

Disaster Risk Finance Country Note: Armenia



World Bank Europe and Central Asia Disaster Risk Management
World Bank Disaster Risk Financing and Insurance Program



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Washington D.C. 20433, USA
Internet: www.worldbank.org

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Acknowledgements

This note was prepared by a World Bank team composed of Benedikt Signer, disaster risk financing and insurance specialist, Tafadzwa Irvine Dube, disaster risk management specialist, Fernanda Senra de Moura, Aram Hovhannisyan, and Nora Mirzoyan, consultants.

The team gratefully acknowledges the data, information, and other invaluable contributions made by representatives of the government of the Republic of Armenia. Particular thanks go to the Ministry of Finance, and the Ministry of Emergency Situations as without their knowledge and expertise, the compilation of this note would not have been possible.

Anne Himmelfarb edited the report.

The team is grateful for the financial support received from the Japan – World Bank Program on Mainstreaming Disaster Risk Management in Developing Countries of the Global Facility for Disaster Reduction and Recovery (GFDRR), which enabled this project.

Image credits: Benedikt Signer

Layout by: Studio Grafik

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ABBREVIATIONS

AAL	annual average losses
AMD	Armenian Dram
CAT DDO	Catastrophe Deferred Drawdown Option
CRED	Centre for Research on the Epidemiology of Disasters
DRFI	disaster risk financing and insurance
GDP	gross domestic product
GFDRR	Global Facility for Disaster Reduction and Recovery
MoES	Ministry of Emergency Situations
MoF	Ministry of Finance and Economy
OCHA	Office for the Coordination of Humanitarian Affairs (United Nations)
OFDA	Office of U.S. Foreign Disaster Assistance
UNDP	United Nations Development Programme
UNISDR	United Nations Office for Disaster Risk Reduction

All monetary amounts are in Armenian dram (AMD) or U.S. dollars (US\$), as indicated.

Exchange rate as of August 2017:

US\$1 = AMD 478.7

Preface

This Disaster Risk Finance Country Note is the first activity of the World Bank's support to the Government of the Republic of Armenia on strengthening financial protection against natural disasters. It takes stock of existing mechanisms and instruments used to finance disaster response in Armenia and lays the foundation for the development of a comprehensive disaster risk financing strategy. Relevant government stakeholders were consulted during the development of this note, and the findings of this analysis and options for next steps were discussed and agreed with the government. This note was developed

jointly by the World Bank's Disaster Risk Management Team for the Europe and Central Asia Region and the Disaster Risk Financing and Insurance Program (DRFIP). The note builds on the operational framework for Disaster Risk Finance, which was developed by DRFIP drawing on collaboration with over 60 countries in strengthening their financial resilience to disasters and climate risks. Funding to enable this engagement was provided by the Japan – World Bank Program on Mainstreaming Disaster Risk Management in Developing Countries of the Global Facility for Disaster Reduction and Recovery (GFDRR).

1. Introduction

This note presents a preliminary assessment of the fiscal impacts of natural disasters in Armenia and the current state of the country's financial protection capacity. Drawing on a disaster damage and loss data set assembled from existing global disaster impact data and selected local reports and on a set of fiscal indicators assembled under the scope of this study, it analyses the funding gap for recurrent events. It also presents the same exercise for earthquakes (with a focus on less frequent events) based on an earthquake risk profile developed by the World Bank as part of a regional initiative.

The note takes stock of the existing legal and institutional framework for financial resilience against disasters in Armenia. It further offers an overview of mechanisms currently in place to provide funds to finance disaster response and reconstruction.

Together with a review of the budgetary process for disaster response in the country, the results suggest that the public financial management of both recurrent and rare disasters could be strengthened by reviewing the country's current risk retention mechanisms and by adopting contingent financing or risk transfer instruments.

Chapter 2 briefly presents the country's hazard profile, and chapter 3 describes the data set on the damage and losses caused by disasters in Armenia in the recent past. Chapter 4 reviews current mechanisms for financing disaster response. It then carries out a funding gap analysis for both recurrent events and rare earthquakes. The note concludes with a summary of key findings and preliminary options the government may want to consider to further strengthen its financial resilience against disasters.



2. Armenia's Hazard Profile

Armenia has a history of natural disasters that includes catastrophic earthquakes, such as the devastating Spitak earthquake that hit the country in 1988. Historically, earthquakes of at least 5.5 magnitude have an average reoccurrence interval of 30 to 40 years (World Bank 2009). Some of the most severe earthquakes in the history of the country are listed in table 1.

Table 1. Most Severe Recorded Earthquakes in Armenia

Year	Name	Magnitude
1679	Garni	7.0
1827	Tsaghkadzor	6.5
1840	Ararat	7.4
1893	Dvin	6.5
1937	Parakar	4.7
1972	Talin-Arouch	6.5
1988	Spitak	7.0

Source: World Bank 2009.

Armenia lies in a region of high seismicity¹ and faces significant exposure to earthquakes, but it is also exposed to other hazards; indeed, it is one of the most disaster-prone countries in the southern Caucasus (World Bank 2009). Drawing a precise picture of the country's historical hazard profile is not possible because a comprehensive data set of disaster occurrence in Armenia is not available. Case studies and partial records, however, suggest the relevant risks faced by the country.

Flooding is among these risks. Although Armenia does not have abundant flowing surface water, more than 50 percent of annual discharge occurs during spring due to snow melting. This can increase water volume in some river basins tenfold, and can also trigger seasonal flooding, particularly in the Araks, Hrazdan, and Aghstev river basins (World Bank 2009).

Table 2 shows a timeline of the major natural disasters in Armenia,² and suggests that floods and downpours are relatively frequent events. Although not shown in the table,

Table 2. Timeline of Major Natural Disasters in Armenia

No. of events	4		1	1	1	1	2	2	3	2	2
Period	1679–1893		1937	1972	1988	1994	1995	1996	1997	1998	1999
Typology	EQ		EQ	EQ	Spitak EQ	Floods	Floods & extreme weather		EQ & other	Floods & extreme weather	

No. of events	2	2	2	2	2	2	2	2	–	1	1	1	1	3
Period	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Typology	Drought		Floods & extreme weather		Floods and downpours				Extreme weather			Storms & extreme weather		

Note: EQ = earthquake; “–” = not available. Extreme weather includes droughts, hot dry winds, hail, and spring frosts.

1. UNISDR [United Nations Office for Disaster Risk Reduction, “Central Asia and Caucasus Disaster Risk Management,” http://www.unisdr.org/files/11641_CentralAsiaCaucasusDRManagementInit.pdf].

2. Major events are those events for which there are records in international data sets or damage and loss assessments and other cases studies. The designation is not based on the magnitude of the event, since systematic information on magnitude is not available.

Armenia is also prone to landslides that can be secondary effects of earthquakes or heavy precipitation.

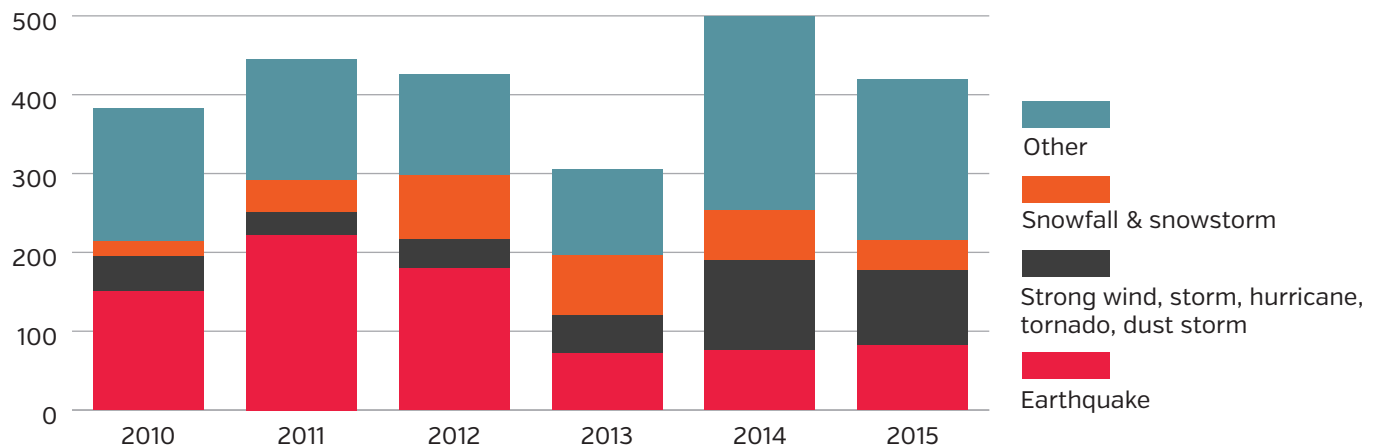
Droughts also cause significant damage to the country. The most severe drought among recent events was in 2000 and affected approximately 300,000 people. The country is also exposed to hail storms, with at least 38 experienced every year between 2010 and 2016.

Data were collected on the number of times different regions in Armenia were affected by natural disasters during the 2010–2015 period, as shown in figure 1. Earthquakes, snowfall, and storms were the most frequently reported hazards. Data

in figure 1 refer to the number of records across various locations. If the same event was reported by two different geographical units, it could appear twice in the totals.

