Armenia have begun actually only from 1996.

3.4. Principles and strategy of vulnerability reduction of existing structures.

Underestimated assessment of seismic hazard for all the territory of Armenia till 1989, drawbacks in building design, poor quality of construction etc. became the main reasons of high vulnerability of the majority of existing buildings and structures. For their vulnerability reduction the following steps are made:
a) In 1994 the Seismic Resistant Building Code in Armenia was created, in which the instructions for restoring and reinforcement of buildings and structures are stipulated.
b) The methods of increasing of seismic resistance for existing buildings are developed
c) The programs of vulnerability reduction are developed.
The Seismic Resistant Building Code has been developed taking into account local peculiarities: seismic hazard, building traditions, ground and climatic conditions, materials for buildings etc.
The building code of Armenia is based on seismic zoning map created in 1995, seismic properties of soils, types of unfavorable sites for construction etc. A big attention in the Code is given to seismic loads and design schemes. There are also requirements for restoration and reinforcement of buildings and structures. The scale for buildings damages assessment is given. Though 8 years after the acceptance of building code have passed only, experts already are talking about the necessity of its revision. Simultaneously, necessity for creation of uniform Codes for the states of Southern Caucasus is felt. There are forcible arguments for doing that.
Various methods are applied for reinforcement of different types of buildings in Armenia. The methods of one and double-side reinforcement of walls using ferro-concrete jacket, method of double-side reinforcement of angles of buildings by creation of metal belts and construction elements, volumetric modifications etc. are widely used.
Except for use of traditional methods, new methods of restoring and reinforcement of buildings are developed in NSSP. Already are well-known the methods of seismic isolation of buildings and of the upper flexible floor.
The substance of these methods is the decreasing of possible seismic effects on buildings. At present, the method of seismic isolation has already turned from experimental single buildings to mass application. There are more than ten multi-storey residential buildings in Vanadzor, Spitak and Gyumri cities, which are built on rubber bearings. In Vanadzor city five-storey stone building of a ? 451 series has been separated from the base and stored on bearings without resettlement of the inhabitants. The bearings installed between the base and a building, damp the seismic vibration, not allowing the deformation of constructions of buildings. In such a way it is possible to reduce seismic intensity by 1 to 2 points. The programs for vulnerability reduction of buildings are developed. In particular, the main types of residential buildings in Yerevan are investigated. The problem of

increasing of their seismic stability is necessarily beginning with passportization of each building, evaluation of their actual vulnerability, investigation of soils and seismic conditions etc.

3.5 Interaction of State Bodies on Seismic Risk Management

According to the "The Law on Seismic Protection of the RA" three main unit are selected on Seismic Risk Management:

- The government
- The state plenipotentiary body
- The local authorities bodies

The government of RA approves: basic directions of state policy, state programs of seismic risk reduction; establishes the list of the objects of the special, significant and general significance, a state plenipotentiary body, the order of granting licenses for seismic zoning works; realizes other competencies established by the legislation.

The state plenipotentiary body on seismic risk management: develops the basic directions of state policy in the field of seismic protection; is responsible for seismic hazard and risk assessment, and seismic risk reduction; coordinates and controls the execution of the state programs in the field of seismic protection; affirms the prediction of possible strong earthquakes both in the territory of Armenia and adjacent territory; approves various scale maps of seismic zoning and seismic risk for the territory of Armenia, and seismic microzoning maps for dense populated areas, objects of the special, significant and general importance; affirms expert assessment of special, significant and general importance objects territories; organizes preparedness and training of the population to withstand strong earthquakes; participates in operative vulnerability assessment of buildings and structures with the aim of seismic risk reduction in the zones of high seismic hazard; in due course grants the licenses for works on seismic zoning.

The local authorities in the field of seismic protection: organize works in the field of seismic risk reduction in the territory of a community; provide works on preparation of the population to strong earthquake in the territory of a community; support executing of the state programs in the field of seismic protection in territory of community; realize other competencies, established by the legislation of the Republic of Armenia

That law on a seismic protection establishes the interactions of these three bodies of management. These interactions are divided into three groups: during preparation, in time and after disaster. If the state programs solve the primal problems of the first period, second and third stages are established by the law (fast reaction, rendering of medical aid, restoring of a zone of earthquake, rendering suffering assistance).

4. Public Awareness, Education and Training

Only the society with improved awareness is able to prevent the heavy consequences connected with hazard realization. With the establishment of two state bodies of the government in Armenia responsible for protection of the population from hazards: the EMA and NSSP were conducting wild-scale activities in the country for increasing of the population awareness on disasters. The main forms of awareness increasing of the population and state bodies of the government are education and training.

In EMA and NSSP a "Disaster Preparedness and Management Course" has been organized regularly both for population and governmental, regional and local bodies. The course topics cover the subject

dealing with the prevention of disasters and reducing their effects as follows: types and effects of natural and technogen disasters; hazard assessment; analysis of potential vulnerability; disaster simulation models; implementation of public alarms; regional and national planning against disasters, disaster management.

Education approaches are differentiated: the volume of the education increasing from elder generation to young generation, from civil population up to all level leadership. In the Appendix 2 were described detailed schemas of education organization, which were developed and conducted by the Crisis Management Institute of EMA.

Training in Armenia has the most crucial role in realizing pre-disaster activities through certain methods with which the causes of hazards and their effects are taught to the concerned people at technical and managerial level. In the training course were given special place to the prediction and mitigation of natural and technogen disasters through technical assistance and technology transfer, demonstration projects and education and training programmes.

With the purpose of education and training conduction were developed and published numerou manuals, booklets, posters, cut movies and video films. In the cities and villages of the country wer organized and conducted training courses, there were established points of education for training of disaster protection basic elements. Regularly were published articles by Mass media, organized cycle of TV programs on different themes of readiness and protection of population from disasters. Now we are conducting the works for education program preparation for schools as a subject "Basic elements of seismic protection".

5. Disaster reduction cooperation among Asian countries

Successful interaction of different countries during the Spitak tragedy became a trigger in 1988 for many international projects and programs development aimed to disaster reduction. One of such program has become the UN-IDNDR.

The very recent strong earthquake (M=8.1) occurred on January 26, 2001 in Gujarat State of India. According to Government of India more than 18,000 people have perished in the earthquake, with nearly 166,734 people injured. Several districts of Gujarat State have been severely affected wit extensive losses.

Getting warning from Armenian NSSP about Gujarat earthquake, the Government of Armenia, in coordination with Indian Government has rushed for two weeks an 18-member strong fully equipped and very experienced Armenian NSSP multi-disciplinary Task Force for relief operations into earthquake affected Gujarat area. The team included seismologists, structural and communication engineers, geotechnicians, physicians, psychologist and rescuers with a sniffer dog.

In agreement with Government of India, the Armenian NSSP Task Force was placed in Ahmedabad city.

The formal charge to the team was as follows:

-To provide scientific and technical expertise and multidisciplinary assistance to the authorities of the Gujarat state of India with respect to immediate post-earthquake relief efforts including: establish a temporary array of accelerographs in the different parts of Ahmedabad city to record strong aftershocks;

-To provide rapid engineering assessment in such areas as soil and structural performance;

-To provide with demolition of heavily affected buildings and structures dangerous for public and built environment and provide rescue, medical and psychological assistance to demolition team and suffered people.

