WORLD BANK GROUP

GFDRR
Global Facility for Disaster Reduction and Recovery

Syria Earthquake 2023

Rapid Damage and Needs Assessment (RDNA)

March 2023

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Disclaimer:

This is a largely remotely conducted assessment that relies primarily on data from satellite imagery, publicly available information, and social media analytics, corroborated and validated by other sources and means, including data from development partners. Although all efforts have been made to improve the accuracy of the information that was collected and analyzed, and to use publicly available ground-based data when feasible, the assessment was produced in a quick timeframe to ensure the relevance of the estimations. This is a living document and will be updated as new information becomes available. It provides an overall picture of the effects of the earthquake on the population, physical assets, infrastructure, and service delivery, but is not a substitute for in-depth sector-specific assessments. Given the situation in Syria, this RDNA was conducted solely by the World Bank without any collaboration with the Syrian government.

The report uses the exchange rate US$1 = 4,500 Syrian Pounds (SYP).

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Acknowledgments

The Rapid Damage and Needs Assessment for Syria was conducted by the World Bank Group in the aftermath of the devastating earthquakes that struck Syria and Türkiye on February 6 and February 20, 2023.

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ABBREVIATIONS AND ACRONYM

ABA	Area-based approach
ACLED	Armed Conflict Location & Event Data Project
AI	Artificial intelligence
ALOS	Advanced Land Observing Satellite
AANES	Autonomous Administration of North and East Syria
BBB	Build back better
CPI	Consumer Price Index
CSO	Civil society organization
DCM	Disaster Connectivity Map
DG	Diesel generator
DMSP	Defense Meteorological Satellite Program
DNA	Damage and needs assessment
EO	Earth Observation
EU	European Union
EWARS	Early Warning, Alert and Response System
FAO	Food and Agriculture Organization
FCV	Fragility, Conflict and Violence
GDP	Gross domestic product
GFDRR	Global Facility for Disaster Reduction and Recovery
GRADE	Global Rapid Post Disaster Damage Estimation
GRM	Grievance Redress Mechanisms
HNAP	Humanitarian Needs Assessment Programme
HRH	Human Resources for Health
ICT	Information and communication technology
IDP	Internally displaced person
IHME	Institute for Health Metrics and Evaluation
IMF	International Monetary Fund
iNGO	international non-governmental organization
InSAR	Interferometric Synthetic Aperture Radar
IOM	International Organization for Migration
ISP	Internet service provider
ITU	International Telecommunication Union

Mbps	Megabits per second
MCM	Million cubic meters
MENA	Middle East and North Africa
MOSAL	Ministry of Social Affairs and Labor
MPCA	Multi-purpose cash assistance
MPCV	Multi-purpose cash and vouchers
Mw	Magnitude
NCD	Non-communicable disease
NGO	Non-governmental organization
NSAF	National Social Assistance Fund (NSAF)
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PAI	Personal activity intelligence
PHC	Primary health care centers
PLW	Pregnant and lactating Woman
PSS	Psychosocial support
PV	Photovoltaic
rCSI	Reduced Coping Strategy Index
RDNA	Rapid Damage and Needs Assessment
SAR	Synthetic aperture radar
SDF	Syrian Democratic Force
SSN	Social Safety Nets
ST	Syrian Telecom
STE	Syrian Turkish Energy Company
SYP	Syrian Pound
TIMSS	Trends in International Mathematics and Science Study
UN	United Nations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
US	United States of America
USGS	United States Geological Survey
VIIRS	Visible Infrared Imager Radiometer Suite
VSAT	Very Small Aperture Terminals
WASH	Water, Sanitation, and Hygiene
WB	World Bank
WBG	World Bank Group
WFP	World Food Programme
WHO	World Health Organization

Executive Summary

Following the magnitude (Mw) 7.8 Türkiye-Syria Earthquake on February 6, 2023, and the (Mw) 6.3 earthquake on February 20, 2023, the World Bank launched the Syria Rapid Damage and Needs Assessment (RDNA). The objective of the RDNA is to estimate the impact of the earthquake on physical assets and service delivery in the most affected areas. The RDNA covers six governorates with roughly 10 million inhabitants, with an in-depth analysis of nine cities. It provides preliminary estimates to rebuild infrastructure and restore service delivery, and general guiding principles for recovery and building back better, focusing on early recovery (0–12 months) and short-term needs (1–3 years). The RDNA also analyses the macroeconomic and socioeconomic impacts of the earthquake to anticipate repercussions on the economic outlook and on the population's well-being.

Physical damages and losses related to the Syrian earthquake are estimated at US$3.7 billion and US$1.5 billion, respectively, bringing the total estimated impact to US$5.2 billion. Reconstruction and recovery needs across the six assessed governorates are estimated at US$7.9 billion, with needs in year 1 and years 2-3 post-earthquake estimated at US$3.7 billion and US$4.2 billion, respectively.

The Syrian economy, which prior to the earthquake was projected to contract by 3.2 percent in 2023, is now projected to decline by 5.5 percent over the same year (with the uncertainty of this year's forecast increasing significantly following the earthquake).[1] On the production side, the earthquake will adversely impact the productive capacity of the country, mainly through the destruction of physical capital and disruptions in trade networks. The projected increase in inflation from 44 to 60 percent due to supply chain disruptions and higher transport costs will reduce private consumption. Earthquake-related reconstruction is expected to offset some of these losses but the extent and pace of this reconstruction remains to be seen. The fiscal deficit is projected to rise marginally from a pre-earthquake baseline of 8.6 percent to 8.8 percent of GDP based on the assumption that the country's social and infrastructure needs following the earthquake will be largely met by foreign donor aid. The current account deficit is estimated to rise from a pre-earthquake baseline projection of 2.5 percent of GDP to around 3.2 percent of GDP, due mainly to higher imports to support reconstruction investment. The economic outlook is poor because of anticipated slow reconstruction, weak private investment, and limited humanitarian assistance. GDP losses will be higher in the medium-term should reconstruction efforts be further delayed.

Overall, it is estimated that 6.6 million Syrians live in impacted areas which have been affected by the earthquake at an intensity VI (strong shaking) or higher. Earthquake-induced displacement will add to the staggering count of 3 million conflict induced internally displaced persons (IDPs) already living in affected areas. High levels of pre-existing welfare vulnerability limit households' capacity to cope with the impact of the earthquake, hence exacerbating the risk of long-lasting welfare consequences.

The RDNA follows another assessment recently conducted by the World Bank known as the Global Rapid Post-Disaster Damage Estimation (GRADE)[2], that estimated direct physical damages in Syria ranging between US$2.7 billion and US$7.9

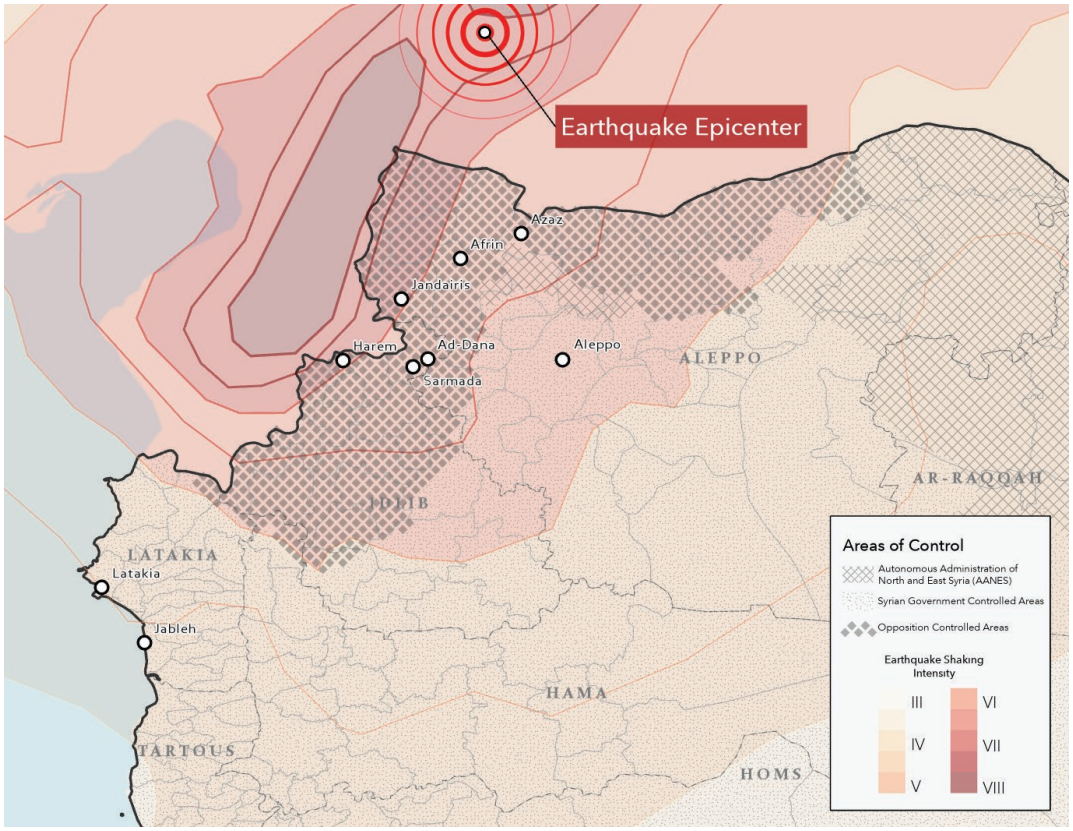
1 The Winter 2022/23 issue of the Syria Economic Monitor of the World Bank provides a more detailed analysis of the Syrian economy prior to the earthquake

2 ***Global Rapid Post-Disaster Damage Estimation (GRADE) Report : Mw 7.8 Türkiye-Syria Earthquake - Assessment of the Impact on Syria : Results as of February 20, 2023***

billion.[3] While the GRADE focuses on physical damages and relies largely on earthquake damage modelling and exposure analysis, the RDNA provides sectoral damages, economic losses, and recovery needs, estimated through various data acquisition and triangulation tools, detailed in the section below. While there are differences in the methodology and the scope of these two assessments, the RDNA damage and loss estimate is closely aligned with the GRADE's median estimate.

This RDNA contributes to the understanding of the impact of the earthquake on Syria. While the RDNA focuses on the damages incurred by the earthquake, the compounding effect of the pre-existing damages caused by the conflict are reflected in the pre-earthquake baseline. The RDNA follows a globally established and recognized damage, loss, and needs assessment methodology developed by the World Bank Group (WBG), the European Union (EU), and the United Nations (UN). This methodology has been applied globally in post-disaster and conflict contexts to inform recovery and reconstruction planning. Prior to this RDNA, the World Bank Group conducted six assessments[4] to provide information on the effects of the ongoing conflict on population, physical infrastructure, and quality of service delivery.[5]

Figure 1:
Earthquake impact by Governorate and Control Areas[6].



Source: World Bank

3 ***Earthquake Direct Damage in Syria Estimated at $5.1 billion in Areas Already Severely Ravaged by Long Conflict and Displacement***
4 ***Syria Damage Assessment of Selected Cities Aleppo, Hama, Idlib (2017)***
5 ***Syria 2022 - Joint Damage Assessment of Selected Cities***
6 ***2023 Humanitarian Needs Overview: Syrian Arab Republic***

SYRIA RAPID DAMAGE AND NEEDS ASSESSMENT

RDNA

Key Facts

OBJECTIVES

- Assess the impact of the earthquake on physical assets, infrastructure, and service delivery.
- Conduct a preliminary estimate of infrastructure reconstruction and service delivery restoration needs in the immediate and short-term.
- Inform the World Bank and the international community of the impact and the needs associated with the disaster.

METHODOLOGY

The Syria RDNA's analyses and recommendations focus on the impact, and the recovery and reconstruction needs following the earthquake in Syria. Damages, losses, and needs analyses and recommendations are relative to the pre-earthquake baseline of physical assets. The RDNA relies on remote data sources which include 50 cm resolution satellite imagery, (social) media analytics, anonymized cellphone data, night lights data, and publicly available information to reach inaccessible areas and triangulate and improve the veracity of the data. Data limitations remained, however. While all efforts are made to improve accuracy, a remote assessment is broad-brush and provides only an indicative overview of the impact. For example, in the water sector, damages pertaining to underground water infrastructure could not be assessed due to methodological and data constraints.

SCOPE

TEMPORAL SCOPE:

Damages and losses were calculated against the actual or estimated pre-earthquake baseline of physical assets. Damage data were collected between February 24 and March 5, 2023.

GEOGRAPHICAL SCOPE:

The RDNA covers the **six governorates** most impacted by the earthquake: **Aleppo, Hama, Idlib, Latakia, Raqqah and Tartous**, with an in-depth analysis of **nine cities: Aleppo, Harem, Jableh, Afrin, Ad-Dana, Jandairis, Azaz, Sarmada, and Latakia**.[7] Results are presented by sector, by city, by governorate, by area of control and at the aggregate level.

SECTORAL SCOPE:

The RDNA covers macroeconomic and socioeconomic impacts, **10 sectors, and 4 cross-cutting areas**: Housing, Power, Transport, Water, Digital Development, Agriculture, Education, Cultural Heritage, Health, Municipal Services, Public Institutions, Environment, Social Protection and Livelihoods, and Social Sustainability and Inclusion.

7 The in-depth analysis excluded Idlib city as initial reporting suggested limited damage to the city. However the Idlib governorate as a whole incurred significant damage, which was estimated through extrapolation methods.

MILESTONES

February 6 — A magnitude 7.8 earthquake

February 7 — Launch of the GRADE

February 13-23 — Planning of the RDNA Mobilization of World Bank RDNA team

February 20 — A magnitude 6.3 earthquake

February 24 -March 5 — RDNA data collection

February 28 — Publication of the GRADE

March 5-12 — Data analysis, report writing and review

March 12-17 — Finalization and publication of RDNA report

KEY FINDINGS

DAMAGES

3.7 US$ billion

LOSSES

1.5 US$ billion

NEEDS

7.9 US$ billion

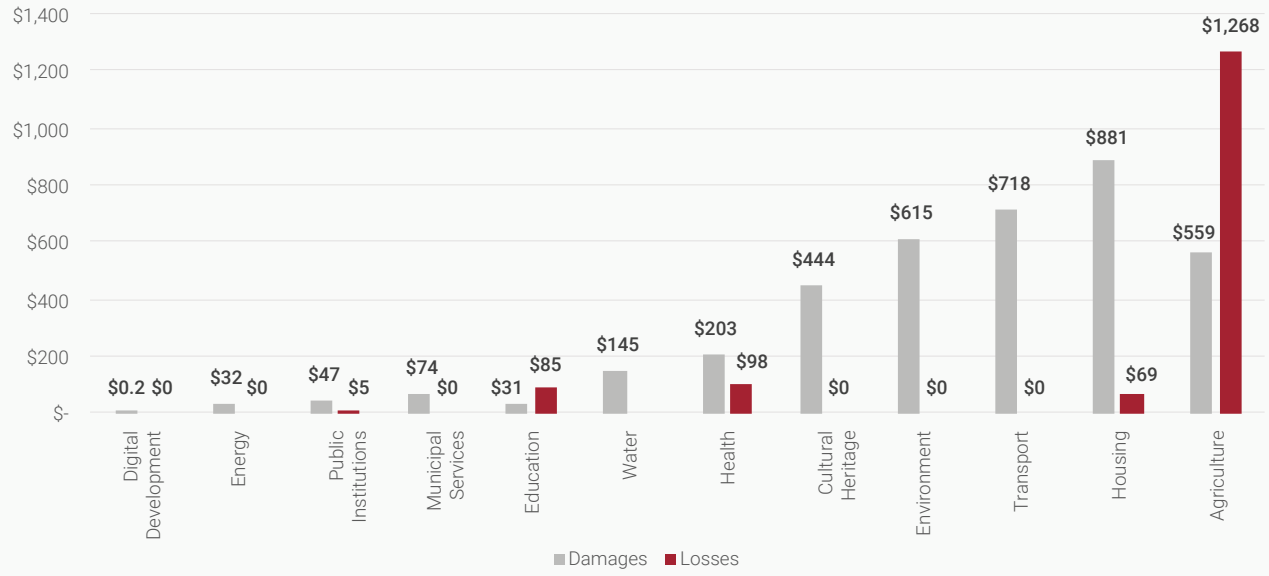
Key Findings of the RDNA

TABLE 1: DAMAGES, LOSSES, AND NEEDS BY SECTOR (IN US$)

Estimates as of March 16 in US$

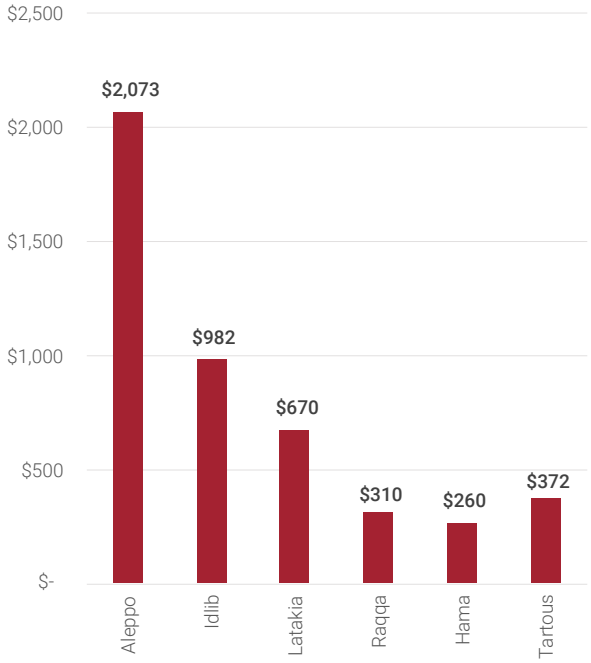
Sector	DAMAGES AND LOSSES (US$)			NEEDS (US$)				
	Damages	Losses	Total Effect	Early recovery (0-12 months)	Short term (1-3 months)	Total (0-3 years)	Share of total needs (%)
Social Sectors							
Housing	$880,869,451	$69,214,139	$950,083,590	$446,600,812	$961,909,441	$1,408,510,252	17.8%
Health	$202,859,637	$97,534,890	$300,394,527	$162,287,709	$223,145,600	$385,433,309	4.9%
Education	$30,691,845	$85,373,788	$116,065,633	$47,073,437	$91,377,849	$138,451,286	1.7%
Municipal Services	$73,767,903	-	$73,767,903	$38,359,309	$57,538,964	$95,898,274	1.2%
Cultural Heritage	$444,020,045	-	$444,020,045	$230,890,423	$346,335,635	$577,226,058	7.3%
Social Sectors Total	**$1,632,208,880**	**$252,122,817**	**$1,884,331,698**	**$925,211,691**	**$1,680,307,489**	**$2,605,519,180**	**32.9%**
Physical Infrastructure and Productive Sectors							
Transport	$717,865,031	-	$717,865,031	$373,289,816	$559,934,724	$933,224,540	11.8%
Water	$145,372,561	-	$145,372,561	$73,593,009	$158,508,019	$232,101,028	2.9%
Power	$32,118,566	-	$32,118,566	$16,284,113	$35,073,474	$51,357,587	0.6%
Agriculture	$559,191,853	$1,268,313,107	$1,827,504,960	$1,602,801,010	$519,292,817	$2,122,093,826	26.8%
Digital Development	$180,000	-	$180,000	$390,000	-	$390,000	0.0%
Infrastructure Sectors Total	**$1,454,728,010**	**$1,268,313,107**	**$2,723,041,117**	**$2,066,357,947**	**$1,272,809,034**	**$3,339,166,981**	**42.2%**
Cross-Cutting Sectors							
Public Institutions	$47,045,120	$4,704,512	$51,749,632	$57,227,028	$3,931,628	$61,158,655	0.8%
Environment	$614,583,069	-	$614,583,069	$307,291,535	$307,291,535	$614,583,069	7.8%
Social Protection	-	-	-	$341,760,000	$950,400,000	$1,292,160,000	16.3%
Cross-Cutting Sectors Total	**$661,628,188**	**$4,704,512**	**$666,332,700**	**$706,278,562**	**$1,261,623,162**	**$1,967,901,724**	**24.9%**
Grand Total	**$3,748,565,079**	**$1,525,140,436**	**$5,273,705,515**	**$3,697,848,201**	**$4,214,739,685**	**$7,912,587,885**	**100%**

Figure 2:
Damages and Losses by Sector (In US$ million)



Note: The Social Protection and Livelihoods and Social Sustainability and Inclusion sectors do not include damages and losses.

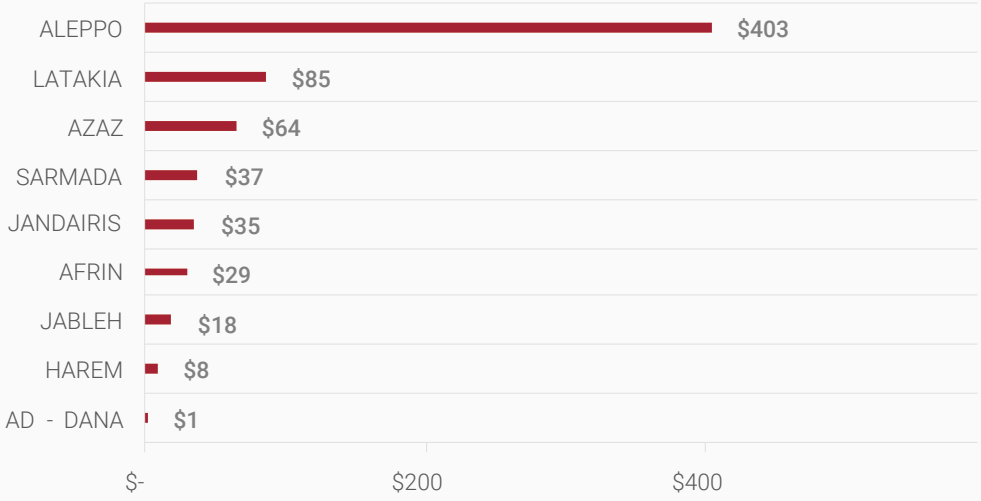
Figure 3:
Damages and Losses by Governorate
(In US$ million)



Physical damages and losses related to the earthquake are estimated at US$3.7 billion and US$1.5 billion, respectively. The largest physical damages were incurred in Housing (23.5 percent of total), followed by Transport (19.2 percent of total), Environment (16.4 percent of total), Agriculture (14.9 percent of total), Cultural Heritage (11.8 percent of total), Health (5.4 percent of total) and Water (3.9 percent of total). The remainder of the damages (4.9 percent of total) were incurred in Municipal Services, Public Institutions, Power, and Education. With regard to losses, Agriculture incurred losses related to the fall in food supplies of US$1.3 billion (83.2 percent of total). The remainder of the losses were in Health and in Education as a result of additional, unanticipated recurrent expenditures in these sectors, and in Housing, related to the loss of rental income, housing expenditures of families with destroyed houses, loss of housing assets, and loss of income to governments. Some sector losses could not be included in the assessment due to data constraints.

Among the six Governorates assessed under the RDNA, the Governorate of Aleppo (which includes the cities of Aleppo, Azaz and Afrin) was most damaged at 44 percent of total damages. The second largest damages were incurred in Idlib (which includes the cities of Sarmada, Harem and Ad-Dana) at 21 percent of total damages. In Aleppo Governorate, damages were predominantly in Housing, followed by Agriculture, Environment, and Cultural Heritage. In Idlib Governorate, damages were most significant in Agriculture, followed by Housing, Transport, Environment and Health.

Figure 4:
Damages and Losses by City (In US$ million)



The estimated damages across the nine assessed cities were in Aleppo (59.9 percent of total), followed by Latakia (12.2 percent of total), Azaz (9.6 percent of total), Sarmada (5.7 percent of total), Jandairis (5.2 percent of total), Afrin (3.3 percent of total), Jableh (2.6 percent of total), Harem (1.3 percent of total) and Ad-Dana (0.0 percent of total).

The recent earthquake in Northwest Syria has caused extensive damages and losses across different areas of control. Government-controlled areas suffered the most significant impact, with total damages and losses estimated at US$2.8 billion. The Autonomous Administration of North and East Syria (AANES) also suffered significant losses at US$1.3 billion, while opposition-controlled areas incurred damages and losses of US$1.2 billion.

Reconstruction and recovery needs for the six assessed governorates are estimated at US$7.9 billion, with needs in year 1 and years 2–3 estimated at US$3.7 billion and US$4.2 billion, respectively. The largest needs pertain to Agriculture (26.8 percent of total), followed by Housing (17.8 percent of total), Social Protection (16.3 percent of total) and Transport (11.8 percent of total).

Government-controlled areas have been identified as having the greatest reconstruction and recovery needs, estimated at US$4.5 billion. This is followed by opposition-controlled areas with US$ 2.1 billion and areas under the control of the AANES with US$1.3 billion. The higher reconstruction and recovery needs in government-controlled areas can be attributed to several factors, such as higher population density and built-up area thus leading to greater infrastructure damage and public service disruption.

In the early recovery period (0-12 months), efforts should address the most urgent and immediate needs of affected communities, including provision of emergency shelter and restoration of basic services, including food, water, and health services. Simultaneously with early recovery efforts, the short-term (1-3 years) focus should shift towards rebuilding damaged infrastructure, and supporting affected communities to rebuild their livelihoods and promote sustainable development.

Figure 5:
Damages and Losses by Area of Control (In US$ million)

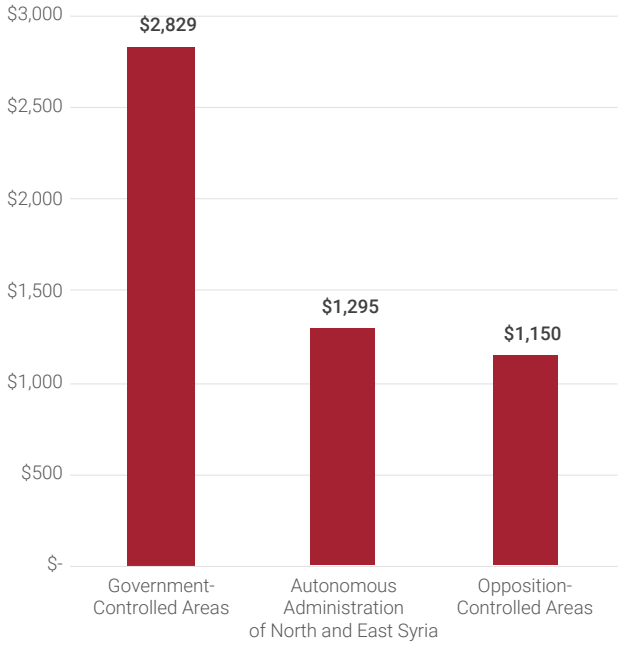


Figure 6:
Recovery and Reconstruction Needs by Sector (In US$ million)

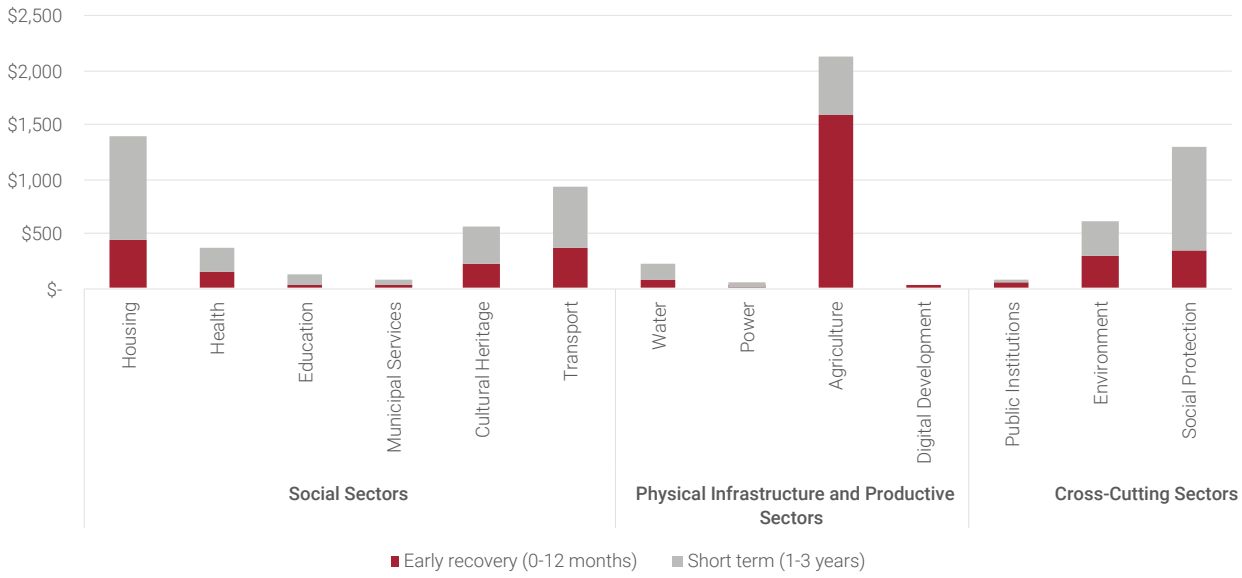


Figure 7:
Share of Total Needs by Governorate

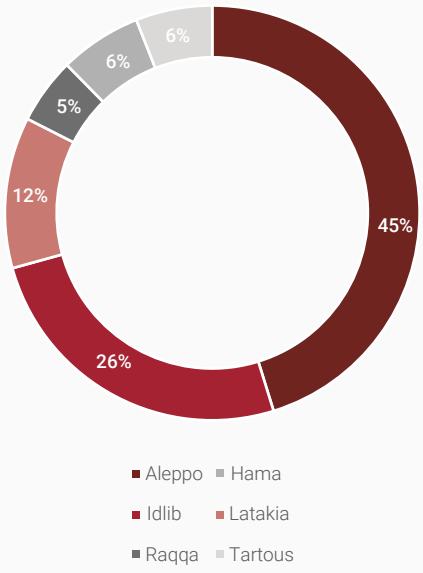
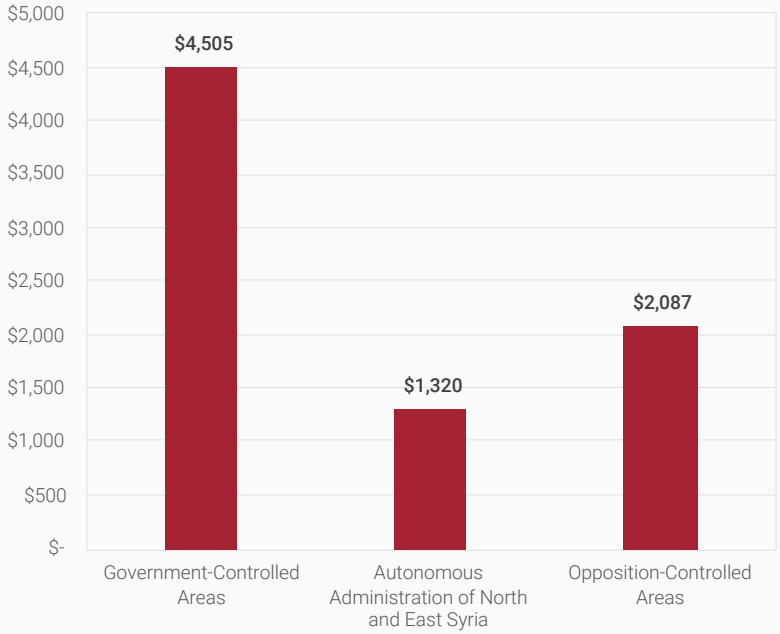


Figure 8:
Needs by Area of Control (In US$ million)



Summary of RDNA Sector Reports

Housing

Housing damages across the urban and rural areas of the six governorates are estimated at US$880.6 million, with some 87,330 housing units, representing 4.8 percent of the total housing stock, considered to have been partially damaged or destroyed. Losses (comprised of loss of rental income, housing expenditures of families with destroyed houses, loss of housing assets, and loss of income to governments) are estimated at US$69.2 million across the six governorates. Aleppo and Idlib Governorates incurred 92 percent of estimated damage costs and 90 percent of estimated losses. About 21 percent of units damaged are from the informal sector, occupied by vulnerable lower middle-income families.