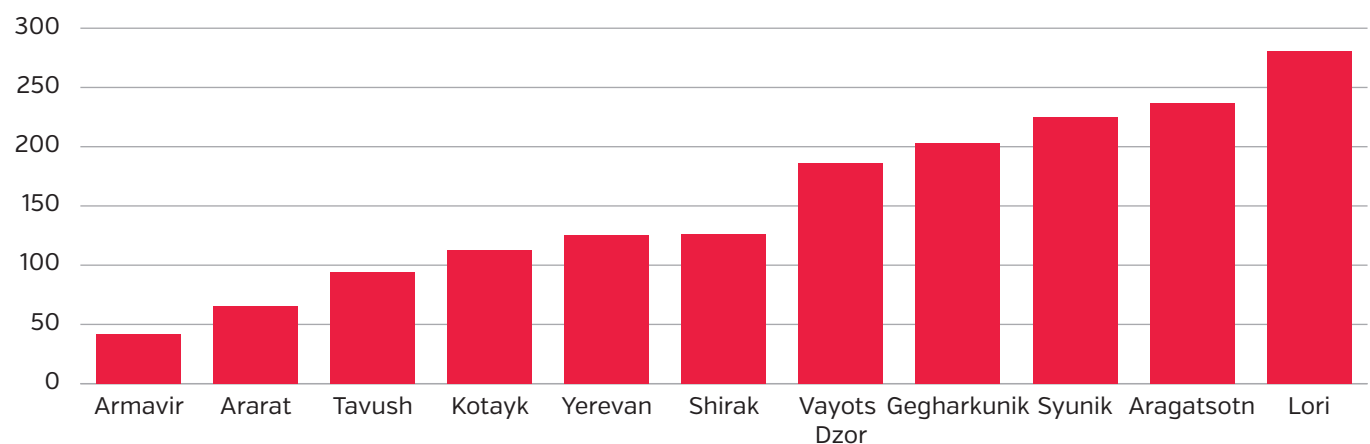
Figure 2 shows the number of natural disasters recorded by region. The numbers, which do not include earthquakes, suggest that Lori and Aragatsotn were the regions hit most frequently. In the capital city of Yerevan, natural disasters were recorded 125 times from 2010 to 2015. The figure presents information only on the frequency of events; information was not available on severity or on the exposure and vulnerability of populations and assets across regions.

Figure 1. Number of Recorded Natural Disasters in Armenia, 2010–2015



Source: National Statistical Service of the Republic of Armenia, “Socio-Economic Situation of RA,” January–December 2010, 2011, 2012, 2013, 2014, 2015, <http://www.armstat.am/en/?nid=82&id=1890>.
 Note: “Other” includes hail storm, ice slick, rockslide, river flood, forest fire, heavy rain, landslide, landfall, thunderstorm, downpour, and increased groundwater.

Figure 2. Number of Recorded Natural Disasters by Region, 2010–2015 [excluding earthquakes]



Source: National Statistical Service of the Republic of Armenia, “Socio-Economic Situation of RA,” January–December 2010, 2011, 2012, 2013, 2014, 2015, <http://www.armstat.am/en/?nid=82&id=1890>.

3. Impacts of Natural Disasters in Armenia

In reviewing the impacts of natural disasters in Armenia, this study considers the damages and losses caused by the Spitak earthquake separately from those caused by other events. This approach takes account of the cumulative impact of the more frequent events in the country.

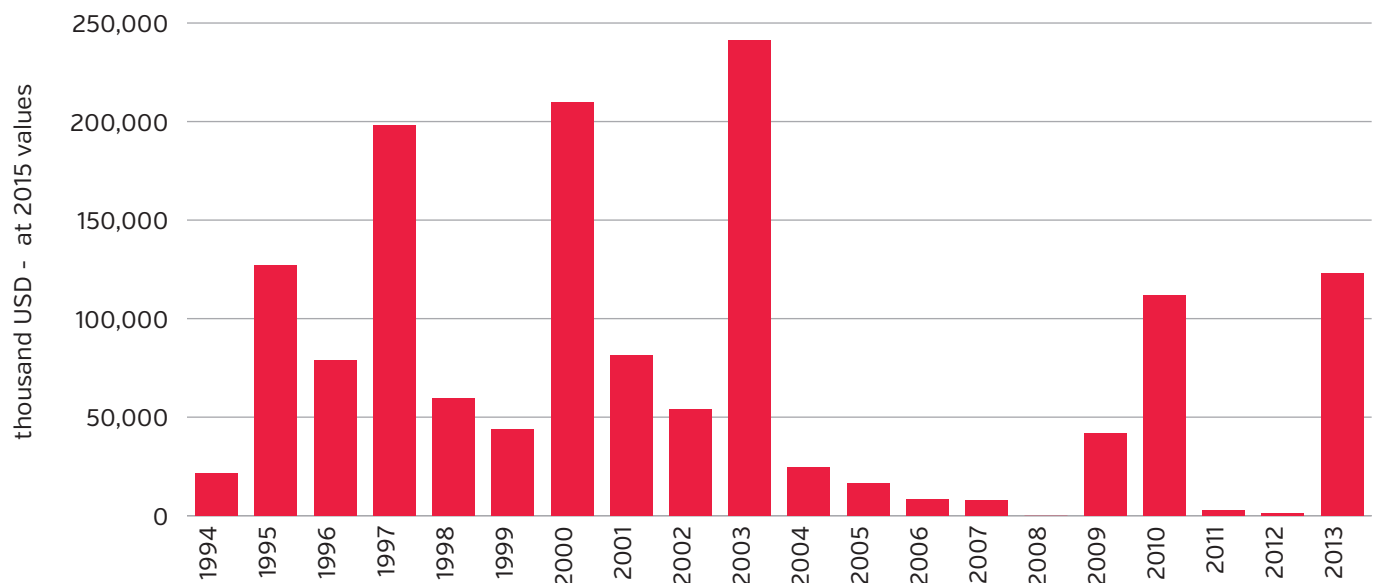
3.1 Disaster Damage and Losses in Armenia: Beyond Earthquakes

There is currently no detailed and comprehensive data set on historical disaster damage and loss in Armenia. This study assembled a data set on damage and losses based on available information from global data sets (the EM-DAT database) and various damage and loss case studies from particular events.

The total assessed damage and losses from 1994 to 2013 came to approximately US\$1.5 billion dollars (at 2015 values). Given the data limitations, it is important to notice that these estimates should be interpreted as a lower bound for the actual impacts of disasters in the country. As the next section shows, this amount exceeds Armenia's financial response capacity for natural hazards.

Figure 3 shows the annual value of disaster-related damage and losses (at 2015 values) in Armenia. During the period considered, which does not include the Spitak earthquake, the average annual damage and losses were US\$76.5 million. This amount includes the impacts of floods, droughts, and other extreme weather-related events from 1994 to 2013 based on damage and loss estimates for 19 events.

Figure 3. Annual Disaster Damage and Losses in Armenia, 1994–2013



Sources: Approximated values are based on various case studies and on the EM-DAT database [D. Guha-Sapir, R. Below, Ph. Hoyois, EM-DAT: The CRED/OFDA International Disaster Database, Université Catholique de Louvain, Brussels, www.emdat.be].

Note: Double counting was avoided. Yearly values are based on annual averages when only multi-period damage and loss estimates were available. For several events recorded, no damage and loss estimates were found. No records were found for 2008. U.S. dollar amounts are at 2015 values.

For many years very little information was available on disaster damage and losses; based on the recorded events presented above, we can assume that missing data are significantly biasing down the totals and averages. It is also not possible to learn much about the evolution of the damage and losses over time because some damage and loss estimates were available only for a multi-year period, meaning that the yearly values presented above were obtained based on average annual values. In addition, public data sets likely miss many smaller localized disaster events, which nevertheless can have a very significant impact on government finances.

Despite these limitations, the above picture is able to capture large impacts, such as the relevance of the 2000 drought, which caused an estimated US\$110 million in damage, triggered a seed shortage the year after, and caused a further US\$43 million in agricultural production losses. At the time, agriculture in the country accounted for 42 percent of employment and one-third of gross domestic product (GDP) (World Bank 2009).

In 2006, a localized drought decreased cereal crop production by more than 35 percent from the previous year, which forced Armenia to import cereals to meet its requirement of 597,000 tons (World Bank 2009). In recent decades, extreme weather events (drought, hot dry winds, hail, spring frosts) have been more frequent and lasted longer, and have inflicted great damage on agriculture. The assessment of extreme weather-related damage to agriculture in Armenia between 1995 and 2013 is presented in detail in table 3.

During the 2004–2007 period, rain damaged about 200 community areas and 600 sections of main roads. Average annual damage caused by rain during this period was estimated at US\$2.9 million.

Though damage varies greatly across regions, from 1994 to 2007 the total damage caused by floods was approximately US\$41 million (nearly AMD 13 billion) (UNDP 2013). For example, floods in 2004 caused an estimated US\$10 million in damage, while the floods of 2005 caused an estimated US\$5 million in damage (Armenian Red Cross Society 2007).

Table 3. Weather-Related Cropland Damage and Financial Losses in Agriculture, 1995–2013

Year	Damaged land area [1,000 ha]	Losses [million AMD]	Official exchange rate [AMD per US\$, period average]	Losses [thousand US\$, current values]
1995	86.96	17.00	405.91	41,881
1996	36.65	12.59	414.04	30,408
1997	129.82	26.53	490.85	54,049
1998	63.41	14.95	504.92	29,609
1999	430.03	11.33	535.06	21,175
2000	Not available	59.78	539.53	110,801
2001	83.50	23.94	555.08	43,129
2002	74.55	15.14	533.45	28,381
2003	48.67	82.63	578.76	142,770
2009	35.37	11.89	363.28	32,729
2010	17.47	35.50	373.66	95,006
2011	4.06	0.91	372.50	2,443
2012	2.22	0.49	401.76	1,220
2013	11.10	23.92	409.63	58,395
Total		336.60		691,996

Source: Republic of Armenia 2015.

3.2 The Impacts of the Spitak Earthquake

Armenia faces particularly high risk from earthquakes, whose impacts can far exceed the losses from floods, droughts, and other extreme weather events. For example, the 1988 Spitak earthquake caused an estimated US\$15–20 billion in economic damage (Pusch 2004), by some estimates destroying over 40 percent of the country's manufacturing capacity and halting operations of 170 industrial enterprises (World Bank 2009).

