The Earthquake of Spitak, Armenia, and its socio-economic implications

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Abstract

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On 7th of December 1988, an earthquake shook the northwest of Armenia. It was one of the most devastating and most lethal earthquakes at the end of the 20th century that resulted in approximately 25000 fatalities. It was the largest earthquake in the region until then, and attracted great international attention, which led to a turning point in the politics of the USSR: The Soviet government requested relief of the international community outside the USSR. This contribution aims at analysing the structures of national and international help under Soviet conditions, the reasons for the great damage the earthquake caused, and its socio-economic implications for the local population at time of the catastrophe until today. As to the methods used to investigate the earthquake of Spitak, we studied the relevant literature and conducted a semi-structured qualitative interview with an Armenian NGO, which was founded directly after the catastrophe.

Introduction

On the 7th of December 1988, an earthquake shook the northwest of Armenia at 10:41 a.m. local time (Hadjian 1992: 5). According to Hadjian (1992: 5), the earthquake caused despite its moderate size the largest earthquake disaster since the 1976 Tangshan earthquake in China. It had a magnitude of 6.9 on the Richter scale (Noji et al. 1990: 891) and hit 40% of the territory of Armenia, a densely populated region with 1 million people (Armenian NSSP A 2013). Whereas previous earthquakes in Armenia were not noticed by the world public, a series of circumstances led to concentrate international attention on this country (Eknoyan 1992). Eknoyan (1992: 243) describes these

circumstances with the following words: 'Mikhail Gorbachev, who was heading the Soviet delegation to the forty-third Session of the General Assembly of the United Nations[1], was preparing to visit Washington. He interrupted his sojourn, cancelled his visit to Washington, and returned home to assess the situation in the earthquake zone personally. The news media assembled to cover his visit were suddenly deprived of the news item they had gathered to cover and channelled their collective force on the tragic events in Armenia. The earthquake which had its epicentre in the north western region of the country, approximately 3 miles (Eknoyan 1992: 242) away from Spitak caused greater damage as initially expected, and overcharged the treasury of the USSR. Based on the enormity of the disaster, Minister of Health, Evgueni Chazov asked the international community outside the USSR for help (Eknoyan 1992: 243), which was an unusual step for a socialist country behind the Iron Curtain. Almost immediately after his request for help, forty Red Cross and Red Crescent organisations offered their help (DRK 1991: 31), and until the 10th of December 1988, international relief was on the way (DRK 1991: 23).

Consequences of the earthquake

Even though the number of fatalities could not be fixed exactly, it can be assumed that the earthquake caused 25000 fatalities, 50000 injured (Hadjian 1992: 5) and 19000 disabled persons. About 530000 people lost their homes. The damages were estimated to amount to 10 billion US dollars (Mikayelyan 2001: 2f). By these numbers, the earthquake belongs to the 10 most expensive and 3 most lethal earthquakes in the last 32 years (Munich Re 2013). As to damages, the cities of Leninakan, today's Gyumri, and Kirovakan, today's Vanadzor, were severely affected. Gyumri was destroyed to an extent of 75%, and Vanadzor to an extent of 40%. The city of Spitak suffered the highest level of devastation with 95% destruction, and was therefore reconstructed on a completely different site (DRK 1991: 19). All in all, 21 regional centres and towns, and 342 villages were damaged (Balassanian et al. 1995: 371). Translated in numbers, in the region of the epicentre, 314 buildings collapsed, 641 buildings had to be pulled down, 1264 had to be repaired and only 712 buildings were judged as habitable (Hadjian 1992: 5). Despite the fact that the winter of 1988 was rather mild, the weather changed after the earthquake towards a very cold winter, which complicated the conditions for helpers as well as for inhabitants (DRK 1991: 11, 27).