Total reconstruction and recovery needs in housing, which comprise of the reconstruction of destroyed housing units, and the rehabilitation cost of partially damaged units and service costs, are estimated at US$1.4 billion, respectively, across the six governorates. The housing recovery strategy encompasses the mass rehabilitation and reconstruction of the damaged and destroyed housing stock based on Building-Back-Better standards and the use of participatory recovery approaches, while particularly targeting displaced populations. The early recovery phase should include damage assessment; vulnerability mapping and technical support to local governments for seismic-resilient urban planning and development; and community and area-based inclusive and sustainable recovery.

Health

3.9 percent of health facilities in the affected areas were either damaged (3.5 percent of facilities) or destroyed (0.4 percent of facilities), with estimated damages of US$202.9 million. Health facilities in impacted areas were unable to accommodate the surge in patients and had to refer them elsewhere. Shortages of specialized care facilities, equipment, basic medical consumables, and health professionals all impaired the ability of health facilities to provide care. With thousands of displaced people living in shelters, there is an increased risk of disease due to crowding, unsafe water, and poor sanitation and hygiene. In the weeks following the earthquake, there has been a 28 percent increase in morbidity for common conditions such as influenza and diarrhea.

The health recovery strategy needs to address the compounded impacts of the conflict, COVID-19, the cholera outbreak and the earthquake on the health system and requires an estimated US$385.4 million. The near-term priority is to restore essential health services in functional facilities, while continuing to provide services through mobile units to impacted areas without functional health facilities. This includes obtaining vaccines and medicines for pregnant women, children and non-communicable diseases (NCDs); providing mental health and psychosocial support services, re-equipping hospitals and laboratories with medical and diagnostic equipment, monitoring children and pregnant women for malnutrition, and working with the Water Sector to prevent water-borne disease outbreaks. In the medium to long term, it will be important to build human resources, restore damaged health care facilities, strengthen emergency care and pandemic preparedness, and engage the private Health Sector to provide affordable services.

Education

Damages and losses in education are estimated at US$30.7 million and US$85.4 million, respectively. For damages assessed across the six governorates, 22 facilities (0.3 percent of total) were fully destroyed, and 243 facilities were partially damaged (4 percent of total). 188 primary schools (4 percent of total) were partially damaged or destroyed, followed by 41 secondary schools (2 percent of total), 31 kindergartens (2 percent of total) and five colleges/universities (8 percent of total). The most impacted governorates were Aleppo and Idlib, which both incurred damages or destruction of up to 10 percent of their facilities. Assessed economic losses relate to unexpected public expenditures, such as for temporary education spaces, safety programs, psychosocial support, educational supplies, and temporary teaching staff.

Recovery and reconstruction needs in education, which consist of infrastructure and restored service delivery, are assessed at US$116 million. The immediate needs in education over the next 12 months amount to US$40 million. The short-term needs in education years 2 and 3 amount to US$76 million. The rebuilding of education infrastructure must consider seismic resistant, green, and child-centered school designs.

Municipal Services

The earthquake damages to municipal assets—i.e., community facilities, community markets, fire stations, libraries, parks/playgrounds, police stations, public parking lots, stadiums, town/city halls, zoos, and tertiary and residential roads–are estimated at US$24.6 million across the nine cities and **US$73.8** million across the six Governorates.

Overall needs in the first three years following the earthquake are estimated at US$35.7 million for the cities assessed, spread across year 1 (US$14.3 million) and years 2–3 (US$21.4 million). At the governorate level, needs are estimated at US$95.9 million, spread across year 1 (US$38.4 million) and years 2–3 (US$57.5 million). Interventions should support municipalities to maintain services citywide and increase delivery to communities most affected by the earthquake. In the short to medium-term, municipalities need support for a holistic area-based approach at city and neighborhood levels to restore damaged assets.

Cultural Heritage

The earthquake caused damage to cultural heritage estimated at US$157.8 million across the nine cities and at US$444 million in the six Governorates. The analysis targeted archaeological sites, museums, heritage housing, other heritage buildings, and religious buildings. Losses to the tourism sector have not been estimated as the sector was inactive prior to the earthquake due to conflict.

For the Governorates covered by the assessment, overall needs are estimated at US$577.2 million with US$311.7 million for the year 1 and US$ 346.3 million for the years

2 and 3. Priority interventions are to stabilize damaged assets, survey debris, protect salvaged assets (movable and immovable), and train border police to combat trafficking and in emergency conservation.

Transport

The overall damage to the transport sector is estimated at US$718 million across the six Governorates and US$56 million across the nine cities. Around 11 percent (675 km) of primary and secondary roads in the six governorates were damaged. 1 km of bridges were destroyed and 10 km partially damaged. These impacts extend beyond local damage to physical assets and affect people's mobility and access to critical services and employment. Ports and railway stations do not appear to have been damaged by the earthquake, but Aleppo's airport has been, with limited information available. The assessment excludes damage to vehicles and road traffic furniture or infrastructure due to the limited data and time to prepare this RDNA. Damages to motorways and trunk roads have only been assessed for bridge sections; and damage to tertiary roads, tracks, residential roads and service roads are covered under the municipal services chapter.

The recovery and reconstruction needs amount to US$933 million for the six governorates and US$73 million for the cities, and include the repair of primary roads, secondary roads, and bridges, and the Aleppo airport. Early recovery interventions will cost approximately US$373 million in the six governorates and US$29 million in the nine cities and should start with road clearance, rubble removal, temporary bridges to residential areas, markets and essential services such as health and education. Short-term interventions amount to US$560 million in the six governorates and US$44 million in the nine cities (excluding bridge rehabilitation) and include rehabilitation works and capacity building for the sector's institutions.

Water

Damages are estimated at US$129.7 million across the nine cities and US$145.4 million across the six assessed Governorates. The water related infrastructure assessed includes wells, water towers/tanks, water treatment plants, sewage treatment plants, pumping stations, storage reservoirs of approximately 10,000 liters, and water and sanitation facilities. The water sector section of the RDNA excludes underground infrastructure (water supply networks; sewerage networks), and house-level water infrastructure (household connections). It further excludes damage to the Afrin and other dams, which are expected to account for most damages. The administrative buildings of Water Sector institutions were not reported damaged.

Recovery and reconstruction needs are estimated at US$232.1 million. The immediate requirement of the Water Sector is to provide basic minimum services, restore infrastructure for water supply and sanitation to limit the spread of cholera, and fund operational costs for these facilities. The recovery strategy should consider design improvements and improving the efficiency of services (for example, by reducing energy use). Another short-term priority is a dam safety assessment, mainly of fissures in the Afrin and other dams.

Power

The Power Sector has sustained moderate damages estimated at US$32.1 million in assessed areas. It is estimated that the earthquake has damaged nine substations and 405 electricity towers. Although opposition-controlled areas were closest to the epicenter, they were less damaged, as these areas are relatively smaller and have less power infrastructure than Government-controlled areas. In fact, government-controlled areas contain 73 percent of power sector assets while the opposition-controlled area contains 11 percent. The link between damaged assets and electricity service delivery is not straightforward due to the nature of electrical networks and the spread of private generators in impacted areas. However, based on Nightlight Satellite Imagery, we know that, in impacted areas, 11 percent of the population (roughly 4.9 million people) had less nightlight intensity after the earthquake which indicates reduced or disrupted services.

Needs are estimated at US$ 51.4 million for interventions in the three years following the earthquake. As most earthquake damaged assets were electric towers and substations, the priority is to repair transmission and distribution networks, both formal and informal. First efforts are expected to focus on assets in the functional or used network. Early recovery needs for reconstruction and service restoration are estimated at US$16.3 million in year 1 and US$35.1 million for years 2 and 3.

Agriculture

Damages and losses in agriculture are estimated at US$559.2 million and US$1.3 billion, respectively. Roughly 18 percent of all agriculture-related assets are estimated to be at least partially damaged. The loss of access to fields and reduced availability of agricultural labor will limit the current harvest and upcoming growing season. As a result, the Agriculture Sector is likely to operate far below capacity in the near future and food security will likely deteriorate. The losses of US$1.3b are on account of disruptions to food trade activity, based on the foregone revenue by local food system actors resulting from food insecure people having to instead rely on externally provided food assistance. All assessments should be considered preliminary due to severe data limitations.

Needs related to agriculture, food production and food security are estimated at US$2.1 billion. The largest share relates to early recovery from loss of income for poor, marginalized rural populations and amounts to US$1.6 billion. This includes the cost of providing standard reference food baskets to 4 million food insecure people as a result of the earthquake, for a period of 12 months. In the short term, infrastructure reconstruction is expected to amount to US$519 million, needed to restore food security and restore the agriculture sector's livelihood and job generation potential.

Digital Development

Remote analytics were used to assess damage to mobile assets in selected cities[8]**:** 0.8 percent of mobile network assets were partially damaged, and none were fully destroyed. As it was not possible to assess city-level damage to underground assets[9] through remote analytics, the extent and costs of damage to the fixed network could not be determined. Impacts on service delivery were determined in the week following the earthquake: a ground-level survey in the governorates of Aleppo, Hama, and Idlib showed approximately 2.5 million people (69 percent of the population) were affected by a degradation in or loss of connectivity; 62 percent of subdistricts from 90 out of 607 communities had severe telecom damage, and 98 communities needed repair or rehabilitation of telecom assets. These findings are corroborated by connectivity maps that showed widespread outages between February 6 and 11. As of March 5, however, network connectivity appears to be almost entirely re-established in all affected areas[10].

Given the low damages and near full restoration of connectivity, the reconstruction needs are very low, estimated at US$390,000 over the short term. However, priority interventions in the immediate and short terms include providing emergency communications in areas that are still experiencing internet outages and restoring and improving mobile phone and broadband services. In the medium term, it is important to increase investment in the national fiber backbone infrastructure, and to increase the resilience of the telecom network by licensing extra radio spectrum to provide additional mobile broadband capacity and reduce network congestion.

Public Institutions

Damages to public institution facilities, including national, municipal, and provincial administrative buildings, courthouses, prisons, civil registry buildings, civil defense, traffic police offices, post offices, real estate registration offices are to the tune of 15 percent of facilities in the nine cities (14 facilities out of 91). Damages are estimated at US$3.1 million, with Aleppo the most affected due to damage to its courthouses. Damages across the six assessed governorates are estimated at US$47 million.

Reconstruction and recovery needs across the six governorates are estimated at US$57.2 million for early recovery and US$3.9 million for short term (1–3 years). The needs are mainly concentrated in Government-controlled areas and in Northwest Syria under Opposition-Controlled Areas.

Environment

The cost to clear, transport, process and dispose of rubble related to damaged and destroyed buildings is estimated at US$614.6 million. An estimated 122,054 buildings have been damaged and 10,629 buildings have been destroyed by the earthquake, constituting 8.4 percent of the total housing stock. This has resulted in the accumulation of 58 million

8 Except Idlib, for which no remote sensing data was available.
9 Such as fiber-optic and copper lines.
10 ***Connectivity Map (DCM)***

tons of rubble. The governorates of Aleppo, Idlib, and Hama, which have suffered the greatest damage to housing, have the largest amounts of rubble and bear the highest costs for clean-up. Rubble poses a concern for environmental health and safety, and can contain toxic elements including asbestos, which require careful handling. Limitations of the study include assumptions around the amount of rubble.

The early recovery needs related to the preservation of the environment are estimated at US$307.3 million, while the overall needs are around US$614.6 million. Areas with many destroyed and heavily damaged buildings should be prioritized for rubble management, as these have the greatest risk of contamination (e.g., via release of asbestos). These areas may have blocked roads and access to services, which can be dangerous to residents. Interventions should include solid waste (rubble) removal in the short term, hazardous waste assessment and treatment (before, during, and after rubble removal), and environmental monitoring. Rubble should be tested before removal for toxic substances, and toxic waste should be handled according to international safety standards. It is unlikely that Syria's current waste management system can handle this volume of rubble or has the capacity to safely dispose of contaminated waste. Therefore, a priority should be to improve Syria's solid waste management sector and identify sites for hazardous waste disposal, general rubble disposal, and safe testing and handling practices for rubble removal.

Social Sustainability and Inclusion

Vulnerable segments of the population, such as women, children, the elderly, the disabled, and the poor, were hit hardest by the effects of the earthquake. At least 100,000 families have been displaced in Aleppo, Homs, Hama and Latakia. The rise in the number of IDPs has led to a significant deterioration in living conditions in IDP camps and in informal housing, with many female-headed households, unaccompanied and separated children, the elderly, and persons with disabilities having taken refuge in these shelters. Women have become increasingly vulnerable to gender-based violence in these shelters. Children who have lost family members, their homes and their communities have suffered psychological distress, with many affected by post-traumatic stress disorders likely to have long-lasting effects on their mental health and their development. The elderly and disabled remain particularly vulnerable to displacement and loss of public services. The earthquake has also affected the livelihoods of the poor, most notably, of smallholder farmers. Damage to infrastructure and deteriorating public services are also expected to disproportionately affect the poor.

Reconstruction and recovery strategy should account for the needs of the most vulnerable. This includes providing them with the safety and security they require and meeting their most urgent and basic needs by providing shelters, public services, and economic restoration. These efforts should be community-driven to build ownership and to promote the sustainability of development outcomes.

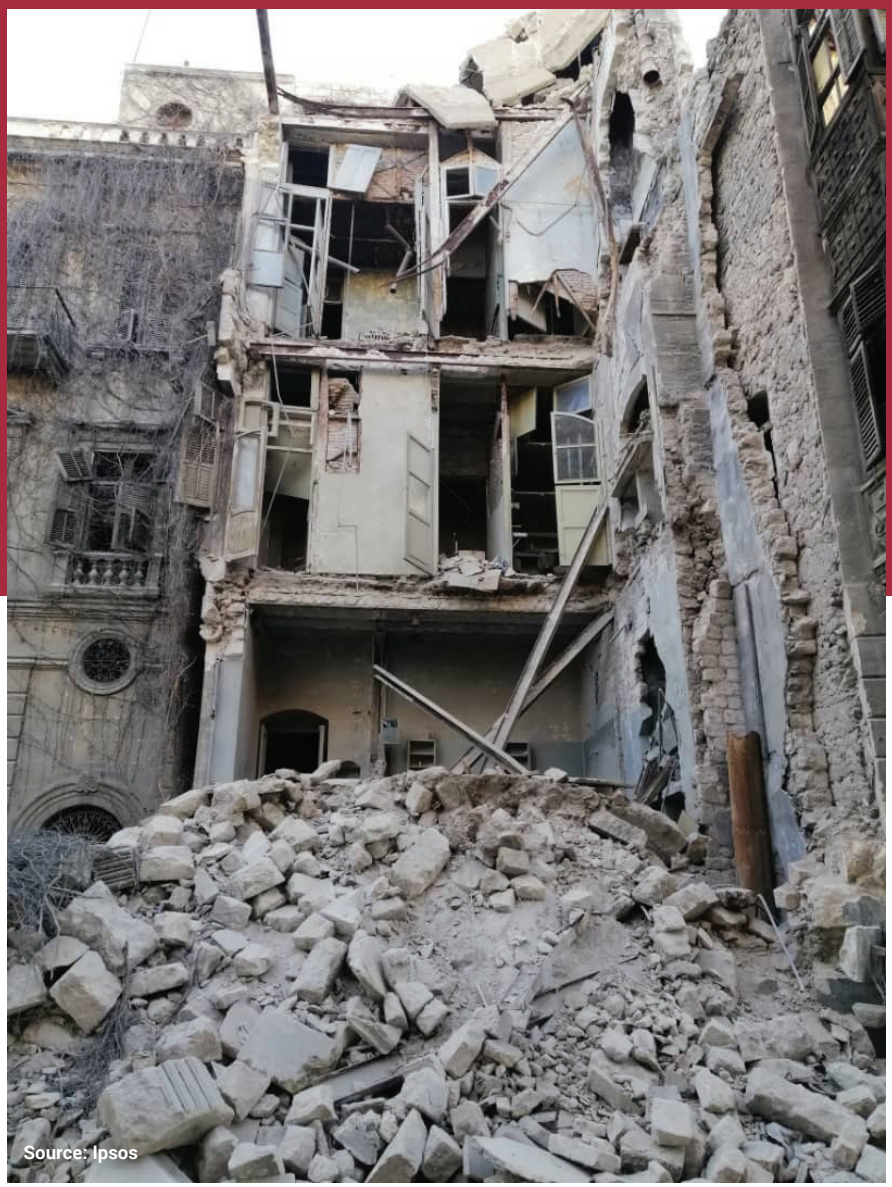
Social Protection and Livelihoods

A significant portion of the Syrian population located in the earthquake-affected areas is in dire need of social protection in the aftermath of the earthquake, with needs estimated at around US$1.3 billion. The earthquake has exacerbated existing vulnerabilities following years of conflict. The reconstruction and recovery strategy would comprise unconditional cash transfers and labor intensive works for the most vulnerable earthquake affected people. The estimated needs for social protection in the early recovery period include:

- Emergency cash transfers to households who became further vulnerable following the earthquake. Priority would be given to (i) households who suffered the loss of their breadwinner, as well as households with injured member(s); and (ii) the new IDPs.
- Labor intensive public works, which would provide temporary employment to unskilled/semi-skilled individuals not receiving cash transfers, for the rehabilitation of damaged infrastructure in the social sectors.

Following the emergency response, it is expected that a substantial number of impacted households would remain in need of social assistance. It is therefore recommended that the cash transfers initiated under the early recovery phase be maintained in the short-to-medium term for poor and vulnerable households, with flexibility in revising coverage, targeting and benefits levels.

Introduction



Source: Ipsos

Context: The Conflict and Disaster Nexus

In June 2022, nearly 9.5 million Syrians, or 44 percent of Syria's population, were severely food insecure.

On February 6, 2023, a 7.8 magnitude (Mw) earthquake struck Syria, followed by a 6.4 magnitude (Mw) earthquake on February 20, 2023, along the Türkiye – Syria border. The earthquake has exacerbated the adverse impacts of 12 years of conflict for the population of Syria by causing extensive destruction and damage to residential buildings and already weak public infrastructure and killing more than 5,000 individuals. The earthquake caused extensive damage to 38 districts and 174 sub-districts across six of the country's 14 governorates, with Aleppo and Idlib being the worst affected.

The earthquake had the most severe impacts in the Northwest of Syria. These impacts are compounded by various constraints to delivering humanitarian assistance in government and opposition-controlled areas, and the extensive destruction of infrastructure from the war. These factors have severely limited the country's ability to cope with the additional destruction and damage inflicted by the earthquake.

The earthquake is expected to have led to a significant deterioration in humanitarian conditions, particularly in the Northwest region. In June 2022, nearly 9.5 million Syrians, or 44 percent of Syria's population, were severely food insecure, with an additional 2.5 million at risk of becoming food insecure.[11] There were 6.8 million internally displaced persons (IDPs) as of 2022[12], with camps and informal settlements hosting 1.9 million IDPs.[13] The earthquake has led to a significant deterioration in food security and housing.

The complex political fragmentation of the Northern regions has exacerbated vulnerability to natural disasters and constrains humanitarian responses. The Northwest is politically divided into areas with competing political leadership, notably, the Government-controlled areas, the opposition-controlled areas and the AANES. The Government-Controlled areas are mainly in the Western part of the country and include the cities of Latakia, Tartus, and Hama. Opposition-Controlled areas are mostly in the Northern and Eastern parts of the province of Idlib and are controlled by various groups. The AANES in the Northeastern parts of the country, comprises of the Syrian Democratic Forces (SDF) a coalition of Kurdish and Arab fighters.

11 United Nations (2022), Syria, https://news.un.org/en/focus/syria
12 World Bank. 2023. "Syria Economic Monitor – Syria's Economy in Ruins after a Decade-long War".
13 ***Reliefweb. 2023. "Camp Crisis in North-west Syria."***

In all three of these control areas, the protracted conflict has undermined the local authorities' capacity to build resilient infrastructure and institutions. Military service, displacement, violence, and lack of security led to an extensive brain-drain in most professions and administrations, including urban planning and disaster response. Extensive damage from years of conflict has weakened infrastructure and buildings and left them vulnerable to additional shocks. Syria's isolation from the international community has limited the transfer of resources that could have alleviated the dire consequences of the war. Limited opportunities for financial transactions, for example, reduced the transfer of remittances and individual assistance to ensure resilient reconstruction of residential buildings.

Various factors have limited the humanitarian response to the earthquake. The conflict has damaged equipment needed for disaster response, such as heavy machinery and others, while there is insufficient basic service delivery, notably access to clean water, sanitary systems, and sewage management. The dire economic situation and high inflation have weakened the population's coping mechanisms. Politically, the complex conflict dynamics have severely hampered post-disaster humanitarian assistance and its coordination e.g., it is difficult to launch assistance to opposition-held areas from government-controlled areas. The closing of border crossings and extensive red-tape have severely complicated and delayed the delivery of humanitarian assistance from Türkiye.

Objectives, Approach, and Scope of the RDNA

The overarching objective of the RDNA is to inform key players of the impact of the earthquake on the population, physical assets, infrastructure, and service delivery, and to conduct a preliminary estimate of immediate- and short-term physical infrastructure reconstruction and service delivery restoration needs in selected cities and sectors. The RDNA follows a globally established and recognized damage, loss, and needs assessment methodology developed by the WBG, EU, and the UN. This methodology has been applied globally in post-disaster and conflict contexts to inform recovery and reconstruction planning.

Temporal Scope: The RDNA analyses and recommendations focus of the impact and the recovery and reconstruction needs as a result of the earthquake in Syria. Damage, loss, and needs analyses and recommendations were therefore made relative to the pre-earthquake baseline of physical assets.

Geographic scope: The RDNA covers **six governorates** most impacted by the earthquake: **Aleppo, Hama, Idlib, Latakia, Raqqah and Tartous,** with an in-depth analysis in **nine cities: Aleppo, Harem, Jableh, Afrin, Ad-Dana, Jindaires, Azaz, Sarmada, and Latakia**.

Sectoral scope: The RDNA covers macroeconomic and socioeconomic impacts, **10 sectors, and 4 cross-cutting areas**: Housing, Power, Transport, Water, Digital Development, Agriculture, Education, Cultural Heritage, Health, Municipal Services, Public Institutions, Environment, Social Protection and Livelihoods, and Social Sustainability and Inclusion.

Methodology of the RDNA

The RDNA assesses (i) damage to physical assets; (ii) economic losses; and (iii) reconstruction and recovery needs. The quantitative results and qualitative analysis of all three were used to assess the macroeconomic and human impacts.

The RDNA methodology and scope differ from the Global GRADE that was recently conducted for Syria[14]. GRADE entails a remote, desk-based assessment of the physical and economic damages incurred as a result of the earthquake. It estimates the economic damage utilizing a mix of earthquake damage modelling and assessment of capital stock value of different assets and sectors[15]. Unlike the RDNA, GRADE does not evaluate the impact on loss in terms of economic flows (e.g., production or business interruption) or estimates on recovery and reconstruction needs; it only assesses physical economic damage to capital stock. The variation in the GRADE and RDNA results is thus explained by differences in methodology and in scope.

The RDNA uses the following key definitions for damage, loss and needs: **damages** are estimated as the replacement value of totally, partially, or minimally damaged physical assets; **losses** are estimated from the disruptions to the economy that arise from the temporary absence of the damaged assets; and reconstruction and **recovery needs** are comprised of rebuilding infrastructure and restoring service delivery and are costed in the immediate and short-term.

Damages

Damage estimations were based on the number of damaged facilities, their physical status (partially damaged or completely destroyed), and the estimated pre-disaster unit costs for each asset class. These unit costs were estimated by sector specialists, local contacts, and others. Hence, damage is a stock variable. To compute governorate-wide damages, an extrapolation method was used. Unit rates for calculating damages were established based on data received from the ground on unit rates existing prior to the earthquake. These were further compared with the unit rates used in the 2022 Syria Joint Damage Assessment[16], resulting in the application plus a 10 percent correction factor to account for increases in the price of basic materials.

Extrapolation

The extrapolation method is used to fill data gaps on sector damages across governorates when robust data are not available. Extrapolation draws on data from city-level deep dives and uses information from neighborhood or district levels; it makes assumptions about areas e.g., the impact of conflict on a population, and adapts data from cities to non-urban areas. For this RDNA, inputs for extrapolation included satellite imagery, social media analytics, and assessments by on-ground partners or non-governmental organizations (NGOs). The data were analyzed by applying proportional average damage estimations based on (i) estimated/known sector baseline values at earthquake impacted village/settlement; (ii) known average estimated impacts from seismic activity (based on research from prior earthquakes of similar scale and known building types); (iii) estimated damage based on synthetic aperture radar (SAR) analysis (Sentinel-1, ALOS-2); (iv) estimated observed damage from PAI/social media and (v) prior/current damage assessments by on-ground partners and NGOs in the impacted area.

Losses

Losses are defined as changes in economic flows caused by the disaster. Typical forms of losses include the decline in output in productive sectors, lower revenues, and higher operational costs to provide services.

14 ***Syria Global Rapid Post-Disaster Damage Estimation (GRADE) Report***
15 For more on GRADE methodology, ***Methodology Note: The Global Rapid post-disaster Damage Estimation (GRADE) approach***
16 ***Syria 2022 Joint Damage Assessment***

Reconstruction and Recovery Needs

The Syria RDNA also estimates recovery and reconstruction needs – immediate early recovery needs (0–1 year), and short-term needs (1–3 years). Reconstruction needs across sectors convert damages to current prices, considering inflation, security, insurance premiums, and a build back better (BBB) factor. Recovery needs also consider soft and non-infrastructure–related aspects, such as staffing, equipment and/or material, which are necessary to provide services at pre-disaster levels. Reconstruction and recovery needs are prioritized and distributed over immediate and short-term horizons. The needs were calculated based on the projected unit rates by applying a standard multiplier to the existing unit rates to cater for inflation, building back better, and security premiums.

Baseline: General and sector-specific pre-earthquake data and information to compare with post-disaster conditions (presented in "physical numbers" e.g., number of houses, hospitals, schools etc.).

Limitations and Key Challenges

The challenges and limitations described above were mitigated as much as possible through the design of the assessment methodology and close coordination with international organizations.

Data accuracy: This is a remotely conducted exercise which means that the information relies largely on remote-based data and publicly available information. Data from satellite imagery have been corroborated and validated by other sources and means, including publicly available information, social media analysis, night-time lights data, and mobile signal data. While all efforts are made to improve accuracy, a remote assessment is broad-brush and provides only an indicative overview of the impact. Such approaches are useful to understand the nature and extent of an impact and the needs of returning populations, and may inform later, in-depth assessments and coordinated interventions.

Government engagement: Whenever possible, RDNAs are carried out with a government counterpart to promote ownership and to validate data. However, given the situation in Syria, this RDNA was conducted solely by the World Bank. The assessment relied heavily on remote sensing data and the expertise of sector and country specialists.