This event killed 25,000 people, injured 15,000, left 517,000 homeless, and caused significant damage to several cities.³ It led to AMD 5,467 billion in direct economic damage, equivalent to approximately US\$ 14 billion (at the December 2011 exchange rate).

Based on this preliminary analysis of historical disaster losses, we calculate that the damage and losses caused by this rare event amounted to about 10 times the impacts caused by other hazards since then. The main implication of such discrepancy is that the economic and fiscal risks associated with earthquakes in Armenia are in a class by themselves; hence optimal management of earthquake risk will differ from management of the risk associated with more frequent, less severe events and will require the use of specific financial mechanisms.

3.3 The Challenges of Disaster Data Management in Armenia

An important implication of the discussion above is that no official or comprehensive data set on disaster occurrence and damages and losses is available. According to interviews held with government representatives, a tentative data set covering the 1996–2010 period was prepared but had significant limitations: (i) for the vast majority of cases, the damage and losses are only qualitatively presented, and there is no estimate of the monetary value of the impacts; (ii) not all disaster occurrences are included in this data set, as about 30 percent of the events were recorded only by specific line ministries and sectorial institutions; and (iii)

there is no guarantee of consistency across the damage and loss assessment methodologies employed.

This means that the only official data set on disaster events and their impacts is not reliable in its current state and hence is not a suitable tool to inform financial decision making by the government.

While the challenges of disaster data availability can be seen as a matter of structural database management, they may also reflect the current institutional arrangements that govern disaster data collection routines and protocols in the country.

The current legal framework is contained in Decree no. 1582-N, 2011. It stipulates that following a disaster, the Ministry of Emergency Situations, the heads of *marzes* (regions), and the heads of local communities are all involved in disaster damage and loss assessments through commissions that function on a permanent basis and are also responsible for keeping the records of the assessed damage and losses.

According to the decree, the processes and the agencies involved in disaster damage and loss assessments are as follows:

1. The minister of emergency situations presents the loss assessment to the republican commission's members.
2. The heads of *marzes* present the loss assessment to regional commissions' members.
3. The heads of local communities present the loss assessment to local commissions' members.

The damage and loss assessment procedure depends on the extension and severity of the natural disaster and on its impacts on the affected population. Depending on the scope of the event, the commission at the relevant level would be involved. Typically, the damage and loss assessment acts prepared by the local commissions are presented to the regional commission for approval and then to the republican commission for final approval. The republican commission is the body responsible for summarizing and publishing the assessed impacts arising from the emergency situation.

3. United Nations Development Programme, "UNDP Project Document—Armenia: Strengthening National Disaster Risk Reduction Capacities (2013–2015).

The Ministry of Emergency Situations, the *marz* administrations, and the local self-governance bodies have overall responsibility for keeping records on the impacts of disasters. The damage and losses are recorded with the purpose of understanding and eliminating their drivers as well as planning risk reduction measures.

The overall guidelines for the damage and loss assessment stipulate that

1. The list of damaged property is to indicate the property's type and location and include a brief description
2. The damaged property is to be examined and its condition to be assessed
3. The amount of the loss to the property is to be assessed

The damage and loss assessment should consider the following:

1. Agricultural damage and losses
2. Damage and losses to the population's property
3. Damages to infrastructure
4. Possible medical-sanitary losses

For the purpose of covering all the relevant sectors, the commissions are supposed to include experts in emergency situations, health care, agriculture, transport and communication, and civil construction; these experts examine, record, and assess the situation and possible threats in each sector.

Beyond these general instructions, however, there are no officially approved damage and loss assessment methodologies to which the commissions are required to adhere when producing their estimates. This leaves room for inconsistency across events, regions, types of hazards, and sectors.

Within this context, part of the current agenda of the Ministry of Emergency Situations is to prepare and approve damage and loss assessment acts in order to (i) establish a common approach to be used by all institutions involved in disaster impact assessments, and (ii) strengthen the management of the information collected at different levels.

Efforts to improve the damage and loss assessment protocols are relevant to disaster risk financing because the local and regional authorities base their funding requests for disaster response on these assessments, and because greater efficiency in allocating disaster response resources requires reliable information on the impacts of disasters among different areas and sectors.

Thus from the perspective of the institutions responsible for public financial management, it is important that ongoing discussions about disaster damage assessments and any resulting reforms take into account the importance of disaster damage data as inputs to an effective financial protection strategy against natural hazards.

4. Fiscal Management of Natural Disasters in Armenia

4.1 Sources of Funding

The Republic of Armenia does not have a disaster risk financing strategy that sets out a comprehensive approach to meeting the financial impact of disasters. The main sources of financing to fund disaster response and reconstruction are the Cabinet Contingency Fund and the contingency funds of community budgets. In addition, resources for the Emergency Storage Facility are allocated regularly, and donations from the international community are also commonly used. Budget reallocations are allowed but limited by law, and their regular use was not detected

under the scope of this study. Table 4 summarizes the main findings regarding the sources of funding for disaster response typically used in Armenia.

4.1.1 Ex Ante Sources of Funding

Cabinet Contingency Fund

The Law on the Budgetary System of the Republic of Armenia (article 19) provides for the allocation of funds to the Cabinet Contingency Fund to cover expenditures that are not included in the annual state budget, which includes public spending related to natural disasters response. According to government representatives interviewed for this study, after a

Table 4. Summary of Instruments for Disaster Risk Financing in Armenia

Disaster risk	Financing source available	Amount of funds available
High-risk layer (e.g., major floods, major earthquakes)	Donor assistance	Unpredictable and unreliable (from 2000 to 2015 approximately US\$40 million)
	Emergency borrowing	Unpredictable (difficult to track even after extensive research)
	Sovereign risk transfer	Not currently in use
Medium-risk layer (e.g., regional floods, minor earthquakes)	Contingent financing	Not currently in use
	Budget relocation	Up to 3% of the budgeted program expenditures could be relocated between different programs
Low-risk layer (e.g., localized floods, droughts, landslides)	Budget funds: Cabinet Contingency Fund	Up to 5% of the total budget appropriations, but these are not dedicated to natural disasters. The annual average was US\$90.3 million from 2010 to 2015 (usually 5%). Disaster spending as % of the total varied from 74% (in 2009) to 5% (in 2011)
	Budget funds: Contingency funds of community budgets	Up to 30% of total revenue expectations programmed in the communities' administrative budget (estimates not available)
	Catastrophe insurance	Very low (total insurance penetration rate was 0.62% in 2014)

Source: World Bank team desk-based review and interviews with government representatives.



natural disaster the government of Armenia typically prepares decrees on the amounts of compensation for the damage and losses; the source of financing is the Cabinet Contingency Fund of the state budget.

According to article 19 of the law, the Cabinet Contingency Fund is the source of finance for unforeseen expenditures and liabilities from budget guarantees, which means that it is not a disaster response facility only. Disbursements from the Cabinet Contingency Fund are defined by cabinet decisions,⁴ which should make the fund a flexible platform for disaster response. However, the Cabinet Contingency Fund cannot exceed 5 percent of the total budget appropriations and is the source of funding for other contingencies as well, which in practice means that in any given year there is a limit to the resources that can be allocated to disaster response through the fund.

As previously mentioned, the amounts and allocations of resources are based on the damage and loss assessments presented by the regional commissions, which are responsible for consolidating the assessments prepared by the community commissions. There are no specific legal guidelines on the timing of the process (from the damage and loss assessments to the disbursement of resources

from the Cabinet Contingency Fund), but typically these steps are taken fast. Once the cabinet decree is issued, disbursement of resources takes approximately one week.

A review of the overall process from the occurrence of an emergency to the disbursement of funds from the Cabinet Contingency Fund is presented in figure 4. Based on Decree no. 1582-N of 2011, it was possible to identify a set of procedures that could be strengthened to improve the efficiency of the Cabinet Contingency Fund disbursement process. For example, there are no objective criteria for defining the level of the relevant loss assessment commission, and no official deadline by which the republican commission must submit the approved Loss Assessment Act to the government or to the prime minister. Nor is there any official or uniform methodology to estimate damage and loss amounts.

Moreover, if the resources available are insufficient to meet all the requests for funding, there is no guidance on how to prioritize among sectors, regions, and communities. Following the disbursement of funds, there is no protocol for controlling and auditing the damage and loss assessment.

4. Law of the Republic of Armenia on the Budgetary System of the Republic of Armenia [1997], <http://www1.worldbank.org/publicsector/pe/BudgetLaws/ArmeniaBudgetLaw1997.pdf>.