Geophysical conditions and reasons for the large devastation

Armenia is situated in Western Asia between the Black and the Caspian Sea in the area of the lesser Caucasus (Eknoyan 1992). As the lesser Caucasus was pushed towards the north by a drift of the

[1] The 43rd Session of the General Assembly of the United Nations was held 1988 in Argentina. President of the 43rd Session was Dante M. Caputo (United Nations 2013).

Arabic continental plate, it bumped against the continental crust of the Mesozoic back-arc basins and led to the emergence of the folded mountains of the Great Caucasus (Philip et al. 1989). Due to the collision, the lesser Caucasus has been exposed to folding, severe deformations and reverse faulting (Philip et al. 1992). Nowadays continental collisions, which exist in the Caucasus region, are distinguished by the drift to the north of the Arabic continental plate and a sidewise ejection of the Iranian plate to the east and of the Anatolian plate to the west (Philip et al. 1989). About 76.5% of the land surface is composed of mountainous areas between 1000 and 2500 m above sea level (National Statistical Service 2013: 6). The average height is about 1800 m and the highest mountain (Mountain Aragaz) peak is 4090 m above sea level (GOV AM 2013). In addition to that, almost the entire land surface belongs to territories of volcanoes, of which some are recent volcanoes (Philip et al. 1992). The earthquake of Spitak was part of an earthquake type called earth's crust quakes, which occur up to 20 times on earth every year. It was a 'whole cycle earthquake' (Armenian NSSP A 2013) made up of a foreshock, a main quake, and several aftershocks with a magnitude of 6.9 (Balassanian 1995: 354f). This value is high but normally does not lead to such disastrous outcomes. The high degree of destruction was mainly due to the flat hypocentre, which denotes the seismic source of an earthquake. The hypocentre was only situated 2.5 to 10 km below the surface of the earth (Armenian NSSP A 2013). In addition to that, surface breaks were traced over a distance of 13 km in the epicentral region near Spitak (Hadjian 1992: 5).

Although the magnitude of the earthquake was not large, the devastation it caused was enormous. Eleven reasons can be quoted for the devastation:

(1) Bad errors in the seismic zonation map, where the 10-intensity Spitak zone was indicated as a 7-intensity zone (Balassanian 1995: 370).

(2) Lack of data about seismic microzoning; small quantities and depths of holes, and limited volume of laboratory and field investigations of the soil properties; unusual physical properties of some varieties of loess like loams were not reported (high porosity, high values of the initial collapse pressure, poor compactibility und heavy tamers), etc. (Khanin 1992: 210).

(3) Two earthquakes of similar intensity followed one another within 30-40 seconds. The first one degraded the buildings, and the second one destroyed them. The short period between both quakes did not leave any time for the inhabitants to evacuate the buildings (Hadjian 1992: 9).

(4) Code of earthquake proof construction that needed sufficient development (Balassanian 1995: 370).

(5) Poor construction quality and poor quality of construction materials (Balassanian 1995: 370, Noji et al. 1990: 896).

(6) The fragmentation of the floor system resulted in very tight packing of the rubble with no cavities or 'void spaces' for possible survival of victims. The distribution and amount of void space in the collapsed structure (…) are important in locating and rescuing trapped people quickly (Noji et al. 896).

(7) Major problems with extrication of trapped victims because of lack of adequate equipment and trained rescue personnel (Noji et al. 1990: 896).

(8) According to the 1969 Soviet Building Code, all newer buildings in Armenia were constructed with an intensity value of 8 on the Soviet intensity scale[2]. An intensity value of 8 corresponds to a horizontal ground acceleration of 0.2 g[3]. For each change in the intensity level, the design acceleration is doubled; Intensity 9 corresponds to 0.4g and Intensity 7 to 0.1g. In 1981, the Soviet Building Code introduces a refinement of seismic hazard through the use of subscripts 1, 2 and 3, which refer, respectively, to design accelerations equal to 0.85, 1.0, and 1.15. For the design of the cities of Spitak and Kirovakan, the intensity value was reduced from 8 to 7_1 in 1982, but it is not clear if the collapsed buildings were constructed after 1982 (Hadjian 1992: 6). However, it can be assumed that the governments of the Soviet Republics underestimated the situation in the region (Hadjian 1992).