The main outcomes of Armenian NSSP Task Force Mission

During two weeks of relief operations in Ahmedabad the following outcomes were achieved:

- 6 strong aftershocks of the Gujarat earthquake have been recorded in different parts of Ahmedabad city, as well as ground geotechnical conditions were studied for buildings and structures earthquake damage analysis; further building codes design for current seismic hazard assessment and seismic microzonation for re-assessment of seismic hazard;
- 140 (4-12 story) buildings were inspected and tested with conclusions made in respect to their suitability for their further use;
- the unique operations have been done jointly with Ahmedabad fire brigade for the decutting and demolition of the 14 multistory, heavily affected buildings, which were very dangerous for public and surrounding built environment;
- the rescue, medical and psychological assistance has been provided for demolition team and for earthquake suffered people;
- the sociological studies have been carried out to investigate the reasons of such consequences, through talks to local people to understand their awareness and preparedness to strong earthquake, as well as their performance in rescue and recovery efforts.

Tasks force group of NSSP RA successfully worked in zones of Tbilisi (Georgia) earthquake on April 2002. The main tasks of the NSSP task force team were:

1. Studying of the epicentral zone and marking of the heavy destruction territories;
2. Preparation of the conclusion on ground conditions of the heavy destruction territories;
3. Studying of the earthquake after-shock activity by SMACH;
4. Cooperation with Georgian colleagues in the sphere of seismology, seismotectonics and macroseismic data and outputs exchange.

There were prepared and presented to the Georgian party the report on detailed analysis of conducted works.