Figure 4. Damage and Loss Assessment and Reporting Procedure

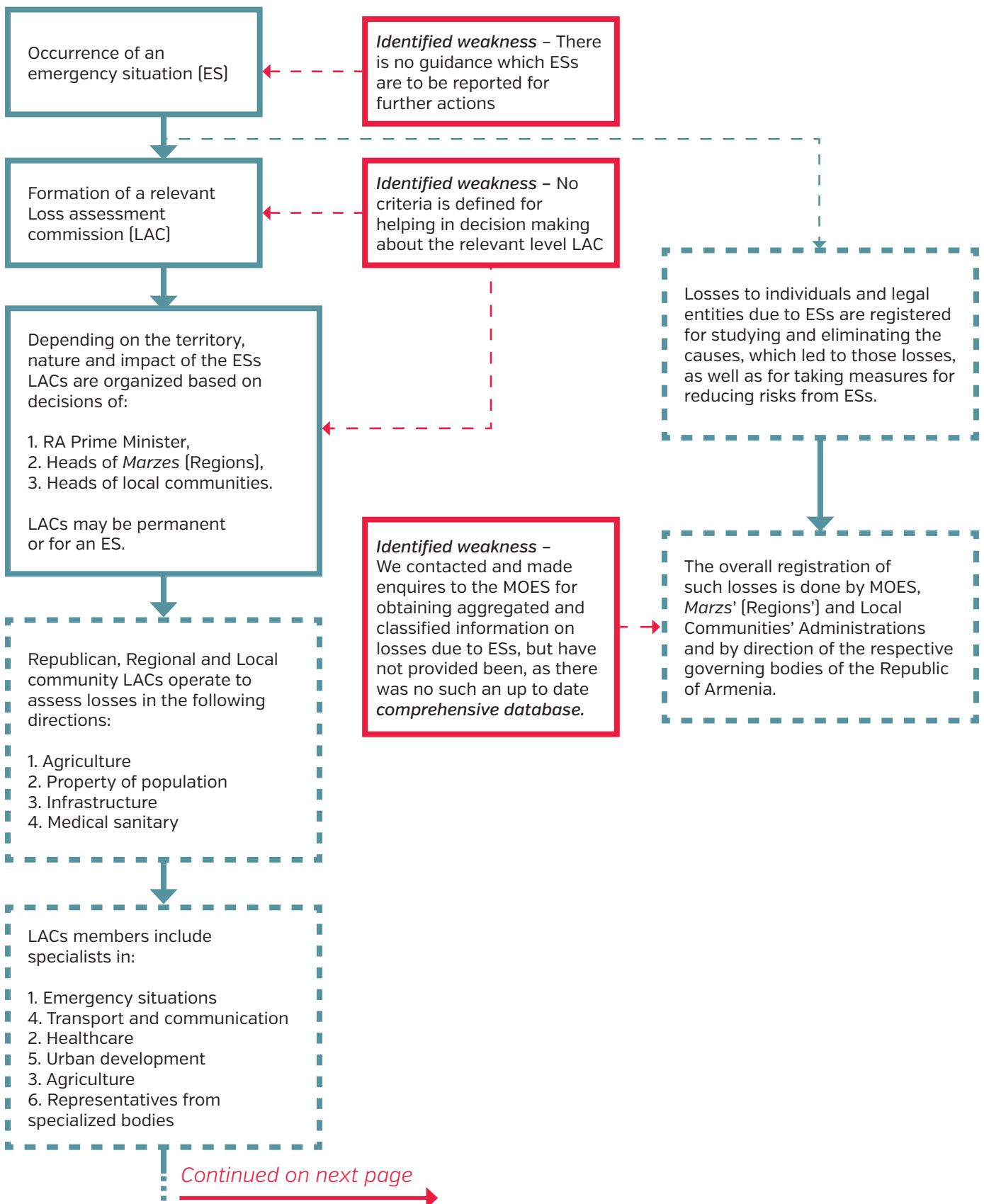
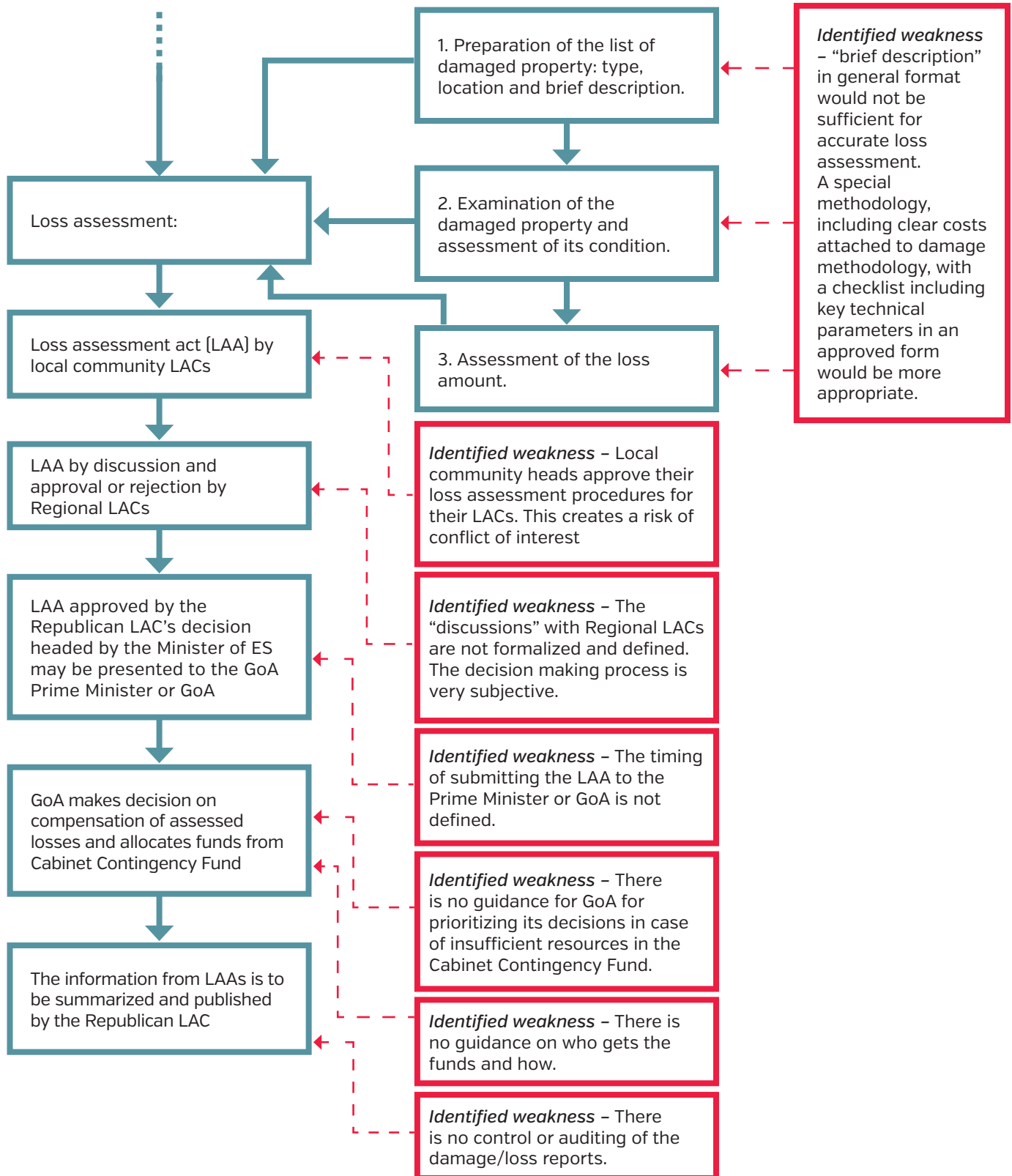


Figure 4. Damage and Loss Assessment and Reporting Procedure (continued)



Contingency funds of community budgets

Besides the Cabinet Contingency Fund, the contingency funds of community budgets are another potential source of post-disaster funding at the local level. Article 29 of the Law on the Budgetary System of the Republic of Armenia defines the contingency funds of community budgets,⁵ which are not to exceed 30 percent of total revenue expectations programmed in the community's administrative budget for the given fiscal year. Disbursements from the contingency fund, for financing of the expenditures not programmed in the community budget, are carried out by the local council's decision.

Emergency Storage Facility

The law of Armenia established the National Reserves Agency within the Ministry of Emergency Situations to establish a storage facility that would accumulate "material values in the state reserve."⁶

Contingent credit

For disasters that exceed the budget reserves capacity, contingent credit could cover the financing gap. So far, the government of Armenia does not have any contingent credit arrangement linked to natural disasters with any international financial institutions.

Insurance

The insurance market in Armenia has a very low penetration (total insurance penetration rate was 0.62 percent in 2014), leaving the government with potentially large fiscal exposures. However, the draft National Strategy on Disaster Risk Management indicates that the disaster insurance system will be introduced by the year 2020. The Ministry of Emergency Situations and the Central Bank of Armenia are the implementing agencies for this activity.

The current insurance legislation in Armenia enables the introduction of the following agricultural insurance lines: insurance of harvest, animals, industrial buildings,

and premises that are part of the property insurance.⁷

At present, the operating insurance companies have licenses for property insurance, but no company provides agricultural insurance.

4.1.2 Ex Post Sources of Funding

Budget reallocations

The Law on the Budgetary System of the Republic of Armenia (article 23) also refers to the implementation of the state budget; regarding the reallocation of funds, the law states that the heads of corresponding state government agencies may reallocate funds for each program by an amount not exceeding 15 percent of the funding initially allocated for that program, between the budget lines of economic classification. In addition, it stipulates that the government of Armenia may reallocate up to 3 percent of the budgeted program expenditures between different programs. The Ministry of Finance tracks reports of these reallocations.

At the local level (community budget), the law states that "the mayor may reallocate funds between the budget lines, if these reallocations do not conflict with the decision of the local council on adoption of the community budget. The reallocation between the budget lines shall not exceed the limits of annual budget appropriations" (article 33).

Within this context and based only on the legal framework for budget reallocations, it is possible to conclude that budget reallocations as a source of funding for disaster response would likely be very limited—unless the programs approved in the state budget are broad enough to be used as budget lines for disaster response initiatives. With access only to publicly available data, it was not possible to investigate the use of regular programs in disaster response, and the fiscal indicators presented below did not capture a systematic use of reallocation during the period being considered.

5. The provisions on amount of allocations to these funds may contradict those in the Budget Law of Armenia (as of 1997) and the Law of the Republic of Armenia on Local Self-Government, a point to be discussed with the Ministry of Finance.

6. Article 7 of "Approving Statutes and Structure of the Agency of State Reserves of the RA MES." See UNDP (2009). United Nations Development Programme, "Assessment of Legal and Institutional Framework for Disaster Management and Disaster Risk Information Systems in Armenia," Yerevan, September 2009, http://www.un.am/up/library/Assessment%20of%20Legal_Inst_Framework%20for%20DM_eng.pdf.

7. Articles 7.2.8 and 7.2.9 of the RA Law on Insurance and Insurance Activity

At the local level, another issue that could be further investigated is the potential use of retained budgetary funds for funding contingencies (as mentioned in the Law of the Republic of Armenia on Local Self-Government). Under the scope of this study, however, local-level fiscal data were not collected, so that the relevance of reallocations within the community budget could not be assessed.