(9) The Armenian government was overchallenged because it had not expected such a catastrophe (Balassanian et al. 1995) and therefore no rescue activity management for the population (lack of trained personnel and equipment, inability to quickly render first aid etc.) existed (Eknoyan 1992). In consequence to this absence of professional rescue teams and a management system, the biggest load was handled by the local population during the first days after the catastrophe (Balassanian et al 1995: 371). Within the first hours after the catastrophe, people living in the earthquake region provided assistance (Noji et al. 1990), while governmental medical aid arrived and started just 10 to 12 hours later (Eknoyan 1992: 242). Only after 36 to 72 hours, medical aid seemed to have an organised structure (Eknoyan 1992: 242).

(10) Based on insufficient design of buildings (Noji et al. 1990, Hadjian 1992), nearly all hospitals and medical care stations were severely damaged and a great number of medical personnel was injured or killed, which made first aid on site almost impossible (Noji et al 1990, Armenian NSSP B 2013).

[2] For an explanation of the Soviet intensity scale, please refer to the next chapter.

[3] The horizontal ground acceleration is measured in *g*. Lohmeyer et al. define *g* as follows: 'Gravity acts on all bodies, and all bodies accelerate during free fall. This acceleration is called "gravitational acceleration" or "acceleration of free fall", and is of same size for all bodies. Gravitational acceleration is referred to as *g* and is supposed to have on earth a mean as normal gravitational acceleration g_n: g_n=9.80665 m/s².' (Lohmeyer et al. 2005: 11, translated by Johanna Schott).

(11) People's unawareness with respect to protection against earthquake risks was one out of several reasons for the high number of fatalities (Mikayelyan 2001).

The Soviet intensity scale

The Soviet intensity scale denotes the MSK scale (Medvedev-Sponheuer-Kárnik seismic intensity scale) which the Institute of Earth Physics of the Soviet Academy of Science adopted, and of which the descriptive part is similar to the Mercalli scale (Wyllie and Filson 1989). The Italian volcanologist Mercalli Guiseppe developed his scale in the second half of the nineteenth century and Adolfo Cancani advanced the scale in 1902. This system contains 12 ranges for classifying the damages of earthquakes (Schwanke et al. 2009: 23). In contrary to magnitude scales, the MSK scale is used to describe the intensity of earthquakes related to persons, nature, and structures such as buildings (Bell 1999: 64ff). The MSK scale includes also an instrumental part based on seismoscope readings. Maximum amplitudes of displacement on the seismocope make up the base for building code definitions of intensity used for all buildings in the former USSR (Wyllie and Filson 1989). Only intensity ranges from 6 to 9 were relevant to the Soviet building code in earthquake regions. In regions, where an intensity of 10 was expected, it was not possible to construct earthquake resistant buildings (Wyllie and Filson 1989: 94).

Using historic data, the intensity scale was transferred to a map of the Soviet Union. The intensity ranges of the scale were distributed according to the presumption that the strongest earthquake in the past would be the strongest one in the future. Two other items were included in the building code, which played an important role for the construction of buildings. One of them is the 'Soil Influence Factor' (Wyllie and Filson 1989: 95) stating that buildings on a soft ground have to be classified one rank higher, and buildings on a hard ground one rank lower. The other item is called the 'Seismic Coefficient' (Wyllie and Filson 1989: 95), which is a multiplier of the gravitational attraction on the basis of the maximum acceleration to the ground. In consequence of the Seismic Coefficient, reduction of intensity ranges for buildings of special importance like atomic power plants was not allowed. For normal buildings, a dividing factor of 4 was estimated for the calculation of the seismic charge. For example, a ground acceleration of 0.10 g for intensity 7 would be divided by the factor 4, and 0.025 g would be used as the coefficient for calculating the base shear (Wyllie and Filson 1989: 96). As already mentioned, an intensity range of 7_1 instead of the former range 8 was assumed for new buildings in Spitak and Kirovakan in 1982. Frighteningly, the intensity of the earthquake in Gyumri, which was destroyed to an extent of 75%, was 9 on the intensity scale. But the city was built according to the building design code of 8 (Wyllie and Filson 1989: 97). Thus, the high degree of devastation can partly be explained by the wrong assessment of buildings with respect to the ranges on the intensity scale.