Guiding Principles for Syria Earthquake Recovery Amidst Protracted Conflict

Despite the earthquake devastation and challenges emanating from a weak economic, social and institutional environment after a decade of fighting, recovery efforts should aim to mitigate communities' vulnerabilities and reinforce their resilience to natural and man-made disasters. To ensure responses that address the needs of citizens, undertaking disaster reconstruction and recovery requires a participatory and inclusive approach based on the involvement of all concerned, including authorities, local communities, the private sector, and the international community. The sectoral recovery needs and strategies outlined in this RDNA are guided by a number of principles aimed at improving the quality and the impact of the recovery, emphasizing equity and inclusion and do-no-harm principles, while containing risks. These ten guiding principles are enunciated below:

- Recovery efforts should aim at improving living conditions for all the affected population, most notably, vulnerable populations and IDPs, emphasize gender equity and social inclusion.
- Marginalization and exclusion have been key drivers of conflict and fragility in the past. Hence, recovery should follow a people-based approach which encourages consultations with communities and empowers them to voice their needs, utilizes social networks to identify and implement recovery solutions, e.g., consultative processes with the community should be undertaken to identify community infrastructure that needs to be built, repaired or enhanced.
- Sector must ensure conflict sensitivity in the recovery program designs to prevent conflict over access to aid or services or exclusion of communities or individuals (by, for example, including grievance redress mechanisms, etc.). Increased sensitivity to local dynamics can be done by including granular stakeholder, political economy, conflict, and sectoral analysis accounting for pre-crises grievances and root causes to needs and conflict in advance of project design.
- Recovery efforts should aim at improving services beyond the levels before the earthquake. It should prioritize resumption of basic public services, notably water provision and sanitation and healthcare, to protect vulnerable populations and free up capital for individual and private sector investments.
- Reconstruction or rehabilitation of essential infrastructure should be undertaken in the most resilient and sustainable way possible, using a BBB and integrated approach, that includes climate and disaster risk reduction considerations. In case of housing, some dwellings and settlements that face a high risk (such as a landslide) may need to be re-clustered. However, the relocation of settlements must be resorted to only when no other in situ solution is possible.

- Recovery and reconstruction should rely on local materials, knowledge and skills. The recovery program should create assets and skills for people affected by the disaster. Creating assets and skills will reduce vulnerability and promote long-term resilience among people.
- The recovery program should be implemented effectively in an open, accountable, and transparent manner.
- Recovery efforts should aim at enabling the private sector to have a prominent role in the process.
- Recovery planning, where possible, must be guided by an area-based approach (ABA) for spatial coordination, prioritization and sequencing of activities.
- Given the interdependencies among sectors and systems, inter-sectoral coordination should be at the center of recovery and reconstruction planning and implementation.

In addition to the above principles, the below tools and approaches should be relied upon during recovery planning and implementation:

Tools to support recovery: Sectors should utilize tools such as detailed hazard mapping, participatory planning exercises, risk-informed planning, facilitated management structures (bringing together communities, local authorities, and the private sector), and rental stock support and more.

Bottom-up recovery planning approach: Recovery planning should be a bottom-up planning process that combines consultations with communities including unheard voices of residents, and the displaced, and the more formal and technical representation through local authorities. Community consultations are a core ingredient in the recovery methodology, starting from hands-on, participatory local planning in workshops and meetings with local officials and local community representatives, to reach the final validation and endorsement of developed plans through internal community consultation meetings with a wider community participation on the neighborhood and city levels.

Addressing drivers of fragility and vulnerability: Beyond ensuring that all rehabilitation or reconstruction is undertaken as per hazard-resistant standards, recovery and reconstruction aims to address the underlying processes that create vulnerability (even beyond the areas affected by the earthquake) or exacerbate conflict. Marginalization and exclusion have been key drivers of conflict and fragility in the past and continue to undermine social cohesion and stability until today. Any recovery efforts need to ensure that communities are empowered and have their voices heard in the definition of their needs. Recovery should foster reformative rather than restorative processes, tackling the underlying causes of vulnerability and risks on the basis of in-depth studies.

Macroeconomic Impact

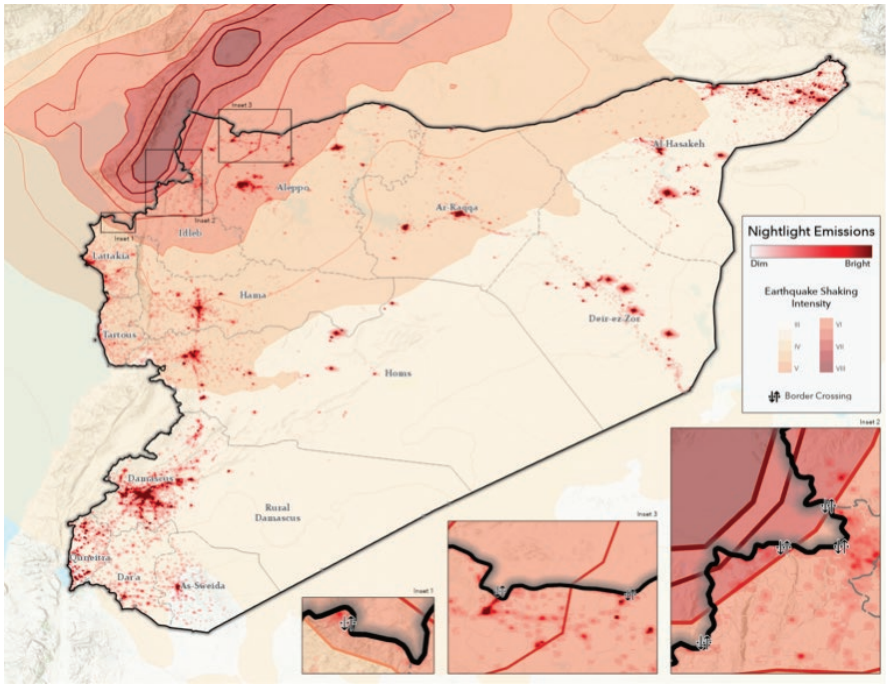
Economic context before the crisis[17]

Syria has been confronted with a series of compounding crises before the earthquake. According to official statistics, GDP halved between 2010 and 2020. Nighttime light emissions suggest that GDP has further contracted since 2020, particularly in conflict-intensive regions. Furthermore, severe droughts, damages to the irrigation infrastructure and high input costs have reduced agricultural production since 2021. Economic instability in neighboring Lebanon and Türkiye, and US sanctions under the Caesar Act[18] have further exacerbated crisis conditions. After more than a decade of war, a severely degraded health care system is preventing an effective response to the cholera outbreak that started last summer. With nearly half of oil consumption and about one-third of cereal consumption being imported, higher commodity prices following the war in Ukraine have weakened Syria's external position and have fueled inflation. The market exchange rate of the Syrian pound depreciated by about 76 percent against the US dollar in 2022 alone. Currency depreciation has been accompanied by rising inflation, with food prices, as proxied by the World Food Programme's (WFP) minimum food basket price index, rising by 93 percent in 2022.

17 For a more detailed analysis of the Syrian economy prior to the earthquake, see the Winter 2022/23 issue of the ***Syria Economic Monitor*** of the World Bank.

18 The Caesar Syria Civilian Protection Act of 2019 gives the U.S. sanctioning authority against entities that support the Syrian government's ability to commit human rights violations.

Figure 9:
Earthquake Intensity and Economic Activity in Syria



Source: *World Bank staff based on satellite images from the VIIRS and the US Department of Defense's Defense Meteorological Satellite Program (DMSP) and the shake intensity from USGS ShakeMap.*
Note: *Nighttime light emissions, as shown in the chart, are a proxy for economic activity.*

Assessment of Disaster Effects[19]

The earthquake struck significant parts of Syria's northern and western territory where a significant portion of economic activity is based. Since the start of the conflict, a large share of economic activity has shifted to the border areas, including the Syria-Türkiye border (Figure 10). The governorates of Idlib, Aleppo, Hama, and Latakia, which suffered the greatest damage, accounted for about one-quarter of economic activity in 2022 as measured by nightlight emissions data, with Idlib and Aleppo alone accounting for 18 percent of economic activity.[20] These four governorates are poorer (as measured by GDP per capita) than the national average and Idlib has the lowest GDP per capita in the country based on the per capita nightlight emissions estimate. Areas most affected by the earthquake in Idlib and Aleppo coincide with regions in which conflict is common and Cholera is prevalent.

GDP

Syria's real GDP contraction is projected to widen by 2.3 percentage points as a result of the earthquake.[21] Losses in economic activity are primarily driven by the destruction of physical capital. In addition to physical capital destruction, trade activity has been disrupted, resulting in higher transaction costs for external trade and the overall economy.[22] Furthermore, earthquakes operate as a negative supply shock that pushes the cost of capital up, reducing household incomes and firm profits – contributing to reduced demand. The assumed reconstruction activity is expected to offset some of these losses (see below). Accordingly, the Syrian economy, which was projected to contract by 3.2 percent in 2023 prior to the earthquake, is now projected to decline by 5.5 percent. However, the uncertainty around this year's forecast has widened significantly since the earthquake. A major source of uncertainty is the extent and

19 Given the data limitations, there are clearly significant uncertainties around the impact estimates in this report.
20 In the absence of sub-national GDP data, nightlight emissions have been shown in the economic literature as a good proxy for economic activity.
21 In the RDNA, sector assessment estimates present absolute damages and losses to the capital stock of each sector of the economy. This shock to the stock of capital, together with those to the labor supply due to earthquake-induced fatalities and injuries, and the shock to trade prices from disrupted trade activity with Türkiye in particular, are introduced into the World Bank's macroeconomic and fiscal model (MFMod) to estimate the impact on real GDP growth.
22 The baseline scenario assumes Syria will not be able to substitute for imports and exports from Türkiye in the short term. Trade costs with Türkiye are estimated to increase by about 4 percent after the earthquake. In light of the fact that Syria imports approximately 40 percent of its goods and exports about 20 percent of its goods from Türkiye, the analysis assumes that Syria's import and export prices will increase by 1.6 percent and 0.8 percent, respectively, in the aftermath of the earthquake, owing solely to disrupted trade activity.

pace of the earthquake-related reconstruction; both depend on the level of foreign financing, since domestic financing is limited.

On the expenditure side of GDP, the impact of the earthquake will be most significant on private consumption. Damages to residential property have destroyed the wealth of households which will adversely affect private consumption. Further, higher inflationary pressures triggered by the supply shock from the earthquake are expected to depress real incomes and restrict private consumption. In addition to the direct disruption of economic activity from the destruction of firms and the disruption of daily commerce in the affected areas, indirect effects will also lower GDP. Reconstruction activity,[23] to the extent it occurs, will increase investment. Higher investment will partially offset the decline in consumption, although the final impact on GDP will depend to what extend investment goods need to be imported.

From the supply side, the earthquake will adversely impact production capacity, mainly through disruptions in trade networks. Trade-related businesses and financial services will likely be materially affected from weaker demand. Industry will be affected by supply chain disruptions for intermediate inputs or the ability to bring goods to market. However, the impact of the earthquake on industry is expected to be limited overall, as industry accounts for only 8 percent of employment in Aleppo and Idlib, according to the Humanitarian Needs Assessment Programme survey of 2022. Key industrial bases in both governorates also remain largely intact. Compared to services and industry, agriculture is usually less affected by earthquakes.[24] However, the loss of access to fields and reduced availability of agricultural labor are likely to limit the current harvest and upcoming growing season alike. Reconstruction efforts are expected to partially offset the decline in economic activity, mainly through faster growth in the construction sector.

Inflation

The earthquake is expected to lead to a substantial increase in inflation. The reduction in goods available, an increase in transport costs, and a rise in overall demand owing to reconstruction needs, are all expected to contribute to higher inflation (as measured by the Consumer Price Index). For 2023, inflation is predicted to rise to 60 percent from a pre-earthquake projection of 44 percent. The disruption of production and distribution supply chains through Türkiye will likely generate inflationary pressures in Northwest Syria. In affected urban areas, the earthquake is expected to increase rents as the supply of habitable dwellings has been reduced. As families with destroyed homes may alternative shelter, rents in non-earthquake-affected areas are also projected to rise. The expected rise in inflation will not be homogeneous across Syria as some non-tradeable goods and services are expected to increase disproportionately in earthquake areas where supply chain disruptions are most severe. Prices for tradables are also expected to rise more substantially in earthquake-affected areas, because of a significant cost of trading across areas of control. According to the WFP, the nominal prices of key commodities in the food basket, comprised of bread, lentils, vegetable oil, sugar, and rice, increased by over 10 percent in almost all of the most affected governorates of Aleppo, Hama, Idlib, and Latakia two weeks after the earthquake.[25] Even in regions that were not seriously impacted by the earthquake, the cost of food and other necessities also increased noticeably.

Labor Market

The earthquake is expected to have a limited impact on the labor market. Since reported fatalities and injuries account for 0.2 percent of the total working-age population in Syria, the direct impact on labor supply is limited. Moreover, the majority of the labor force in Aleppo and Idlib is employed

23 The baseline scenario assumes 10 percent of destroyed capital stock is rebuilt every year over the next ten years. This takes account of expected weaker reconstruction in non-Government-controlled areas. The analysis also assumes that 50 percent of reconstructed goods are imported.

24 Lackner, Stephanie (2018) "Earthquakes and economic growth", FIW Working Paper, No. 190, FIW - Research Centre International Economics, Vienna.

25 WFP, Syria markets update (6-16 February 2023) "***The devastating earthquake likely to upend food prices***".

in non-capital-intensive service industries that have not been severely affected by the earthquake. According to the REACH survey, which covers parts of Aleppo and Idlib that are outside of Government-controlled areas, markets remain relatively resilient, with about three-quarters of assessed communities reporting markets and shops accessible to most of the population.[26] While earthquakes are expected to cause job losses immediately after the disaster, recovery and reconstruction efforts will likely lessen this impact; again, this will depend on the scale and timing of recovery and reconstruction efforts.

Fiscal Position

The earthquake is expected to only marginally affect the country's public finance in the short term. The fiscal deficit is estimated to increase by only 0.2 percentage points of GDP in 2023 from the pre-earthquake baseline of 8.2 percent of GDP. Of the 6.6 million Syrians affected by the earthquake, 4.6 million (70 percent) live in areas outside of Government-controlled areas. Thus, the increase in expenditures to meet social and infrastructure needs in the aftermath of the earthquake is expected to be financed by external aid, and thus only a minor worsening of public finances is anticipated. On the revenue side, the fall in tax revenues is expected to be negligible since only a very limited number of large corporate taxpayers are located in areas that have been severely hit by the earthquake. On the other hand, only a fraction of the increase in international aid is expected to support the budget.

Balance of Payments

The current account deficit is estimated to worsen, mainly from reconstruction investment. The earthquake is expected to have a negligible impact on exports, which are already very low due to conflict-related disruptions and international sanctions after the conflict. Meanwhile, imports are expected to increase due to inflationary pressures from trade disruptions in Syria and Türkiye.[27] Imports are also expected to increase due to reconstruction activities considering the relatively high import content of capital investment in Syria. This is likely to lead to an even larger deficit in the country's trade balance, from 24.6 percent of GDP to 26.0 percent of GDP. On the other hand, the primary and secondary income balance is expected to increase from 22.1 percent to 22.8 percent of GDP, driven primarily by increased net remittances flows.[28] Overall, the current account deficit is projected to worsen from the pre-earthquake baseline of 2.5 percent of GDP to 3.2 percent of GDP following the earthquake.

Risks to the Outlook

Risks to the growth outlook are significant and tilted to the downside. Economic growth may contract further if reconstruction progress is slower than expected, given limited public resources, weak private investment, and constraints to delivering humanitarian assistance in earthquake-affected areas. Syria's weak level of preparedness for the earthquake and limited coping mechanisms are expected to adversely impact the pace of reconstruction and recovery efforts. Inflationary pressures, most notably on construction materials, may even increase further if imports from Türkiye prove to be severely affected, and/or, if Syria experiences difficulties in substituting imports from Türkiye. Furthermore, significant population displacement from earthquake-affected areas might have a protracted impact on the labor market. Finally, GDP losses would be materially higher in the medium term should reconstruction efforts be further delayed.

26 REACH Syria (2022) "Joint Rapid Assessment of Markets", February 2023.

27 In 2021, according to the United Nations' COMTRADE database, Türkiye was the top destination of Syria's exports and the second largest source of Syria's imports. Türkiye is Syria's leading supplier of critical goods such as petroleum products, cement, wheat, and steel.

28 It is expected that numbers of Syrian refugees from countries other than Türkiye will increase. In Türkiye, which hosts around half of the Syrian refugee population, earthquake-induced displacement and the consequent loss of incomes/livelihoods of Syrian refugees in affected areas of Türkiye are likely to negatively impact the flow of remittances into Syria.

Socio-economic Impact

Demographic and socio-economic profile of people living in affected areas prior to the earthquake

6.6 million Syrians, approximately 31 percent of the country's population, live in locations where the earthquake intensity reached level VI (strong shaking) or higher. The 7.8 magnitude earthquake that hit the southern region of Türkiye on February 6 affected significant parts of Syria's Northern and Western territory. Overall, it is estimated that 6.6 million Syrians live in areas which were affected by the earthquake at an intensity VI (strong shaking) or higher (Figure 11). Governorates most affected, both in terms of population and intensity, are Idlib and Aleppo. In Idlib, 2.2 million individuals live in areas affected by strong earthquake intensity and 571,000 in areas of very strong/severe intensity. Corresponding figures in Aleppo are 3.5 million (strong intensity) and 200,000 (very strong/severe). Focusing on very strong and severe intensity areas only, the most affected districts are Afrin (Aleppo governorate), Harem and Idlib (Idlib governorate).

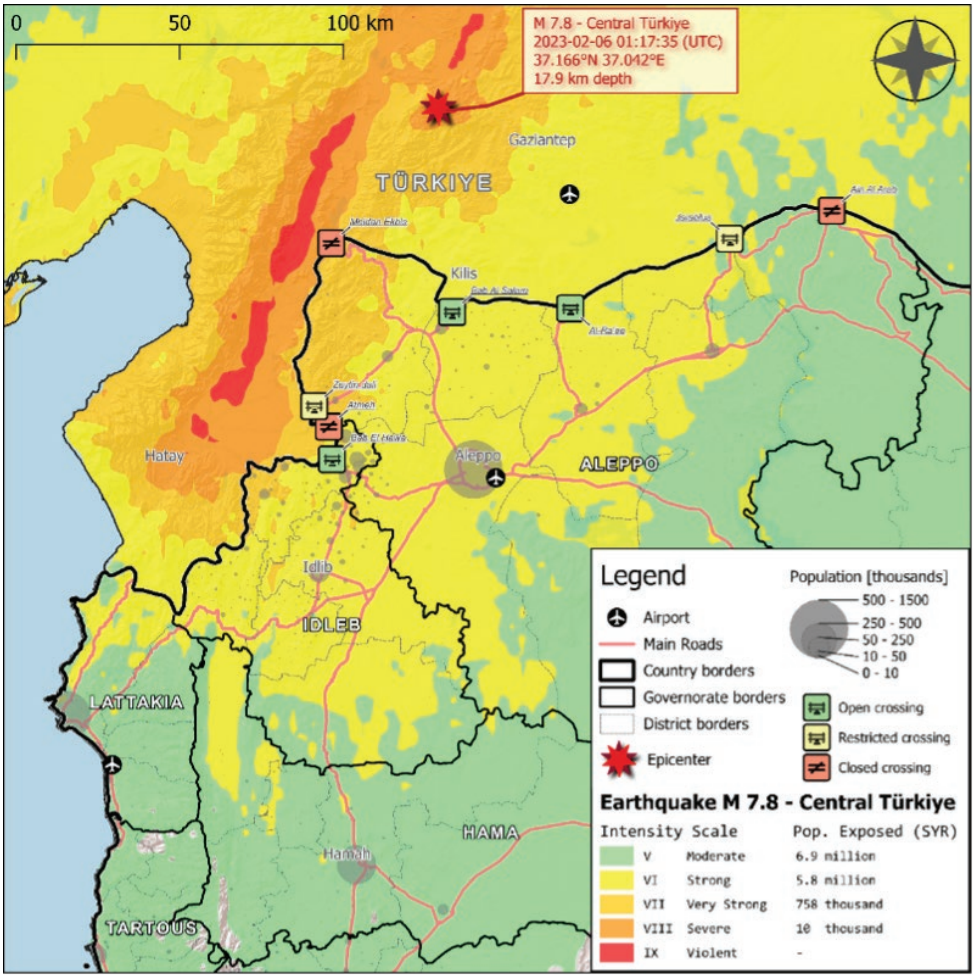
Of the 6.6 million Syrians potentially affected,[29] 4.6 million (70 percent) live in areas outside of Government-controlled areas.[30] The political and conflict landscape of the areas most affected by the earthquake is complex. Among the most affected governorates of Idlib, Aleppo, Hama and Latakia,[31] only Hama and Latakia are fully Government-controlled areas. In the governorate of Idlib, almost all the affected population lives in areas controlled by non-

29 Population is defined as "affected" if residing in areas affected by strong – scale VI – or higher earthquake intensity.
30 Distribution of Syria's territory by area of control is based on information by OCHA, as of July 2022.
31 Most affected governorates are those with populations living in areas affected by strong – scale VI – or higher earthquake intensity.

state armed groups. The Aleppo governorate has the most complex political landscape, with all factions in the conflict being in control of parts of its territory.[32] The conflict remains the most active outside of Government-controlled areas.

Prior to the earthquake, affected areas were already home to the highest concentration of people who had been internally displaced as a result of conflict. As shown in Table 2, as of August 2022, affected areas were home to about 3 million IDPs, close to 50 percent of the entire IDP population of Syria. In Idlib, close to two-thirds of the population were IDPs. Affected areas outside of Government-controlled areas are home to the overwhelming majority of IDPs living in camps (Figure 13).[33]

Figure 10:
Earthquake intensity map and population exposure by intensity level

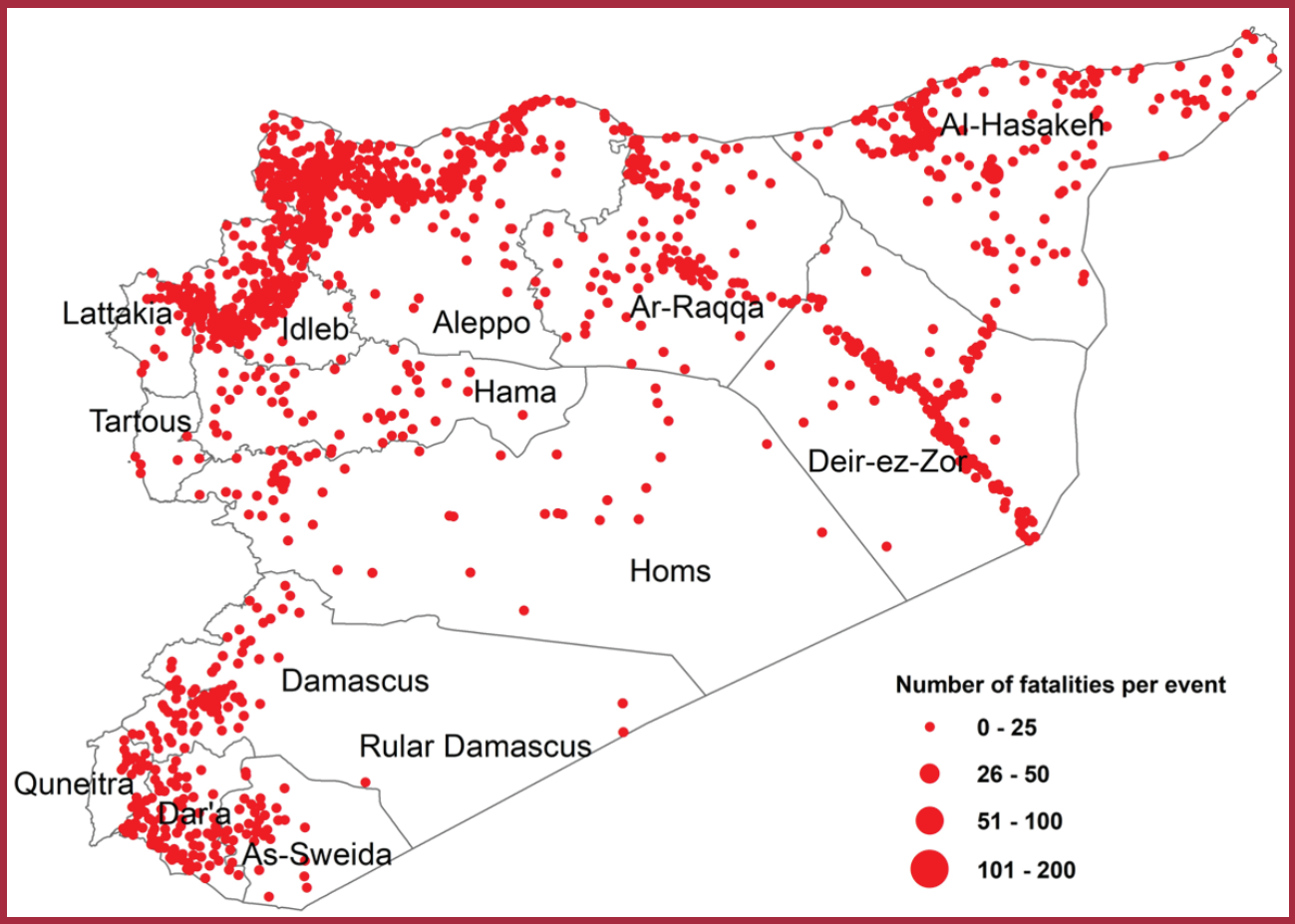


*Source: World Bank staff estimates based on **USGS ShakeMap Version 12** and HNAP population data as of August 2022.*

32 In terms of the population affected in Aleppo governorate, 50 percent live in areas under Government-controlled areas (southern part of the governorate), 36 percent live in areas under the control of the Turkish armed forces and National army (Northwestern areas bordering with Türkiye), and 2 percent live in Opposition-Controlled Areas. The remaining 14 percent of Aleppo's population is equally split between areas controlled by non-state armed groups (in eastern areas bordering with Idlib governorate) and areas controlled by Syrian Democratic Forces (in eastern areas bordering with Raqqa governorate).

33 The large majority of IDPs in affected areas under government control live in residential areas, housed in collective shelters, hosted by friends/relatives or in rented accommodations.

Figure 11:
Distribution of conflict events and fatalities in Syria, January to November 2022



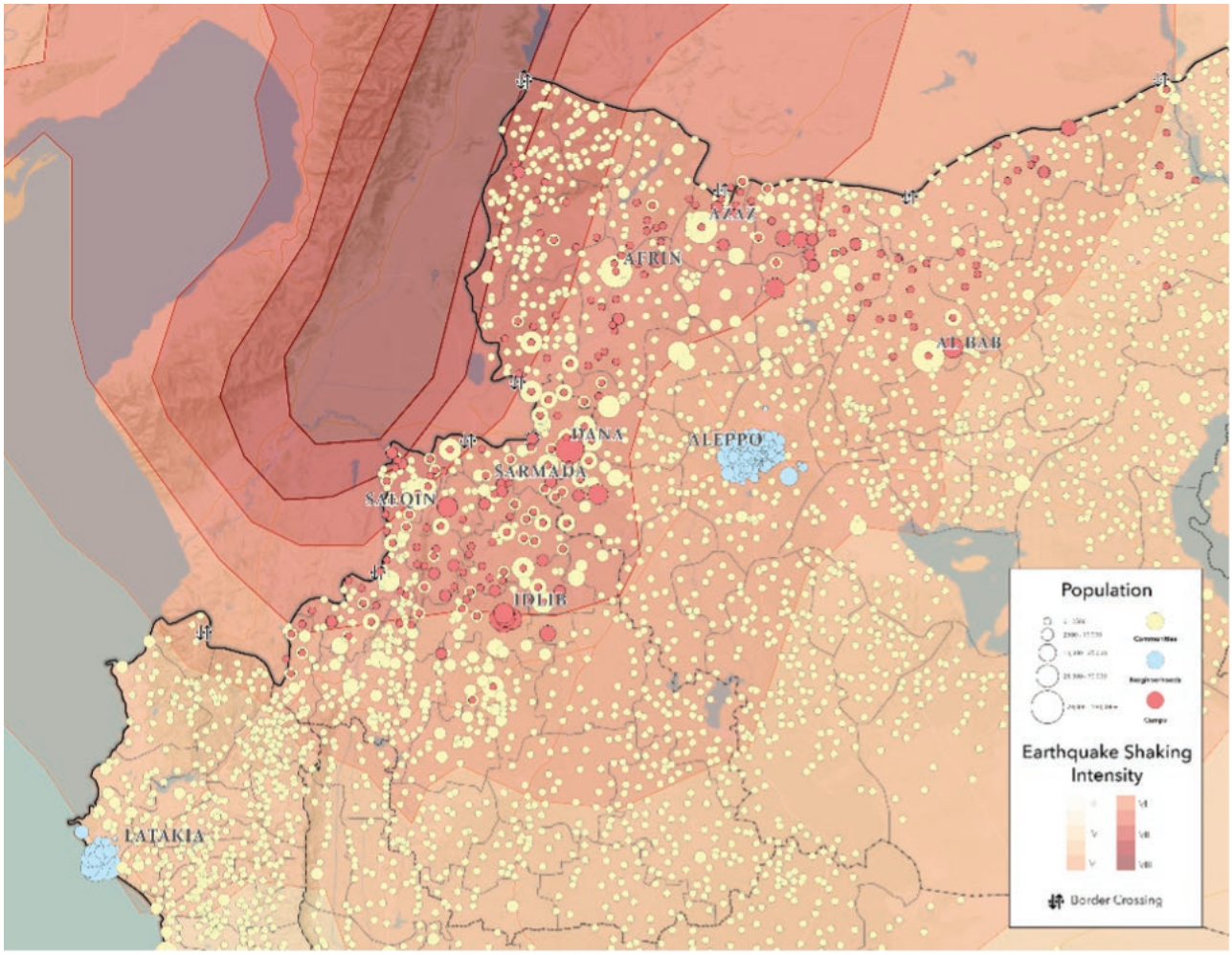
Source: World Bank staff estimates based on Armed Conflict Location & Event Data Project (ACLED)

TABLE 2 : DISTRIBUTION OF IDPS IN AFFECTED AREAS (EARTHQUAKE INTENSITY VI – STRONG - OR HIGHER) BY GOVERNORATE

governorate	IDPs Out of camp	IDPs In camp	Total IDPs	%IDPs in total population
Idlib	801,233	997,728	1,798,961	64.7
Aleppo	908,015	333,229	1,241,244	33.1
Hama	1,235	-	1,235	3.4
Latakia	2,045	-	2,045	9.4
Total in affected areas	**1,712,528**	**1,330,957**	**3,043,485**	**46.2**
Total in Syria	**5,199,119**	**1,437,045**	**6,636,164**	**31.5**

*Source: **USGS ShakeMap version 12** and HNAP population data as of August 2022.*
Notes: Geographical mapping of population and intensity performed at community level (Amdin4).