Donor assistance

Armenia has been on the receiving end of international development aid for at least the past 15 years. Between 2000 and 2015, the donor commitments to Armenia totaled more than US\$58 million.⁸ Among these commitments, nearly US\$40 million was directed at various response and reconstruction activities.⁹ The main donors for the country are the European Commission, the Russian Federation, Switzerland, and United States.

Donor support to Armenia was significant following the Spitak earthquake, for example: in 1988 the country received about US\$500 million in international aid from 113 countries (Parks 1989). The Soviet Union sent building teams and constructed nearly 4,000 apartments in the affected zone. It planned on constructing more, but after the Soviet Union's collapse the project slowed down significantly.

Borrowing

No comprehensive database or systematic reporting on the use of borrowing specifically for post-disaster funding allocations was identified. Even a detailed manual review of the borrowing operations in the recent past made it possible to identify with certainty only one instance of borrowing—US\$20.1 million for earthquake zone reconstruction in 1994.

Taxation

There has been no reported use of tax policy in Armenia as an instrument to raise additional revenue following disasters, or to offer tax deductions to help the affected population. However, Armenian tax policy provides for possible tax privileges under article 13 of the Law of the Republic of Armenia on Taxes (as of 1997).

4.2 Disaster Response Fiscal Indicators

Keeping track of disaster-related public spending is a complex task. Most public accounting methodologies and systems are not equipped with the tools to label disaster-related spending in a way that allows easy analysis of relevant disaster-related fiscal indicators. It is common practice to use proxies that are country-specific and chosen to make the best use of the available information in a feasible manner.

For this study, a few options for quantifying disaster response-related public spending were considered. This section presents the results of two approaches and proposes a hybrid approach to be used at least as a first approximation of the actual fiscal burden of disasters in Armenia.

Given the relevance of the public spending related to the Spitak earthquake even in the recent past, the discussion presents both Spitak Earthquake and non-Spitak Earthquake indicators whenever possible. Keeping track of these two large categories of disaster spending separately is particularly important for the funding gap analysis (section 4.3).

4.2.1 Fiscal Indicators Based on the Armenian State Budget

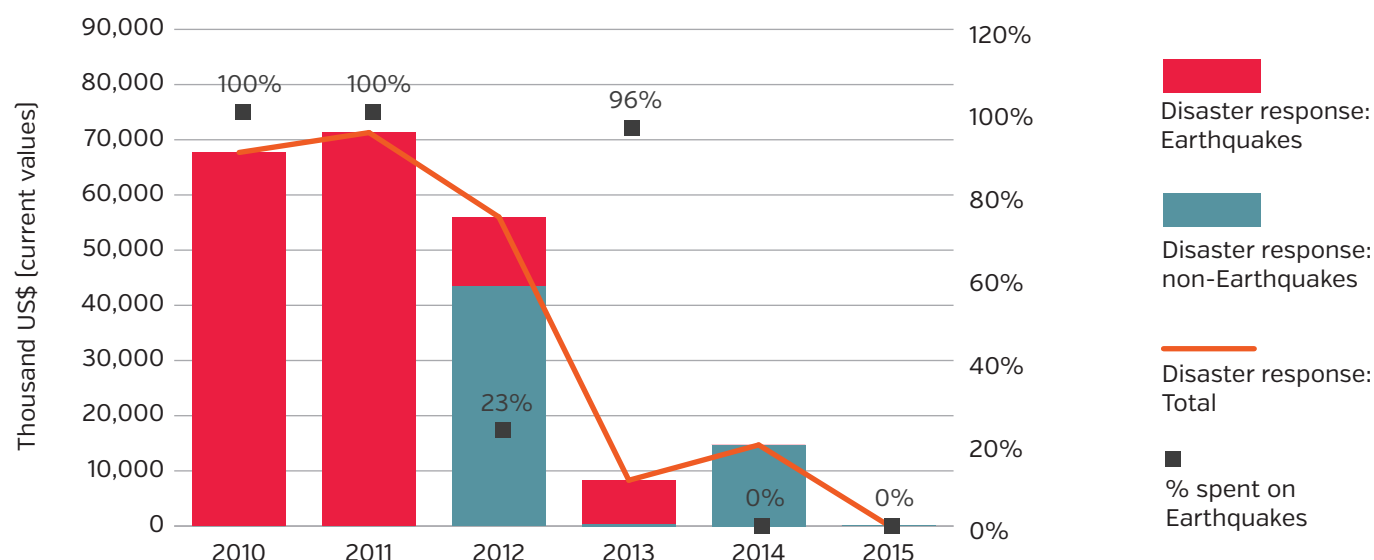
The first attempt to measure the fiscal burden associated with disaster response in Armenia was based on a review of the Armenian state budget through the use of relevant keywords and the analysis of program designations, with the goal of identifying budget lines relevant to the study of government spending on disaster response. This is shown in table 5.

The main issue with the fiscal indicators based on the state budget (figure 5) is that disaster response spending not related to the Spitak earthquake is not detected in most years. Even when non-Spitak spending is potentially detected, it is not always possible to accurately separate prevention from response because expenditures are aggregated.

8. United Nations Office for the Coordination of Humanitarian Affairs, "Financial Tracking Service: Tracking Global Humanitarian Aid Flows," <https://fts.unocha.org/pageloader.aspx?page=AboutFTS-Introduction>.

9. Ibid.

Figure 5. Disaster Response Fiscal Indicators Based on the Armenian State Budget



Source: World Bank estimates.

Note: Amounts refer to allocations. Municipal budgets are not considered.

Table 5. Disaster-Related Expenditures under Armenian State Budget, 2010–2015 (billion AMD)

	2010	2011	2012	2013	2014	2015
Allocated from the government's contingency fund for solving a number of urgent problems in the regions	0.00	0.00	17.40 ^a	0.0	1.00	0.00
Reallocations from budget line items	0.00	0.00	0.00	0.00	5.00 ^b	0.00
Heavy hail in Armavir Province	0.00	0.00	0.00	0.12 ^c	0.00	0.00
Housing construction for affected families in the earthquake disaster area (Gyumri and surrounding)	25.30	25.80	0.29	0.64	0.00	0.00
Housing support programs for affected families in the earthquake disaster area (Gyumri and surrounding)	0.00	0.75	4.80	2.60	0.00	0.00
Construction of anti-hail stations in the provinces	0.00	0.00	0.00	0.00	0.11	0.00
Expenditures for forming and maintaining the state material reserves	0.00	0.00	0.03	0.03	0.01	0.01
Emergency medical services program	0.00	0.00	0.00	0.00	0.01	0.01
Total disaster-related expenditures	25.30	26.55	22.52	3.39	6.12	0.03
Official exchange rate [AMD per US\$, period average]	373.66	372.50	401.76	409.63	415.92	477.92
Total disaster-related expenditures, in million US\$	67.70	71.30	56.00	8.30	14.70	0.10

a. This funding was primarily aimed at repairing and reconstructing educational facilities (including preschools), cultural facilities, health care facilities, community centres, roads, roofs, water supply, gas supply, and irrigation networks in residential areas.

b. This amount was mainly for construction of schools and roads and for urgent problems requiring immediate measures. More specifically, the provinces of Aragatsotn, Ararat, Armavir, Kotayk, Syunik, and Vayots Dzor had been provided AMD 526,897,000 to assist farmers affected by freezing; farmers' entire land tax (amounting to AMD 160,750,000) was paid, as well as half of their irrigation water costs (AMD 366,147,000).

c. The government implemented a special program to support the rehabilitation of certain affected farmers. Assistance was provided to 630 farmers, while 1,411 persons were provided with temporary employment for about three months.

Note: Numbers were rounded to the nearest 100th

Table 6. Cabinet Contingency Fund of the Armenian State Budget, 2010–2015

	2010	2011	2012	2013	2014	2015
Total Cabinet Contingency Fund (billion AMD)	21.60	36.80	41.90	43.20	47.00	29.90
Portion of current expenses (billion AMD)	10.90	12.70	20.60	29.60	32.80	21.80
Portion of nonfinancial assets (billion AMD)	10.70	24.10	21.30	13.70	14.20	8.10
Official exchange rate (AMD per US\$, period average)	373.66	372.50	401.76	409.63	415.92	477.92
Total Cabinet Contingency Fund (million US\$)	57.80	98.80	104.30	105.50	113.00	62.60