National and international relief

In Armenia, a large number of civilians committed themselves to help. Especially students went together with international relief organisations into the disaster area, and worked there as searchers, as medical care assistants, and as interpreters (DRK 1991). The Armenian Red Cross, the Soviet Red Cross, and Armenian ministries were unable to cope with relief organisation due to a lack of personnel and a missing structure. For this reason, it was possible for members of international relief organisations to move freely during the night in spite of the fact that there was a nightly ban on going out. The KGB was present, but did not accompany any of these organisations (DRK 1991).

Almost immediately, the international relief started. The first group of the French team already arrived in Armenia on 9th of December 1988 (Verluise 1995: 41). By the 10th of December, the international relief was in full play and provided mould-breaking amounts of personnel and material (Eknoyan 1992: 243). Regarding donations in terms of money, it turned out that the Armenian Diaspora donated high amounts of money in favour of the victims of the Spitak earthquake. Furthermore, the earthquake can also be seen as a reviving of the Armenian identity of the Armenian Diaspora (Verluise 1995). The willingness to donate in favour of the earthquake victims was as well high in other countries. For instance, the German population donated 85 million Deutschmarks (Sayn-Wittgenstein 1991). Altogether, 113 million Deutschmarks were used for relief consisting of monetary donations and donations in kind (DRK 1991: 79). In addition to donations based on charity appeals by relief organisations, other donations were collected by media events like 'Rock Aid Armenia' (Rock Aid Armenia 2013) and 'Pour toi Armenie'.

Besides the Red Cross, World Vision from the USA actively helped in the disaster area by donating a cheque of one million dollars and relief equivalent to three million dollars (World Vision 2013). All in all, 40 countries were involved (Sayn-Wittgenstein 1991) in the relief by sending 40 Red Cross and Red Crescent organisations to Armenia (DRK 1991: 31). Concerning the German management system of catastrophes, handling of catastrophes is managed according to a general plan that the German Red Cross implements in disaster areas: (i) immediate aid: rescue of and care for injured people, quick provision of medicaments, dressing material, food, covers, tents and the employment of canine squads (dogs searching for survivors), (ii) survival aid: temporary maintenance of provision with water, food, clothes, shelter and medical care, (iii) reconstruction aid: reconstruction of destroyed hospitals, weatherproof temporary houses, earthquake proof kindergartens and the creation of local disaster aid groups (DRK 1993: 21).

The international relief concentrated especially on dialysis. Beginning from 12th of December, mobile dialysis stations were delivered by German, British, American, Belgian, French and Israeli teams (Eknoyan 1992: 243). The number of victims suffering from acute renal failure was quiet low. It can

be assumed that this is not only due to the early employment of high quality equipment, but also to the decision of Professor Mikaelyan, at that time director of the Yerevan All-Union-Scientific Surgical Institute, towards early amputation preventing the release of nephrotoxic events (Eknoyan 1992).

Adverse relief effects

A point of criticism was that Armenia was cut off from relief supplies in 1989 due to the national conflict with Azerbaijan (DRK 1991: 10). This implied that Azerbaijan and allied countries like Turkey prevented relief supplies from arriving in Armenia. Another difficulty consisted in the insufficient logistical planning. As Armenia was logistically not prepared to such an exceptional situation with 250 starts and landings of aircrafts per day (DRK 1991: 22), accidents happened at the airport. A helicopter and a military aircraft collided, and a Yugoslavian cargo plane came down, which caused 78 dead people (DRK 1991: 25).