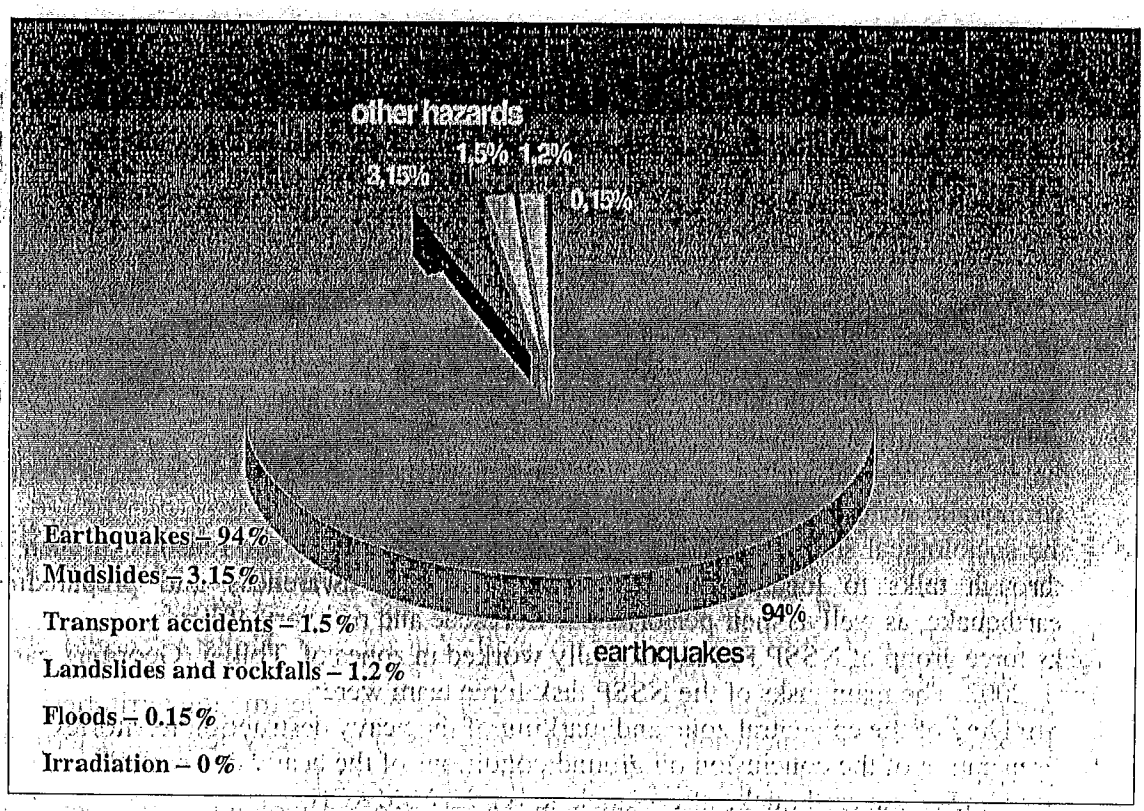


Fig.1. Loss caused by various types of disasters in Armenia

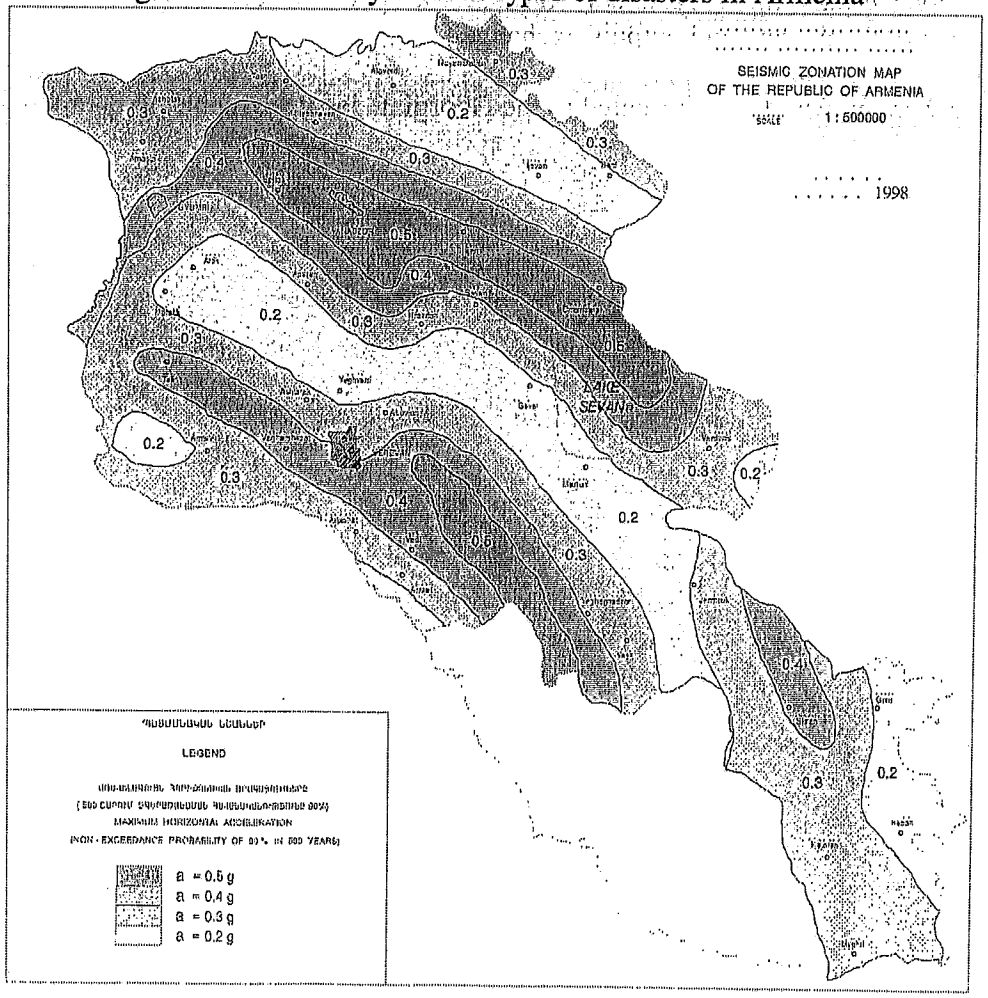


Fig.2. Seismic zonation map for Armenia

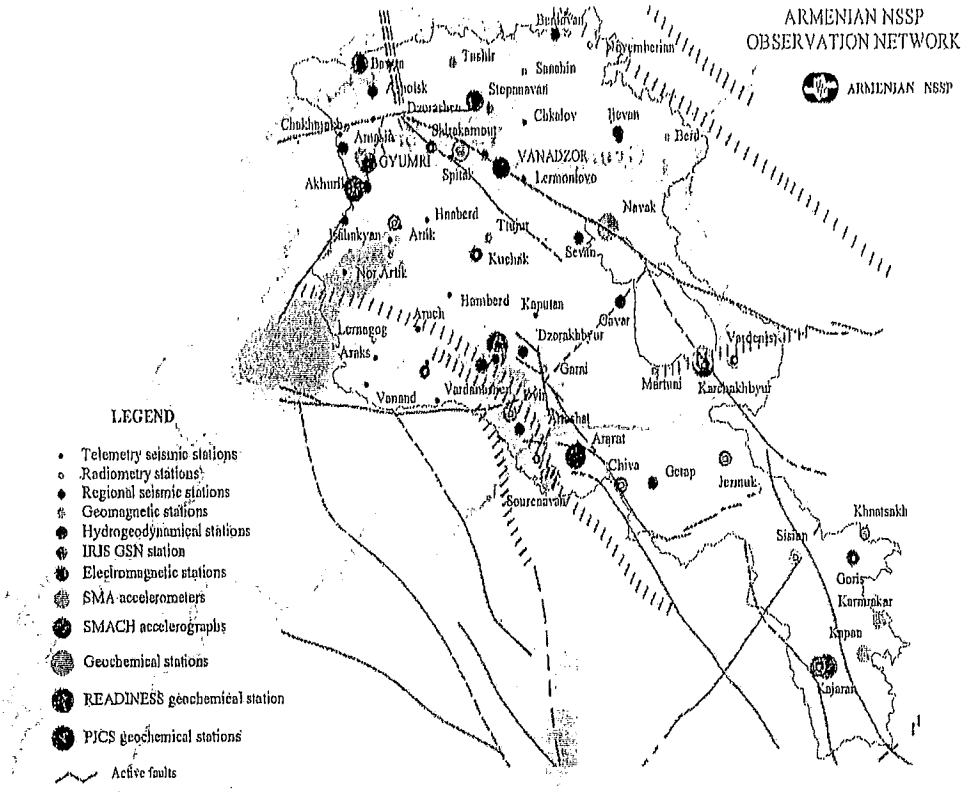


Fig.3. National observation network of Armenia

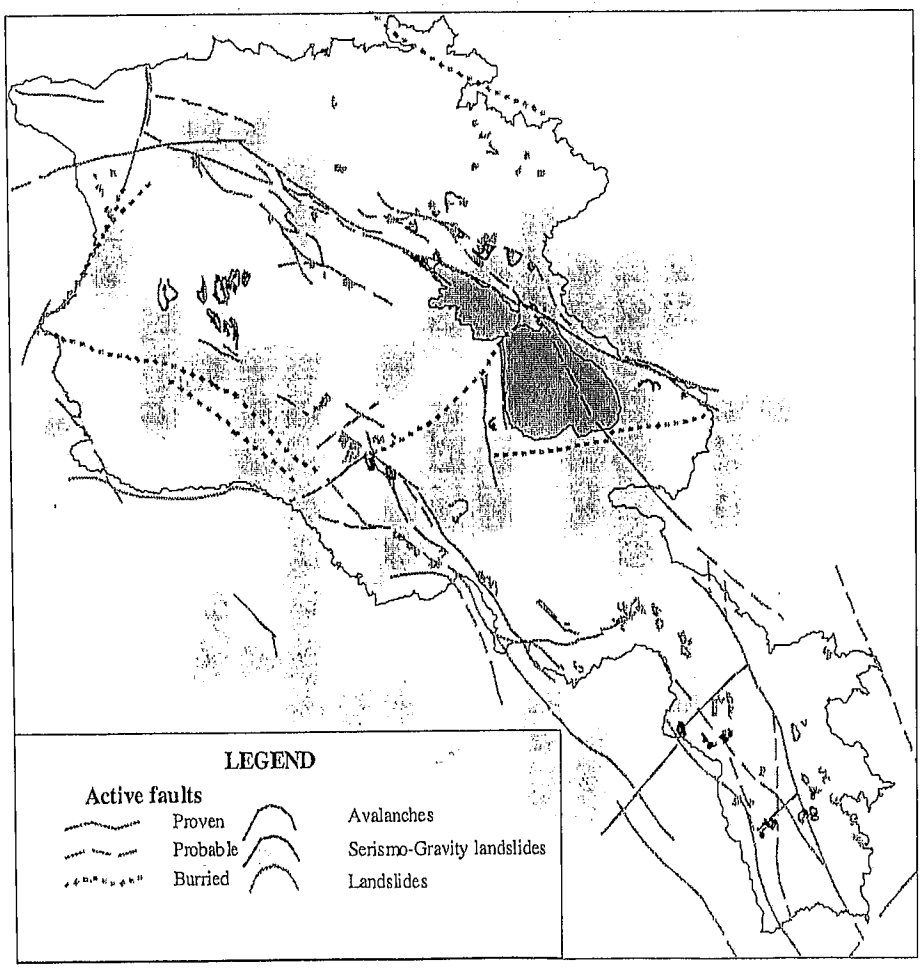


Fig.4. Secondary geological processes

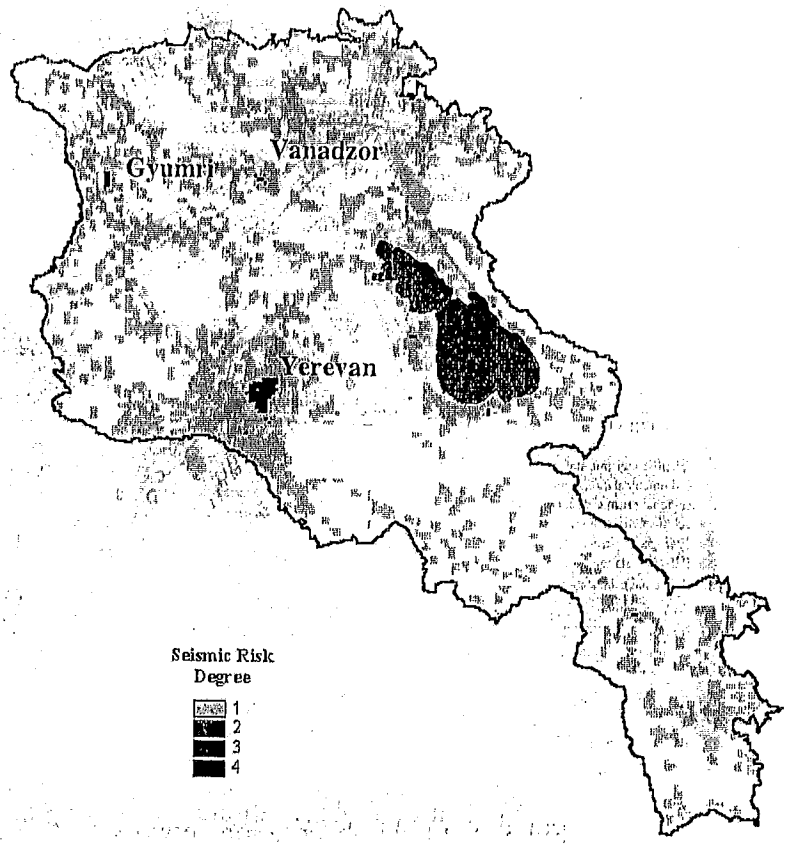


Fig.5. Seismic risk map for Armenia

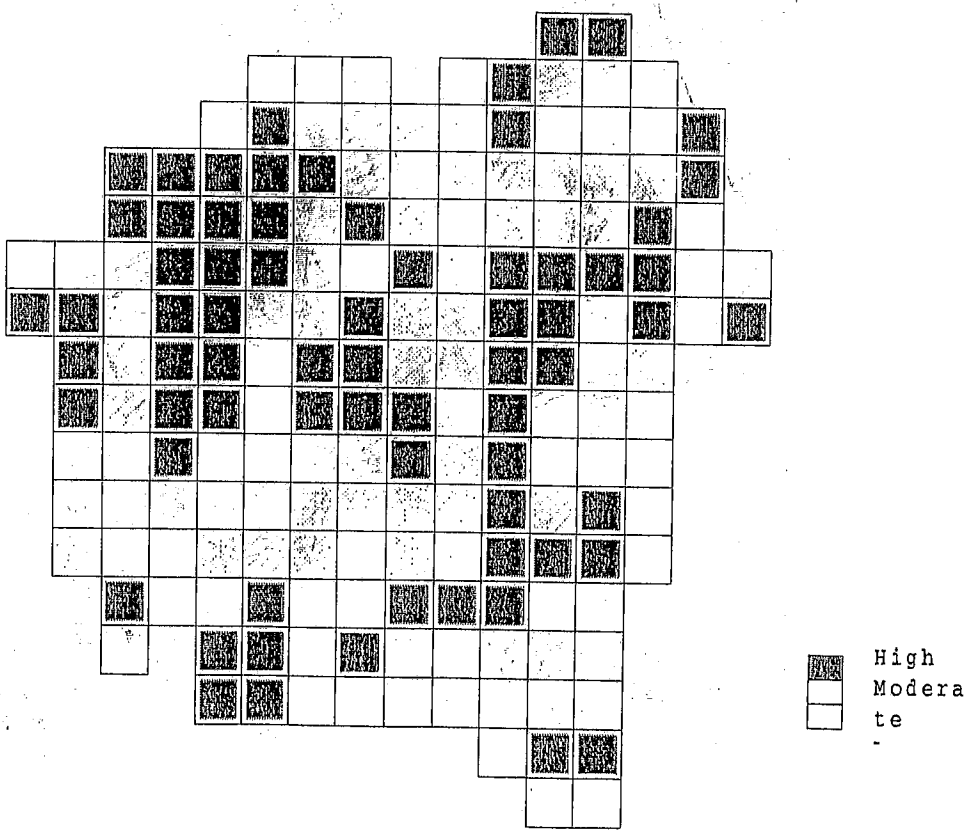
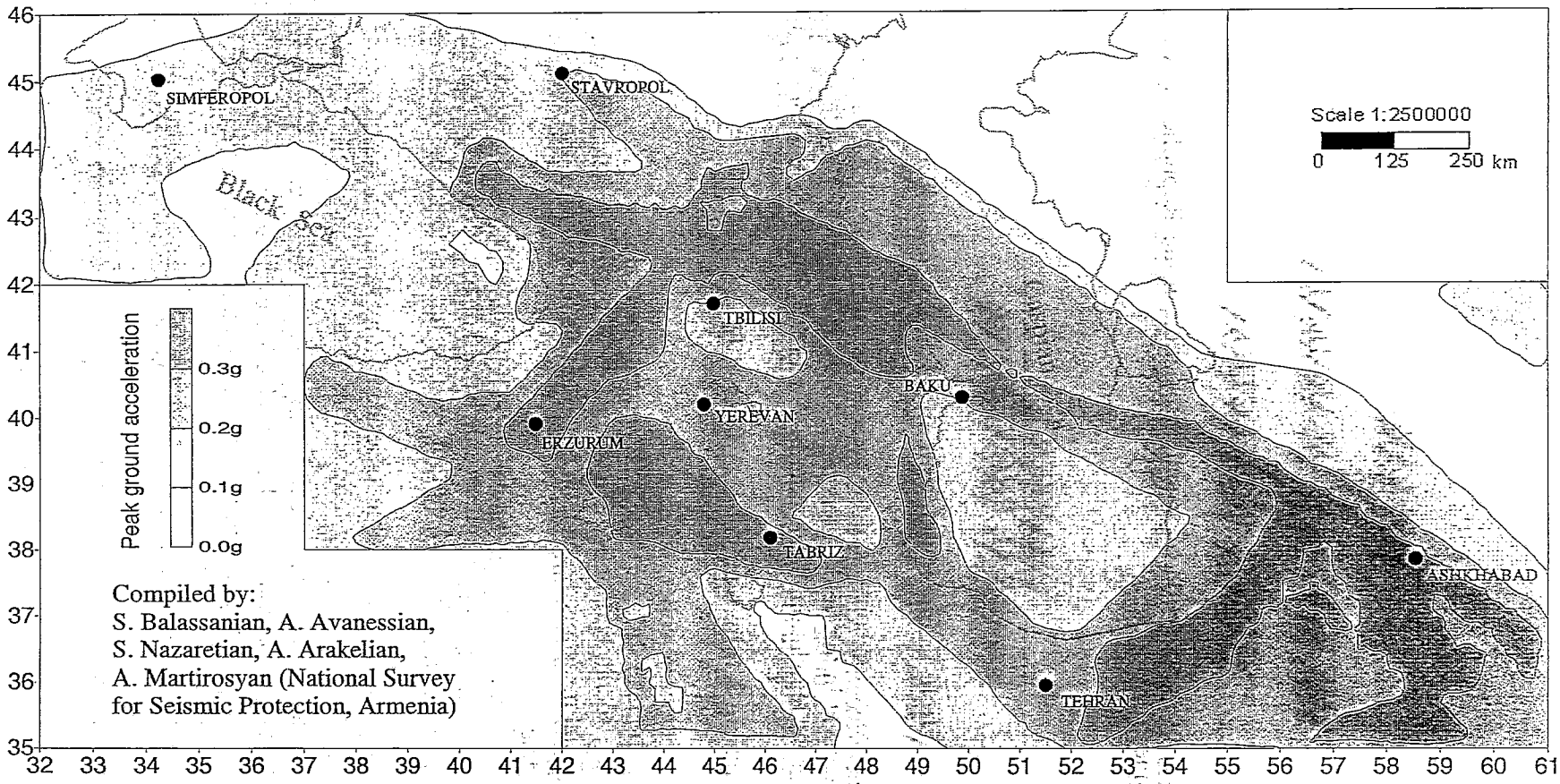


Fig.6. Seismic risk distribution for Yerevan-city



Return period of 500 years for 0.6 standard deviation in log acceleration

Fig.7. Seismotectonic-probilistic seismic hazard assessment map for Crimea-Caucasus-Kopet Dagh region

Appendix 1

THE LAW
OF
THE REPUBLIC OF ARMENIA
ON
SEISMIC PROTECTION

This law prescribes basics for organization of seismic protection in the Republic of Armenia and regulates the relations connected with them.

CHAPTER 1.
GENERAL PROVISIONS

Article 1. The legislation on seismic protection.

The legislation on seismic protection consists of the present law, other laws and legal acts.
If under international agreement in the field of seismic protection, established standards differ from standards established under the legislation, the standards of international agreement are applied.

Article 2. The basic concepts used in the law.

In the present law the following basic concepts are used:
1) strong earthquake- an earthquake stronger than 5,5 by magnitude scale;
2) seismic protection- legal, social, economic, educational, organizational, scientific, engineering and technical, and other special measures directed on ensuring seismic safety of the state and society and its sustainable development;
3) seismic hazard- threat of possible strong earthquake in region, shown by strong shocks;
4)seismic zoning- mapping of possible maximum seismic hazard distribution in the region;
5) seismic situation- general characteristic of current seismic hazard from the point of view of seismic protection;
6) seismic risk- human, material and other possible losses caused by strong earthquake;
7) seismic risk reduction- complex, various long-term actions of the state and society (administrative, legal, social, economic, tutorial, educational, scientific, engineering- technical, organizational etc.), directed to the reduction of human, material and other possible losses caused by strong earthquake;
8) early warning- notification on temporary infringement of population natural vital functions, with the purpose of ensuring its safety;
9) seismic protection of buildings and structures- ensuring of seismic stability of buildings, structures;
10) assessment of buildings and structures vulnerability- prediction of buildings, structures behavior at strong earthquake;
11) task forces of seismic protection- specialized, multi-profile formations in the field of seismic protection for rendering an immediate aid to population at strong earthquake or its threat.