Figure 12:
Distribution of IDP camps in affected areas



Source: World Bank

Table shows population of interests in communities where earthquake intensity ranked VI (strong) and above.

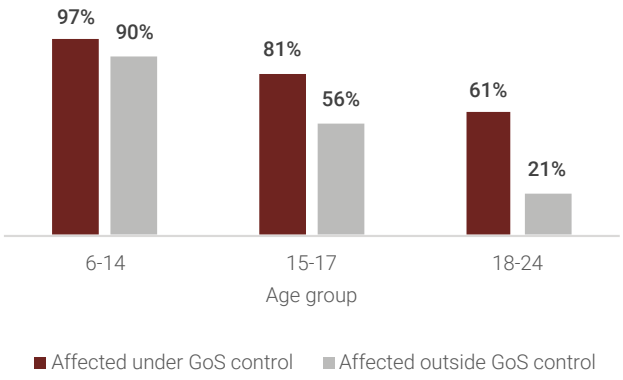
TABLE 3: DEMOGRAPHIC CHARACTERISTICS OF THE POPULATION BY CONTROL AREA

	Age (average)	% children below age 6	% children age [6-17]	% elderly (65+)	% female	% population in female headed HH
Affected Outside GC	22.1	20.0	29.9	2.1	49.3	7.3
Affected Under GC	28.1	12.1	24.6	3.9	52.0	10.1
National average	25.5	14.0	29.5	3.0	50.5	8.3

Source: WB staff calculations based on the Summer 2022 HNAP demographic household survey.

The demographic profile of affected areas that are outside of the Government-controlled areas is on average younger, with one in five inhabitants consisting of children below the age of six. As shown in Table 3, the average age of the population in affected areas outside of Government-controlled areas is 22 years against 28 years, on average, in affected areas under government's control. Not surprisingly, the incidence of children below age 6 and school age population (age 6-17) is higher in affected areas outside of government's control compared to affected areas under government's control. Interestingly, affected areas under Government-controlled areas have a higher incidence of population living in female headed households (10 percent, against 7 percent in affected areas outside of Government control), as well as a relatively higher female population share, possibly related to ongoing conflict dynamics.

Figure 13:
School enrollment, by age and area of residence

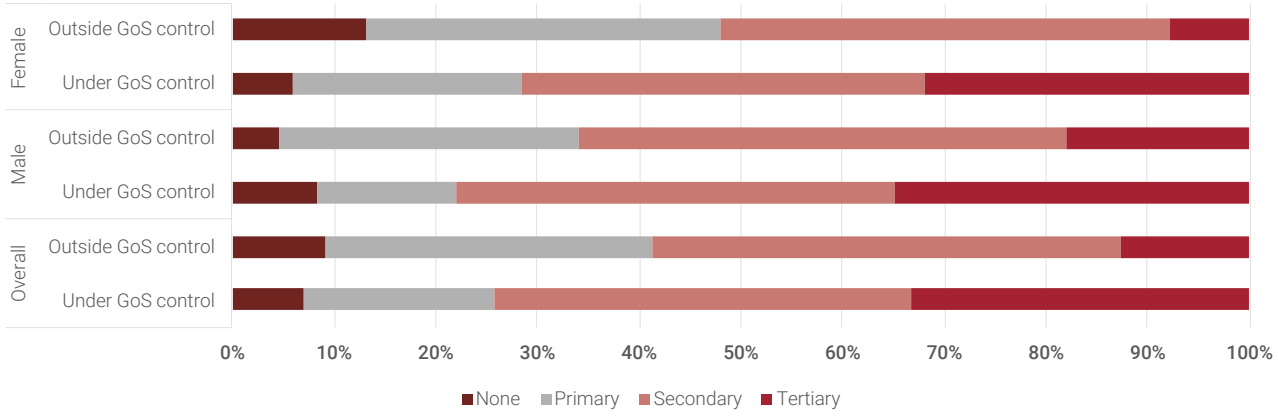


Source: WB staff calculations based on the Summer 2022 HNAP demographic household survey.

Children living in affected areas outside of Government-controlled areas are less likely to be attending school and the adult population has significantly lower levels of education. Prior to the earthquake, school aged children living in areas affected by the earthquake outside of government control were significantly less likely to be attending school compared to their counterparts living in government controlled areas, with a difference of 7 percentage points among children in the 6-14 age group, 25 percentage points among children aged 15-17, and 40 percentage points among youth aged 18-24 (Figure 14). A similar pattern emerges for the educational attainment rate of the adult population (age 18 and above), particularly as it pertains to women (Figure 15).

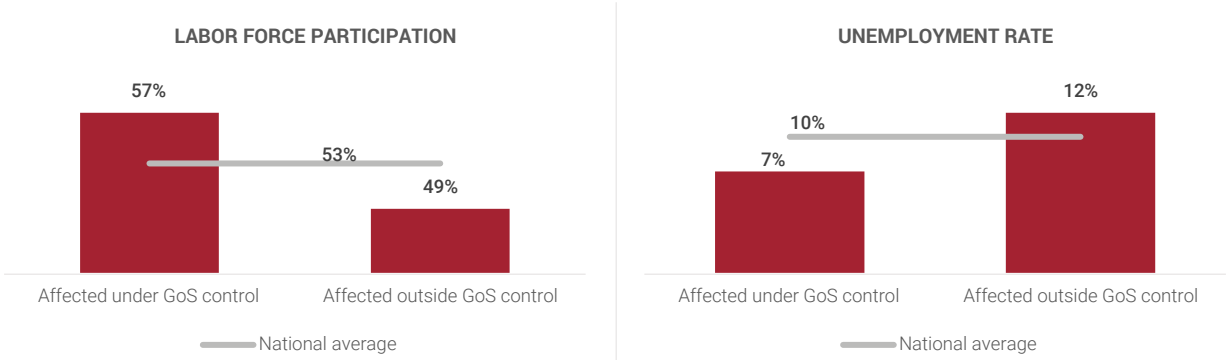
Compared to the national average, inhabitants of affected areas under Government-controlled areas have relatively better labor market outcomes. Many of the observed differences in labor market outcomes are driven by gender dynamics, with women in affected areas outside Government-controlled areas being substantially less likely to participate in the labor market and, despite lower activity levels, being much more likely to be unemployed (Figure 16). Irrespective of area of residence, people with higher levels of education (secondary and tertiary) are over-represented among the unemployed. The distribution of employment by sector of occupation indicates a relatively higher incidence of employment in agriculture in affected areas outside of government's control (Figure 18).

Figure 14:
Education attainment rate of population age 18 and above, by gender and area of residence



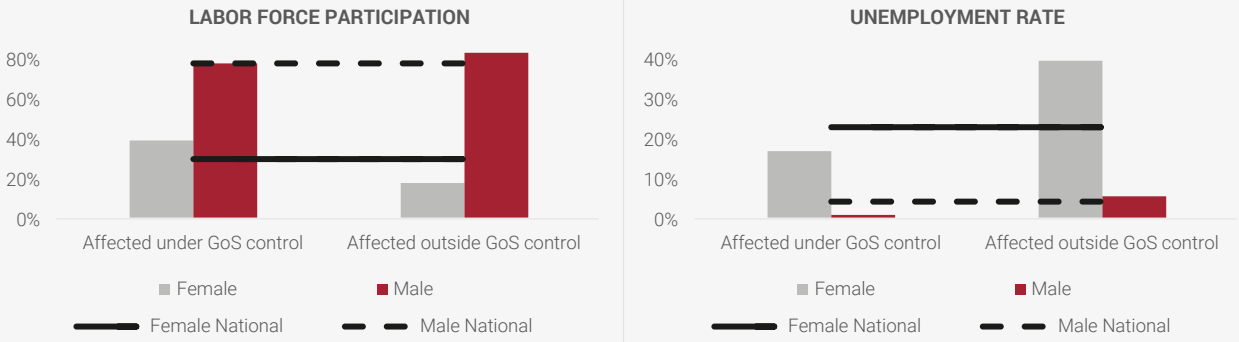
Source: WB staff calculations based on the Summer 2022 HNAP demographic household survey.

Figure 15:
Labor market indicators, by area of residence



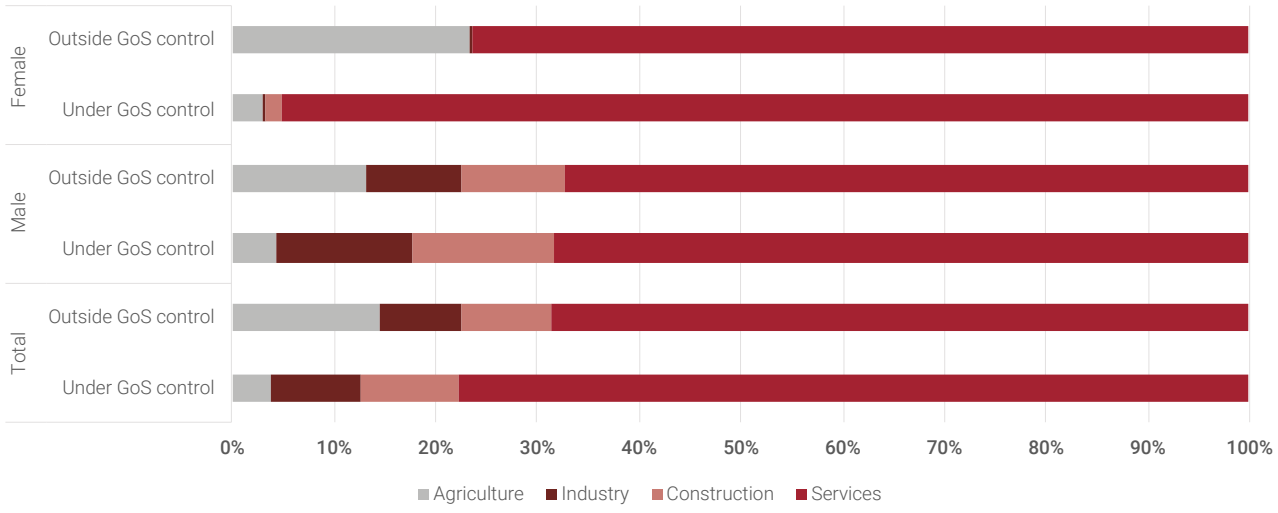
Source: WB staff calculations based on the Summer 2022 HNAP demographic household survey.

Figure 16:
Labor market indicators, by gender and area of residence



Source: WB staff calculations based on the Summer 2022 HNAP demographic household survey.

Figure 17:
Distribution of employment by sector, by gender and area of residence



Source: WB staff calculations based on the Summer 2022 HNAP demographic household survey.

Figure 18:
Share of households without sufficient income to satisfy essential needs, by area of residence

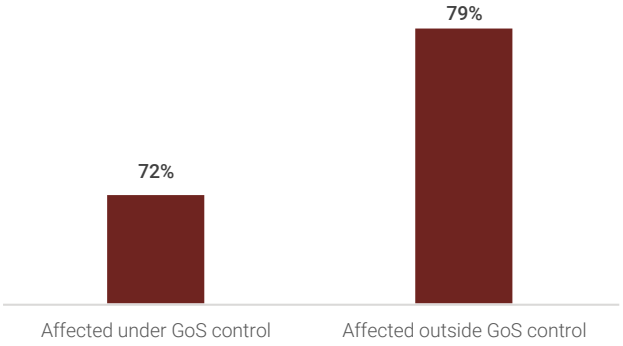
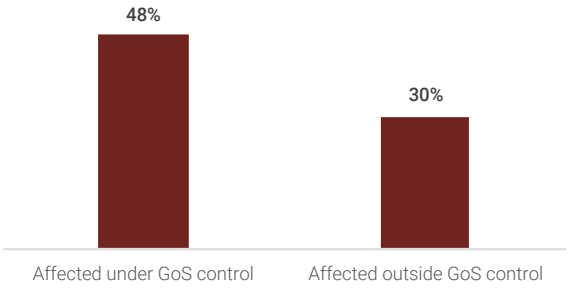


Figure 19:
Share of households having to rely on at least one extreme coping strategy, by area of residence



Source: WB staff calculations based on the Summer 2022 HNAP demographic household survey.

Before the earthquake, households throughout Syria were already facing severe welfare challenges. In the summer of 2022, according to the latest HNAP demographic survey data, 85 percent of households in Syria reported insufficient income to satisfy essential needs in the three months preceding the survey. As shown in Figure 19, in areas hardest hit by the earthquake, insufficient incomes are relatively most widespread among households living in areas outside of government control. However, the "severity" of welfare distress – as proxied by the share of households having to rely on at least one extreme coping strategy – is relatively higher among households living in Government-controlled areas (Figure 20).

Assessment of the earthquake's socio-economic impact

As of February 23, reports indicate that the earthquake has caused 5,914 deaths and 10,857 injuries throughout Syria. The highest human toll was recorded in areas outside of government control (78 percent of total), which is consistent with the relatively stronger earthquake intensity registered in these areas.[34] The highest number of deaths and injuries has been recorded in Harim district in Idlib, followed by Afrin (Aleppo governorate) and Jish-Ash-Shugur (Idlib governorate).[35]

Twelve years of conflict have raised the population's vulnerability to the impact of this devastating earthquake. According to the latest HNAP demographic survey estimates, 4 percent of the population living in Aleppo and Idlib governorates resided in buildings which had already been damaged by the conflict. Initial accounts of earthquake-induced displacement indicate 34 000 households having been displaced in government-controlled areas (***OCHA-DFS***), and 86,500 households in Northwest Syria (***CCCM Cluster - IOM***), in areas outside of government control. Assuming an average household size of five members, these figures would translate into approximately 600,000 people having been displaced as a result of the earthquake. Earthquake-induced displacement will add to the staggering count of the 3 million conflict-induced IDPs already living in affected areas.

Given pre-existing levels of welfare vulnerability, households living in areas affected by the earthquake have limited capacity to cope with the direct and indirect impacts of the earthquake. The earthquake poses further challenges to the precarious welfare conditions of households in impacted areas. Pre-existing income shortfalls will be further exacerbated by direct and indirect impacts on sectors of employment, pushing more households to rely on extreme coping strategies, with long lasting consequences in terms of welfare. Negative income shocks, coupled with damages affecting the delivery of education services and trauma will negatively impact welfare. Moreover, disruption in access to critical services, notably in water, sanitation, and health will further worsen the ongoing cholera outbreak and further expose the population to water-borne diseases.

34 As of February 21, 1,414 deaths, and 2,357 injuries were reported in Government-controlled areas according to OCHA-DFS. As of February 23, UN Health cluster reported 4,400 deaths and 8,100 injuries in Northwest Syria (OCHA - Flash update No. 13, February 23).

35 OCHA - Flash update No. 13, February 23

Impact on Social Sectors

Source: Ipsos

Housing

Background and Analysis of Pre-Crisis Conditions and Trends

The conflict not only reduced the stock of housing units, but it also resulted in the rapid migration of rural populations to urban centers, and to significant internal displacement, forcing a large share of the urban population to live in makeshift shelters with poor amenities and to construct houses which do not meet building requirements. Roughly 30-40 percent of the housing units built by the private sector are estimated to be informal housing.

Assessment of Disaster Effects: Damage and Loss Estimates

The assessment is done across four housing typologies, i.e., apartments, villas and other formal housing, informal housing, and rural housing. Housing units are classified as having been partially damaged if they have incurred damages ranging between 20 percent and 40 percent of the capital stock, and to be fully damaged/destroyed if they have incurred damages in excess of 40 percent of the capital stock.[36] The primary assessment is done for nine highly impacted cities in Aleppo, Idlib, and Latakia Governorates. Extrapolations of the housing damage across various housing typologies for the six governorates[37] as well as Government-controlled areas, Opposition-Controlled Areas, and the AANES are conducted based on remote sensing data linked to earthquake damage intensity, (shake data/recorded seismic waves), housing damage profiles, proportions of housing units located in urban and rural areas, average construction costs, average monthly housing rent, etc. Figure 21 shows the housing assets that have been damaged as a result of the earthquake.

Housing damage and loss estimations (i.e., loss of rental income, housing expenditures of families with destroyed houses, loss of housing assets, and loss of income to governments) are based on a few critical assumptions concerning the unit cost of construction, distribution of total damaged houses into various housing typologies, median built-up areas of apartments, villas, and other formal housing, informal housing in urban areas, and rural housing units.[38] The region experienced an exorbitant increase in the cost of ready to buy apartments.[39] The damage cost estimation is based on differential construction costs across housing typologies.[40] The weighted average construction cost applied to estimate damage cost is US$ 206/sqm.

Some 87,330 housing units representing 4.8 percent of the total housing stock are considered to have been partially damaged and destroyed across the urban and rural areas of the six governorates (Table 4). Total housing damages across the six governorates is estimated at US$880.7 million.

36 Housing units with less than 20 percent damage (no structural damage) are treated as minor damage and these houses are excluded from the analysis. Housing units with minor damage constitute nearly 23 percent of the total housing stock.

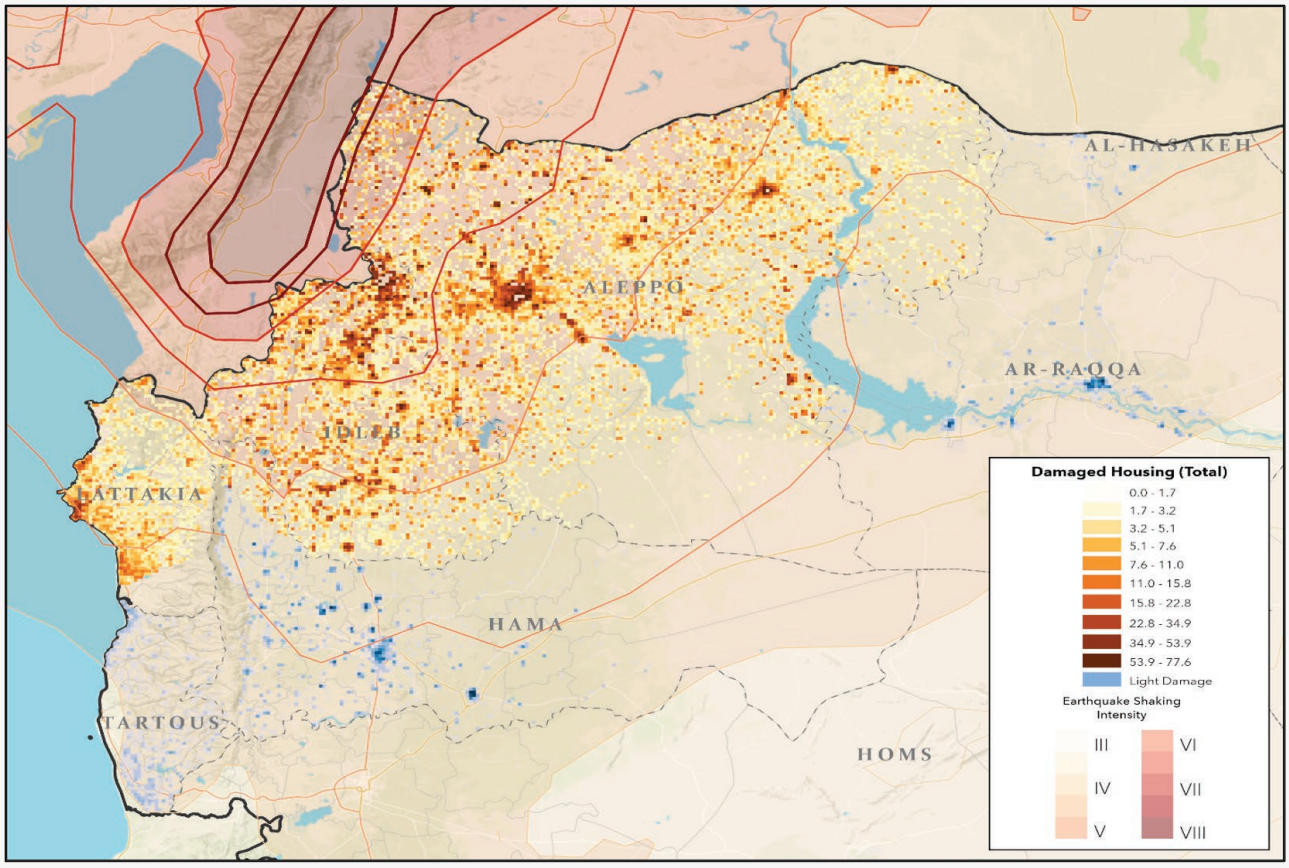
37 The governorates of Hama, Tartous, and Raqqah are not included in city-level damage assessments.

38 Based on the housing profiles of the region, it is assumed that the average built-up areas of these typologies are: apartments 120 sqm, villas and other formal housing (150 sqm), informal housing (90 sqm), and rural housing (70 sqm).

39 ***Property Prices in Syria***

40 The unit cost of RC type of construction with essential fittings and fixtures is assumed as US$ 250 for an apartment and villas, US$ 185 for informal housing, and US$ 100 for rural housing, with a weighted average of US$ 206/sqm. This is close to the average construction cost assumed in the recent World Bank and European Syria Joint Damage Assessment (2022).

Figure 20:
Estimated Housing Damage in the Region



Source: World Bank

TABLE 4: NUMBER OF DAMAGED HOUSING UNITS AND ASSOCIATED DAMAGES (IN US$ MILLION)

Housing Typology	Number of Partially Damaged Units	Number of Destroyed Units	Total of Partially Damaged and Destroyed Units	Damages[41]
Apartments	23,136	8,997	32,133	496.6
Villa and Other Formal Housing	13,799	5,366	19,165	259.2
Informal Housing	13,367	5,198	18,566	90.6
Rural Housing	12,576	4,890	17,466	34.2
Total	**62,878**	**24,452**	**87,330**	**880.7**

Note: The housing damage estimate could be considered higher.

41 The weighted average cost of US$ 206 applied in the costing is the lowest estimate and hence did not deflate for the increase in the exchange value of the Syrian Pound, this is nearly US$ 253/sqm *(https://syriadirect.org/100-%-increase-how-raising-cement-prices-impact-syrians/)*

TABLE 5: GOVERNORATE-LEVEL DAMAGES AND LOSSES (IN US$ MILLION)

GOVERNORATES	Number of Partially Damaged and Destroyed Units	Damages	Losses
Aleppo	64,724	616.9	43.0
Idlib	17,302	215.2	20.4
Raqqah	61	0.5	0.3
Hama	1,052	9.9	3.3
Tartous	26	0.2	0.1
Latakia	4,165	37.9	2.0
TOTAL	**87,330**	**880.7**	**69.2**

Note: The cost estimates could be considered higher due to the higher estimate of damaged units.

TABLE 6: HOUSING DAMAGES AND LOSSES BY AREAS OF CONTROL (IN US$ MILLION)

Areas of Control	Number of Partially Damaged and Destroyed Units	Damages	Losses
Government-controlled areas	49,778	502	39.4
Opposition-Controlled Areas	23,579	237.8	18.7
Autonomous Administration of North and East Syria	13,973	140.9	11.1
TOTAL	**87,330**	**880.7**	**69.2**

The governorate which incurred the highest damage is Aleppo at 74 percent of total damages, followed by Idlib. The total economic loss estimated across the six governorates is about US$69.2 million (Table 5).

Across the nine assessed cities, the number of housing units assessed to have been damaged and destroyed are estimated at 9,278 units (27.8 percent of total stock) and 3,669 units (12 percent of total stock), respectively. The most impacted cities are Jandairis, Azaz, and Harem. Nearly 70 percent of the total partially damaged and destroyed housing units consist of apartments and villas. Damages and losses across the nine cities are estimated at US$133 million and US$10.5 million, respectively[42] (Annex 1.1). The sector has incurred one of the highest damages from the earthquake likely due to high concentration of apartments (salient typology in highly urbanized Syria), inadequate structural quality including lack of seismic resilient standards in an already poor governance environment, associated challenges of importing construction materials due to the ongoing conflict, etc.

42 ***The average rent is assumed as US$ 200 per month.***

Sectoral Reconstruction and Recovery Needs Assessment

Reconstruction and recovery needs estimations in housing embed provisions for physical and financial contingencies (10 percent inflation), and additional cost incurred to comply with robust seismic resilient building by-laws, including build-back better practices. The total reconstruction cost of these cities is estimated at US$173 million, and the recovery investment needs at US$213 million measured at current prices (Annex 2.1).

The total cost of reconstruction and recovery needs estimated at the Governorate and Control Zone levels is about US$1.1 billion. The housing reconstruction needs are highest for Aleppo and Idlib at US$ 802 million and US$280 million, respectively (Table 7). This pattern is consistent with the city level damage profile and typologies of housing damaged experienced by Aleppo and Idlib cities.

The recovery needs in the Government-controlled areas share nearly 57.7 percent of the total recovery needs (Table 8).

TABLE 7: HOUSING RECONSTRUCTION NEEDS (IN US$ MILLION)

Governorates	Reconstruction Needs of Destroyed Units	Rehabilitation Needs of Partially Damaged Units	Total Reconstruction Needs	Total Reconstruction Needs (Reconstruction + Service Costs)
Aleppo	572.8	229.1	802.0	969.3
Idlib	199.8	79.9	279.7	344.4
Raqqah	0.5	0.2	0.7	1.1
Hama	9.2	3.7	12.9	40.4
Tartous	0.2	0.0	0.3	0.5
Latakia	35.2	14.1	49.3	52.7
TOTAL	**817.8**	**327.1**	**1,144.9**	**1,408.5**

Note: The above estimates are influenced by the higher end estimate of damaged units, although the application of the 1.3 multipliers for estimating the recovery need seems reasonable considering the cost escalation and investment risks.

TABLE 8: DISTRIBUTION OF HOUSING DAMAGE COST AND RECOVERY NEEDS BY AREAS OF CONTROL (IN US$ MILLION)[43]

Areas of Control	Total Reconstruction Needs	Total Reconstruction Needs Including Service Cost	Percentage
Government-controlled areas	572.4	809.9	57.7
Opposition-Controlled Area	309.1	380.3	27.0
Autonomous Administration of North and East Syria	263.3	218.5	15.3
TOTAL	**1,144.9**	**1,408.5**	**100.0**

Note: Estimates are influenced by the higher estimate of housing damage.

43 The higher reconstruction and recovery needs in government-controlled areas can be attributed to several factors, such as higher population density and urbanization, which has exacerbated the effects of damage cost and recovery needs in the housing sector.

PRIORITIZATION AND SEQUENCING OF RECOVERY INVESTMENT

Recovery investment needs consist of (a) rehabilitation and reconstruction of damaged houses as per seismic resilience construction standards and building back better practices, and (b) technical assistance for designing and implementing the housing recovery program, and early recovery provision of transit accommodation to homeless and other vulnerable families. An essential element of the housing recovery framework is to develop and implement a need-based prioritization and investment sequencing strategy. While this process should conform to the overall recovery strategy for the earthquake-affected regions, one of the first considerations could be to sequence the investments to address the rehabilitation of the partially damaged housing units which will place a large number of the damaged housing stock on the housing market. Prioritization of the rehabilitation of partially damaged housing units could jump-start the recovery process and meet community expectations. Demand-driven recovery strategies for supporting rehabilitation of partially damaged housing units would be more effective to increase the housing stock in the short term as compared to the reconstruction of fully damaged multi-story residential buildings in the urban areas.

Investment needs within the first year are estimated at US$446.5 million and US$961.7 million in years 2 and 3 (Table 9). In addition to rehabilitating partially damaged housing units in prioritized geographical areas, the early phase interventions should support capacity building and other activities essential for service delivery; they should also address housing vulnerabilities of families impacted by the disaster and loss of livelihoods, including addressing the special needs of families affected by Fragility Conflict and Violence (FCV) challenges.

HOUSING RECOVERY FRAMEWORK

One of the first tasks should be to formulate a sustainable and inclusive housing recovery strategy which not only addresses the need to restore damaged housing units but also applies the recovery process to address inherent housing vulnerabilities and fragilities of families affected by the protracted conflict and earthquake. A realistic housing recovery strategy should address institutional challenges related to access to land and housing supply, and demand mismatches through a combination

TABLE 9: PHASING HOUSING RECOVERY INVESTMENT NEEDS (IN US$ MILLION)

Types of Investments	Early Recovery (0–1 year)	Short-Term Recovery (1–3 years)	Total Recovery Investment Need
Rehabilitation and Reconstruction of Damaged Houses	343.5	801.4	1,144.9
Technical Support and Service Provision, including Transit Housing	103.0	160.3	263.3
TOTAL	**446.5**	**961.7**	**1,408.2**

of homeowner-based financing strategies and partnerships with the private sector and civil society. The strategy should also address the institutional challenges entailed in regularizing informal housing through incentives and inclusive participation of local communities. Effective transformation of the defunct rent control policy is pertinent for promoting the rental market. While a mass housing development strategy is required to address supply and demand mismatches, policy guidelines and strategic interventions to address housing vulnerabilities and risks to home buyers should form the fulcrum of a sustainable housing recovery program.

A housing reconstruction and recovery strategy in the urban housing context, which is comprised of a majority of multi-story buildings, must be based on effective urban planning guidelines, enforceable development regulations, and robust building by-laws. The common practice of financing core housing units, mostly implemented in the case of single-story tenements and rural housing, is not practical in the case of rehabilitation and reconstruction of multi-story buildings which cannot be sub-divided in terms of reconstruction units and beneficiary targeting. Application of seismic resilient construction standards and building-back-better practices would lead to land consolidation and land reorganization and may require area-based recovery approaches. The housing recovery financing strategy shall address operational mechanisms such as financial assistance subsidies, community-based housing mortgage and risk transfer mechanisms, and co-financing by homeowners and development partners.