Socio-economic implications

In addition to physical devastation, the earthquake entailed long lasting socio-economic implications as well. These implications that strongly influence the earthquake region until today include (a) a high degree of deforestation around Gyumri: About 80% of the forest areas were deforested in the years after the earthquake. This was due to the hard winter of the earthquake catastrophe in 1988 and due to a crisis of energy supply from 1992 to 1994, which forced the population to collect firewood for heating and cooking purposes (Mikayelyan 2001: 3). (b) Increase of dust particles due to ruins and lack of vegetation (Mikayelyan 2001: 3). (c) Linked to the higher amount of dust particles, the liability to respiratory diseases increased by 15% (Mikayelyan 2001: 3). (d) Infectious diseases increased because of problems with water supply (Mikayelyan 2001: 3). (e) Rise of the unemployment rate in 40 villages which reached a total of 81% in the year 2000. This can mainly be ascribed to the devastation of state-owned organisations and agricultural enterprises in which many women and men worked during the period before the earthquake (Mikayelyan 2001: 3). (f) Closure of the single atomic power plant in the country, which remained turned off until 1995 (Jeffries 1996: 238) and therefore caused difficult years for the country in terms of electricity supply after the breakdown of the USSR (Gureghian 1994).

Aside from the disastrous earthquake consequences, the emergence of non-governmental organisations (NGOs) in Armenia can be assessed as a positive development. While NGOs did not exist during the period of the Soviet Union, the earthquake can be seen as the root of Armenian NGOs. The dedication of a number of people led to the foundation of first NGOs in the independent Republic of Armenia. One example for this kind of organisation is Meghvik. Meghvik was founded by Ms Vehanush Hovhannisyan in 1989 and is nowadays an approved NGO. The NGO has its origins in

the private commitment of Ms Hovhannisyan for the homeless orphans of Gyumri. The name Meghvik means ‘small bee’ and refers to the position that all children are small bees who change into proud and hardworking bees by means of an appropriate education. Meghvik founded an orphanage, which offered support to Gyumri’s homeless children. The so-called earthquake kids learned to work for themselves and to produce things in order to be financially independent. In the first years of its existence, the NGO was solely looking after 300 orphans and non-orphans (Hovhannisyan 2012). The organisation cooperates among others with the SOS Children's Villages organisation. Projects of Meghvik are financed by organisations such as USAID, Save the Children, and UNICEF (Meghvik 2013). In addition to children’s education and the work approach, today the areas of environment protection and health count to the fields of activity of the NGO, too. Another example is the NGO ‘Women for Development’, which was founded by members of the ‘Armenian Association of Women with University Education’ in 1997 (Women for Development 2013). Main goal of this NGO is to support the earthquake region by offering special education to children and women, aiming at raising their awareness of earthquakes and training them with regard to peace and health (Women for Development 2013). Besides of new socio-economic problems such as the physical involvement of women in the reconstruction, new health difficulties appeared that had the following reason: Nearly all medical care centres were destroyed by the earthquake. They had offered free health care. In the period after the earthquake, 70% of the population in the region could not afford health care anymore because they had to pay for it now (Mikayelyan 2001: 4). Women for Development discovered that women in the region were responsible for health care but were not sufficiently informed about health issues. Therefore, the NGO implemented a project in the earthquake region to enhance responsibility and the level of awareness among women as to health issues (Mikayelyan 2001). While men often migrated from the region, women, however, seemed to be more flexible and active and often established small businesses as well as their own NGOs. In addition to that, the NGO organised trainings on seismic protection skills for school teachers and school kids. These projects were funded by UNICEF (Mikayelyan 2001).