Article 3. The basic goals of seismic protection accomplishment.

Basic goals of seismic protection accomplishment are:
1) implementation by a plenipotentiary body (hereinafter plenipotentiary body) of unified state policy in the field of seismic protection;
2) ensuring of prevailing of preparedness and warning principles above consequences rehabilitation in the unified state and international interstate policy in the field of seismic protection;
3) equal priority of all elements of seismic risk reduction;
4) involving the governmental bodies, local authorities and society in the realization of the state and interstate programs of seismic risk reduction;
5) internationalization of state programs on seismic risk reduction.

Article 4. The work programs on seismic protection.

Seismic protection works in the territory of the Republic of Armenia are realized through the state program on seismic risk reduction (hereinafter Program).
The Program has complex character and consists of short-term (up to 1 year), mid-term (up to 5 years) and long-term (up to 30 years) sub-programs.
The Program includes complex measures with the schedule and responsible executives directed to the reduction of vulnerability of territories to earthquakes and catastrophes connected with them.
As a result of the Program completion the forecast of seismic hazard, seismic risk assessment and reduction are provided.
Annually, until May 1, the head of plenipotentiary body in the field of seismic protection at the session of National Assembly represents a report on conducting the works established by short-term program of seismic risk reduction.
The program is funded from the state budget of the Republic of Armenia, as well as other sources not prohibited by the legislation.

Article 5. Seismic protection objects.

From the point of view of seismic risk assessment and reduction, objects of seismic protection are:
1) territory of the Republic of Armenia;
2) territory of administrative - territorial units of the Republic of Armenia;
3) populated regions of the Republic of Armenia;
4) governmental, defence, industrial, agricultural-industrial, hydro-engineering (including reservoirs, dams), power (including NPP), scientific and technical, health and educational institutions;
5) buildings, structures, immovable monuments of history and culture;
6) systems of engineering-transport communication;
7) lifelines (gas pipeline, water supply and sewage).

Article 6. Classification of the objects of seismic protection.

From the point of view of seismic risk assessment and reduction, the objects of seismic protection are classified by their importance as:
1) special;
2) significant;
3) general.
The list of the objects by classification, in due course, approved by the Government of the Republic

of Armenia.

CHAPTER 2.
GOVERNMENTAL MANAGEMENT IN THE FIELD OF SEISMIC PROTECTION

Article 7. Competencies of the Government of the Republic of Armenia in the field of seismic protection

In the field of seismic protection the Government of the Republic of Armenia:
1) approves the basic directions of state policy;
2) approves the state programs of seismic risk reduction ;
3) establishes the list of the objects of the special, significant and general significance;
4) establishes a plenipotentiary public governing body ;
5) establishes the order of granting licenses for seismic zoning works;
6) fulfills other competencies established by the legislation.

Article 8. Competencies of plenipotentiary body in the field of seismic protection

Plenipotentiary body in the field of seismic protection:
1) develops the basic directions of state policy in the field of seismic protection;
2) is responsible for seismic hazard and risk assessment and seismic risk reduction;
3) coordinates works conducted in the field of seismic risk reduction in the territory of the Republic of Armenia;
4) affirms the prediction of possible strong earthquakes in territory of the Republic of Armenia and possible strong earthquakes at the distance hazardous to the Republic;
5) approves various scale maps of seismic zoning and seismic risk, for the territory of the Republic of Armenia, and seismic microzoning maps for dense populated areas, objects of the special, significant and general importance;
6) affirms expert assessment of seismic risk for the territories of special, significant and general importance objects;
7) organizes preparedness and training of the population to withstand strong earthquakes;
8) coordinates and controls the execution of the state programs in the field of seismic risk;
9) participates in operative vulnerability assessment of buildings and structures with the aim of seismic risk reduction in the zones of high seismic hazard;
10) in due course grants the licenses for works on seismic zoning;
11) fulfills other competencies established by the present law.

Article 9. Competencies of local authorities in the field of seismic protection

"Law on local authorities" of the Republic of Armenia, the given and other laws, establish the competencies of local authorities of the Republic of Armenia in the field of seismic protection.
Local authorities in the field of seismic protection:
1) organize works in the field of seismic risk reduction in the territory of community;
2) provide works on preparation of the population to strong earthquake in the territory of community;

3) support executing of the state programs in the field of seismic protection in the territory of community;
4) realize other competencies, established by the legislation of the Republic of Armenia.

Article 10. Spheres - subject to licensing in the field of seismic protection.

In the field of seismic protection works on seismic zoning are subject to licensing. The licenses specified are issued only to legal entities, for the period up to three years.
For receiving the license the State Tax in the statutory size and course is raised.

CHAPTER 3.
SEISMIC HAZARD ASSESSMENT.

Article 11. Seismic hazard assessment elements

Seismic hazard assessment elements are the primary seismic hazard assessment and the secondary seismic hazard assessment.
The primary seismic hazard assessment includes long-term and current assessment of seismic hazard.
The secondary seismic hazard assessment includes assessment of natural and technogene phenomena caused as a consequence of earthquake.

Article 12. Long-term seismic hazard assessment

Long-term seismic hazard assessment is the prediction of place and intensity of maximal possible shocks on the Earth surface.
As a result of Long-term seismic hazard assessment, in due course, various scale maps of seismic zoning are compiled, approved as normative document by a plenipotentiary body.
The maps of seismic zoning are a basis for designing of seismic resistance construction standards, land use, elaborating of the population settlement schemes of the Republic of Armenia.
The maps of seismic zoning in the obligatory order are taken into account at building up the cities and settlements, and designing the objects of special, significant and general significance.

Article 13. Current seismic hazard assessment

Current seismic hazard assessment is the prediction with the defined probability of place, magnitude and time of possible strong earthquake.
For assessment of current seismic hazard in the territory of the Republic of Armenia the national multiparameter network of seismic observation operates.
The network consists of national and international observation stations, which are included in a world global network. At seismic stations are directly implemented round-the-clock multiparameter observations and the received results are transmitted to the data acquisition center of plenipotentiary body, where they are collected in unified databank. After the expert analysis, information, in order, established by a plenipotentiary body, is reported to the President of the Republic of Armenia, the chairman of the National Assembly of the Republic of Armenia, the prime minister of the Republic of Armenia, competent authorities and population.
The plenipotentiary body establishes the order of creation of a network, executing of observations, data acquisition and transmission.
For ensuring the reliability of the information about the natural phenomena and in order to prevent

distortion of observations around observation stations conservation zones are created.

CHAPTER 4.
ASSESSMENT AND REDUCTION OF SEISMIC RISK

Article 14. Assessment of seismic risk

Assessment of seismic risk is the prediction of human, material and other possible losses caused by strong earthquake.

As a result of seismic risk assessment, in the order, established by a plenipotentiary body, various scale maps of seismic risk, included in basis of economic development programs are compiled and approved.

Article 15. Basic tasks of seismic risk reduction.

Basic tasks of seismic risk reduction are:

1) reduction of territories vulnerability;
2) increase of knowledge and preparedness of the population;
3) preparation of government bodies and local authorities to the management of seismic risk;
4) creation of population early warning system;
5) medical preparedness;
6) development of task forces;
7) creation of insurance system;
8) rehabilitation of population and recovering of a zone suffered from the strong earthquake;

Seismic risk reduction is realized according to the complex seismic risk reduction state programs.