Limitations of assessment and recommendations for future assessments

Some of the activities that could be prioritized are: (a) field-based damage assessment and classification of damaged houses into fully damaged and partly damaged based on their structural conditions, (b) vulnerability assessment of homeowners, (c) institutional assessments of the local governments, (d) review of urban planning and housing development policies, including current rent control policy, (e) review of development regulations and controls, including their compliance with seismic resilience guidelines, (f) formulation of sustainable housing recovery financing strategies, (g) formulating the affordable housing policy, (h) developing area-based and community-based recovery action plans for cross sector coordination of recovery interventions, (i) formulating community and private sector partnership frameworks for inclusive and sustainable recovery interventions, etc. Most of these policies and operational mechanisms shall be addressed during the early recovery phase.

There are a number of limitations to this assessment. First, this assessment is based on information obtained from the remote sensing analysis of damaged buildings. While fully damaged buildings could be reasonably identified through imagery analysis, the number of apartments within damaged residential buildings and the number of partially damaged units are estimated based on levels of damage triangulated with available housing statistics. Hence, it is possible that the damage estimates could be higher. Secondly, the nine cities selected for detailed analysis are identified from the highly impacted areas of the three governorates of Aleppo, Idlib, and Latakia. Hence, these samples are skewed, and their profiles cannot be extrapolated to the region. Third, since the housing stock which has been estimated through the remote sensing analysis is significantly different from the 2004 census, and houses have been damaged during the conflict, the housing baseline for 2023 is based on the projected population, average household size and housing occupancy ratios. Fourth, extrapolations of the damaged housing units to Raqqah, Hama, and Tartous Governorates as well as Government-controlled areas, Opposition-Controlled Areas, and Autonomous Administration of North and East Syria are based on earthquake intensity and projected population and housing stock. Some of these estimations need to be verified through detailed needs assessments at the design phase of housing recovery interventions.

Health

Background and Analysis of Pre-Crisis Conditions and Trends

Prior to the earthquake, and despite continued conflict, Syria's health outcomes were slowly recovering. Infant mortality rates were equivalent to the Middle East and North Africa (MENA) regional average (18 per 1000 live births), while the maternal mortality ratio (31 per 100,000 live births) was lower than the MENA regional average (57 per 100,000 live births).[44] Improvements were evident for both acute and chronic malnutrition.[45] The national prevalence of wasting for children under five years of age had declined from 3 percent in 2016 to 1.7 percent in 2019, and for stunting from 14.2 percent to 12.6 percent. Vaccination coverage, however, saw a decline. Measles vaccine coverage, for example, dropped from 86.5 percent in 2016 to 79.2 percent in 2019.

Health care services faced multiple challenges even pre-earthquake. In 2021, only 48 percent of public primary care centers and 47 percent of public hospitals were fully functioning.[46] The impact of conflict on functionality varied across regions, with 55 percent of public health centers not functioning in northeast Syria compared to only 12 percent in southern Syria. Personnel shortages were also a challenge. It is estimated that over 50 percent of physicians left northeast Syria.[47] In Aleppo, only 13 health staff are available per 100,000 residents, catastrophically below the emergency standard of 22 staff.[48] Public health expenditure has declined by over 50 percent since 2011,[49] while out-of-pocket payments are high, approximately 53.7 percent of health expenditure (2012 data).[50] The role of the private sector for provision of tertiary care was significant, (393 private hospitals and 114 public hospitals).

Assessment of Disaster Effects: Damage and Loss Estimates[51]

The RDNA estimated damage from the earthquake to nine types of public and private health facilities, shown in Table 10. The six affected governorates have an estimated 1,067 facilities, of which 314 were already damaged or destroyed before the earthquake. Public medical centers are the most numerous (there are 740), followed by public hospitals (211). The RDNA also estimated several categories of losses, also shown in Table 10.

44 data.worldbank.org
45 MOH, UNICEF, WHO, UNFPA, WFP (2019)
46 ***Health Cluster. WHO Snapshot on WoS Health Resources and Services Availability Monitoring System (HeRAMS) 2021 Q3: Jul-Sep***
47 ***WHO Syria Flash Appeal for Northeast Syria, 27 January 2022***
48 ***Health Cluster, WHO Snapshot on WoS Health Resources and Services Availability Monitoring System (HeRAMS) 2021 Q3: Jul-Sep***
49 Allahham et. al, 2022
50 data.worldbank.org
51 Damage may be classified as Partially Damaged if less than 40 percent of the asset is damaged, structure is still sound and repair cost would be less than 40 percent of the total asset value. Damage may be classified as Completely Destroyed if more than 40 percent of the asset has been damaged or if the replacement cost of the damages would be more than 40 percent of the total value of the asset. Any sector that needs to apply another percentage should discuss with the coordination team before moving ahead with the estimations.

TABLE 10: HEALTH SECTOR DAMAGE AND LOSS INVENTORY TABLE (IN US$ MILLION)

	Asset Types	Baseline	Partial Damage	Destroyed	Total Cost
DAMAGE	Health Administration Building	1.0	0.0	0.0	0.0
	Hospital (Private)	119.0	14.0	0.0	16.6
	Hospital (Public)	168.8	6.5	0.4	126.7
	Hospital (Unknown)	14.0	4.0	0.0	25.5
	Medical Center	589.7	14.5	1.7	3.7
	Medical Point	47.3	0.3	1.0	0.6
	Polyclinic	10.5	0.4	1.0	0.6
	Specialized Medical Center	40.4	1.6	0.1	12.6
	Teaching Hospital	1.0	1.0	0.0	16.6
	Total Damage				**202.9**
LOSS	Cost of demolition and rubble removal				2.8
	Higher expenditures for treatment of injured				56.6
	Higher expenditures on patients referred to other facilities				17.0
	Lower revenues for attending lower number of patients				14.3
	Higher expenditures for control of cholera				6.8
	Total Loss				**97.5**
Total Effect (Damage and Loss)					**300.4**

In the affected areas, the earthquake caused some damage to health facilities, but considerably less than the unrepaired damage from the conflict. 3.9 percent of health facilities in the affected area were either damaged (3.5 percent) or destroyed (0.4 percent). In total, this damage is estimated at US$129.1 million.

Other economic losses in the Health Sector were also substantial, amounting to a total of US$97.5 million. Higher health expenditures required for the treatment of injuries caused by the earthquake, and indirect costs associated with those injuries, were the largest category of loss, amounting to US$ 56.6 million. Losses were calculated based on the following assumptions: (i) demolition and rubble removal would make up the same percentage of reconstruction costs (1.0 percent) as in a in other contemporary earthquake reconstruction programs; (ii) direct and indirect costs of injuries average US$5.3 based on a 2013 review with an inflation adjustment;[52] (iii) extrapolation of annual expected hospitalizations from other settings;[53] (iv) an assumption

52 Hadley K H Wesson, Nonkululeko Boikhutso, Abdulgafoor M Bachani, Karen J Hofman, Adnan A Hyder, The cost of injury and trauma care in low- and middle-income countries: a review of economic evidence, Health Policy and Planning, Volume 29, Issue 6, September 2014, Pages 795–808, https://doi.org/10.1093/heapol/czt064

53 James Macinko, Veneza B. de Oliveira, Maria A. Turci, Frederico C. Guanais, Palmira F. Bonolo, and Maria F. Lima-Costa, 2011: The Influence of Primary Care and Hospital Supply on Ambulatory Care–Sensitive Hospitalizations Among Adults in Brazil, 1999–2007, American Journal of Public Health 101, https://doi.org/10.2105/AJPH.2010.198887

TABLE 11: TOTAL HEALTH SECTOR DAMAGE AND LOSS BY GOVERNORATE (IN US$ MILLION)

Governorate	Total Damage	Total Loss
Aleppo	150.1	72.2
Idlib	32.3	15.5
Raqqah	0.0	0.0
Hama	1.9	0.9
Tartous	0.0	0.0
Latakia	18.6	8.9
Total	**202.9**	**97.5**

TABLE 12: TOTAL DAMAGE AND LOSS BY AREAS OF CONTROL (IN US$ MILLION)

Areas of Control	Total Damage	Total Loss
Government-controlled areas	106.1	51
Autonomous Administration of North and East Syria	4	1.9
Opposition-Controlled Areas	92.8	44.6
Total	**202.9**	**97.5**

Source: Ipsos

that referrals, including to private facilities, will cost US$1000; (v) extrapolation of out-of-pocket costs per capita from pre-conflict data; and (vi) costs of delivering outreach services from other conflict settings.[54] Losses are assigned to cities and governorates proportionately to each area's respective share of the total damage.

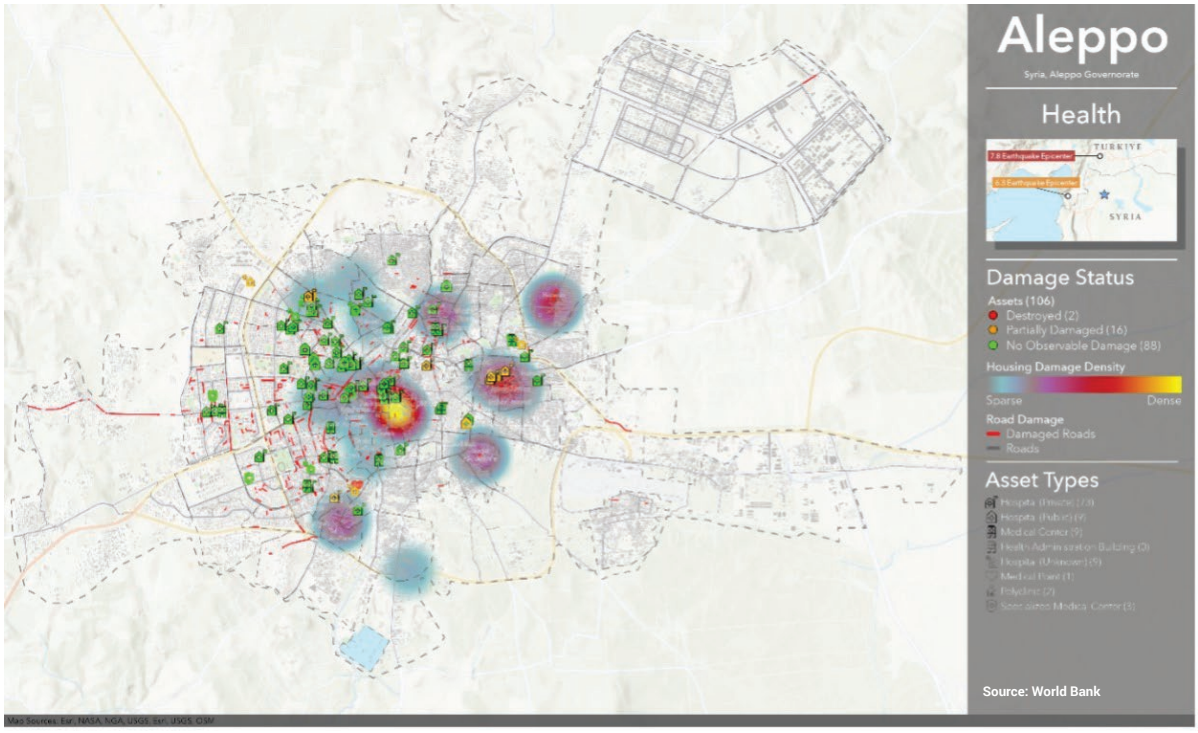
Damage and loss are highly geographically concentrated. Annex 1.2 shows damage and loss estimates in the nine cities assessed in depth, which accounted for 57.7 percent of all Health Sector damage across the affected area. Table 3 shows damage and loss estimates by governorate. Most damage and loss to the Health Sector occurred in Aleppo Governorate, with US$62.3 million in damages and US$29.9 million in losses; almost one third of all damage occurred in Aleppo city. Even within cities such as Aleppo, damage is sometimes concentrated in specific pockets, illustrated in Figure 22. The Health Sector in Raqqah Governorate and Tartous Governorate was estimated to face no damage or loss; the RDNA also found no damage or loss in the cities of Harem, Ad-Dana, Jableh, or Sarmada.

To place a dollar value on infrastructure damage in the Health Sector in a consistent way, the RDNA uses the same costs per facility employed in earlier exercises in 2018 and 2022.[55] These costs were adjusted to reflect changes in prices overall between the pre-crisis period and the immediate pre-earthquake period. For hospitals, cost estimates are based on the average floorspace of hospitals of each type included in the 2022 assessment.

Health service delivery was also impacted. The Syrian health system, which was already suffering from the cumulative effect of the conflict, the COVID-19 pandemic and the recent cholera outbreak in 2022, is struggling to cope with the increasing health needs triggered by the earthquake. Reports from impacted governorates suggest that hospitals in impacted areas are unable to accommodate more patients and are redirecting incoming patients to smaller health centers and clinics. There are shortages in intensive care units, neurosurgery rooms, and of respirators in hospitals, but also in basic materials such as medical gauze, analgesics, anesthetics, first aid kits, splints, and plates for bone fractures[56]. Hospitals and health facilities

54 WHO, 2015, "***Integrated outreach activities launched in Yemen***"
55 World Bank, 2018, "The Mobility of Displaced Syrians: An Economic and Social Analysis"; and World Bank, 2023, "Syria: Joint Damage Assessment of Selected Cities, December 2022"
56 Mercy Corps – Humanitarian Access Team, Feb 2023

Figure 21:
Health Sector damage and housing damage density in Aleppo city



lack medical consumables, orthopedic surgical equipment, anesthetics, ventilation devices, blankets and beds, intravenous fluids, blood and oxygen (WHO Whole of Syria Earthquake Response - Situation Report, 13–19 February 2023). Shortage of health care professionals, a pre-existing challenge, has forced hospitals to increasingly rely on recent graduates from medical faculties in Idlib and Aleppo, who have become the healthcare sector's primary workforce, with specialist doctors in short supply (Mercy Corps – Humanitarian Access Team, Feb 2023). It is therefore not surprising that approximately 20 percent of communities report not having access to healthcare in a recent survey[57] (REACH) in two of the impacted governorates.

There is a 28 percent increase in morbidity across a range of health conditions, particularly among women and children, which is expected to worsen health and nutrition outcomes.[58] The leading causes of morbidity among all age groups were Influenza-Like Illness (60.6 percent) and Acute Diarrhea (23.7 percent), with increasing concerns about the resurgence of cholera. With significant damage to the water networks reported, turbidity and contamination of water, there is an increased risk of waterborne illness, including exacerbation of pre-existing cholera and hepatitis A outbreaks.[59] With thousands of displaced people living in shelters in Aleppo, Hama, Tartous and Latakia, ensuring essential health care, water and hygiene, is important to minimize the risk of disease outbreaks and transmission due to crowded conditions in shelters, including the spread of respiratory illness (COVID-19 and influenza), as well as those related to pre-existing outbreaks which are seeing an increase (cholera, hepatitis A and measles, scabies, lice and acute watery diarrhea). (WHO Syrian Arabic Republic – Situation Report 5, February 15, 2023). The earthquake impacted 3.7 million children and Pregnant and Lactating Women (PLW) and, while so far available data from rapid assessments indicates that there is no upward trend in acute malnutrition in the assessed areas, the increase in diarrheal diseases is expected to worsen the nutrition situation of vulnerable children and women (UNICEF Humanitarian Situation Report No. 2, February 25, 2023).

57 Limited to Greater Idlib and Northern Aleppo
58 Table 1 - Syrian Arab Republic: EPWARs Weekly Epidemiological Bulletin, 2023 – Week 7 – February 12-18, 2023
59 WHO Syrian Arabic Republic – Situation Report 5, February 15, 2023

TABLE 13: DISEASE SURVEILLANCE DATA FOR RECENT WEEKS

Disease Name	23W04	23W05	23W06	23W07	Total
Acute bloody diarrhea	106	84	60	93	**343**
Acute Diarrhea	9,595	8,562	5,904	6,794	**30,855**
Acute Flaccid Paralysis	7	6	4	6	**23**
Acute Watery diarrhea (suspected cholera)	210	135	24	77	**446**
Brucellosis	103	108	50	84	**345**
chicken pox	285	194	84	107	**670**
Influenza Like Illness	23,530	21,631	14,460	18,977	**78,598**
Leishmaniasis	1,754	1,409	639	1,079	**4,881**
Lice	1,054	987	252	396	**2,689**
Measles and Rubella	304	399	169	267	**1,139**
Meningitis	37	41	10	22	**110**
Mumps	22	28	6	12	**68**
Others	149	220	130	195	**694**
Pertussis	283	291	220	238	**1,032**
SARI	679	761	652	763	**2,855**
Scabies	433	343	255	463	**1,494**
Suspected Hepatitis (Jaundice)	881	760	601	558	**2,800**
Tuberculosis	49	44	31	52	**176**
Typhoid Fever	178	163	67	90	**498**
Total	**39,659**	**36,166**	**23,618**	**30,273**	**129,716**

Source: *WHO, Syrian Arab Republic: EWARS Weekly Epidemiological Bulletin, 2023 Week 07 (12-18 February 2013)*

While the number of trauma and injury cases have gradually declined since the earthquake, the need for post-traumatic injury aftercare and support for management of people with existing NCD conditions is emerging. Pre-earthquake Syria had a high burden of NCDs, with ischemic heart disease, stroke, chronic kidney disease and diabetes among the top causes of death (IHME). These require sustained care and medication, which are in short supply following the earthquake. In addition, there are needs related to plastic and orthopedic surgery, as well as provision of physical rehabilitation, prosthetics and assistive devices for several trauma and injury cases. Mobile teams are receiving frequent requests from displaced and affected persons to supply and/or replace their non-communicable disease (NCD) medications as many have lost their monthly regimen during the earthquake, and local primary health care centers (PHCs) are struggling to meet the surge in demand.

Mental health is a growing concern, especially among children and first responders who are experiencing burnout and distress. Several reports point to the need for mental health support due to the extreme trauma and stress resulting from the earthquake on affected populations, especially children who may also be experiencing family separation, and exposure to unsafe environments.[60] Psychosocial support is also needed for local populations, including health workers who have been involved in the immediate response, and have been impacted by the collapse of their homes, schools and hospitals, and the deaths of family and loved ones (WHO Whole of Syria Earthquake Response - Situation Report, 13-19 February 2023).

Sectoral Recovery and Reconstruction Needs Assessment (including cost estimates)

SECTOR RECOVERY STRATEGY (INCLUDING EARLY RECOVERY AND MEDIUM-LONG TERM RECOVERY AND RECONSTRUCTION)

The health recovery strategy needs to address the compounded impacts of the conflict, COVID-19, the cholera outbreak and the earthquake on the health system. It requires reconstruction and rehabilitation of health care infrastructure, systematic regulation of the growing private healthcare sector, while strengthening service delivery and quality of care, the medicine and equipment supply chain, health workforce, health information systems and health financing. In the near term the focus should be on transitioning from emergency response to recovery and delivery of essential health services, with an additional focus on displaced persons living in shelters and other temporary accommodations. In the medium to long term the focus should be on building institutional and human resource capacity to deliver quality health services, enhance emergency and pandemic preparedness and reduce the current high out-of-pocket expenditures on health to facilitate universal health coverage. The specific focus areas are provided in the next two sections on infrastructure reconstruction and service delivery restoration.

INFRASTRUCTURE RECONSTRUCTION

While this assessment focuses on the damage and recovery needs in the immediate aftermath of the earthquake, addressing other outstanding health infrastructure needs, i.e., facilities that were damaged and non-functional before the earthquake, should be considered as part of the larger health sector development efforts. Reconstruction in Aleppo Governorate should be prioritized given the heavy impact of the earthquake. In general, criteria for investments in reconstruction should include the size of the potential beneficiary population, the non-availability of functioning Public Institutions alternatives for beneficiaries, and the anticipated reduction in referrals to private facilities. Restoring local public service delivery is a key enabler for infrastructure reconstruction, because relatively expensive referrals to private facilities are absorbing large amounts of response funding that could otherwise be deployed to BBB. A pressing immediate need is that core medical capabilities, especially those requiring heavy equipment such as CT scanners and facilities that can accommodate them, are available in each of the three areas of control. Health services are critically dependent on the availability of electricity, either through generators or from the grid, and the latest WHO situation update indicates challenges in this area. Therefore, plans to reconstruct power infrastructure should take into account Health Sector needs.

60 WHO Health Sector update Earthquake Syria, February 21, 2023; UNICEF Humanitarian Situation Report No. 2, February 25, 2023

SERVICE DELIVERY RESTORATION

The priority in the near term is to restore essential health services in functional facilities, while continuing to provide services through mobile units to impacted areas without functional health facilities, to prevent excess mortality and morbidity. This requires (a) ensuring medicine and vaccine supply to primary health care facilities for care and management of pregnant women and child illnesses, and management of NCDs, such as diabetes and hypertension; (b) capacitating primary health care workers to screen for mental health issues to enable referral to trained psychosocial support providers; (c) re-equipping hospitals and laboratories with essential and life-saving medical and diagnostic equipment to enable them to provide the required care and treatment to patients; (d) referrals and transport given the shortages of specialist doctors in the impacted areas; (e) screen and monitor children and pregnant women for malnutrition, and especially among displaced populations, providing micronutrient supplements and food to prevent them from becoming undernourished; and (f) working with the Water Sector to treat drinking water, create awareness on hygiene practices and facilitate maintenance of sanitation facilities, particularly in shelters for displaced populations. The same broad priorities apply equally to the three areas of control, but access to tertiary medical care for residents of non-Government-controlled areas may differ if they cannot be referred to facilities in Aleppo and Damascus.

In the medium to long term, it is important to build the human resource capacity of the health work force in Syria, and health infrastructure, to meet the disease burden of the country. This requires a strong framework to provide mental health and psychological support services and specialized care, such as cardiac specialists, orthopedics etc. With the scaling up of an essential package of health services, it is important to ensure the quality of these services by establishing mechanisms to measure and monitor quality of care provided to patients. Another priority is to strengthen emergency care and pandemic preparedness, which are globally emerging as important investments to enhance a country's ability to respond effectively during natural or man-made disasters. With climate change increasing the risk of communicable diseases and malnutrition due to water scarcity, affecting agricultural production and the emergence of new diseases due to changing climatic conditions, enhancing preparedness is key to a proactive rather than reactive response. Pursuing these priorities needs a clear framework to engage and leverage the private Health Sector, such that it complements Public Institutions to address gaps without high out of pocket expenditures for patients. All of this requires increased investment in the Health Sector to reverse declining per capita health spending.

Source: City of Latakia, PLEIADES NEO, DOI: 07FEB2023. World Bank/Ipsos

TABLE 14: TOTAL COST OF HEALTH NEEDS BY GOVERNORATE (IN US$ MILLION)

Governorate	Needs category	Cost
Aleppo	Infrastructure Reconstruction	195.2
	Service Delivery Restoration	90.1
Idlib	Infrastructure Reconstruction	42.0
	Service Delivery Restoration	19.4
Raqqah	Infrastructure Reconstruction	0.0
	Service Delivery Restoration	0.0
Hama	Infrastructure Reconstruction	2.4
	Service Delivery Restoration	1.1
Tartous	Infrastructure Reconstruction	0.0
	Service Delivery Restoration	0.0
Latakia	Infrastructure Reconstruction	24.1
	Service Delivery Restoration	11.1
Total		**385.4**

TABLE 15: TOTAL COST OF HEALTH NEEDS BY AREA OF CONTROL (IN US$ MILLION)

Areas of Control	Needs category	Cost
Government-controlled areas	Infrastructure Reconstruction	79.9
	Service Delivery Restoration	36.9
Autonomous Administration of North and East Syria	Infrastructure Reconstruction	12.4
	Service Delivery Restoration	5.7
Opposition-Controlled Areas	Infrastructure Reconstruction	171.4
	Service Delivery Restoration	79.1
Total		**385.4**

Recommendations and Limitations

The key emerging recommendations from the assessment are:

- Restoring the functionality of undamaged or partially damaged health facilities to scale up service delivery. Mobile health clinics continue to provide health services to areas with no accessible health facilities.
- Providing essential life-saving medicine and equipment to hospitals and primary health facilities to facilitate adequate care for patients.
- Continuing to screen and monitor for infectious diseases and malnutrition and take early corrective action, offer food supplementation, infant/young child feeding, sanitation, hygiene practices and water treatment to reduce morbidity and mortality from cholera and other conditions.
- Providing mental health screening and NCD management and medicines at the primary care level to avoid adverse events for manageable conditions.
- Leveraging the private sector and partners for resources and develop a medium to long term Human Resources for Health (HRH) strategy to build a better equipped health workforce. Also, exploring the possible use of telemedicine services to support service delivery.

The main limitations of the Health Sector assessment, beyond those noted earlier for the overall assessment, are:

- Information on disruption of health services is variable across governorates and has been used to provide generalized recommendations across impacted areas. Several deep-dive assessments are currently underway by partners, such as WHO, which will likely provide more robust information in the coming weeks to further validate the recommendations.
- Idlib is not covered in the WHO EWARS weekly epidemiological report, and therefore limited-service delivery information is available from that governorate.
- The Assessment primarily focuses on the shelters; therefore, access, sanitation and hygiene issues for un-displaced people may not be well reflected.
- Information on the capacity and utilization of health services was not available for this assessment, and the assessment had to rely on the functionality of health facilities as a proxy for where and if people were unable to obtain medical care.
- For most facilities (72 percent), the assessment could not determine whether a facility was fully functional or not.
- Data on market prices and input costs to reconstruct health facilities were not available for the assessment, which had to use proxy estimates drawing on data from other countries.
- Estimates of damage to private hospitals in areas not covered by the in-depth city analyses are not included in this analysis.

Education

Background and Analysis of Pre-Crisis Conditions and Trends

Before the conflict, Syria exceeded the MENA region indicators on primary and secondary enrolment rates[61] **and participated in international learning assessments (e.g., TIMSS). Since the onset of the civil war,** approximately 2.5 million children and youth in the Northwest have been out of the school system (30 percent of the population ages 5–17).[62] By 2017, 40 percent of schools (6,841 out of 17,120) had been damaged or destroyed.[63]

Before the earthquake, the nationwide out-of-school rate was 18 percent, with much higher rates being recorded in the Northwestern governorates such as Raqqa (35 percent), Idlib (28 percent) and Aleppo (26 percent). School dropout is more prominent among older children between the ages of 12 and 17. The most cited reasons for non-attendance were the lack of access to schools and the need to work.[64] Learning spaces, children and teachers continued to be affected by other crises, including COVID-19, a cholera epidemic, and floods.[65] Even when schools or other learning spaces remained open, they had little or no access to basic operational services such as clean water, energy, and sanitation services, not to mention internet and school meals.[66]

Assessment of Disaster Effects: Damage and Loss Estimates

Damages have been assessed for 803 education facilities across nine affected cities in Northwestern Syria and extrapolated to the six affected governorates and their 6,632 education institutions (K-12 and colleges/universities):[67] Aleppo, Idlib, Latakia, Hama, Raqqah, and Tartous.

In the cities assessed, overall infrastructure damages have been calculating at US$21.2 million**.** By extrapolating damages to the to the governorate level from the 9 assessed cities to the six most affected Governorates (Aleppo, Idlib, Latakia, Hama, Raqqah, and Tartous), give overall education infrastructure damages of US$31 million.[68] The earthquake damaged or destroyed 126 educational facilities from K-12 to higher education facilities across the nine cities assessed (15 percent of total). Based on the data collected for this

61 Sieverding, M. et.al (2020). Education Interrupted: Enrollment, Attainment, and Dropout of Syrian Refugees in Jordan. https://hicn.org/wp-content/uploads/sites/10/2020/04/HiCN-WP-324.pdf

62 Joint Education Needs Assessment for Out of School Children North West Syria; Assistance Coordination Unit, Save the Children, Syria Response Education Cluster; December 2019

63 Victoria University (2022). Syria education and development investment case: economic, social and psychological costs and risks resulting from not investing in education systems in Syria

64 UNICEF (2022). Humanitarian Needs Overview: Syrian Arab Republic. https://www.unicef.org/mena/media/15726/file/hno_2022_final_version_210222.pdf.pdf

65 ***Camps of Northwest Syria and Winter Floods***.

66 Assistance Coordination Unit, ACU (2018). Schools in the Northern Syrian Camps: Thematic Report Edition 02.

67 The nine cities selected for direct remote data collection on infrastructure damages were within the governorates of Aleppo, Idlib, and Latakia. They were used to extrapolate damages and losses in about 60 districts, subdistricts, and towns of the 6 most affected governorates affected by the earthquake (Aleppo, Idlib, Latakia, Raqqah, Hama and Tartous).

68 The value of infrastructure damages is based on pre-earthquake costs and do not yet include increased prices in transport, security, warehousing, and other additional post-earthquake expenditures.

exercise, only 20 percent of pre-earthquake facilities (157) are considered functional. Even for schools with seemingly limited external infrastructure damage, approximately 10 percent (78) are deemed not functional, and the status of the remaining 70 percent (568) is not available.

Economic losses were calculated based on unexpected education expenditures and increased operational costs directly linked to the earthquake.[69] These include temporary education spaces and payment of temporary staff (teachers and paraprofessionals), as well as emergency related operational costs of education institutions, mainly safety, psychosocial support (PSS), catch up programs to mitigate learning loss, provision of classroom materials and student supplies, and training of teachers. Table 19 presents the detailed infrastructure damages and economic losses extrapolated for the six governorates most affected by the earthquake. Annex 1.3 and Table 17 compare the infrastructure damage calculations, respectively, in the assessed nine cities and in the extrapolated assessment of the six governorates.