Another more recent NGO that was founded due to the deficiencies in the earthquake region is Shirak Gentron. This NGO was registered on 5 January 2006. Its main goal is the protection of homeless people who live on the street—still because of the earthquake. In this regard, Shirak Gentron conducted a monitoring of the city of Gyumri from December 2009 to September 2010, and founded flat-sharing communities for homeless people. Moreover, the monitoring aimed at informing these people, who live at the edge of society, with regard to their rights and to facilitate them shared apartments, and finally to rehabilitate them into society (Shirak Center 2013).

Some institutions which were set up by international relief organisations offer work places for Armenians until today. One example is the orthopaedic workshop in Yerevan. In January 1989, two

orthopaedic technician masters who were financed by the German Red Cross went to Yerevan in order to support the traumatology institute there. After a short period, the German Red Cross decided to implement a completely new orthopaedic workshop. In 1991, the new workshop was already fully furnished and five trainees in orthopaedics were qualified there. Four trainees were sent for their apprenticeship to Saarbrücken and Munich/Germany in 1990. After having passed their apprenticeship qualification exam, they should take over the workshop, which was planned to be affiliated to the traumatology institute in Yerevan in 1992. Apart from 500 earthquake victims, 100 patients from Georgia and Moscow were treated in the new orthopaedic workshop (DRK 1991: 50f). The centre cooperates with medical institutions in Germany, Austria, France, Georgia, Ukraine and Russia (SCTO 2013).

With regard to the handling of earthquakes, the earthquake of Spitak caused a number of changes in Armenia including the foundation of the Armenian National Survey of Seismic Protection (Armenian NSSP C 2013) in 1991, and two complex long-term programmes in the field of seismic risk reduction in 1999 (Armenian NSSP C 2013). The Armenian NSSP became the leading regional institution in the field of seismic risk reduction, and has been awarded with UN-Sasakawa disaster prevention prize in 1998 (Armenian NSSP C 2013). In addition to this, detailed seismological investigation started in 1989 (Balassanian 1995: 359). One important result of the post-earthquake investigations revealed that earthquakes of an intensity exceeding 7 on the MSK scale may occur at least once during an interval of 50 years in Armenia (Chernov and Sokolov 1996: 209). Besides seismic hazard assessment, the Armenian NSSP is responsible for seismic zonation mapping, for the earthquake education of children, for the seismic protection of the population by information via media and the development of protection plans, and for the evaluation of the condition of buildings (Armenian NSSP A 2013). Furthermore, the Emergency Management Administration was founded in 1991 (GFDRR 2009: 17), which is the responsible organisation for emergency situations, their preparation, and the set up and implementation of management plans. Both organisations were subject to the Armenian Prime Minister after their foundation but belong since 2008 to the new Ministry of Emergency Situations (GFDRR 2009: 17)). The tasks of the Ministry of Emergency Situations are described by the Global Facility for Disaster Reduction and Recovery (GFDRR 2009: 18) as follows:

‘In 2008, Government established the Ministry of Emergency Situations (MoES) and outlined three priorities for emergency mitigation, preparedness, and response/recovery: (i) develop a program for risk assessment and emergency preparedness; (ii) respond to and aid recovery from emergencies; (iii) coordinate a government-wide policy on risk mitigation. The MoES will

coordinate the development of joint, multi-agency emergency management policies to support these priorities.'

In 2002, the Armenian government enacted 'The Law of the Republic of Armenia on Seismic Protection' covering the aspects of a) governmental management in the field of seismic protection; b) seismic hazard assessment; c) assessment and reduction of seismic risk; and d) the responsibility of offences in the field of seismic protection. This law prescribes the basics for the organisation of seismic protection in the Republic of Armenia (RA Law 2002).