Article 16. Basic principles of territories vulnerability reduction

Basic principles of territories vulnerability reduction are:

1) seismic zoning of territories;
2) assessment of seismic risk of settlements, objects of the special, significant and general significance;
3) strengthening of existing constructions;
4) increase of seismic resistance of objects of special, significant and general importance and lifelines;
5) presence of rules and standards of seismic resistant construction;
6) accomplishment of the state control on buildings and structures design, measures and requirements on vulnerability reduction during construction and exploitation;
7) prediction of secondary hazard.

Article 17. Role of the population in the system of seismic protection

The raise of knowledge and preparedness of population is provided by means of state training system.

The state training system includes the following subsystems:

1) direct training of various strata of the population, beginning from high schools (instructors, teachers, tutors, doctors etc.):
2) educational programs, methodical manuals, relevant indicative materials;
3) TV and radio programs, publications in mass media;

4) social - psychological preparedness;
The state training system provides the reliability and availability of the given information.

Article 18. Preparation of government bodies and local authorities to the management of seismic risk

The purpose of preparation of government bodies and local authorities is the creation of a unified seismic risk control system for effective utilization of capabilities and assets of the state.
The preparation for seismic risk management should include the following periods: before earthquake (long-term preventive measures), during earthquake (task force), after earthquake (rendering aid, recovering works, rehabilitation of population).
The preparation of government bodies and local authorities includes elaboration of programs on regional and local seismic risk reduction, as well as mutual aid, organization of staff training.

Article 19. Order of the population warning about seismic situation at strong earthquake or its threat.

The official warning of the population about strong earthquake or its threat and as well as about a general seismic situation in the Republic of Armenia is realized in order established by the government of the Republic of Armenia.

Article 20. Methods of early warning and notification.

Methods of early warning and notification are non-prompt notification, through government bodies, and immediate, automatic notifications by means of a seismic alarm acoustic signal.
In the basis of the non-prompt early warning and notification lays the assessment of current seismic hazard by a plenipotentiary body, which is accompanied by accomplishment of the stipulated measures, in order established by the government of the Republic of Armenia. An overall objective of measures is to avoid significant human and material losses, through the preliminarily planned actions.
The immediate early warning and notification is transfer of a signal about the destructive seismic wave propagating from earthquake source to a settlement, via technical automatic system.

Article 21. Task force system.

Task force system in the field of seismic protection includes the program of actions and necessary means and is directed on rendering prompt and efficient aid to the population with the purpose of ensuring the minimum human and material losses.

The program of actions, in due order, is approved by the government of the Republic of Armenia. The program of actions is a list of complex measures taken in case of earthquake with the appropriate schedule and responsible executives.
In areas suffered from earthquake task force (hereinafter forces) realize:
1) search and rescue works;
2) rendering of the first medical aid by rescuers and population to the population, suffered from earthquake;
3) rendering of medical aid by the system of public health services;
4) examination of psychological state of the people and organization of explanatory works with the population;

5) recovery of communication and other subsystems of life-support.
6) organization of an information service;
7) organization of material-technical support;
8) ensuring of the public order;
9) neutralization of damaged buildings;
10) assessment of preliminary damage grade of buildings and structures, and consequences in the earthquake zone;
11) installation of a dense network of seismic observation stations, seismogeological and macroseismic research in the earthquake zone;
12) other works on liquidation of strong earthquake consequences.
By the decision of the prime minister of the Republic of Armenia, the task forces participate in the works on earthquake consequences liquidation, occurred abroad the Republic of Armenia.

Article 22. Medical preparedness

Medical preparedness is based on the forecast of possible sanitary losses at earthquake.
Medical preparedness supposes:
1) preparation of the specialized medical establishments;
2) preparation of medical and not medical experts, with the purpose of rendering the first medical aid;
3) planning of medical establishments arrangement, depending on the location of high seismic risk zones;
4) accomplishment of mutual actions between medical services and government bodies and local authorities.

Article 23. Principles of recovery

The stage of recovery of a zone suffered from strong earthquake is the intermediate between the stages of an emergency seismic situation and reconstruction. The duration and the strategy of recovery stage defines the government of the Republic of Armenia.
The accomplishment of recovery works is based on the following principles:
1) planning of possible amount of probable recovery works before the catastrophe and their adjustment after the catastrophe;
2) ensuring of cooperation between government bodies and local authorities, non-governmental organizations, society for the solution of recovery tasks;
3) creation of the conditions for population active participation in recovery works in the disaster zone;
4) creation of the conditions for attracting an international investments to the disaster zone.

Article 24. Essence of recovery works

Recovery works suppose:
1) revision of existing seismic hazard assessment maps and compilation of new maps (including seismic microzoning maps);
2) presence of recovery program for settlements in earthquake zone and general layout;
3) elaboration of seismic resistant construction strategy in earthquake zone;
4) assessment of technical state of preserved buildings and structures, granting of the certificate for their exploitation;
5) demolition of high emergency and destroyed structures and clearing of the site;
6) construction of new settlements, residential areas, buildings;

7) recovering of objects of public health services, culture, common, industry, education and science, lifelines, religious facilities;
8) solution of environment protection tasks.

Article 25. Aid for the population and its rehabilitation

The purpose of aid rendering to the population and its rehabilitation is the reduction of material and psychological losses of the state after an earthquake.
Rendering of aid to the population and its rehabilitation is a multi-stage one: operative (first few days), short-term (first month), mid-term (first year) and long-term (more than one year).
Rendering of aid to the population and its rehabilitation are based on the following principles:
1) preliminary planning of works amount on rendering aid and rehabilitation before the catastrophe and their adjustment right after the catastrophe;
2) active participation of government bodies and local authorities and society.

Article 26. The order of earthquake insurance in the Republic of Armenia.

The insurance of life, health and asset of the citizens of the Republic of Armenia, as well as assets of governmental management bodies and local authorities, legal entities from earthquake is realized in order established by the law "About insurance" of the Republic of Armenia.

CHAPTER 5.
THE RESPONSIBILITY FOR OFFENCES IN THE FIELD OF SEISMIC PROTECTION

Article 27. The responsibility for offences in the field of seismic protection

The offences committed in the field of seismic protection arouse the responsibility according to the order established by the legislation of the Republic of Armenia.

CHAPTER 6.
FINAL PROVISION.