4.2.2 Fiscal Indicators Based on the Cabinet Contingency Fund Decreases

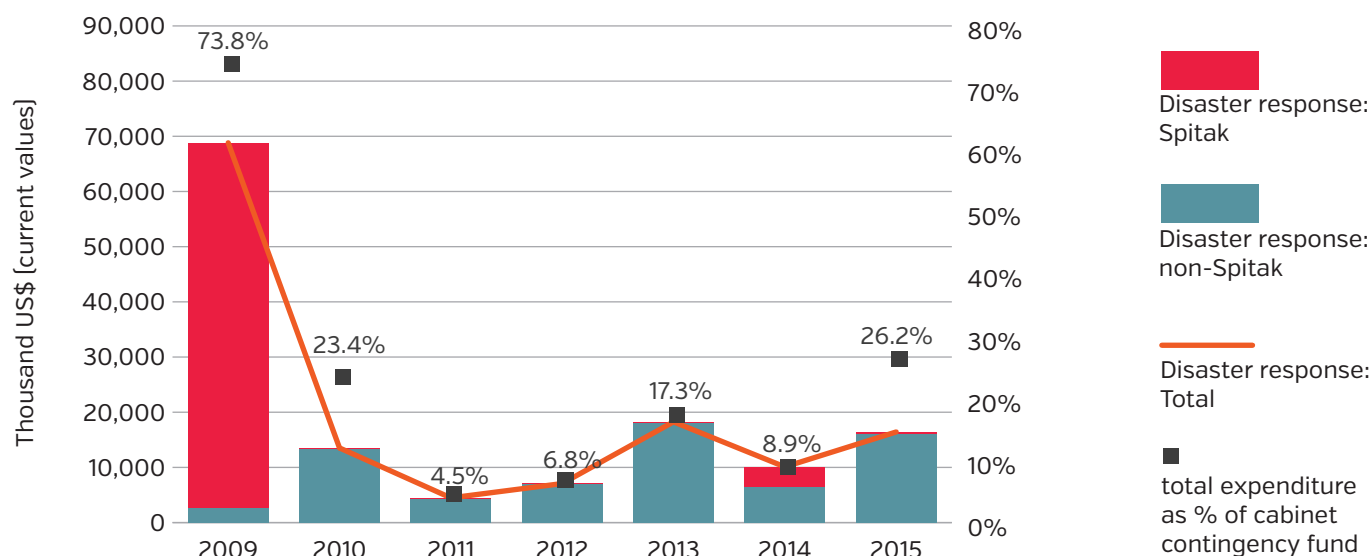
Given the difficulty of separating Spitak- and non-Spitak-related funding, and considering that the Cabinet Contingency Fund is the main source of funding for disaster response, a set of fiscal indicators based on the Cabinet Contingency Fund was produced. The total allocations to the Cabinet Contingency Fund are presented in table 6 and figure 6. As the Cabinet Contingency Fund is not used exclusively for disaster response, the totals are not the best proxy for government spending on disaster response, as they would overestimate the funds available.

Cabinet Contingency Fund decrees were analyzed manually to identify the disaster response-related spending within

the fund. Amounts allocated to disaster response were identified from the qualitative information contained in those documents. Even this case-by-case approach, however, was not able to extinguish measurement errors. For example, the description for some budget lines was not detailed enough to indicate whether a certain disaster-related expenditure referred to response or prevention.

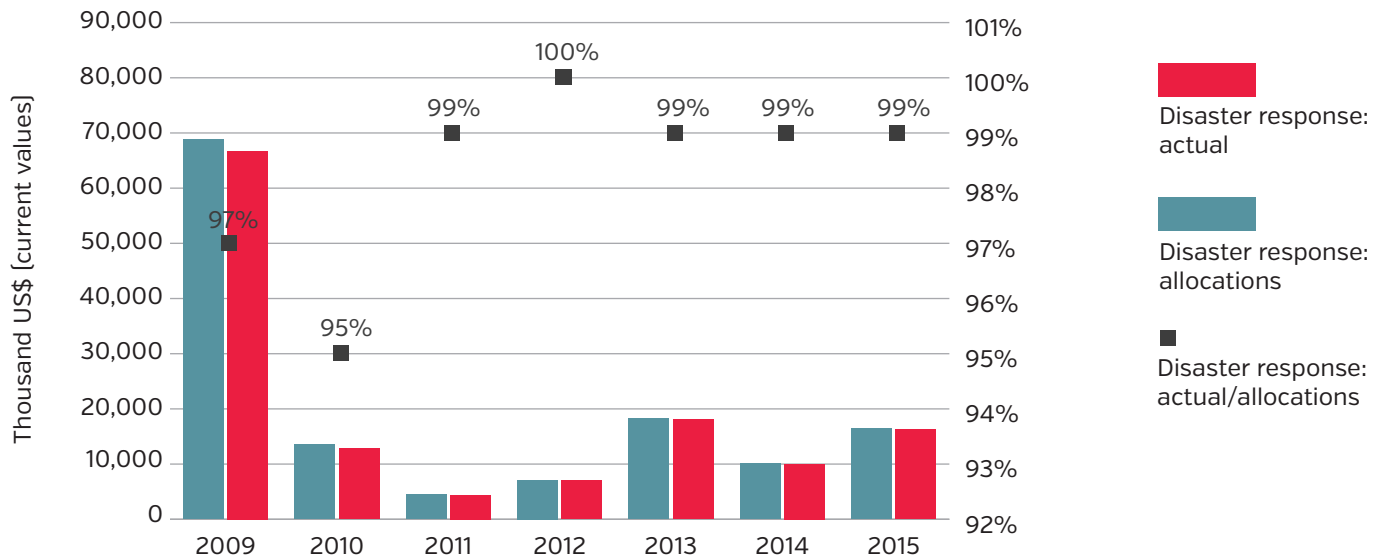
This methodology allowed for improved analysis of non-Spitak-related spending. It showed that disaster response over the course of seven years corresponded to at most 26 percent of the total allocations to the Cabinet Contingency Fund, indicating that besides the overall cap to the fund (5 percent of total budget appropriations in the state budget), there might be competition between disaster response and other needs also managed within the fund (figure 7).

Figure 6. Disaster Response Fiscal Indicators Based on the Cabinet Contingency Fund, 2009–2015 [decrees]



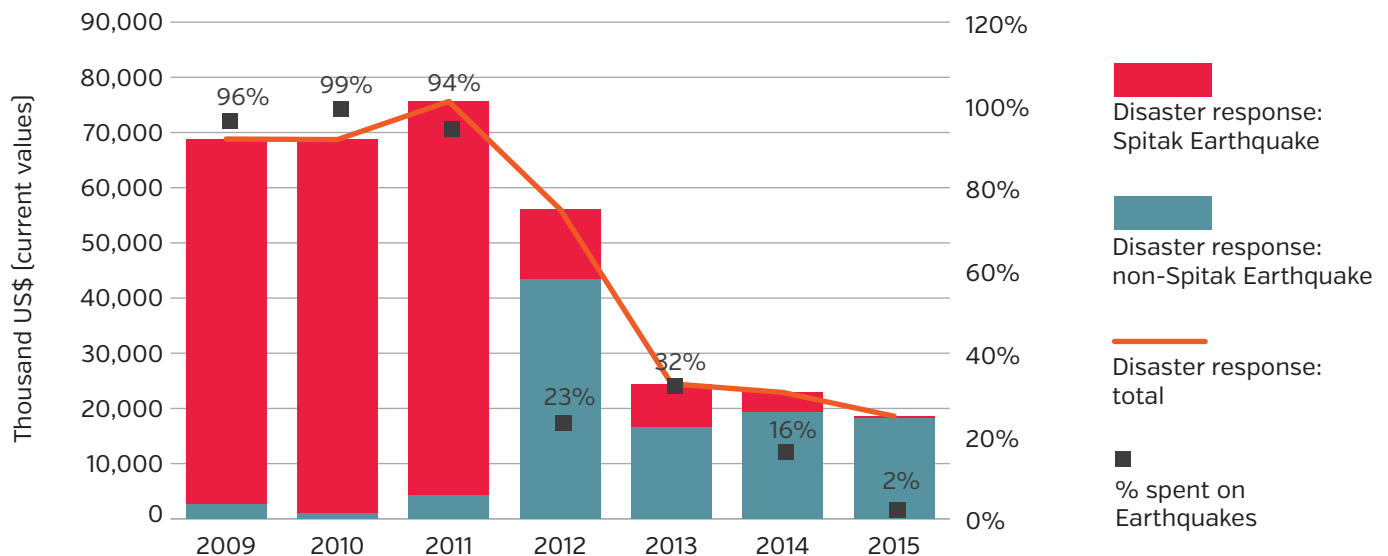
Source: World Bank estimates.
Note: Amounts refer to allocations.

Figure 7. Disaster Response Fiscal Indicators: Disbursements within the Cabinet Contingency Fund, 2009–2015



Source: World Bank estimates.

Figure 8. Central Government Disaster Response Fiscal Indicators, 2009–2015



Source: World Bank estimates.

Note: Amounts refer to allocations. Community budgets were not considered. Data from both the state budget and the Cabinet Contingency fund were considered except in 2013, when state budget data only were considered.

Another relevant aspect of the financial management of disaster response is performance in terms of disbursement. Often, besides the difficulties in raising funds, there is difficulty in disbursing funds due to weak technical capacity or institutional bottlenecks at the disbursement stages. In Armenia, however, the disbursement of disaster response expenditures seems to have confronted few problems in the recent past.

While the indicators based on the Cabinet Contingency Fund decrees are informative and allow for relevant insights, as a measure of the funds available to disaster response in the recent past they might be biased downward.

Both the method based on the state budget and the method based on the Cabinet Contingency Fund seem to miss relevant information. Another option for quantifying

disaster response-related public spending in Armenia was to combine both data sets in a way that does not allow for double counting of expenses detected by both methodologies. A case-by-case approach was employed and, for each year, a relevant set of budget lines was defined using both sources (see figure 8).

The consolidated data confirm that Spitak-related public spending still accounts for a very significant share of disaster response spending, but that non-Spitak public expenditures have increased in the recent past: the rise has not been regular, but the 2012–2015 annual average is much higher than the annual average for the 2009–2011 period.

This study is a first attempt to quantify the fiscal burden caused by natural hazards in the country, and not a precise metric of disaster-related public spending. The methods employed involved a significant manual review of official records and case-by-case considerations, which means that they are not well suited for routine record keeping. Nevertheless, they are an initial step toward understanding any potential funding gap faced by the government, an issue explored in greater detail below.