TABLE 16: EDUCATION SECTOR DAMAGE AND LOSS INVENTORY TABLE (IN US$ MILLION)

	Asset Type	Baseline	Partially Damaged	Completely Destroyed	Total Cost
DAMAGE	Pre/Kindergarten	1,141	27	4	3.1
	Primary	4,496	177	11	16.9
	Secondary	936	36	5	6.4
	College/ University	59	3	2	4.2
	Total Damage				**30.7**
LOSS	Temporary Learning Spaces				13.1
	Student Safety				3.5
	Additional Teachers				3.5
	Psychosocial Support				29.3
	Academic Catch-Up				24
	Teacher Training (education in emergencies)				7.9
	Educational Materials				4.1
	Total Loss				**85.4**
Total Effect (Damage and Loss)					**116.1**

69 Losses from higher operational costs and unexpected expenditures due to the earthquake are calculated for a three-year period (until recovery).

TABLE 17: EDUCATION SECTOR TOTAL DAMAGE AND LOSS BY GOVERNORATE (IN US$ MILLION)

Governorate	Total Damage	Total Loss
Aleppo	17	31.1
Idlib	11	22.5
Raqqah	0	7.1
Hama	1.6	9.2
Tartous	0	7.1
Latakia	1.1	8.4
Total	**30.7**	**85.4**

TABLE 18: EDUCATION SECTOR. TOTAL DAMAGE AND LOSS BY AREAS OF CONTROL (IN US$ MILLION)

Areas of Control	Total Damage	Total Loss
Autonomous Administration of North and East Syria	0.2	0.5
Opposition-Controlled Areas	11.5	31.9
Government-controlled areas	19	53
Total	**30.7**	**85.4**

TABLE 19: PRIORITIZED AND SEQUENCED EDUCATION SECTOR NEEDS (IN US$ MILLION)

Type	Early Recovery (0-12 months)	Short term (1-3 years)	Total Needs (Over 0-3 years)
Infrastructure Reconstruction	18	35.1	53.1
Service Delivery Restoration	29,1	56,3	85.4
Grand Total	**47.1**	**91.4**	**138.5**

Sectoral Recovery Strategy and Needs Assessment (including cost estimates)

The education recovery strategy should be centered around building more resilient education infrastructure and services. This includes education infrastructure with seismic resistant, green, and child-centered school designs. Also, the restoration of education services must provide safe access and support the physical, psychological, and social wellbeing of students and teachers. In the aftermath of the earthquake, children and youth are vulnerable to trauma, abuse, hunger, and illness. Schools ideally provide an immediate sense of normalcy, and support the physical, social, and emotional well-being of learners and teachers. Schools may also provide child and youth services by other sectors – including water, sanitation, hygiene, nutrition, vaccination, and mental and physical health screening and referrals. Catch up and back up programs limit the amount of learning loss, which in the long run affects the productivity and growth of a country.[70]

The recovery investments can be divided into Early Recovery (0-12 months) and Short-term Recovery (1-3 years). In the early phase, the main objective is to reopen schools and learning spaces safely and operate education institutions with a minimum set of educational and complementary services. The short-term recovery sets the foundations to return to education development indicators which prevailed prior to the conflict, including rebuilding of 31 kindergartens, 188 primary schools, 41 secondary schools, and 5 universities, as well as the damaged and destroyed universities. Table 19 presents the early investments of US$ 47.1 million (36 percent of total needs) for one year, and the short-term investments of US$ 91.5 million (66 percent of total needs) for up to three years of the recovery strategy.

The recovery strategy can be applied at both city and governorate levels, subsequent to verifying both preliminary infrastructure damages and economic losses due to unexpected expenditure and higher operating costs of education institutions. Annex 2.3 and Table 20, below, show an initial estimation of needs for both the nine cities assessed and the six governorates affected by the earthquake. Investments are allocated over the next three years, for both infrastructure reconstruction and education service delivery restoration.

70 See, for example: ***The Economic Impacts of Learning Losses***

TABLE 20: TOTAL EDUCATION SECTOR COST OF NEEDS BY GOVERNORATE (US$ IN MILLION)

Governorate	Needs Category	Cost
Aleppo	Infrastructure Reconstruction	29.5
	Service Delivery Restoration	31
Idlib	Infrastructure Reconstruction	18.9
	Service Delivery Restoration	22.5
Raqqah	Infrastructure Reconstruction	0
	Service Delivery Restoration	7
Hama	Infrastructure Reconstruction	2.9
	Service Delivery Restoration	9.2
Tartous	Infrastructure Reconstruction	0
	Service Delivery Restoration	7.1
Latakia	Infrastructure Reconstruction	1.8
	Service Delivery Restoration	8.4
Total		**138.5**

** Infrastructure reconstruction at the governorate level includes building back better coefficients*

TABLE 21: TOTAL EDUCATION SECTOR COST OF OVERALL NEEDS BY AREA OF CONTROL (IN US$ IN MILLION)

Areas of Control	Needs Category	Cost
Autonomous Administration of North and East Syria	Infrastructure Reconstruction	0.2
	Service Delivery Restoration	14.7
Opposition-Controlled Areas	Infrastructure Reconstruction	19.8
	Service Delivery Restoration	30.1
Government-controlled areas	Infrastructure Reconstruction	32.9
	Service Delivery Restoration	40.8
Total		**138.5**

Implementation Arrangements

This is an initial projection of infrastructure damages, economic losses, and recovery needs in education. Implementation arrangements will also require politically sensitive consultations, designs, and strategies given the complex governance structure of Syria today, especially in the Northwest regions. Local participation and ownership are key to the recovery strategy. To better understand the impact of the earthquake in each area of geographic control, Table 21 allocates the cost of recovery needs across the three main authorities in the region.

Recommendations and Limitations

There are several data limitations in the present assessment, including:

a. Data deficits limited analysis of colleges and university recovery needs, and calculation of school age beneficiaries (in and out-of-school and in non-camp and IDP camp settings).
b. Lack of clear data on the unit cost of some interventions – especially for education in emergency services in schools (PSS, Safety Programs, education materials, etc.)
c. Absence of information on the damage sustained in IDP camps and hard-to-reach areas.
d. Certain water infrastructure, including underground water infrastructure and water canals could not be assessed due to methodological and data constraints.

Nonetheless, several findings are clear from the present analysis:

a. Education infrastructure damages and economic losses are high and should be verified in the field
b. Securing safe and quality temporary teachers and learning spaces in the short-term is critical, while the reconstruction of the education infrastructure is underway.
c. To restore service delivery, at a minimum, schools will require safe teaching and learning spaces, access to basic needs (school meals, water, sanitation), and psychosocial support, in addition to educational materials and teacher training and support.
d. Recovery plans for the Education Sector should include a clear building back better vision from the start (to prevent further out of school pressures, learning loss, and trauma).

Municipal Services

Background and Analysis of Pre-Crisis Conditions and Trends

Local administration in Syria prior to the conflict was managed by a centralized and hierarchical administrative set up. The role of the municipalities was restricted to the provision of limited services. In September 2011, there was an effort at national level, with law 107, to introduce decentralization and strengthen the role of local governments, although it is not clear to what extent the law has been implemented, especially on fiscal decentralization. The conflict had a significant impact on the municipal sector, as the number of administrative units doubled and new cities, towns and townships were established. The vacuum created in many cities from the withdrawal of formal public institutions during the 2012–2013 period has resulted in the creation of many Local Administration Councils that are outside of Government-controlled areas. Moreover, inadequate financial resources to manage the ever-increasing demand for local services, coupled with the exponential growth in migration of rural populations to cities, have significantly challenged municipal service delivery in the earthquake-affected regions.

Earthquake damage to municipal assets has compounded challenges to the already strained municipalities. Maintaining the provision of basic municipal services in cities is critical to sustain livelihoods, transport people and goods, remove productivity constraints, and stimulate local economic development. To achieve this, key underlying challenges should be unlocked, including giving municipalities more responsibilities in the spirit of law 107 of 2011; enhancing their ability to facilitate horizontal coordination with other state and non-state actors; and equipping them with the financial and human resources to fulfill their service delivery mandates.

Assessment of Disaster Effects: Damage and Loss Estimates

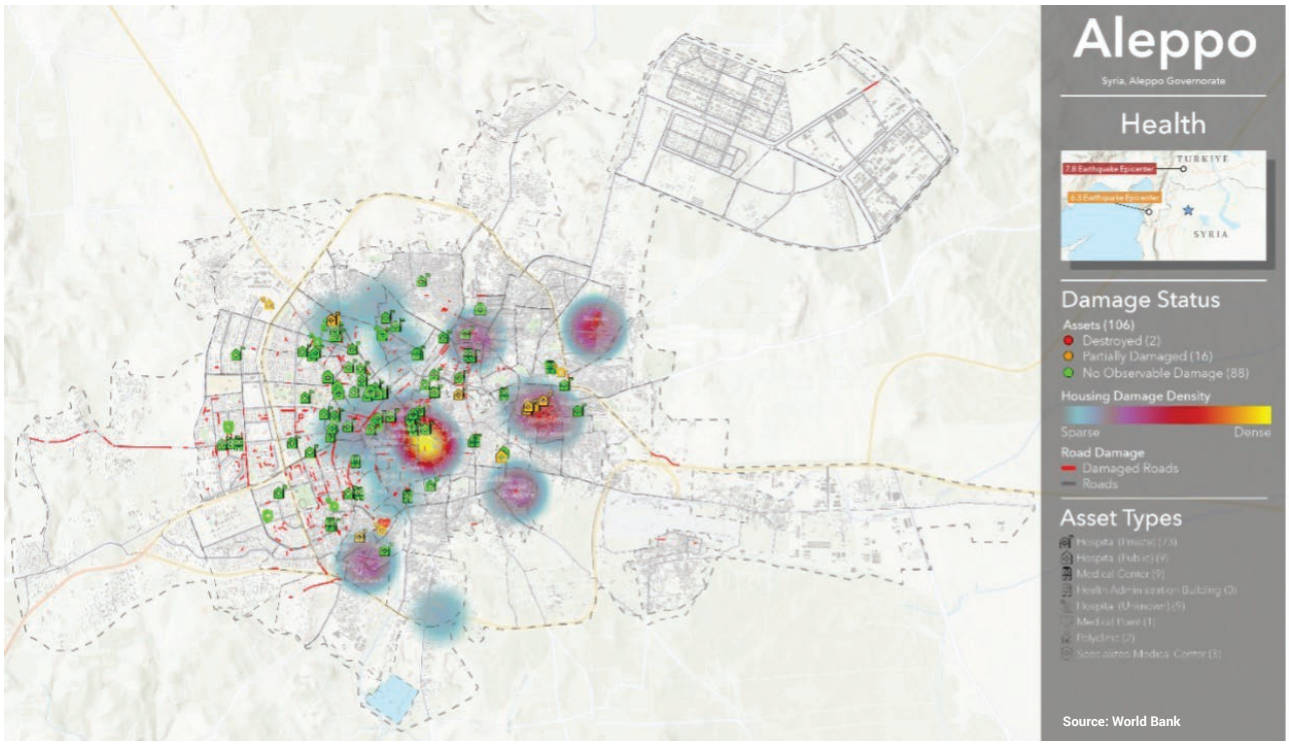
This damage assessment of Municipal Services covers the following asset classes: community facilities, community markets, fire stations, libraries, parks/playgrounds, police stations, public parking lots, stadiums, town/city halls, zoos, and tertiary and residential roads. Other public services such as secondary roads, public transport, WASH, sewerage, effluent water treatment, public schools and health centers are included in the respective sector assessments. There are no records on the inventory of these basic services at city and regional level in Syria, and particularly in the earthquake-affected regions.

Damage levels vary between the different types of municipal assets with community markets being the most affected asset category. Table 22 below provides an overview of damages inr the nine cities included in the assessment.

TABLE 22: DAMAGE INVENTORY TABLE (IN US$ MILLION)

Asset Types	Baseline	Partially Damaged	Completely Destroyed	No Observable Damage	Total damage
Community Facility	7	1	0	6	0.2
Community Market	5	2	2	1	2.8
Fire Station	8	0	0	8	0.4
Library	0	0	0	0	0.4
Park/Playground	79	4	0	75	2.5
Police Station	12	1	0	11	0.4
Public Parking	1	0	0	1	0
Stadium	0	0	0	0	8.8
Town/City Hall	11	1	0	10	0.4
Zoo	0	0	0	0	0
Tertiary Road	265.91	4.73	0	261	8.7
Residential Road	11.00	1.00	0.00	10.00	0.1
Total Damage					**15.6**

Figure 22:
Damage status of municipal assets in Aleppo City.



The total damage to municipal assets varies significantly between cities with approximately one third of the damage recorded in Aleppo city. Latakia, Jableh and Harem also showed significant damage to their municipal assets. The breakdown of damage at the city level is presented in Annex 1.4. The impact of the earthquake has also been uneven for municipal assets in different neighborhoods of the cities. Figure 23 presents the damage status of different assets in Aleppo city.

It should be noted that losses have not been estimated, since losses in municipal services have been considered as virtually zero compared to the situation immediately before the earthquake, due to their low capacity prior in consequence of the protracted conflict.

Extrapolation of the damage for the six governorates covered by the assessment indicates a total of US$69.3 million worth of damage. Most affected governorates are Aleppo, Latakia and Hama as presented in Table 23. For the three governorates where the nine cities presented above are located (governorates of Aleppo, Latakia, and Idlib), the data were extrapolated linearly based on population with a discount rate of 25 percent to reasonably account for lower levels of municipal services outside of the main cities. For the other three governorates where there were no cities analyzed in detail (governorates of Raqqa, Hama, and Tartous), data have been extrapolated linearly.

TABLE 23: TOTAL DAMAGE BY GOVERNORATE (US$ IN MILLION)

Governorate	Total Damage
Aleppo	28.5
Latakia	17.9
Idlib	6.3
Raqqa	5.2
Hama	9.3
Tartous	6.6
Total	**73.8**

TABLE 24: TOTAL DAMAGE BY AREAS OF CONTROL (US$ IN MILLION)

Areas of Control	Total Damage
Government-controlled areas	42.4
Autonomous Administration of North and East Syria	19.9
Opposition-Controlled Areas	11.4
Total	**73.8**

Prioritized Recovery and Reconstruction Needs

The Early Recovery (0-12 months) measures should consider supporting municipalities to maintain their current levels of service delivery citywide and increase delivery in the communities most affected by the earthquake. In these areas, the key priority would be to remove rubble and conduct engineering studies and multi-hazard assessments at the city level to determine structural integrity of buildings, and risks and specific needs for reconstruction. Equally important is to deliver urgent municipal services and infrastructure and address the disproportionate impact of the earthquake on different segments of society, especially women, children, and other vulnerable groups.

For the short-term recovery (1-3 years), municipalities should adopt a holistic, area-based approach at the city and neighborhood level. This will include rehabilitating and reconstructing tertiary roads, vocational areas, community markets, and other communal places that are critical to the functionality of the cities. This could be followed with the rehabilitation of damaged public housing, community centers and other assets managed by the municipalities. Moreover, municipalities should gradually prepare neighborhoods' upgrading plans, urban mobility plans, comprehensive waste management plans and area-based regeneration plans.

Early recovery needs at the city level are estimated at US$14.7 million and US$38.4 million at the governorate level. Short-term reconstruction needs in the selected cities are estimated at US$ 21.4 million, and US$57.5 million at the governorate level. Overall, the recovery and reconstruction needs at the city level are estimated at US$ 35.7 million. At the governorate level, they are estimated at US$ 95.9 million, of which US$55.1 million is required for Government-

controlled areas, and the remainder is for the Autonomous Administration of North and East Syria, US$55.1 million, and the Opposition-controlled areas, US$14.9 million. Annex 2.4 presents the total needs by city, Table 25 presents the total needs by governorate and Table 26 presents total needs disaggregated by the different control areas.

For effective action, a roadmap should be developed and tailored technical assistance and capacity building should be delivered to enhance the institutional and financial capacity of the municipalities. This technical assistance should strengthen municipal capacity for spatial planning and integrated service delivery, support interdepartmental and intermunicipal coordination mechanisms, and build capacity of municipalities to improve revenue and asset management.

TABLE 25: TOTAL NEEDS BY GOVERNORATE (IN US$ MILLION)

Governorate	Needs category	Cost
Aleppo	Infrastructure Reconstruction	33.3
	Service Delivery Restoration	3.7
Latakia	Infrastructure Reconstruction	21
	Service Delivery Restoration	2.3
Idlib	Infrastructure Reconstruction	7.3
	Service Delivery Restoration	0.8
Raqqah	Infrastructure Reconstruction	6
	Service Delivery Restoration	0.6
Hama	Infrastructure Reconstruction	10.9
	Service Delivery Restoration	1.2
Tartous	Infrastructure Reconstruction	7.7
	Service Delivery Restoration	0.8
Total		**95.9**

TABLE 26: TOTAL NEEDS BY CONTROL AREAS (IN US$ MILLION)

Areas of Control	Needs category	Cost
Government-controlled areas	Infrastructure Reconstruction	49.6
	Service Delivery Restoration	5.5
Autonomous Administration of North and East Syria	Infrastructure Reconstruction	23.3
	Service Delivery Restoration	2.6
Opposition-Controlled Areas	Infrastructure Reconstruction	13.4
	Service Delivery Restoration	1.5
Total		**95.9**

Recommendations and Limitations

Recommendations for next steps include the following:

- Detailed studies to fine-tune damage assessments and collect missing data.
- Develop a roadmap for early and short-midterm recovery, with technical assistance to help municipalities deliver services in the spirit of law 107 of 2011.
- Plan, develop feasibility studies and detailed budget to restore municipal services damaged by the earthquake.

There are several data limitations in the present assessment, including:

- The assessment is limited to municipal assets that could be identified remotely with satellite imagery. Services not easily identifiable and those embedded in the urban fabric of Syrian cities may have been missed, and thus the damage cost and needs figures may be higher.
- Due to limited data availability, unit costs have been standardized and used in all locations covered by the assessment. However, different areas may have different unit costs, which can be further fine-tuned in the next phases.
- Extrapolation to governorates may have missed assets, since it was based on population and incorporated a discount to account for fewer municipal services in rural areas.

Source: Ipsos

Cultural Heritage

Syria hosts some of the most important cultural heritage sites in the Middle East. It is a country in which tangible and intangible heritage have intertwined over many millennia. It also has a rich national and local heritage, which reflects the diversity of its people and contributes to the country's sense of identity, but this heritage has been devastated by years of conflict. This assessment targeted archaeological sites, museums, heritage housing, other heritage buildings, and religious buildings. Syria hosts six World Heritage Sites, which are all now on the List of World Heritage in Danger, and 11 sites on the World Heritage Tentative List.

The earthquake extends the damages incurred by the conflict. Economically, cultural heritage in Syria has been the basis of a healthy tourism industry. Before the earthquake and the conflict, the Tourism Sector in Syria employed 20 percent of the workforce and cultural tourism was its driving force. With the earthquake and the conflict, this percentage has dropped nearly to zero, with dramatic consequences for the economy, and the many women and youth who were preferentially employed in this sector.

Assessment of Disaster Effects: Damage and Loss Estimates

The earthquake has resulted in damages sustained to countless heritage structures, archaeological areas and religious sites, many still active places of worship, across a vast area of Syria. The support of a wide network of international experts was mobilized. With social media and new technologies, photos and preliminary surveys have been shared among experts to support efforts on the ground.

Among the most affected cities is Aleppo, which is one of the oldest continuously inhabited cities in the world. Aleppo was already an important human settlement in the middle of the third millennium BC. The ancient Aleppo Citadel suffered great damage, together with the historic city center. It is a World Heritage Site built in the 12th and 13th century by Saladin that, prior to the conflict, had been magisterially conserved by the Aga Khan Trust for Culture. In their assessments, Syrian experts reported the collapse of parts of the Ottoman mill, present inside the Citadel, and some sections of the defensive walls, which apparently first cracked and then collapsed. Furthermore, part of the dome of the minaret of the Ayubid mosque has collapsed and the entrances to the fort and the Mamluk tower are damaged. One of the western towers also fell to the ground, and the souks suffered extensive collapse. Also in Aleppo, cracks appeared on the façade of the National Museum, and there are reports of damage to various museum exhibits inside it, including in the vaults.

Extensive damages are reported in several archeological areas, for instance at the temple of the storm god Hadad, one of the most celebrated sacred sites in the ancient Near East. The temple had been recently discovered in the late 1990s and early 2000s under about 15 meters of ancient deposits and subsequent occupations. This is a very important site of Syria's heritage.

The earthquake also impacted major urban sites that in the past were anchors of tourism. An example is the ancient port city of Balanea, where the ancient castle of Margat, also known as Marqab from the Arabic Qalaat al Marqab, has partially collapsed. Built in 1062, the castle was one of the best-preserved Syrian Crusader fortresses. Another example is the district of Tartus, where the collapse of a rocky cliff in the vicinity of Kadmos Castle, or Al Qadmus was reported, which also damaged several historic houses in the area. The earthquake did not spare more recent heritage; the Church of the Annunciation of Iskenderun, dating to the 19th century, was one of the first buildings to be damaged.

The earthquake caused damage to cultural heritage which, based on available data, can be estimated at US$ 157,8 million for the cities included in the assessment (Aleppo, Afrin, Azaz, Jandairis, Latakia, Harem, Jableh, Ad-Dana, and Sarmada) and at US$444 million at the governorate level (Aleppo, Latakia, Idlib, Raqqa, Hama, Tartous).

Table 1 below provides an overview of damage for the nine cities included in the assessment. Data were based on remote sensing; with the limitations such a methodology brings with it. Archaeological sites, museums, and religious buildings included are those that show visible damage (partial or total) from comparison of high-resolution satellite imagery before and after the earthquake, in the nine cities covered by the assessment. The baseline is the situation the day before the earthquake, and all damage caused by the conflict is part of the baseline. For heritage housing and other heritage buildings, they have been derived statistically from the housing stock and the extent of damage to this stock, assuming that the earthquake impacted 10 percent of the historic housing stock and 5 percent of other heritage buildings in all cities, with an increase to 30 percent and 15 percent respectively for Aleppo, given the uniqueness of its historic urban fabric. Such a low percentage, despite Syria's rich heritage, has been assumed to be a conservative estimate.

Annexes 5.1a and 5.1b provide the breakdown of damage at the city level. The total is the same as the previous Table, but in this case, figures are broken down city by city. Most of the sustained damage is in Aleppo, at an estimated damage of US$100 million, due to its remarkable heritage assets and the high intensity of the earthquake. Heritage assets in Jandairis and Latakia were impacted too, although to a lesser extent than Aleppo. In the remaining four cities analyzed in this assessment, damage to heritage has been more limited, as evidenced by the data. Losses have not been estimated, because losses in heritage are negligible compared to the situation immediately before the earthquake. This is because tourism has already collapsed because of the conflict.

Table 27 provides an extrapolation of damage for the six governorates covered by the assessment. For the three governorates that included the nine cities presented above (governorates of Aleppo, Latakia, and Idlib), the data were extrapolated linearly based on population, with a discount rate of 50 percent to reasonably account for fewer heritage assets outside main cities. For the other three Governorates in which there were no cities analyzed in detail (governorates of Raqqa, Hama, and Tartous), data have been extrapolated linearly.

Table 28 below presents the damage by control area.

TABLE 27: TOTAL CULTURAL HERITAGE DAMAGE BY GOVERNORATE

Governorate	Total Damage (in US$ million)
Aleppo	283.4
Latakia	20.9
Idlib	19.1
Raqqa	29.5
Hama	53.4
Tartous	37.7
Total	**444.0**

TABLE 28: TOTAL CULTURAL HERITAGE DAMAGE BY CONTROL AREAS (IN US$ MILLION)

Control Area	Total Damage (US$)
Government-controlled areas	255.3
Autonomous Administration of North and East Syria	119.9
Opposition-Controlled Areas	68.8
Total	**444.0**

Sectoral Recovery and Reconstruction Needs

Cultural Heritage recovery needs were calculated following a tested approach in post-disaster and post-conflict scenarios. A premium of 15 percent for BBB has been applied to allow not only for reconstruction of assets to their conditions before the earthquake, but also to enhance their resilience to future shocks. This would build on global best practices that have allowed countries to successfully prepare themselves for disaster scenarios and therefore contain damage from future events. Needs included both infrastructure reconstruction costs, which cover the physical restoration of heritage assets damaged or destroyed, estimated as 90 percent of the total. Needs also include the costs to restore service delivery i.e., so that restored assets perform at the same level as before the earthquake and are improved to enhance their resilience. This has been estimated as 10 percent of the total.

Needs have been further broken down by timing, with two periods, one for early recovery, which include the cost of immediate interventions in the next 12 months. For the heritage sector, interventions in this immediate phase include stabilizing damaged assets, surveying debris, protection of salvaged assets (movable and immovable), training border police to combat trafficking, and emergency conservation.

The calculation of needs includes costing for the short term, covering a time span of 1 to 3 years, for the restoration of assets.

TABLE 29: TOTAL CULTURAL HERITAGE NEEDS BY GOVERNORATE (IN US$ MILLION)

Governorate	Needs category	Cost
Aleppo	Infrastructure Reconstruction	331.5
	Service Delivery Restoration	36.8
Latakia	Infrastructure Reconstruction	24.5
	Service Delivery Restoration	2.7
Idlib	Infrastructure Reconstruction	22.4
	Service Delivery Restoration	2.5
Raqqah	Infrastructure Reconstruction	34.6
	Service Delivery Restoration	3.8
Hama	Infrastructure Reconstruction	62.5
	Service Delivery Restoration	7
Tartous	Infrastructure Reconstruction	44.1
	Service Delivery Restoration	4.9
Total		**577.2**

TABLE 30: TOTAL CULTURAL HERITAGE NEEDS BY CONTROL AREAS (IN US$ MILLION)

Areas of Control	Needs category	Cost
Government-controlled areas	Infrastructure Reconstruction	298.7
	Service Delivery Restoration	33.2
Autonomous Administration of North and East Syria	Infrastructure Reconstruction	140.3
	Service Delivery Restoration	15.6
Opposition-Controlled Areas	Infrastructure Reconstruction	80.5
	Service Delivery Restoration	8.9
Total		**577.2**

Recommendations and Limitations

There are several data limitations in the present assessment, including:

- The assessment is limited to tangible cultural heritage assets that could be identified remotely with satellite imagery. Smaller sites and those embedded in the historic urban fabric of Syrian cities may have been missed and consequently the figures may be higher. Equally, intangible heritage assets have not been assessed.
- Unit costs for the assessment have been standardized, because this was an essential step in order to calculate total damage and needs. For a sector like cultural heritage this is an obvious limitation, as assets have very different values and restoration costs.
- Extrapolations to governorates may have missed certain assets as they are based on population and incorporate a discount to account for less heritage in non-urban locations. This is obviously a simplification: it is true that heritage assets are concentrated where settlements are denser, and in cities; it is also true that there are major heritage sites in areas of lower human presence. In order to use the chosen methodology, it was necessary to accommodate this assumption.

Nonetheless, several findings are clear from the present analysis:

- Before the earthquake and the conflict, the tourism sector in Syria employed 20 percent of the workforce and cultural tourism was its driving force. Damage to the assets on which this sector was based should be looked at with priority, given the relevance of these assets for the economy. It is hoped that investments to restore these assets may anchor economic recovery.
- Heritage assets have been heavily affected and are at risk of irreparable damage and/or disappearance due to demolition and neglect, in a situation that is further aggravated by the risk of trafficking. This calls for the mobilization of the international community to target the heritage sector and consider addressing its needs in the next phases of interventions.

Impact on Physical Infrastructure and Productive Assets

Transport

Background and Analysis of Pre-Crisis Conditions and Trends

Syria's Transport Sector has experienced a decade of decline in activity resulting in particularly depressed levels of activity in the railway, aviation and maritime sectors following the peak levels of 2011. With regards to road transport, although the country-wide main network length increased by ten percent from 2011 to 2021, damage has been incurred to more than half of the roads in some urban areas, and in rural areas access roads have in parts been severed or impeded and bridges have been destroyed. The connectivity and operation of border crossings to the north between Syria and Türkiye have been dramatically reduced and those crossings that remain operational are heavily controlled with many restrictions in place. During this same period, the country's railway network was partially destroyed which significantly reduced the availability of services; while operations have resumed recently, this has only happened in relatively more peaceful areas. Accordingly, a much smaller catchment is currently being served with overall ridership levels in 2021 down 75 percent compared with 2011.

The aviation sector has been similarly hard hit with the annual number of passengers down 74 percent over the same ten-year period. International carriers largely stopped serving Syria, leaving the national carrier, Syrian Air to monopolize the remaining market demand when airports and skies are not shut for military purposes. The maritime sector also experienced a reduction in activity from 2011 to 2021 with the total number of containers in Latakia and Tartous ports dropping by 77 percent and 90 percent respectively. However, during the same period, the overall quantity of merchandise shipped dropped by only 31 percent which suggests that the level of activity in non-containerized goods was comparatively less affected by the recent deterioration in the economy.