Likewise, a resolution entitled 'About the Complex Program of Seismic Risk Reduction in the Territory of Yerevan' was issued for the capital Yerevan and its territories in 1999 because the region is threatened by earthquakes to a high extent. As buildings in Yerevan are not able to resist an earthquake and as a high share of the Armenian population lives in the capital, a special programme to reduce the earthquake risk needed to be developed. Moreover, Yerevan has been destroyed completely by an earthquake in 1679, and future earthquakes are expected (RA Resolution Yerevan 1999). A similar resolution was issued for seismic risk reduction in all of Armenia in 1999 (RA Resolution Armenia 1999). Further changes include the type of buildings. Their earthquake resistance was upgraded by a new seismic code that came into effect in 1995. The seismic code regulates that new buildings obtain value 9 according to the Soviet intensity scale (Agbabian and Melkumian 1996: 5).

After the earthquake of Spitak, professors for earthquake engineering from Armenia and the Armenian Diaspora at the University of California, USA, came together and discussed the idea of establishing an American style technical university in Armenia. The new university should be the start for a new type of education and training in Armenia. Finally, the plan was put into action and the American University of Armenia (AUA) was founded in 1991 by the Armenian government in cooperation with the Armenian General Benevolent Union (AGBU) in the USA and the University of California (UC) in the USA. Today, AUA is a private, non-profit institution of higher education in Armenia (AUA 2013).

Reconstruction

After the earthquake, the government of the Soviet Union announced that reconstruction of the whole region should take not more than two years, but already in 1989 it became clear that it would take at least ten years. After the collapse of the Soviet Union, this goal was postponed again due to a lack of construction materials and the breakdown of the infrastructure, which forced voluntary assistants to leave the country. Therefore, only 10% of the damaged buildings could be reconstructed within the first two years (Agbabian and Melkumian 1996: 1). Furthermore, the war with Azerbaijan

over Nagorno Karabagh[4] impeded the reconstruction plans of the new Armenian government. As the region was cut off from any infrastructure at this point of time, people suffered from very bad living conditions for a long period: The greater part of new houses was constructed outside the former boundaries of the initial settlement. For this reason, a completely new infrastructure with water, gas and power supplies had to be constructed which took many years (Agbabian and Melkumian 1996). Agbabian and Melkumian (1996: 3f) state in this regard:

'Reconstruction works began in 1994 when Armenia received a credit of 28 million US Dollars of the World Bank. The new plan included the reconstruction of apartments for 1600 families, workplaces for 5000 people, 4 schools, 1 stadium, and 1 kindergarten. In addition, 30 km water supply, electric cables and canalization should be constructed.'

An organisation which was strongly involved in reconstruction is the Hayastan All Armenian Fund. It was founded by Presidential Decree in 1992 in order to overcome the problems caused by the breakdown of the Soviet Union and the earthquake of Spitak. The Fund used donations of the Armenian Diaspora to rebuild schools and hospitals in the region. Also regional infrastructures, e.g. the streets were reconstructed and national organisations were supported by the Hayastan All Armenian Fund as well. For instance, the orphanage of Meghvik was built by donations given to the Hayastan All Armenian Fund. Until today, the foundation is actively working in the province of Shirak, the province in which the earthquake happened (Hayastan All Armenian Fund 2013). Other countries helped voluntarily in many different domains. Examples of the contribution of volunteer units include:

- Reconstruction of a school for 400 pupils – United Kingdom
- Hospital with 90 beds – France
- Construction materials factory – Austria
- Rubble processing factory – Germany
- Village with school – Italy
- Hospital – Norway
- Rehabilitation centre – Finland
- School for 480 pupils – Czech Republic
- Cottages and kindergarten – Denmark
- Housing buliding complex – USA
- Polyclinic – Poland

(Agbabian and Melkumian 1996: 2)

[4] Nagorno Karabagh, also known as mountainous Karabagh is an enclave settled by ethnic Armenians in today's Azerbaijan. After the breakdown of the USSR, Armenia and Azerbaijan went to war over Nagorno Karabagh. Both countries are at war to the present day.