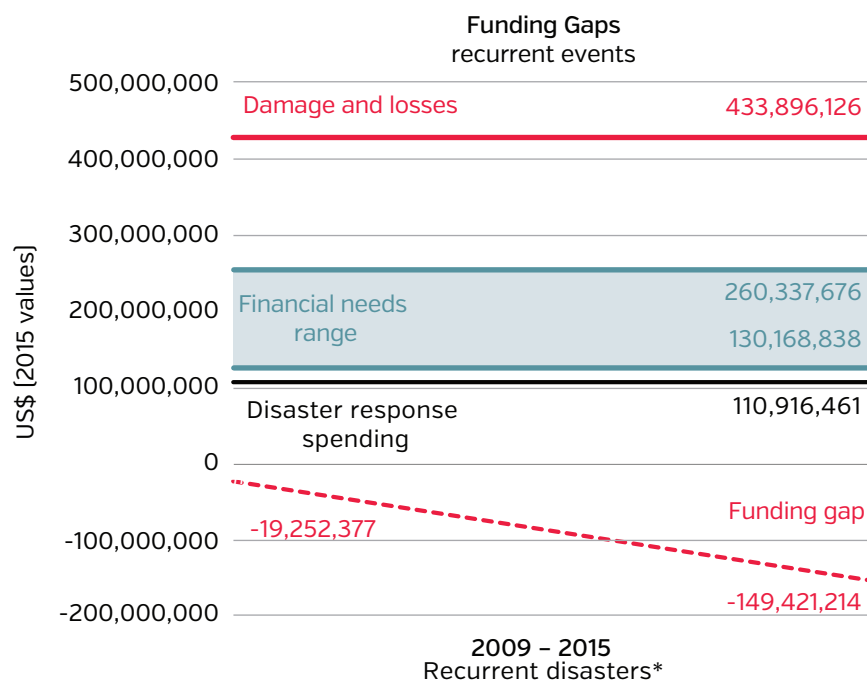
4.3 Funding Gap Analysis

4.3.1 Central Government (Non-Spitak Earthquake) Funding Gap Analysis

One of the main goals of an optimally designed strategy for financial protection against natural hazards is to guarantee that the public institutions involved in disaster response have timely access to the funds needed to protect citizens and reconstruct key public assets, while still preserving the country's overall fiscal balance. In order to identify any potential shortfall of funds faced by the government, the following section provides a funding gap analysis, where funding gap is defined as the difference between the amounts of resources needed for disaster response and the funds available to meet those needs. The analysis compares the government liabilities generated by historical disasters to the overall amount of financing available.

For Armenia, the estimated disaster damage and loss data set presented earlier was combined with the set of fiscal indicators of disaster response discussed above. Because no detailed information is available on the share of the total

Figure 9. Central Government (Non-Spitak Earthquake) Funding Gap Analysis, 2009–2015 (recurrent disasters excluding earthquakes)



Source: World Bank estimates.

Note: The analysis considers recurrent disasters, excludes earthquakes, and is scenario based. Disaster response public spending is based on state budget and Cabinet Contingency Funds decrees. Local level spending is not considered.

damage and losses financed by the government, a scenario-based approach was adopted.

Figure 9 shows the results for different scenarios based on the consolidated set of fiscal indicators obtained using data from both the state budget and the Cabinet Contingency Fund decrees. The idea is that in case these indicators overestimate the disaster response funds available in the recent past, then the estimates of the funding gaps would be conservative—that is, would not mistakenly identify a gap that did not exist.

The different scenarios consider different shares of the total damage and losses converted into government liabilities each year. Disasters can be seen as a contingent liability on the government because they impact government finances through additional, unplanned spending for relief and reconstruction and through declines in expected revenues. A disaster's local impact can also spread to the national economy, as insolvencies and loan defaults create a domino effect. However, the government is never responsible for meeting all disaster-related damages and losses.

Given that no information regarding actual government liabilities was derived from the data on historical disaster impacts in Armenia, for the purpose of the funding gap analysis we considered the fiscal burden arising under different scenarios with a share ranging from 30 percent to 60 percent of the total damage and losses translating into government liabilities.

Figure 9 shows the funding gap estimates for the 2009–2015 period, when total damages and losses caused by recurrent disasters came to approximately US\$434 million (at 2015 values). Assuming that the government liabilities arising from the economic impacts are between 30 percent and 60 percent of the total, then from 2009 to 2015 the government's disaster-related liabilities were between US\$130 million and US\$260 million. During the same period, cumulative government spending on recurrent disasters was approximately US\$94 million, meaning that the disaster response funding gap was between US\$36 million and US\$166 million.

It is important to remember that tracking government spending was difficult under the current public accounting framework, so that additional spending on disaster response might not be reflected in this analysis.

Moreover, the numbers above do not consider the impacts of earthquakes or any Spitak-related spending. Because earthquakes and their impacts in Armenia are known to be potentially much higher than those associated with more frequent events, the funding gaps for earthquake response are considered separately in the next section.

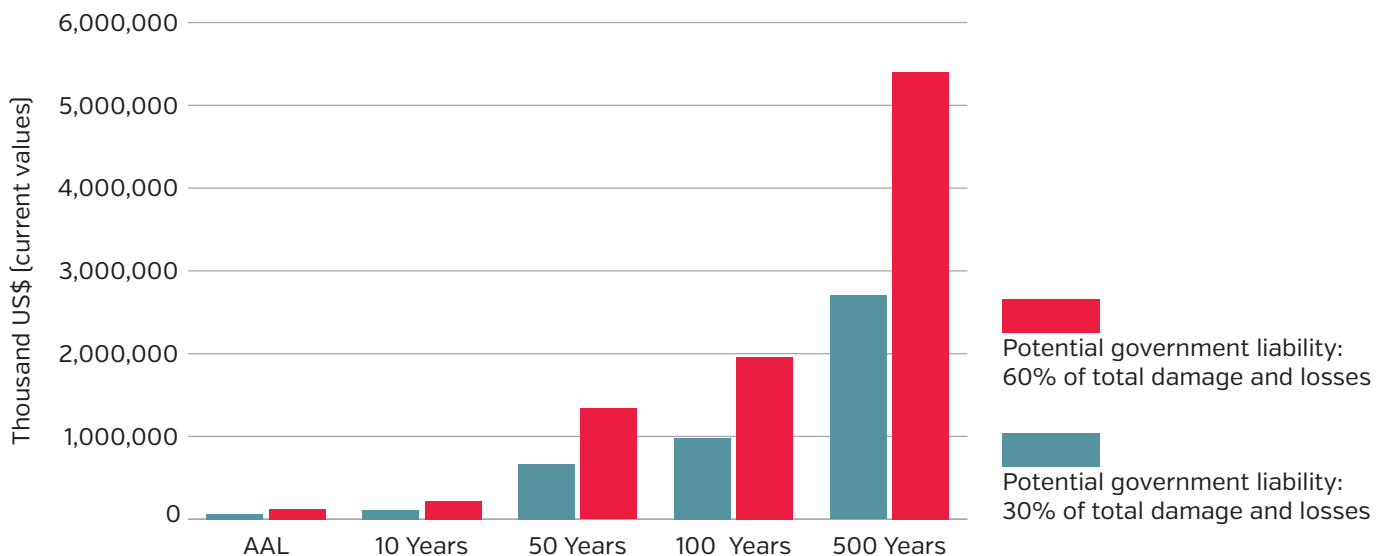
However, since there is no fiscal data on disaster available for the period when significant resources were channelled to post-earthquake reconstruction, it is not currently possible to carry out a retrospective funding gap analysis for the Spitak earthquake. Still, the very fact that almost 20 years later significant reconstruction efforts are being detected is an indicator that the financial response to the damages and losses caused by that event has entailed significant challenges.

4.3.2 Central Government (Earthquake) Potential Funding Gap Analysis

A preliminary assessment of the potential fiscal impacts of rare earthquakes in Armenia can be carried out with the help of a country risk profile developed by the World Bank as part of a study covering the Europe and Central Asia region. This earthquake risk assessment is based on global models. As a result, it does not offer as much accuracy as a country-specific risk assessment and should not be taken as a substitute for a full and detailed probabilistic modelling exercise. As a first indicator of the country's risk profile, however, it can provide important technical information to help decision makers define their priorities in disaster risk management.

Based on the Armenia earthquake risk profile, it is possible to carry out a scenario-based analysis of the government liabilities potentially arising from earthquakes of different return periods. As shown in figure 10, assuming that 30 percent of the total damage and losses translate into government liabilities, a 10-year return period event would

Figure 10. Potential Government Liability from Earthquakes in Armenia [scenario-based analysis]



Source: World Bank estimates.
Note: AAL = average annual loss.

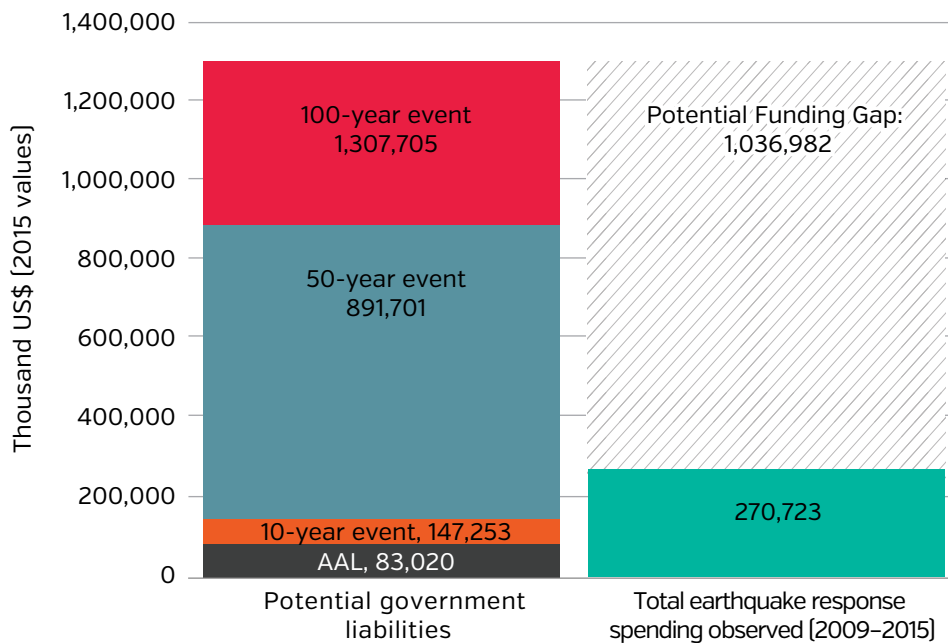
require government response costing US\$110 million or more. However, if the government were liable for 60 percent of the total damage and losses, response would cost at least US\$220 million. So the above estimates can be interpreted as a range for the funding needs potentially arising from events with different frequency and severity.