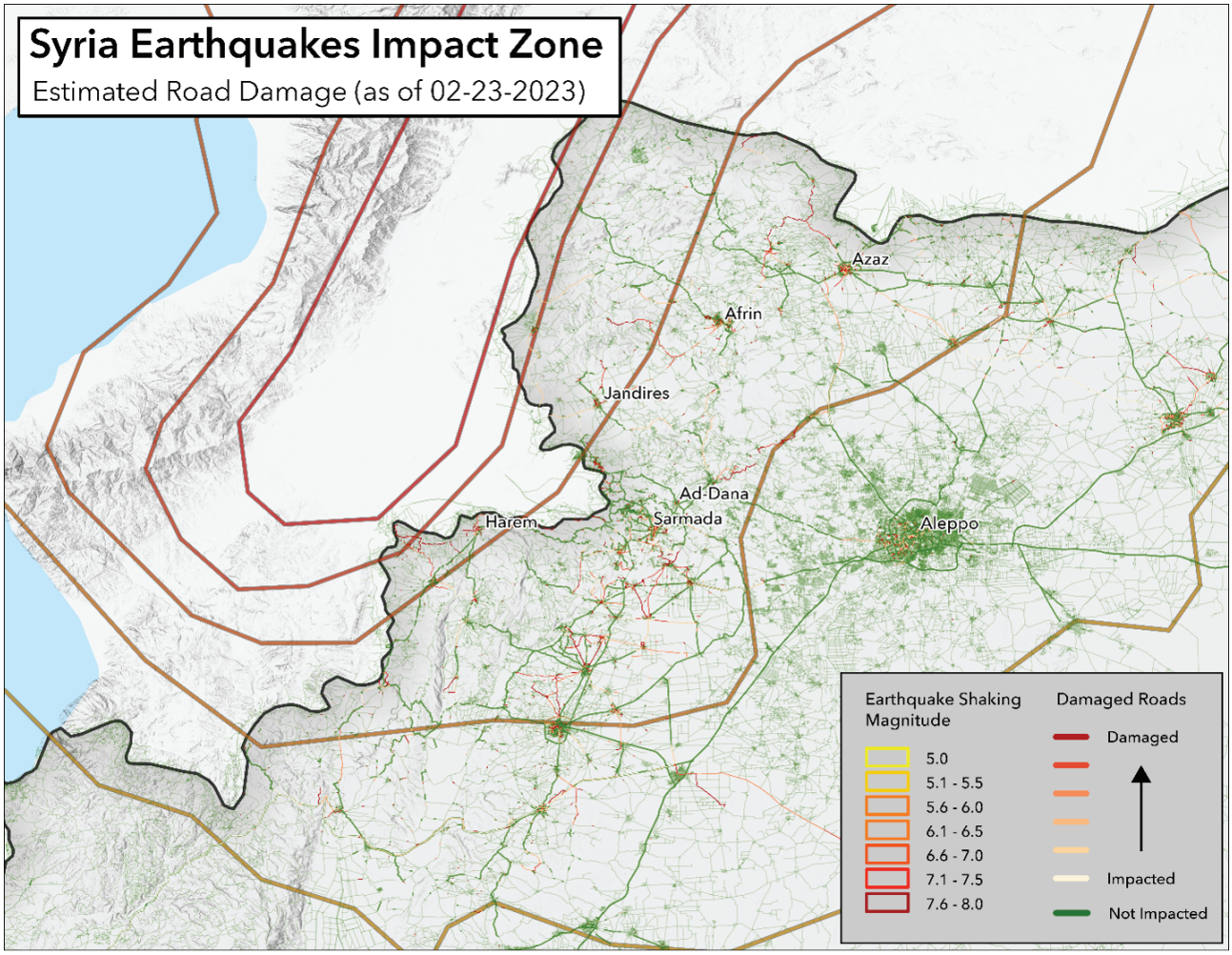
INVENTORY OF INFRASTRUCTURE ASSETS (GENERAL AGGREGATE FIGURES)

The extent of road network covered under the Transport chapter includes primary and secondary roads in the governorates of Aleppo, Idlib, Raqqah, Hama, Tartous and Latakia, with a total length of 3,038 km of primary roads and 2,946 km of secondary roads. The length of railway infrastructure across the nine assessed cities is 813 km out of a total network length of 1,972 km. Both Latakia and Tartous ports are situated within the geographic scope of the RDNA. Aleppo airport is the sole commercial airport to be covered by this assessment as it lies within the earthquake zone, but Damascus International Airport may be commercially indirectly affected due to the potential impact on domestic flights between these two airports.

SECTOR DEVELOPMENTAL CHALLENGES

The management of the transport sector is fragmented across the region given the presence of different control areas. The ongoing crisis in the transport sector continues to hinder investments, particularly in the railway sector which crosses areas controlled by different parties. In the maritime sector, Tartous port is used as a naval facility, and thus port operations are subordinated to security needs. In the civil aviation sector, the poor security situation has reduced revenues for the airport of Aleppo, and there are less revenues and developments in this sector. The environment in Northwest Syria is not conducive to growth, and as a result mobility levels are expected to remain subdued, which also results in less revenues to the government through taxes on fuel and cars. General accessibility to critical sites for redevelopment, together with the availability of materials, plant and equipment, and technical capability to implement reconstruction and rehabilitation works are also significant challenges given the competing high demand for such resources.

Figure 23:
Estimated Road Damage in the Study Area



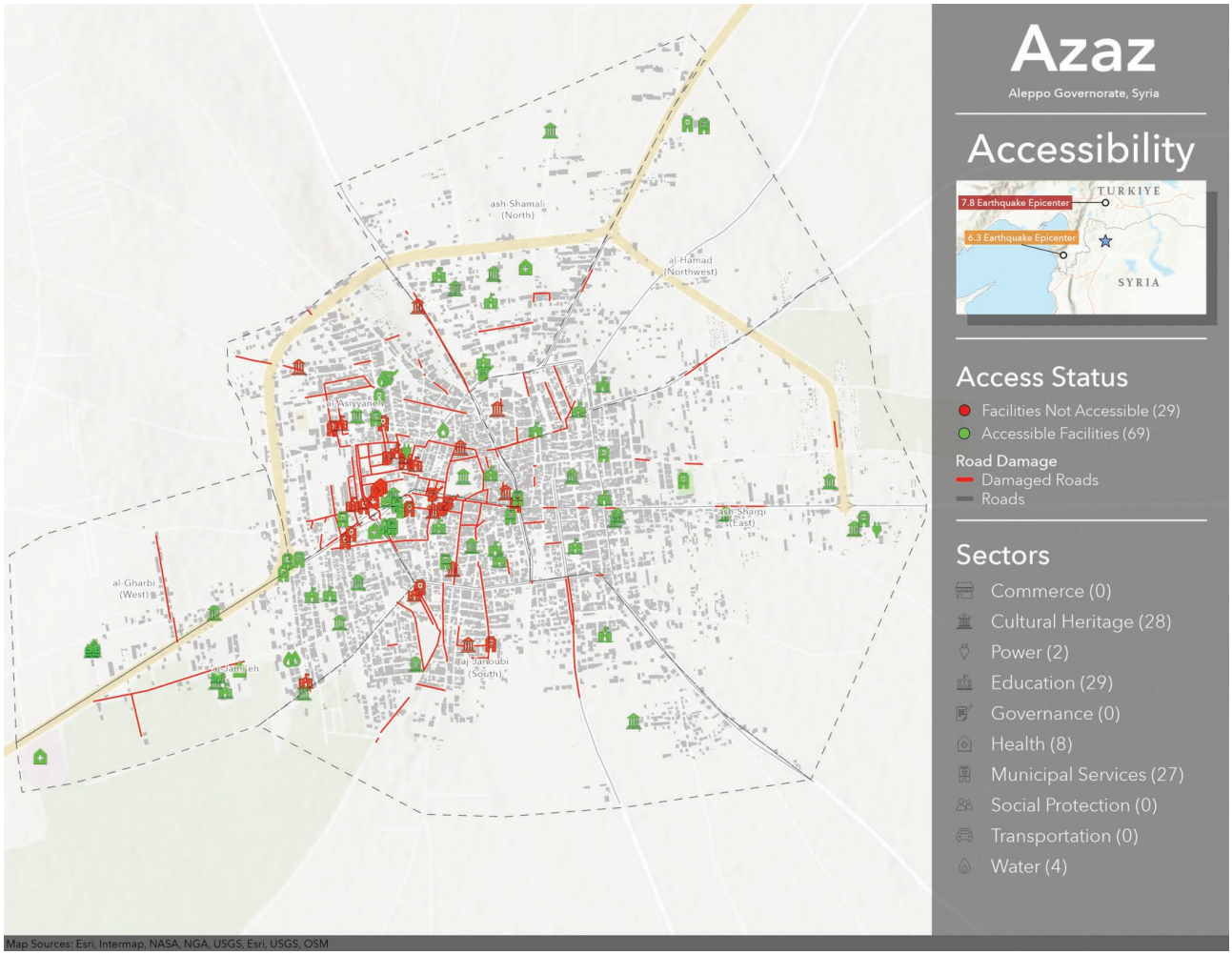
Source: World Bank

Assessment of Disaster Effects: Damage and Loss Estimates

a. Aggregate quantitative and qualitative effects on Infrastructure and Physical Assets (Damage)

The assessment covers six governorates impacted by the earthquake, with a focus on nine cities. The surveys revealed destruction and partial damage to bridge sections, as well as partial damage to primary roads and secondary roads, and blockages due to falling debris from destroyed buildings. The total damage to the primary and secondary roads across the six governorates extends over 675 km, representing about 11 percent of the assessed road network. The length of damage is equally split among primary and secondary roads, with around 340 km of damage in each category. Among the six governorates assessed, Tartous, Aleppo and Idlib have suffered the most as 19 percent (71 km), 18 percent (306 km), and 16 percent (106 km) respectively of their primary and secondary roads have been damaged. The total damage to bridges across the six governorates extends over 11 km, with 1 km of destroyed bridges and 10 km of partially damaged sections. The Figure below shows the roads that have been damaged as a result of the earthquake. In addition to the road assets, the earthquake has resulted in partial damage to the airport in Aleppo. The relatively high damages to the transport sector are also attributable to the pre-earthquake challenges such as lack of maintenance of roads and bridges or lack of repair of conflict-damaged roads. In Aleppo alone, around 25% of the bridges were uncrossable and 1.4 percent of roads needed maintenance.

Figure 24:
Impact on Accessibility in the city of Azaz



Source: World Bank

b. Aggregate quantitative and qualitative effects on production and delivery of goods and services, access to services and goods (Loss)

The obstructions and damages to the road infrastructure have caused traffic movement disruptions, lengthy detours, increased travel times and costs, and increased road safety hazards, further hindering the movement of people and goods, access to employment and essential services, and the operation of ambulances and civil defense vehicles. The closure of roads due to damages and falling debris has forced road users to use alternative longer routes, resulting in increased travel times and transport costs, for passenger as well as freight traffic, including building material and humanitarian relief. Destruction of road safety infrastructure and power outages may also have led to traffic safety hazards.

Across the nine studied cities, nine percent of health facilities and six percent of educational facilities are not accessible anymore. Access to governance, municipal services and cultural heritage facilities has also been affected, as has 16 percent of Public Institutions' facilities (public administration buildings), 14 percent of municipal services facilities (community markets, fire stations, police stations, libraries, parks, playgrounds, etc.) and eight percent of cultural heritage sites (religious sites, museums, etc.) are not accessible anymore. The Figure below shows the impact of the earthquake on accessibility in Azaz.

The total losses to the transport sector in the nine cities are estimated at approximately US$ 4.3 million. They represent the sum of revenue losses from lower fuel taxes (due to inaccessible areas in the aftermath of the earthquake, damaged vehicles, unavailability of fuel and

lower fuel demand due to unaffordable prices), and higher vehicle operating costs and travel times due to lower traffic speeds and long detours caused by road damages and the accumulation of debris obstructing traffic flow. Depending on the timing, availability of funds and strategy for recovery and construction, the estimated losses could be higher than estimated.

c. How damages and loss in the sector will affect projected GDP growth?

The damages and losses in the transport sector will have spillover effects on Syria's economy and will impact projected GDP growth. The lack of accessibility and reduced mobility will result in reduced productivity across sectors due to longer travel times to reach jobs. In addition, the increase in travel time and cost may result in people leaving their jobs to search for closer ones, and this affects women more than men. An additional consequence is the increase in the costs of goods and products due to the increased cost of transport. Also, poor quality of roads leads to increased road safety hazards and accidents and fatalities which are considered added costs to the economy.

d. Can existing vulnerabilities be exacerbated and overall risk increase?

Transport infrastructure is vital for people's access to essential services and employment. Before the earthquake, Syria was already suffering from devastated infrastructure, and the earthquake further exacerbated the level of damage and the risk and vulnerability of existing transport infrastructure. The earthquake and its aftershocks may have indeed affected the structural stability of existing roads, including bridges, and the stability of sloping terrains. Vulnerable groups, including women, IDPs, the elderly, etc., are likely to suffer more from hindered access to services and employment, which in turn further exacerbates their vulnerability. Disasters also tend to particularly impact the poor who have less resources to cope and adapt, and less access to social services.

The total damage to assets and infrastructure in the transport sector in the six governorates amounts to US$ 718 million as detailed in the Table below. The total damage and loss in the nine cities amount to US$ 56 million (excluding damage to bridges) and US$ 4.3 million, respectively.

TABLE 31: DAMAGE AND LOSS INVENTORY TABLE (IN US$ MILLION)

	Asset Types	Baseline	Partially Damaged	Completely Destroyed	Total Cost
DAMAGE	*Primary roads, km*	3,038.4	311.1	N/A	119.9
	Secondary roads, km	2,945.9	322.2	N/A	58.9
	Bridges (motorway, trunk, primary, secondary), km	47.0	10.1	1.1	489.1
	Ports	1	0	N/A	0
	Airports	1	1	N/A	50
	Railway station	2	0	N/A	0
	Total Damage				**717.9**
LOSS	*Losses due to lack of mobility*				0.2
	Losses due to increase in marginal vehicle cost				3.2
	Losses due to increase in travel time				0.9
	Total Loss				**4.3**
Total Effect (Damage and Loss)					**722.2**

TABLE 32: TOTAL DAMAGE AND LOSSES BY GOVERNORATE (IN US$ MILLION)

Governorate	Total Damage
Aleppo	184.2
Idlib	174.6
Raqqah	133.8
Hama	34.1
Tartous	47.2
Latakia	143.9
Total	**717.8**

TABLE 33: TOTAL DAMAGE AND LOSSES BY AREAS OF CONTROL (IN US$ MILLION)

Areas of Control	Total Damage
Government-controlled areas	199.6
Autonomous Administration of North and East Syria	208.6
Opposition-Controlled Areas	309.6
Total	**717.8**

Sectoral Recovery Strategy and Needs Assessment

a. Which assets and infrastructure need to be reconstructed?
The recovery and reconstruction of the sector requires significant financing and coordination among local and international donors. The recovery and reconstruction needs for the six governorates amount to US$933 million and include the rehabilitation of primary roads, secondary roads and bridges, as well as the rehabilitation of the damaged airport in Aleppo. These needs take into account the staffing, equipment and materials needed to bring assets and services back to pre-crisis levels. They also account for inflation, security and insurance premiums, and a BBB factor particularly for more disaster-resilient infrastructure. Reconstruction requires higher standards of design and construction of roads, bridges, and associated infrastructure (drainage, culverts, etc.) to accommodate increased resilience against tremors, and potentially flood-control or landslide protection on strategic and relevant road sections.

b. What is the geographic distribution of needs? Which areas and facilities should be prioritized?
Recovery and reconstruction needs are largely concentrated in the governorates of Aleppo, Idlib, Latakia, and Raqqah, in decreasing order, amounting to US$240 million, US$227 million, US$187 million and US$174 million, respectively.

c. Which facilities have the greatest needs?
Bridges are a priority across the six governorates with US$636 million needed for their restoration and reconstruction, including US$190 million and US$183 million in the governorates of Idlib and Latakia, respectively.

d. How can services be restored? Which types of services should be prioritized?
Rubble clearance and the maintenance and rehabilitation of damaged roads is key and should be prioritized to restore service delivery in the sector, particularly, in areas significantly impacted by the earthquake where the population is struggling to access basic services (like health, social services, education, market centers, etc.) and employment opportunities to sustain their livelihoods. Restoring services involves reducing transport costs and may include: (i) setting up temporary bridges to facilitate traffic over road sections where bridges have been destroyed, until they are rebuilt; (ii) possible temporary government subsidies for public transport in areas with high post-disaster transport costs, thus avoiding increases in tariffs; and (iii) possible temporary tax relief schemes for private and public transport companies over the recovery period.

e. How can sectoral needs be sequenced over a period of one to three years?
Recovery and reconstruction interventions need to be prioritized and sequenced based on the economic and social importance of the damaged facilities and assets. The early-recovery interventions in the transport sector should focus on road clearance, rubble/obstruction removal, and the construction of temporary bridges where needed to restore

access to residential areas, markets, border crossings (to facilitate the entry of construction material and aid) and essential services like health and education. This will be followed by the rehabilitation of key roads carrying high traffic volumes or serving key locations such as hospitals, schools, or border crossings. Short-term interventions include rehabilitation of remaining roads and bridges while improving the implementation capacities of the sector's institutions.

f. What is necessary to address the 'soft' issues (for example, staffing and institutional capacity)?

Strong ownership from national and local institutions is critical for effective recovery. Funding for emergency repairs, recovery and reconstruction needs to be quickly mobilized in collaboration with local and international donors. Moreover, labor-intensive rehabilitation and reconstruction interventions would create much-needed employment for local consultants, contractors, and skilled/semi-skilled workers.

The Table below shows the estimated costs for infrastructure reconstruction in the early-recovery (0-12 months) and short-term (one to three years) phases by city, governorate, and area of control.

TABLE 34: TOTAL COST OF NEEDS BY GOVERNORATE (IN US$ MILLION)

Governorate	Needs category	Cost
Aleppo	Infrastructure Reconstruction	239.5
Idlib	Infrastructure Reconstruction	226.9
Raqqah	Infrastructure Reconstruction	173.9
Hama	Infrastructure Reconstruction	44.4
Tartous	Infrastructure Reconstruction	61.3
Latakia	Infrastructure Reconstruction	187.2
Total		**933.2**

TABLE 35. TOTAL COST OF NEEDS BY AREA OF CONTROL (IN US$ MILLION)

Areas of Control	Needs category	Cost
Government-controlled areas	Infrastructure Reconstruction	467.5
Autonomous Administration of North and East Syria	Infrastructure Reconstruction	194.5
Rebel-Controlled Areas	Infrastructure Reconstruction	271.2
Total		**933.22**

Recommendations and Limitations

a. Main limitations of the assessment

The damage assessment for the Roads Sector focuses on primary roads, secondary roads and bridges, and excludes damage to border crossings, vehicles (light vehicles, buses, trucks, etc.), road traffic furniture (traffic lights, signage, etc.) or facility infrastructure (drainage or protection structures, etc.). Damage to motorways and trunks is only assessed on bridge sections, and damages to tertiary roads, tracks, residential roads and service roads are covered under the Municipal Services Chapter and have not been covered under the present chapter.

b. Link between sector and cross-cutting themes

Damages and obstructions to road assets and infrastructure have hindered access to essential services and markets, particularly for women, the youth, the elderly, people with limited mobility and other vulnerable groups.

c. Brief overview of potential interventions

In the immediate- and short-term, the priority is to restore services by repairing damaged roads and bridges, and a fast-track program to remove debris, clean road surfaces and re-establish a road network to link residential areas, services, businesses and key economic centres. This program would involve planning and implementation of rehabilitation works and should consider the safe disposal of waste. However, there is also a need to balance rehabilitation works with the opportunity this crisis offers to BBB through more resilient designs to earthquakes and natural disasters, greener construction materials and processes, as well as safer roads.

d. Recommendations for recovery plans

The recovery plan should build on the opportunity to BBB and work towards infrastructure resilience against earthquakes, climate change and natural disasters, not only for the immediate reconstruction needs but also for future infrastructure projects through multiyear planning and budgeting. In the immediate- and short-terms, recovery plans should focus on high priority interventions such as the opening, maintenance and rehabilitation of key roads carrying high traffic volumes or serving key locations such as hospitals, schools, or border crossings to restore service delivery and access to essential services. In the medium and long-term, local institutional and implementation capacities need to be restored. Given the widespread loss of jobs and livelihoods due to the earthquake, labor-intensive road maintenance and support for microenterprises should be priorities for job creation in the affected areas. Most importantly, the plan ought to be put together in an inclusive and participatory manner, in consultation with the people and businesses, particularly women, the youth, the elderly, IDPs, people with limited mobility and other vulnerable groups to ensure that no one is left behind and that the needs of the communities are addressed. Civil society organizations (CSOs), local and international NGOs, and the contracting and consulting sectors should also be consulted. The recovery plan should also consider available resources, donors' funding, and the environmental and social impacts of interventions.

Water

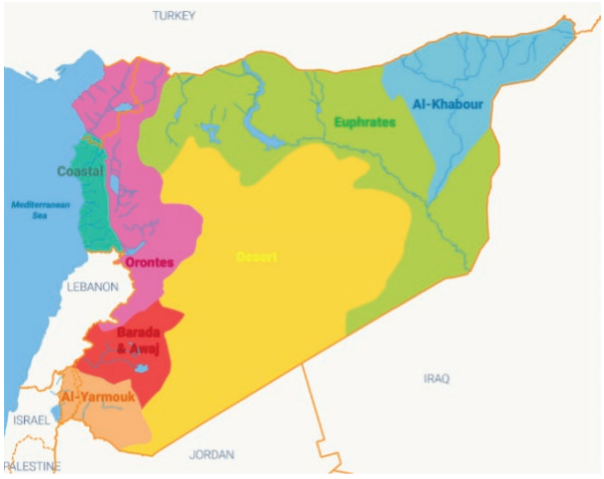
Background and Analysis of Pre-Crisis Conditions and Trends

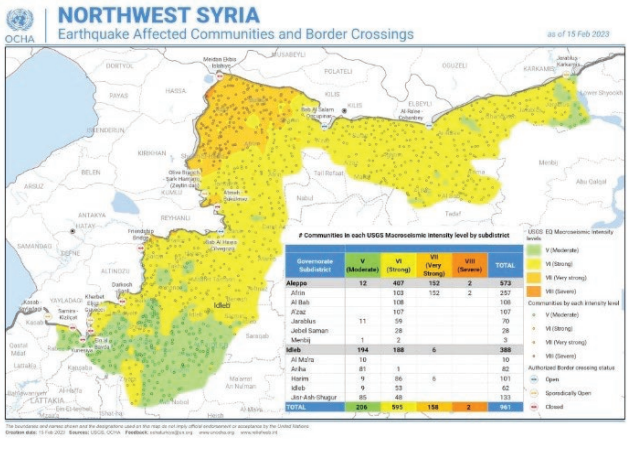
This is a region in which water security is a constant struggle, where much of the population relies on poorly irrigated agriculture and where the water supply and sanitation situation prior to the earthquake was dire. The United Nations Office for the Coordination of Humanitarian Affairs (OCHA) estimates that 90 percent of the 4.6 million people in Northwestern Syria are reliant on humanitarian aid[71]; and the country's water supply has been reduced between 30 and 40 percent due to the protracted conflict. Water and sanitation services have been further affected by the lack of electricity, which limits the distribution of water and the operation of water treatment facilities. As a result, exposure to water borne diseases is high, with cholera infecting over 85,000 people who did not have access to essential care or services in 2022. These conditions are increasing the exposure of highly vulnerable, conflict affected communities across Northwestern Syria.

Water supply and sanitation. Residents in the Northwest had previously faced water shortages as a result of mismanagement, government neglect, and military operations (damaging infrastructure). This forced residents to drill boreholes; around 1,000 boreholes were registered with the Strategic Steering Group Water Resources Department as of August 2022. Water needs were unmet in 97 percent of communities, with an average of 56 percent of the population identifying it as a priority need. According to the United Nations, more than 50 percent of the population of Northwest Syria lacks access to piped water and relies on alternative sources such as trucked water.[72] In many cases, the water trucks only service central locations and residents who live further away need to transport the water they buy by the barrel themselves. Trucked water is not only expensive but is also unregulated and can be unsafe to drink if untreated. Thus, according to the United Nations Children's Fund (UNICEF),[73] 42 percent of the people rely on alternative or unsafe water; and 70 percent of wastewater is untreated.

Dams. In addition to the concern related to the adequate provision of safe drinking water due to the lack of operations and maintenance of dams following years of conflict, concerns have been raised about the earthquake's potential impact on the safety of dams. The earthquake-affected areas in the Northwestern region of Syria are located primarily in the upper reaches of the Euphrates and the

Figure 25:
River basins and Earthquake Impact areas





71 *ECHO. 2022. New life in the village: easing water scarcity in Northwest Syria*
72 *New life in the village: easing water scarcity in Northwest Syria*
73 *UNICEF (2022)*

Source: City of Blleramoon, PNEONEO, DOI: 08FEB2023. World Bank/Ipsos

Orontes basins. These are home to an estimated 53 of Syria's 166 dams (Table 36) which provide an array of services, including water for domestic and industrial supply, irrigation, hydropower generation, and flood control, among others. These regions are also located downstream of a number of dams situated on the Euphrates River and its tributaries in Türkiye. Many dams in the earthquake-affected areas of Syria already suffer from neglect and lack of regular maintenance due to the protracted conflict. This can increase vulnerability of the dam to natural hazards and decrease the safety factor of the dam, progressively leading to or heightening the risk of a catastrophic failure, while the lack of emergency preparedness downstream of the dams can also increase the exposure of the local population and assets to potential inundation. These challenges are further accentuated by the current context, in which there is a complex array of shifting roles and responsibilities for the safety of dams across different areas of control. These challenges are illustrated by the Maydanki Dam which was captured by Turkish Armed Forces from the Kurdish People's Protection Units on March 9, 2018, during the Turkish military intervention in Afrin with armed units affiliated with the Turkish-backed Free Syrian Army rebel faction.[74]

74 ***RUDAW (2018) Turkey takes Afrin dam, nears city: media reports.***

TABLE 36: MAIN DAMS IN SYRIA

Basin	Number of Dams	Storage Capacity (MCM)
Orontes	49	1,492
Euphrates and Allepo	4	16,146
Yarmouk	42	245
Barada and Awaj	-	-
Coastal	21	602
Al Badia	37	69
Tigris and Khabour	12	1,045
Total	**165**	**19,599**

(Source: FAO 2008 based on MLAE 2007)

Assessment of Disaster Effects: Damage and Loss Estimates

DAMAGES ESTIMATES

Earthquakes usually have a significant impact on infrastructure that would need to be assessed on the ground through surveys to determine the exact extent of damage. This assessment relies on satellite images to estimate the damage to water sector assets, which are estimated to be about US$ 145.4 million. This estimate covers only ***detected*** wells, water towers/tanks, water treatment plants, sewage treatment plants, pumping stations, storage reservoirs of 10,000 liters, along with water and sanitation facilities. The Table below presents only the assessed value of replacement and rehabilitation costs by asset. The information is indicative, and shall be completed through an additional, in-depth ground assessment to refine and validate these estimates.

TABLE 37: DAMAGE INVENTORY (IN US$ MILLION)

Summary	Baseline assets	Damaged Assets	Destroyed Assets	Cost (in US$ million)
Well	195.0	9.5	0.9	0.2
Water Tower/Tank	96.0	6.0	6.0	83.2
Water Treatment Plant	2.0	1.0	-	26.4
Sewage Treatment Plant	2.0	1.0	-	18
Water supply network	n.a.	n.a.	n.a.	n.a.
Sewage network	n.a.	n.a.	n.a.	n.a.
Irrigation canals (in km)	1,500	n.a.	33.2	1.2

Summary	Baseline assets	Damaged Assets	Destroyed Assets	Cost (in US$ million)
Dam	n.a.	n.a.	n.a.	n.a.
Pumping Station[75]	12.0	3.4	-	15.1
Water Storage Reservoir	1,169.2	95.6	12.9	0.3
Water/Sanitation Office	2.0	-	-	-
Total	**1,478.2**	**116,5**	**53**	**145.4**

TABLE 38: TOTAL DAMAGES BY GOVERNORATE

Governorate	Total Damages (US$ in million)
Aleppo	78.9
Idlib	12.4
Raqqah	2.9
Hama	15.3
Tartous	0
Latakia	54.0
Total	**145.4**

TABLE 39: TOTAL DAMAGES BY AREAS OF CONTROL

Areas of Control	Total Damage (in US$ million)
Government-controlled areas	131.2
Opposition-Controlled Northwest Syria	13.6
Autonomous Administration of North and East Syria	0.6
Total	**145.4**

Water Supply and Sanitation. In the Northwestern areas, preliminary estimates suggest that as a result of the earthquake, up to 10,000 households[76] are affected by damaged or destroyed water supply and sanitation facilities. Damage to water reservoirs, pumping stations, wells, water tower/tanks, water treatment plants, wastewater treatment plants, water supply networks, sewage networks, water supply station reservoirs, and water/sanitation offices has not been reported. However, based on similar experiences from other assessments, it is reasonable to assume that there would be damage to underground water supply and sewerage systems. Limited information was available on damage to water supply and sanitation facilities. A substantial proportion of the population did not have access to safe drinking water prior to the earthquake, and are now more vulnerable to health emergencies and likely to face greater difficulties in case of future disasters. The rapid assessment showed that the water supply in institutional buildings was not affected by the earthquake. A precise assessment of the damage to the ground is required to better inform people of the status of the water supply and sanitation facilities. In addition, particularly in Greater Idlib on the Turkish border and throughout Northern Aleppo, many households were deprived of water and sanitation. This

75 Estimated cost includes observed and extrapolated damages
76 ***OCHA. Northwest Syria – Situation report***

information is corroborated by information from the media and other humanitarian agencies working on the ground.[77]

Dams Assessment. The satellite imagery identified no additional damage to dams, beyond the fissures in the Afrin Dam. From a technical point of view there are numerous impact pathways associated with the safety of dams and the services they provide. When dams are designed using modern seismic engineering principles and well-constructed, they typically perform well and are able to withstand seismic conditions. The principal consideration for the seismic design of dams is ground shaking, which causes vibrations in dams, appurtenant structures and equipment, and their foundations. Fault movements in the dam foundations or discontinuities in dam foundations near major faults may cause structural distortions. However, there are several other impact pathways associated with the effects of earthquakes, including fault movement in the reservoir area causing water waves in the reservoir or loss of freeboard; mass movements or rockfalls causing damage to gates, spillway piers, retaining walls, powerhouses, electromechanical equipment, penstocks, transmission lines, access roads to dams, etc. Damages can also be incurred due to operational safety considerations. These can include the sudden release of water to draw down the reservoir which results in downstream inundation, an interruption or cessation of services provided by the dam and reservoir, such as lack of water for domestic and industrial supplies, interruption of hydropower production, or provision of water for irrigation. While catastrophic failures are rare, these can result in the sudden uncontrolled release of water with extremely adverse consequences, including large-scale loss of human life and significant economic and environmental impacts. In this context, the risks to Syria also include considerations of the safety of dams located upstream in Türkiye.