Reconstruction of Spitak

As 95% of the city of Spitak was destroyed, it was decided not to reconstruct it but to put up a completely new city outside the former city boundaries. The new city was constructed on farmland (Agbabian and Melkumian 1996: 2f). Even today, 23 years after the commencement of reconstruction, the city is not finished yet (Takvorian 2012). Problems like the blockade of Armenia, the fighting with Azerbaijan over the Nagorno Karabagh enclave and the loss of administrative support by the central Soviet government in the beginning of the 1990s led to delays in terms of construction works in new Spitak as well (Agbabian and Melkumian 1996: 2). The building of new Spitak was put out to tender by the Armenian government. Glendale Hills Construction Company won the tender and executes the construction works. Glendale in California is the city in the USA with the largest Diaspora of Armenians worldwide (estimated 80000 persons) (Hayk 2013), which financially supports the reconstruction in Armenia. Since the beginning of the construction works, 220 private homes with 400 square metres garden were put up (Takvorian 2012). These construction works were financed to a great extent by The Lincy Foundation, a research institute in the USA that aims at enhancing health and social conditions in the USA. The institute was initially founded by a Diaspora Armenian businessman in 1989 in response to the earthquake (The Lincy Institute 2013). Every new building in new Spitak disposes over water, gas and electrical connections and is therefore better equipped compared to other buildings in the region. By now, 15500 persons found a new home in new Spitak (Takvorian 2012).

Conclusions

The earthquake of Spitak entailed a tremendous devastation and a deplorable high number of fatalities. Some of the negative results of the earthquake could have been avoided or reduced. Among these are the high numbers of destroyed buildings due to the wrong assessment of buildings on the Soviet intensity scale. The right assessment would have led to a higher share of intact buildings after the quake. Another issue is related to the rebuilding of Spitak. The decision to completely rebuild Spitak on another place caused delays in the construction works because new supply lines had to be laid. The costs for building the new city increased enormously. Last but not least, valuable farmland was used for the construction of new Spitak. Armenia disposes only over a very small percentage of arable surfaces (Khanin 1992) as most of the country consists of mountains. From an economic and an emotional point of view, the reconstruction of Spitak on its original place would have been more useful for the former inhabitants. Agbabian and Melkumian (1996: 3) describe the situation after the earthquake as follows:

‘The population was inconvenienced and depressed. They did not see dwellings being built where they had lost their ancestral homes, and they knew that the reconstruction program had slowed down considerably. The temporary houses, in which they lived, containers, tents and shacks, had no sanitary facilities or utilities. (…) The slums in the cities caused sanitary and hygienic hazards, and psychological problems compounded the problems.’

On the other hand, the earthquake had some consequences that could be seen as quite positive developments. One example is the fast and international relief and the high amount of donations immediately after the quake. In this regard, the Armenian Diaspora played an important role in terms of donating money, coordinating donations and active help in the affected region. First NGOs emerged on the basis of the earthquake and laid the foundation for civil commitment in the new Armenian Republic. In the face of a high earthquake risk, the prize-winning Armenian National Survey for Seismic Protection was founded by the Armenian government, and a number of laws and regulations concerning earthquake protection were enacted. This shows that the new Armenian government reacted appropriately as to the results of the disaster.

After all, the earthquake caused strong negative effects on the socio economic-conditions of people living in the region of Shirak. Until today, there are homeless people in some cities, and the unemployment rate has increased extremely. The bad living conditions of the population following the earthquake did not only have their roots in the quake, but also in the breakdown of the Soviet Union. Just after the disintegration of the Soviet Union, many state-owned enterprises closed, the war with Azerbaijan started, and free health care was not available anymore. Thus, people battled for their existence for many years in the earthquake region of Shirak, and the ongoing socio-economic problems in the region are not solved yet.

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