Based on the above estimates, it is possible to carry out an analysis of the potential funding gaps from earthquakes in Armenia. Figure 11 presents the potential funding gaps under an intermediate scenario in which the government is liable for 40 percent of the total damage and losses. Under this assumption, the government liabilities from

a 100-year earthquake could amount to US\$1.3 billion or more. Between 2009 and 2015 the government was able to spend approximately US\$270 million on earthquake reconstruction. Taking the spending observed in the last six years as a proxy for the government's current earthquake response capacity, we find that the funding gap for a 100-year earthquake could be higher than US\$1 billion.

Considering the central government's fiscal response capacity observed in the recent past, specifically as measured by the Spitak-related budget allocations from 2009 to 2015, it is possible to conclude that even relatively more frequent earthquakes could generate a fiscal burden

Figure 11. Potential Funding Gaps from Earthquakes in Armenia



Source: World Bank estimates.

Note: AAL = average annual loss. The analysis is based on a scenario of 40 percent government liability. Estimates of disaster response public spending are based on state budget and Cabinet Contingency Fund decrees. Local level spending is not considered.

above the current fiscal capacity of the country. Considering the total Spitak-related spending from 2009 to 2015 (US\$270 million, at 2015 values), even an event that occurs on average every 10 years would exceed the government's financial response capacity.

For example, an earthquake that occurs on average every 100 years would imply a funding gap of US\$1 billion (or more); the funding gap for the most severe events could be at least US\$3 billion.

In the case of another earthquake as severe as the 1988 Spitak event, the public sector would need several years to meet the response needs under current financial protection arrangements.

5. Key Findings

Based on the disaster data currently available and the preliminary analysis, the government of Armenia faces funding gaps for both recurrent disasters and rarer but larger-scale events.

The magnitude of the funding gaps estimated for recurrent events indicates that improved management of the budgetary mechanisms, such as contingent budgets, combined with contingent credit could be used to manage the low-risk layer. Strengthening the management of disaster reserve funds in Armenia could also improve the country's immediate response capacity during the emergency stages following rare earthquakes.

The government liabilities potentially arising from the impact of more severe earthquakes would surpass the

country's fiscal response capacity in most cases. Contingent credit could play an important role in disaster response by providing critical bridge financing until additional international resources can be mobilized. In the medium to longer term, the government may consider promoting insurance to reduce its own liability.

The quantitative assessments discussed above, however, have limitations. Information on historical disaster damage and losses and disaster-related government spending was limited, and tracking of spending was challenging even after an extensive review of government decrees. As an important short-term step toward improved fiscal management of disasters, the government could consider improvements to its current system of damage and loss assessment and recording, which directly feeds into post-disaster resource allocation.



6. Options for Consideration

Based on the information compiled in this note and consultations with relevant stakeholders, the government may want to consider the following options for further work to increase its immediate financial response capacity against natural disasters and better protect its fiscal balance. Specifically, there are seven options spread across shorter, medium and longer-term activities, depending on the length of time required to achieve results (table 7).

Short to medium term options include the following:

- **Option 1: Develop a disaster risk financing and insurance strategy to make the financial management of disasters more effective.** A comprehensive strategy could clearly establish policy priorities for financial protection of the government, help communicate these priorities across all relevant stakeholders, and align resources and efforts toward the main priorities as identified by the Ministry of Finance.
- **Option 2: Improve efficiency in the use of the Cabinet Contingency Fund and other budget mechanisms for disaster-related expenditures.** Reviewing and improving processes related to the Cabinet Contingency Fund, which is the main mechanism currently used by the government for disaster response, could lead to significant efficiency gains. For example, this step could accelerate the process for requesting and allocating disaster-related resources or help to establish clear guidelines on the amounts to be allocated. This option could also include exploration of other options to improve the efficiency of budgetary resources, such as pre-determining a percentage of each budget line that could be reallocated in case of an emergency with the least disruption of planned spending.
- **Option 3: Improve tracking of disaster-related expenditures and conduct more in-depth analysis.** To make more informed decisions and maximize allocative efficiency of its resources, the government may want

Table 7: Options for a National Disaster Risk Financing Strategy in Armenia

Time frame	Options
Policy and Analytical work	
Short term	Develop a disaster risk financing and insurance strategy to make the financial management of disasters more effective
Short to medium term	Improve efficiency in the use of the Cabinet Contingency Fund and other budget mechanisms for disaster-related expenditures
Medium term	Improve tracking of disaster-related expenditures and conduct more in-depth analysis.
Longer term	Explore establishment of a national disaster reserve facility to improve efficiency in disaster-related spending
Longer term	Improve damage and loss data collection and reporting
Leveraging contingent financing	
Short to medium term	Explore the use of contingent credit facilities, such as a CAT DDO (Catastrophe Deferred Drawdown Option), to secure funds in advance of a disaster
Leveraging private sector	
Longer term	Strengthen catastrophe insurance penetration

to improve its understanding of total disaster-related expenditures currently coming from the budget. This work could build on previous public expenditure reviews and the World Bank BOOST analysis to better track disaster-related expenditures. Looking to the future, this option could include investigating establishment of a dedicated system for tracking disaster-related expenditures in the budget.

- **Option 4: Explore the use of contingent credit facilities, such as a CAT DDO (Catastrophe Deferred Drawdown Option), to secure funds in advance of a disaster.** Since the funds can be available immediately in case of emergency, such a line of credit could serve as bridge financing to provide the government additional protection against more severe events until other domestic funds can be reallocated or international aid is received. Armenia is potentially eligible for such a financial mechanism, with a total sum of up to 0.25 percent of its GDP.

Longer-term options include the following:

- **Option 5: Explore establishment of a national disaster reserve facility to improve efficiency in disaster-related spending.** As a longer-term step toward more effective and efficient use of budgetary resources for disaster response, the government could explore channelling disaster-related expenditures through one dedicated budgetary tool. This could be an annual dedicated budget line or a separate reserve facility that could accrue resources over time (subject to an enabling legal framework). Such a mechanism could also serve as a transparent, predictable, and effective framework to receive post-disaster donations by the diaspora or international partners. Such a step would not only improve the availability of funds in the aftermath of a disaster; by setting up dedicated processes it could also tackle inefficiencies in resource execution.

- **Option 6: Improve damage and loss data collection and reporting to inform efficient post-disaster resource allocation.** Armenia currently relies on an extensive system for post-disaster damage and loss reporting, aggregating disaster impact upward from the community to the national level. This reporting directly determines the allocation of financial resources for disaster response from the Cabinet Contingency Fund. There are a number of inefficiencies in the current system that, if addressed, could fundamentally transform disaster financing in Armenia. The government could review the current process for bottlenecks and upgrade the current paper-based system with a modern IT infrastructure. An IT-based system could automate the aggregation of damage reporting, inform resource allocation, and provide the government with detailed, disaggregated information on damage and losses from disasters. An approved official methodology for damage assessment would also help to allocate the funds for post-disaster expenditures across regions.
- **Option 7: Strengthen catastrophe insurance penetration.** The government may wish to consider promoting a culture of insurance and help develop private catastrophe risk insurance markets. This option could include public awareness campaigns and compulsory insurance for all assets receiving subsidies from the budget (that is, through agricultural, mortgage, or small and medium enterprise loans). The government could also consider developing a program for insuring public assets (such as public buildings and bridges) and critical infrastructure (such as power plants). This step could also serve as an incentive to invest in better risk assessment and risk reduction activities (such as retrofitting) to reduce losses and lower the cost of insurance.

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Annex 1. Recorded Natural Disasters in Armenia by Hazard Type, 2010–2015

	2010	2011	2012	2013	2014	2015
Strong wind, storm, hurricane, tornado, dust storm	45	29	38	48	114	95
Thunderstorm, lightning	3	4	9	4	3	9
Hail storm	32	53	41	33	44	24
Heavy rain	19	17	15	7	12	6
Landslide	19	12	6	6	7	3
Downpour	13	10	4	2	0	1
Snowfall, snowstorm	19	41	81	77	64	39
Ice slick	0	0	1	4	96	76
Forest fire	21	5	26	3	17	15
River flood and deluge	29	39	4	8	7	10
Landfall	15	8	2	9	11	8
Rockslide	11	5	19	32	48	52
Earthquake	150	222	179	72	76	82
Increased groundwater	7	0	1	0	0	0
Total	383	445	426	305	499	420

Source: National Statistical Service of the Republic of Armenia, "Socio-Economic Situation of RA," January–December 2010, 2011, 2012, 2013, 2014, 2015, <http://www.armstat.am/en/?nid=82&id=1890>.

Annex 2. Recorded Natural Disasters in Armenia by Region, 2010–2015

	2010	2011	2012	2013	2014	2015
Yerevan	5	10	10	18	47	35
Aragatsotn	22	26	49	47	53	40
Ararat	13	12	10	4	15	11
Armavir	4	4	5	6	12	11
Gegharkunik	19	16	31	23	67	47
Lori	53	52	49	24	52	51
Kotayk	11	13	12	20	32	25
Shirak	21	15	28	19	23	20
Syunik	40	18	24	33	62	48
Vayots Dzor	29	41	20	32	30	34
Tavush	16	16	9	7	30	16
Total	233	223	247	233	423	338

Source: National Statistical Service of the Republic of Armenia, "Socio-Economic Situation of RA," January–December 2010, 2011, 2012, 2013, 2014, 2015, <http://www.armstat.am/en/?nid=82&id=1890>.