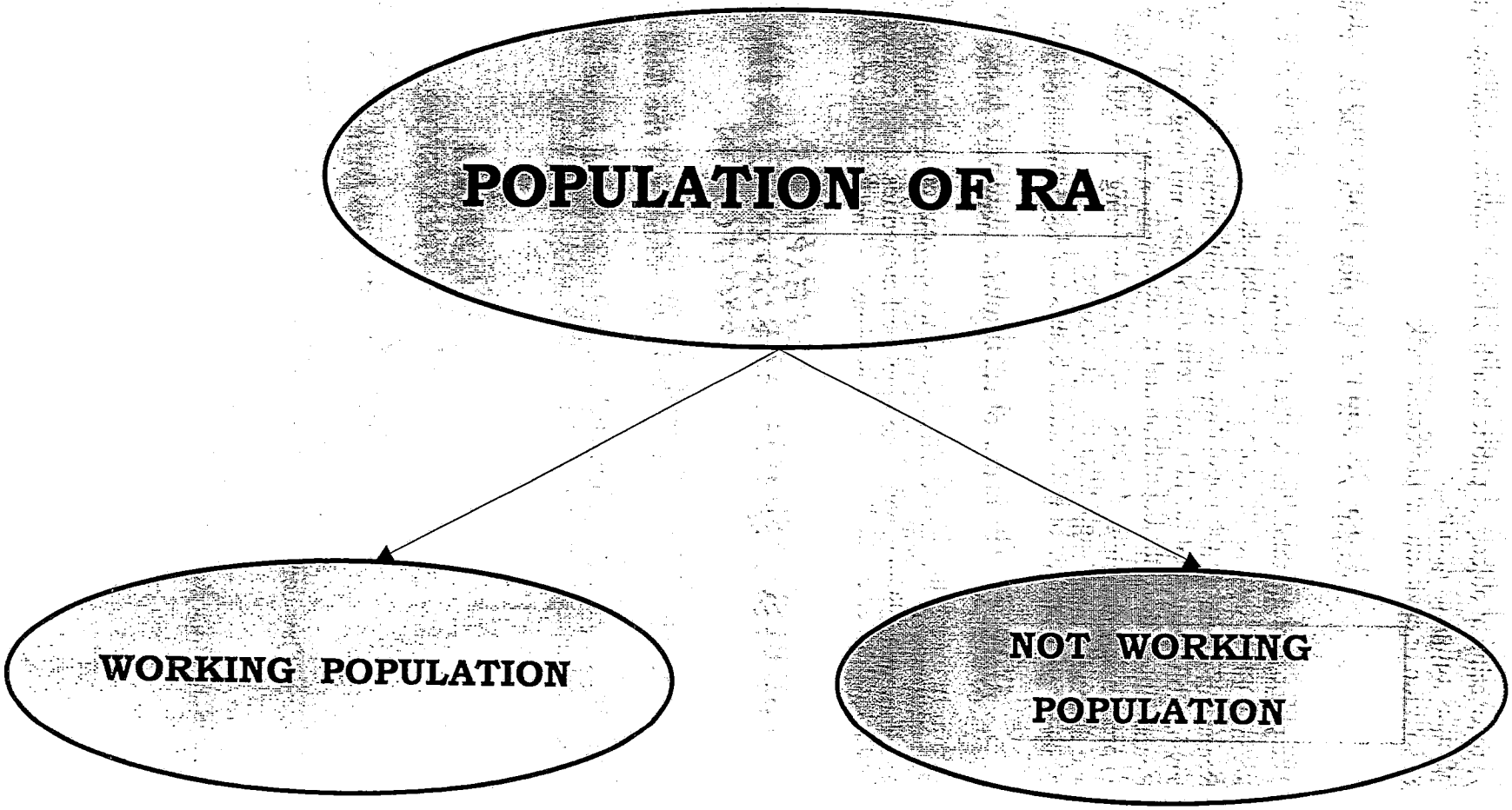
Article 28. Entry into force of the law

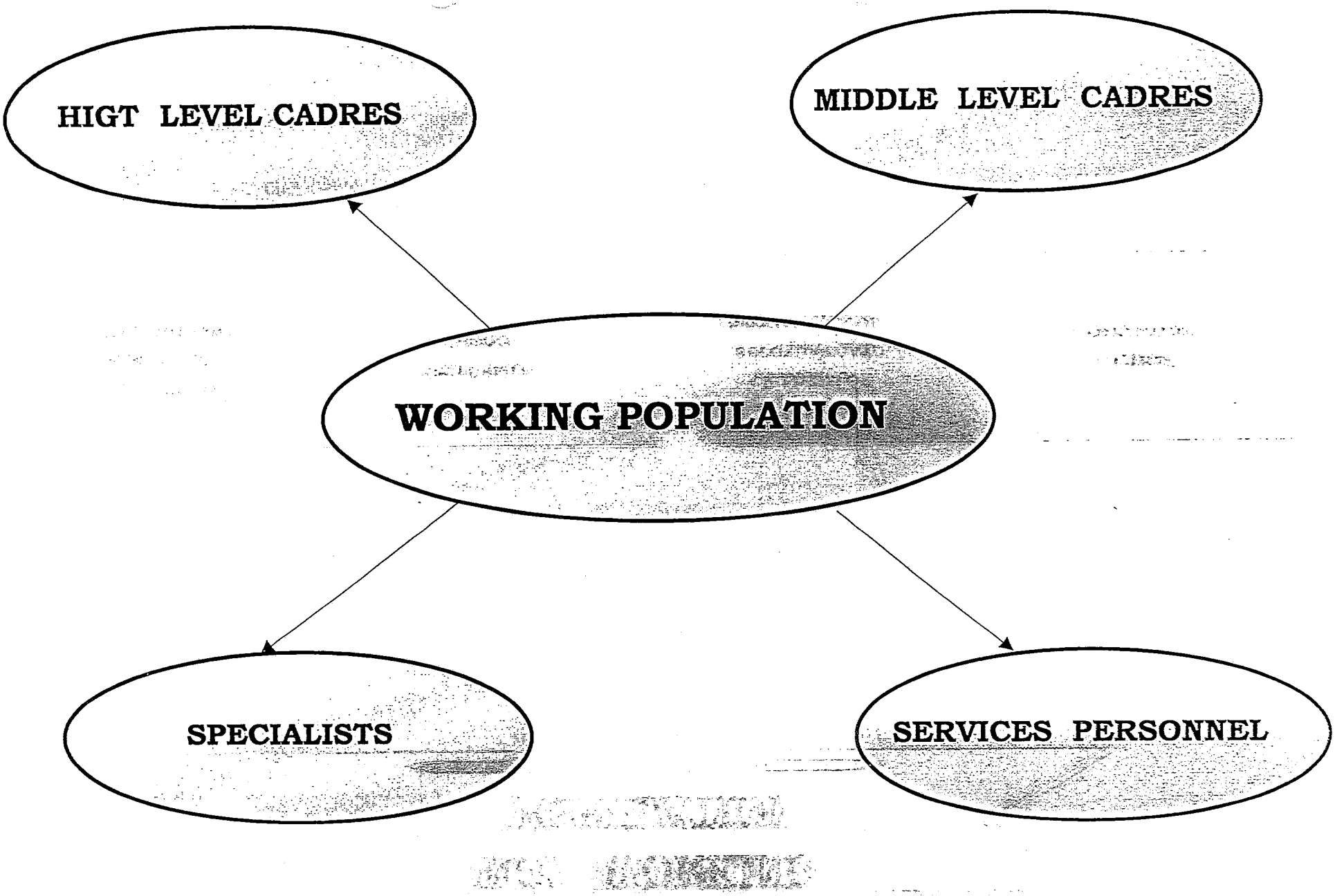
The present law comes into force from the moment of its official publication.

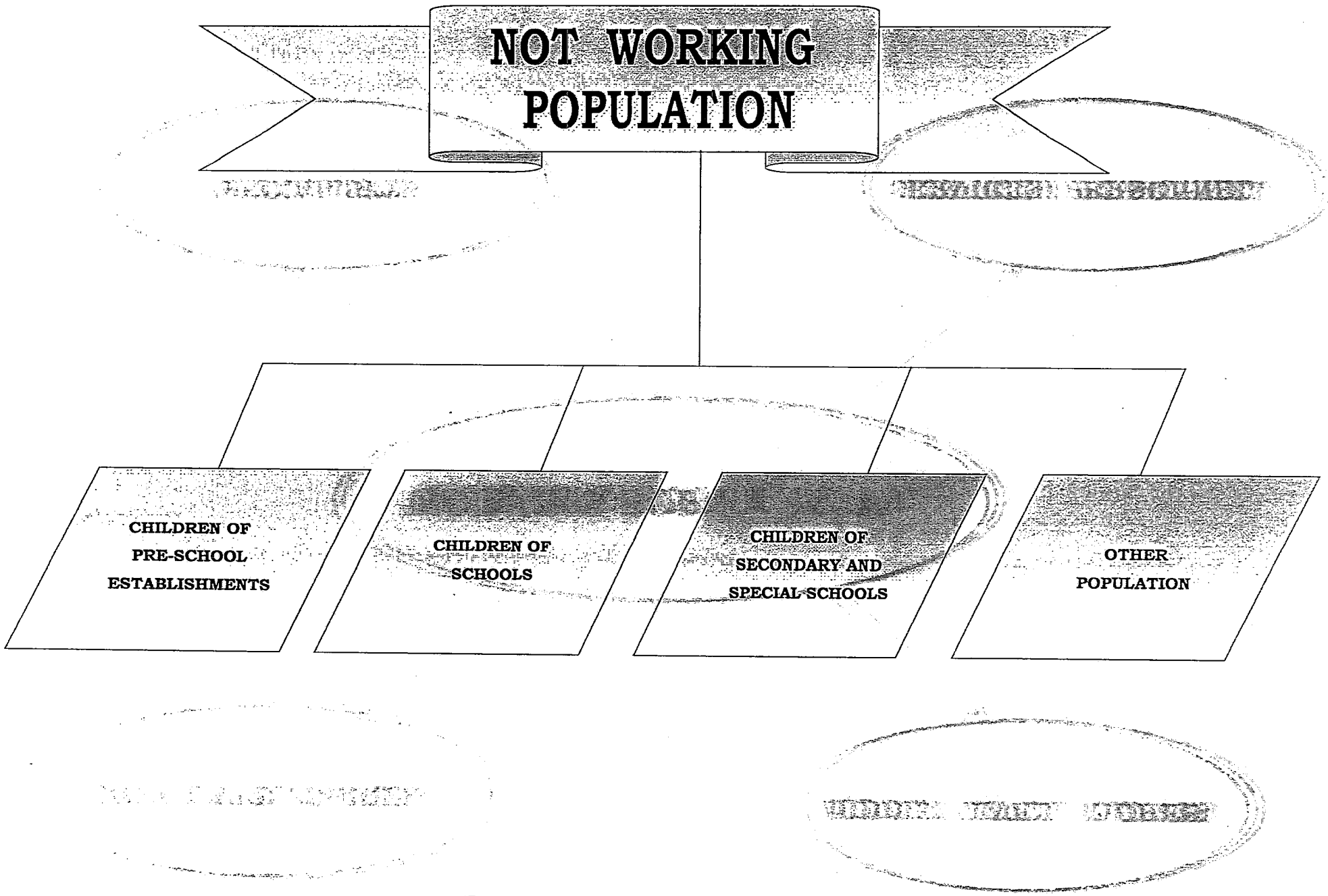
President of the Republic of Armenia.

CLASSIFICATION OF POPULATION

DATA ON THE WORKING POPULATION

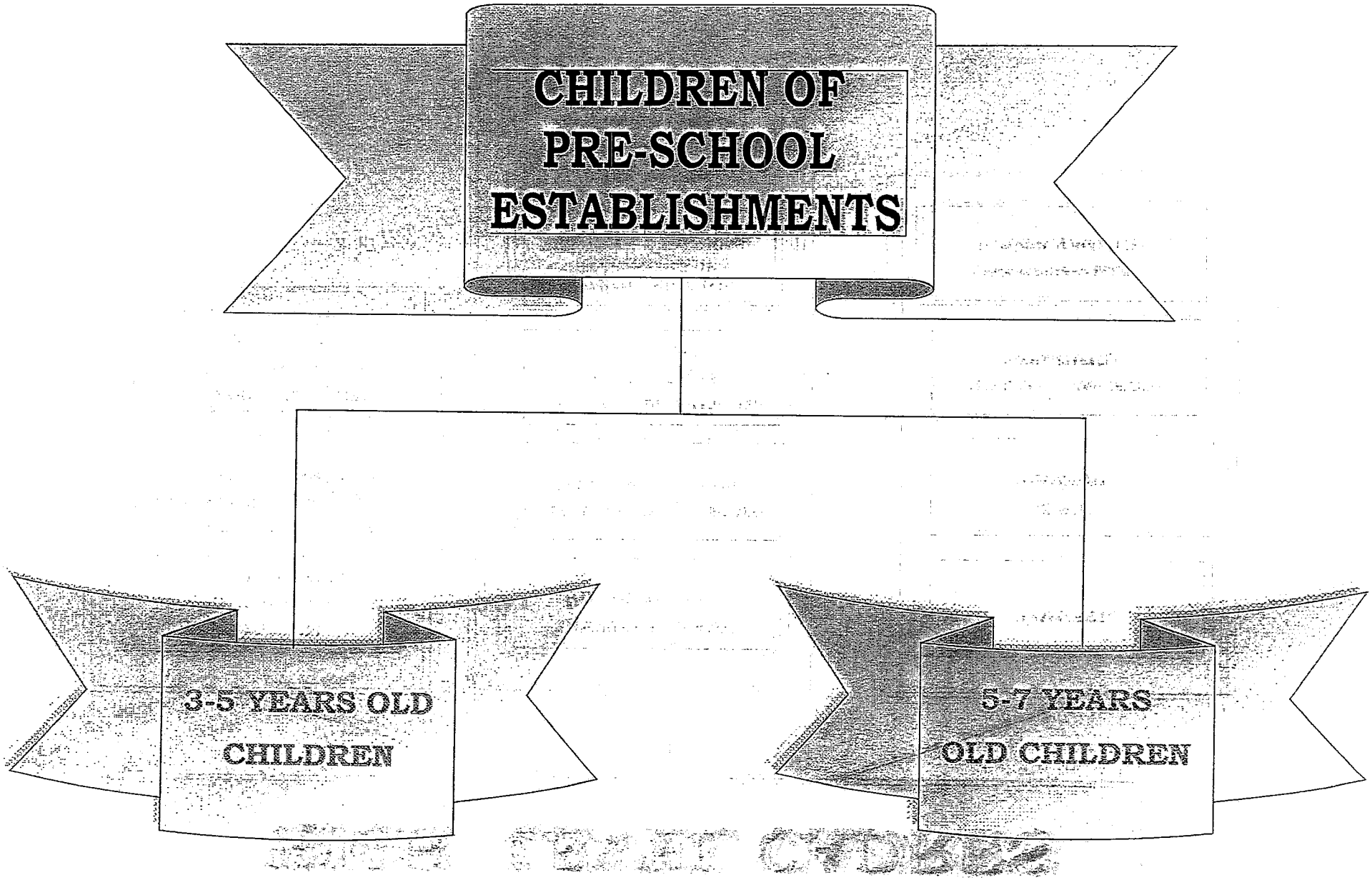



HIGT LEVEL CADRES
MIDDLE LEVEL CADRES
WORKING POPULATION
SPECIALISTS
SERVICES PERSONNEL


NOT WORKING POPULATION
CHILDREN OF PRE-SCHOOL ESTABLISHMENTS
CHILDREN OF SCHOOLS
CHILDREN OF SECONDARY AND SPECIAL SCHOOLS
OTHER POPULATION

HIGH LEVEL CADRES

- HEADS OF RA PRESIDENT'S STAFF PERSONNEL
- HEADS OF RA DEPARTMENTS OF NATIONAL ASSEMBLY
- HEADS OF DEPARTMENTS OF RA GOVERNMENT APPARATUS
- MINISTERS, HEADS OF DIRECTIONS
- DEPUTY MINISTERS, DEPUTY HEADS OF DIRECTIONS
- HEADS OF DEPARTMENTS OF MINISTRIES, DIRECTIONS
- DEPUTY HEADS OF DEPARTMENTS OF MINISTRIES, DIRECTIONS
- HEADS OF LARGE ENTERPRISES AND THEIR DEPUTIES
- MARZPETS
- DEPUTY MARZPETS
- HEADS OF MARZPETS' DEPARTMENTS
- SENIOR SPECIALISTS OF MUNICIPALITIES


CHILDREN OF PRE-SCHOOL ESTABLISHMENTS
3-5 YEARS OLD CHILDREN
5-7 YEARS OLD CHILDREN

CHILDREN OF SCHOOLS