In the aftermath of the earthquake there were numerous reports of structural damage and increased water levels in many sections of the Euphrates and Oronte rivers. The potential risks associated with the earthquake were compounded by several days of snow and rain which increased the discharge volume in rivers in the affected areas. A rapid remote sensing assessment identified 19 dams in the earthquake affected area. Damages were reported for two facilities, five reported no damage while data was not available for the remaining sites. A 3m high levee on the Orontes River near the village of Al Tlul in the Idlib Governorate on the border with Türkiye reportedly failed, causing major flooding in the surrounding residential and agricultural areas. The earthquake and its secondary impacts caused water levels to rise suddenly, and UNOCHA reported that 7,000 people evacuated and 1,000 houses flooded. The 73m high Maydanki Dam, also known as the Afrin Dam, located in the northern Aleppo Governorate was inaugurated in April 2004 with a capacity of 190 MCM and shows extensive cracks, with early reports suggesting the dam was in danger of imminent failure. Located in one of the regions most affected by the earthquake and the only area of "very strong" macro-seismic intensity, the dam provides drinking water to about 200,000 people, irrigation for about 30,000 hectares of olives, fruit trees and agricultural crops, and supplies 25 megawatts of hydroelectric power. The Free Syrian Engineers Association has reportedly inspected the dam, along with engineers who were supervising it before the earthquake and concluded that it is safe but in need of maintenance. The experts who conducted the technical visit will report on the condition of the dam and recommend actions to remedy the damage.

77 The White Helmets tweeted about the destruction of infrastructure, water and sewerage lines after the earthquake increasing the possibility of a cholera outbreak. A report by the UN Security Council also raised similar concerns due to the "severe shortage" of clean water across the country. (***(https://www.foxnews.com/health/2-die-cholera-syria-afterdevastating-earthquake-damaged-health-water-infrastructure)***

Figure 26:
Downstream of Afrin Dam showing dam wall, spill way and irrigation canal intake (left from marker).

Figure 27:
Medium resolution satellite image (Sentinel – 2) dated February 9, 2023- no floods.

Figure 28:
Medium resolution satellite image (Sentinel – 2) dated February 14, 2023- no floods

LOSSES ESTIMATES

The losses for the water sector are related to the loss of service delivery, which is linked directly to the collection of revenues. However, since the beginning of the conflict, users have not paid their water utility bills and have been relying instead on alternatives (private supplies) and humanitarian support. The water fee per subscriber covers water supply, wastewater operations and maintenance, and taxes. The number of subscribers in the impacted area is not documented. These subscribers may not pay until service returns to pre-crisis levels. Thus, it is very difficult at this stage to assess losses until there is more clarity on the governance structure and regulations of the water sector.

Sectoral Recovery and Reconstruction Needs Assessment (including cost estimates)

Tables below provides prioritized and sequenced needs for infrastructure; however, the service delivery restoration would be accurately assessed once information is provided on household connections, water meters, length of water supply network and sewerage network. The infrastructure covers the reconstruction and rehabilitation of damaged wells, pumping stations, treatment plants in the first year. The water storage reservoir and tower tanks should be rehabilitated in years 2 and 3. Fixing the water supply and sanitation service delivery entails the replacement of the damaged household connections and length of networks and wells in the first year. This needs to be assessed on the ground since satellite images do not provide any information on underground assets. However, the rehabilitation of the water supply and sanitation networks and the replacement of damaged water meters require more attention and will be covered in the medium term in this case.

TABLE 40: TOTAL RECONSTRUCTION NEEDS BY GOVERNORATE (IN US$ MILLION)

Governorate	Early recovery (0-12 month)	Short term (1-3 years)	Total (Over 0-3 years)
Aleppo	40.0	85.5	125.2
Idlib	6.3	13.4	19.6
Raqqah	0.0	0.0	0.0
Hama	0.0	0.0	0.0
Tartous	-	-	-
Latakia	27.4	58.5	85.7
Total	**73.7**	**157.5**	**230.6**

TABLE 41. TOTAL RECONSTRUCTION NEEDS BY AREA OF CONTROL (IN US$ MILLION)

Area of Control	Early recovery (0-12 month)	Short term 1-3 years)	Total (Over 0-3 years)
Government-controlled areas	66.4	143.0	209.5
Opposition-Controlled Areas	6.9	14.8	21.6
AANES	0.3	0.7	1.0
Total	**73.1**	**158.5**	**232.1**

Early Recovery Needs. The RDNA team ascertained early recovery priorities based on the existing available information and data on affected people. Short-term interventions included providing semi-permanent and intermediate structures to support water and sanitation of affected people. There is also an urgent need to conduct detailed dam safety site inspections to determine structural integrity and provide a list of dams that require repair before the next wet season.

Reconstruction needs for water supply and sanitation include infrastructure replacement and support for implementation. To meet daily water requirements, there will be a need for rapid repair of damaged distribution systems, provision of temporary filtration facilities and water delivery by tankers. In the short term, priority should be given to rehabilitation of the damaged water distribution networks, which can be accompanied by sanitation improvements and hygiene education programs.[78] Thus, the early recovery needs should focus on: (i) rehabilitation of partially damaged springs, dug-wells, and pumping stations; (ii) rehabilitation of partially damaged surface water schemes and associated treatment plants; (iii) provision of basic buildings supporting water and sanitation-related agencies. In addition, there is a need to monitor and assess potential groundwater contamination due to damage to sanitation facilities.

Short-term Recovery and Reconstruction Needs. The short-term `needs and associated strategy should focus on: (i) providing water distribution networks for reconstructed settlements and for selected new settlements resulting from land readjustment and small-scale relocation

78 The assessment did not have baseline information on the water supply networks and sewerage networks. The satellite images only capture the facilities on the surface and do not cover underground infrastructure.

schemes; (ii) provision of drainage and/or sewerage for reconstructed settlements; (iii) reconstruction of damaged offices; and (iv) upgrading of sector facilities for improved disaster preparedness. House designs are expected to include earthquake-resistant features and technologies and constitute a BBB approach. These should be accompanied by investments in water supply and sanitation infrastructure, facilitating the transition from the short-term emergency response to longer term, sustainable water supply and sanitation services. These measures will need to be accompanied by efforts to strengthen the institutional arrangements for sustaining services. The rapid dam safety assessment should be expanded to include more detailed site-specific assessments and an investment program to support physical rehabilitation, monitoring and surveillance, and institutional measures to improve the safety of dams and downstream communities.

The Table below shows a matrix for both short- and medium-term support that would be needed for both institutional and infrastructure perspectives.

TABLE 42: MATRIX OF SHORT-TERM AND MEDIUM-LONG TERM NEEDS

Type of support	Short-term	Medium-term
Institutional	• Support funding of operations and maintenance costs (staffing, equipment, materials). • Interim service arrangements for the utility to supply tankers for emergencies. • Support mechanism to pay salaries for staff at the water utilities. • Stop-gap energy provisions (fuel/diesel and generators). • Interim service arrangements for the utility to supply tankers. • Spares to tackle O&M backlog. • Security to protect critical intakes and wells. • Developing a prioritized recovery plan.	• Improve the capacity for planning, communications, citizen engagement, and financial sustainability of the water sector. Include the opportunity to BBB (for example, by reducing energy use). • Improve the enabling environment to encourage private sector participation. • Improve the efficiency of existing infrastructure and infrastructure. planning, considering the capital and operational costs in the financial analysis. • Support re-establishing the customer database and billing system. • Recruitment for re-staffing the utility. • Water resources assessments. • Support to implement recovery plan.
Infrastructure	• Conduct an in-depth ground assessment of the water sector infrastructure (i.e. treatment plants, reservoirs, sewerage networks, water supply networks, connections etc.), rapid assessment of dam safety and irrigation infrastructure. • Make emergency repairs and rehabilitate water sector infrastructure to restore services. • Back-up power generation systems. • Cleaning and disinfection of public wells, network and unblocking sewers. • Emergency repairs to treatment plants, production facilities and network (water and sewer). • Replacement of broken equipment.	• Reconnecting water utility with grid electricity. • Rehabilitating treatment plants, production facilities and network (water supply and sewage). • Rehabilitation of dams and irrigation infrastructure. • Leakage control and preparing a non-revenue water program. • Drilling new production boreholes or rehabilitation of the existing ones. • Developing laboratories and monitoring plan for water quality.

Recommendations and Limitations

The rapid assessment relies on a combination of quantitative data derived from remote sensing and a qualitative desk top review of reports available in the public domain for the water sector. To better estimate the damage there is a need for more specific, ground truthed data and information to provide more robust estimates about the infrastructure and to understand the baseline conditions, the extent and coverage of piped drainage, sanitation, water distribution networks, and investment requirements for safe dams and maintenance of irrigation services. In addition, a description of existing water treatment plants and associated infrastructure would be important to understand baseline conditions and allow more robust cost estimates. The recommendations for the recovery/reconstruction in the water sector are to:

Assess damage to the drainage, sewerage, and water distribution network. The extent of damage to these networks remains largely unknown. The significant land movement has presumably disrupted the underground piped networks, causing severe damage and disruption to services. However, it is difficult to determine these damages based on remote sensing, and a more detailed assessment of these networks is needed to develop reconstruction plans:

- **Water supply network.** The networks constitute a very important and expensive component of the overall water system infrastructure. Besides, their status in terms of number and size of leaks determines the size of water losses. A more detailed investigation on the ground will be needed to assess damage to networks and to develop reconstruction plans.
- **Sewerage network and construction of new wastewater treatment plant**. Work on the ground will be needed to ascertain the specifications of the networks and treatment plant. Many critical infrastructure components will probably need maintenance that has been deferred during the crisis. This could be a substantial cost.

Assess damage to dams on the ground. The remote sensing assessment is sufficient to detect the catastrophic failure of dams due to the earthquake. However, site specific assessments are needed to determine structural distortions due to movements or discontinuities in the dam foundations, or fault movement in the reservoir. They are also needed to identify barrier dams caused by landslides and other damages that can be incurred due to ensuing operational safety considerations. A more detailed, structured process is therefore needed, including:

- Remote sensing assessment to identify all dams within the earthquake-affected area using a more detailed time series assessment using high-precision satellite images from before and after the earthquake to identify visual damages and deformations, such as InSAR, that can detect 1-2 mm deformations. This could also be used to identify potential losses due to reduced services for domestic and industrial supplies, water for irrigation and hydropower production.
- On-ground, rapid site inspection and risk assessment of all dams using a prioritized list based on the remote sensing assessment and prioritization that can rank investment requirements for rehabilitation needs. This should be completed prior to the next rainfall period.
- Longer-term dam safety rehabilitation program that would finance structural works required to ensure the safety of dams, protection of downstream communities and assets, sustain the provision of water for related services; as well as non-structural measures, such as institutional capacity and emergency plans to strengthen preparedness in case of subsequent dam failures. This would require a number of years to implement.

Rehabilitate critical infrastructure. Only a few critical pieces of infrastructure were damaged. Reductions in functionality are primarily for non-technical reasons and therefore, given appropriate conditions, much of the critical infrastructure is expected to return to functional status. However, water tanks and wells received the brunt of the damage and should be rehabilitated quickly to provide drinking water.

Irrigation infrastructure status. Most larger irrigation schemes in the affected areas typically consist of steel pipe networks buried in the ground. These underground networks may have become dislocated and broken. Satellite imagery may be suitable to identify wet areas. However, to fully assess damage would involve specific on-ground investigations such as pressure tests and other leakage detection techniques.

Rehabilitation of water towers, tanks and reservoirs. Water storage tanks/towers received the brunt of the damage. These are smaller projects that are distributed over a large area yet will be a priority for short-term reconstruction.

Rehabilitation of existing wells and water monitoring. Many wells were drilled pre-conflict without considering the effect of increased abstraction on groundwater levels, and groundwater resources are as a result over-exploited. Rehabilitation of these wells after the earthquake should be done strategically based on an informed understanding of the longer-term sustainable yields. Undertaking water resources management studies, developing water resources management plans, developing a regulatory framework for groundwater management, and obtaining the equipment necessary to monitor water resources will be a critical part of the reconstruction plan.

Invest in water resources management capacity. In addition to the reconstruction and rehabilitation of infrastructure, substantial non-structural investments will be required to BBB. This will include, for example, a detailed stocktaking of water resources management capacity, assessment of the human capital available and necessary to restore functionality, and hydrological studies to strengthen water resources management capacity. As donors and humanitarian partners are currently supporting the water sector, continuous coordination of activities becomes even more important to ensure complementarity of these activities. Since the onset of the conflict in Syria, there has been little engagement with customers, and billing systems, fees and their collection would need to meet both customer and water authority needs. Currently, a lack of revenue hampers the water authority's ability to operate and maintain water related infrastructure and services.

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5. ***file:///C:/Users/wb444841/OneDrive%20-%20WBG/Desktop/Syria/background.pdf***

Power

Background and Analysis of Pre-Crisis Conditions and Trends

At the end of 2012, violence erupted in the Northwest and since then most electricity services in the area have been suspended by the Government-controlled areas. Transmission lines and other assets were targeted during confrontations between Opposition-Controlled and Government-controlled areas and were subject to looting and theft. During the war (and until 2021), around 28 percent of Aleppo's power sector infrastructure incurred damage estimated between US$358.9 million and US$722.1 million, followed by Idlib where around 60 percent of the power sector infrastructure incurred damages estimated between US$406 to US$816 million. While efforts are being made to rebuild the sector, several challenges remain, including inadequate investment, electricity theft, complications with procurement and limited fuel. Moreover, the enforcement of regulations or policies is relatively poor, as many non-state actors continue to influence economic and political spheres due to the fragile nature of the area.

Between 2013 and 2016, diesel generators (DG) became the primary source of electricity for Northwest Syria. However, after 2016, and due to price volatility of diesel coupled with the affordability of solar PV, there have been multiple attempts to centralize electricity generation and engage the private sector in major cities and towns in Northwest Syria which commonly use DG of multiple MW sizes, with metering infrastructure and set tariffs.2 To obtain electricity, consumers pay a subscription fee which depends on the consumption of amperes. Since May 2021, the supply of electricity in the Northwest has progressed with the establishment of three companies; Turkish AK energy, Syrian-Turkish Energy Company (STE) and Green Energy, which serve as integrated utilities with connection points to Türkiye. However, services suffer from outages and rationing. By early 2023, the Northwest's network was covered to a large extent with a continuous supply of electricity, including relatively remote rural areas.

In Government-controlled areas, the situation is similar, although the alternate supply of electricity was not outsourced to integrated utilities, but followed a rather decentralized, smaller scale approach.[79] After the complete destruction of two of the country's major power plants (in Aleppo and Idlib) during the conflict, an additional six plants around Hama, Homs, and Damascus suffered partial damage and significant reduction in service. Consequently, and as early as 2016, supply was down to 20 percent of its pre-war level. Following a brief recovery in 2017-2019, it dwindled to below 2016 levels due to sanctions which affected the authorities' ability to secure a regular supply of fuel. Starting in 2020, it deteriorated even more due to sharp increases in fuel prices.[80] Before the earthquake, electricity was supplied for a maximum of 6-8 hours per day with as many as 30 percent of households and 33 percent of public institutions reporting less than 2 hours of electricity supply per day. Therefore, private generators are widespread and fill the service delivery gap at a premium.

Assessment of Disaster Effects: Damage Estimates[81]

The assessment identified power plants, substations, private generators, towers, and administrative offices as the main assets of the Electricity Sector and found some areas substantially more damaged than others. It has been reported that the disruption of electricity provision in the Northwest, where private sector companies provide services, lasted approximately 48 hours after the earthquake, and was later restored as damages were addressed.

It is estimated that the earthquake has damaged 9 substations and about 405 electricity towers with an estimated total replacement cost of US$32.1 million. It

79 Hatahet, S., & Shaar, K. (2021). (rep.). Syria's Electricity Sector After a Decade of War: A Comprehensive Assessment Issue 2021/13. san domenico di fiesole, Italy: European University Institute (EUI).

80 UNDP. (2022). (rep.). Syrian Arab Republic Access to Electricity and Humanitarian Needs.

81 Damage may be classified as **Partially Damaged** if less than 40% of the asset is damaged, structure is still sound and repair cost would be less than 40% of the total asset value. Damage may be classified as **Completely Destroyed** if more than 40% of the asset has been damaged or if the replacement cost of the damages would be more than 40% of the total value of the asset.

TABLE 43: DAMAGE INVENTORY TABLE (IN US$ MILLION)

Asset Types	Baseline	Partially Damaged	Completely Destroyed	Total Cost
Substations	34	7	2	29
Towers	77,232	364	41	3.1
Total				**32.1**

is noteworthy that high voltage electricity towers have a relatively higher threshold of resistance to complete damage by earthquakes, and partial damage (if inflicted) is usually to the base or seating of the tower, which can be repaired at a lower cost in comparison to other power sector assets. This was considered as part of the assessment. Table 43 shows a breakdown of total damages by asset type.

The highest level of damage was observed in the governorates of Aleppo, followed by Idlib and Tartous. Hama and Latakia suffered minimal damage while Raqqah, being far from the epicenter, did not sustain any observable damage.

Aleppo experienced moderate damage; around 50 percent of the governorate's population reported observing damaged power infrastructure, while 3 percent reported seeing fully destroyed assets. It was observed that several electricity poles within the distribution network fell as a result of the earthquake, and that their electrical network wiring was damaged. However, some recovery and repair efforts were reported to have started shortly after, leading to a quick restoration of service. Estimated damage by governorate is shown in Table 44.

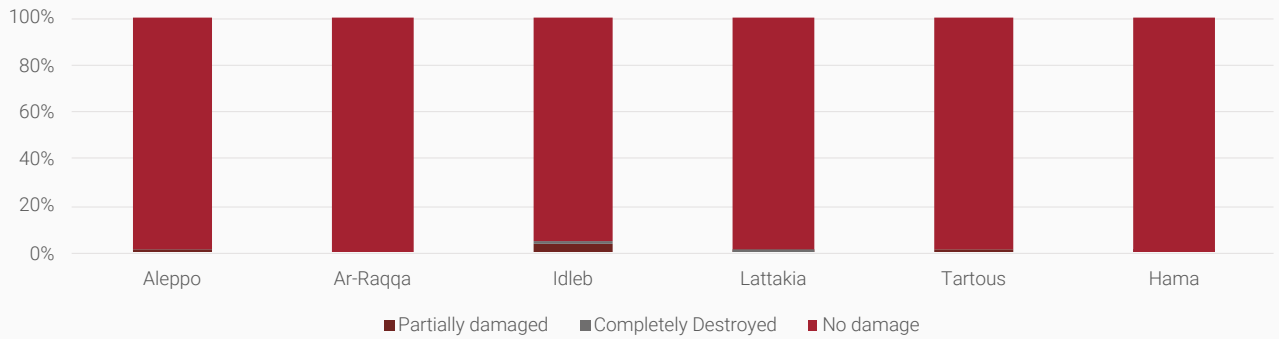
TABLE 44: TOTAL DAMAGE BY GOVERNORATE (IN US$ MILLION)

Governorate	Total Damage
Aleppo	15
Raqqa	-
Idlib	9.6
Latakia	0.1
Tartous	4.8
Hama	2.5
Total	**32.1**

Relative to the overall value of power sector assets in the area, earthquake damage to the sector appears to be low to moderate, as shown below in Figure 30.

In terms of areas of control, Government-controlled areas sustained the highest damage, followed by Opposition-

Figure 29:
Percentage of Asset Damage by Governorate



Controlled Areas. The AANES barely sustained any damage. Opposition-controlled areas are closest to the epicenter and did not sustain as much damage because the region is relatively smaller and includes less power infrastructure than Government-controlled areas. In fact, Government-controlled areas contain 73 percent of asset values, while Opposition-controlled Areas contain 11 percent of asset values.

A per-capita comparison, however, shows that Northwest Syria suffered most with losses of US$6,400 per capita, compared with US$4,700 per capita in Government-controlled areas.

It is notable that power sector damage has been negligible in sampled cities as shown in Annex 1.8.

The relation between damaged assets and electricity service delivery is not straightforward due to the nature of electrical networks and the spread of private generators in impacted areas. However, based on Nightlight Satellite Imagery, we know that, in impacted areas, 11 percent of the population (roughly 4.9 million individuals) had reduced nightlight intensity after the earthquake which is an indication of reduced or disrupted service of electricity.

Disruption and non-reliability of electricity services are likely to increase operating costs for an already strained private sector, reduce prospects of growth, and impede access to other basic services including health and education. According to reports, firms in government-controlled areas have identified the interruption to essential services as their main obstacle to doing business.

TABLE 45: TOTAL DAMAGE BY AREA OF CONTROL (IN US$ MILLION)

Area of Control	Total Damage
Government-controlled areas	22.1
Opposition-Controlled Areas	9.9
Autonomous Administration of North and East Syria	0.1
Total	**32.1**

Figure 30:
Distribution of Assets by Area of Control

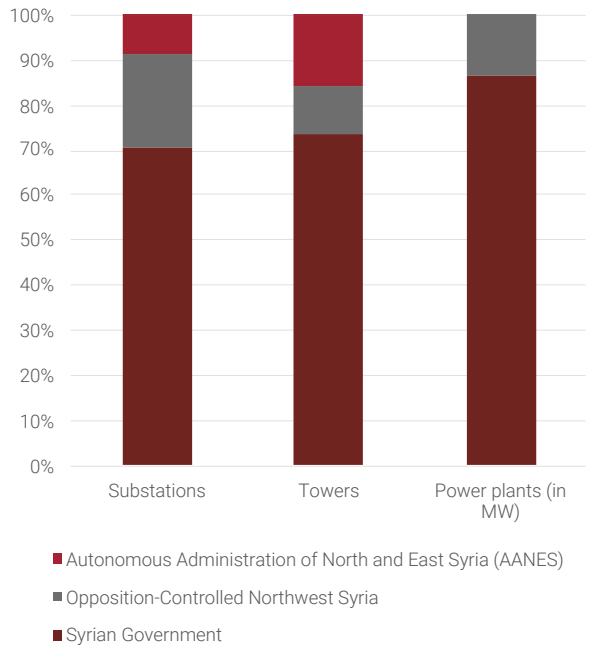
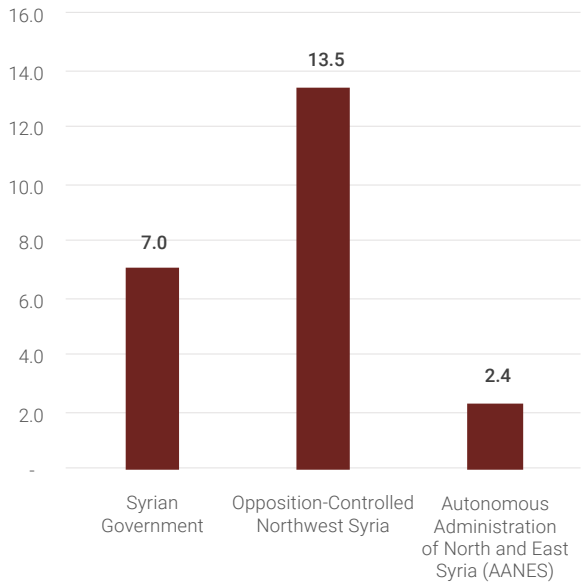


Figure 31:
Per Capita Damage, by Area of Control



Sectoral Recovery and Reconstruction Needs Assessment (including cost estimates)

The assessment shows that most earthquake-damaged assets are electrical towers and substations; thus, it is a priority to repair the network, both formal and informal, in order to resume electricity service to all areas. First efforts are expected to focus on assets that are part of the functional or critical network. As shown in Table 46, the total early recovery needs covering both reconstruction and service restoration are estimated to be US$16.3 million for year 1, followed by US$35.1 million for the following years 2-3. Thus, a total cost of recovery at US$51.4 million to restore the network to its pre-earthquake state.

As shown in Table 48, it is notable that the estimated costs of recovery are highest for government-controlled areas at US$35.4 million as these zones include the majority of the country's power assets, in number and value. At the governorate level, Aleppo has the highest cost of recovery totaling US$24 million.

Figure 32:
Overall estimated costs of recovery over the first three years (US$ million)

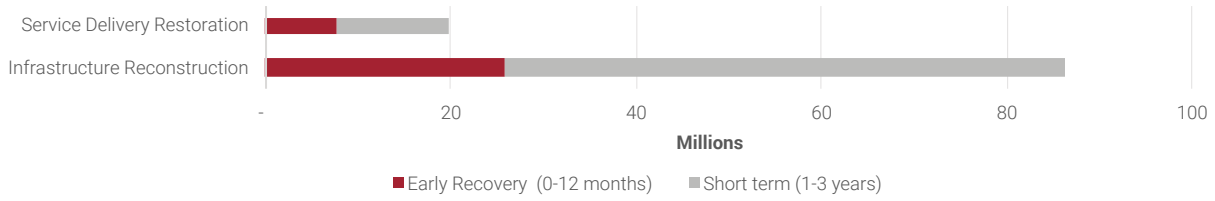


TABLE 46. TOTAL NEEDS FOR RECONSTRUCTION AND RESTORATION OF SERVICE (US$ IN MILLION)

Need	Early Recovery (0-12 months)	Short-term (1-3 years)	Total (0-3 years)
Infrastructure Reconstruction	12.5	29.2	41.8
Service Delivery Restoration	3.8	5.8	9.6
Total	**16.3**	**35.1**	**51.4**

Figure 33:
Estimated costs of recovery by governorate and control area over the next three years (US$ million)

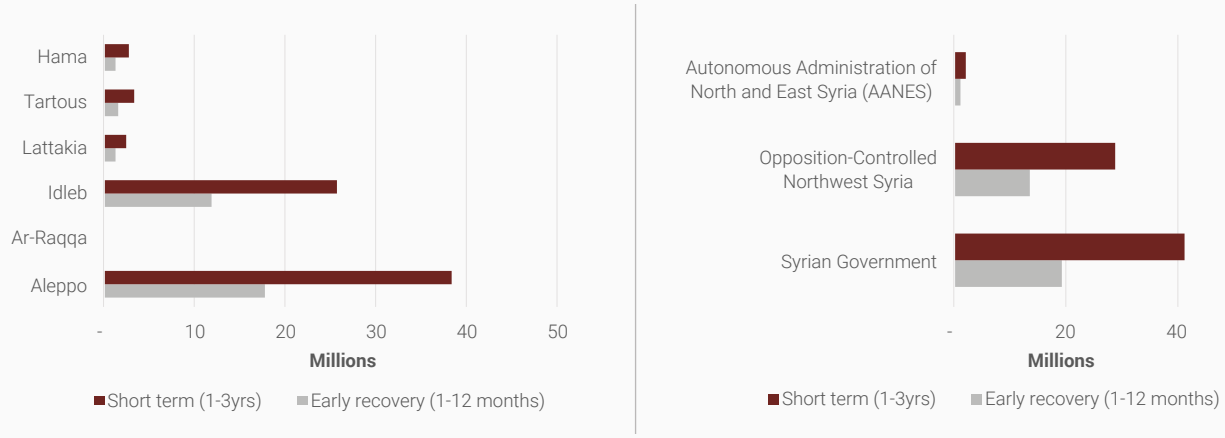


TABLE 47: INFRASTRUCTURE RECONSTRUCTION AND SERVICE DELIVERY RESTORATION NEEDS BY GOVERNORATE (IN US$ IN MILLION)

Governorate	Infrastructure Reconstruction	Service Restoration
Aleppo	Infrastructure Reconstruction	24.0
	Service Restoration	
Raqqah	Infrastructure Reconstruction	0
	Service Restoration	
Idlib	Infrastructure Reconstruction	15.4
	Service Restoration	
Latakia	Infrastructure Reconstruction	0.2
	Service Restoration	
Tartous	Infrastructure Reconstruction	7.7
	Service Restoration	
Hama	Infrastructure Reconstruction	4.0
	Service Restoration	
Total		**51.4**

TABLE 48: INFRASTRUCTURE RECONSTRUCTION NEEDS BY AREA OF CONTROL (IN US$ IN MILLION)

Area of Control	Needs Category	Cost
Government-controlled areas	Infrastructure Reconstruction	35.4
	Service Restoration	
Opposition Controlled Northwest Syria	Infrastructure Reconstruction	15.7
	Service Restoration	
Autonomous Administration of North and East Syria	Infrastructure Reconstruction	0.2
	Service Restoration	
Total		**51.4**

Recommendations and Limitations

The assessment presented is indicative of damage and recovery costs with key limitations as follows:

First, while damage ratings to specific assets are reasonably accurate, damage to other assets such as transmission and distribution networks is harder to assess. Thus, the sample data are not representative of the overall power sector. For instance, damage to electricity poles and towers is hard to verify as damaged poles may still function while tilted or partially fallen. Additionally, the assessment was limited to the city-level and often relied on extrapolation for the overall and governorate-level damage assessment.

Second, the assessment relied on remote investigations using satellite imagery, social media analytics and qualitative reports to support its findings on both the baseline and post-earthquake situation, which makes it difficult to verify and differentiate sources of damage. For instance, a few power plants were previously damaged by conflict, and it was difficult to differentiate conflict damage from earthquake damage.

Third, many communities, particularly in outside of Government-controlled areas, were served by private generators and informal distribution networks prior to the earthquake. Thus, it is hard to measure the change in electricity service delivery linked to asset damage caused by the earthquake without a targeted survey, and night-time satellite imagery was of no use in this regard.

Fourth, the assessment did not account for disruptions in other sectors that may have affected the recovery of the Power Sector. For instance, the transport of much-needed fuels and equipment to perform the repairs might be impacted or delayed by damaged roads.

As earthquakes typically affect electricity transmission and distribution networks, in particular electrical towers and substations, it is recommended that follow up assessments include an on-ground survey of these assets to determine damages. It is notable that while electricity service delivery may be unaffected in the case of partially damaged towers, that they are nonetheless at risk of collapse.

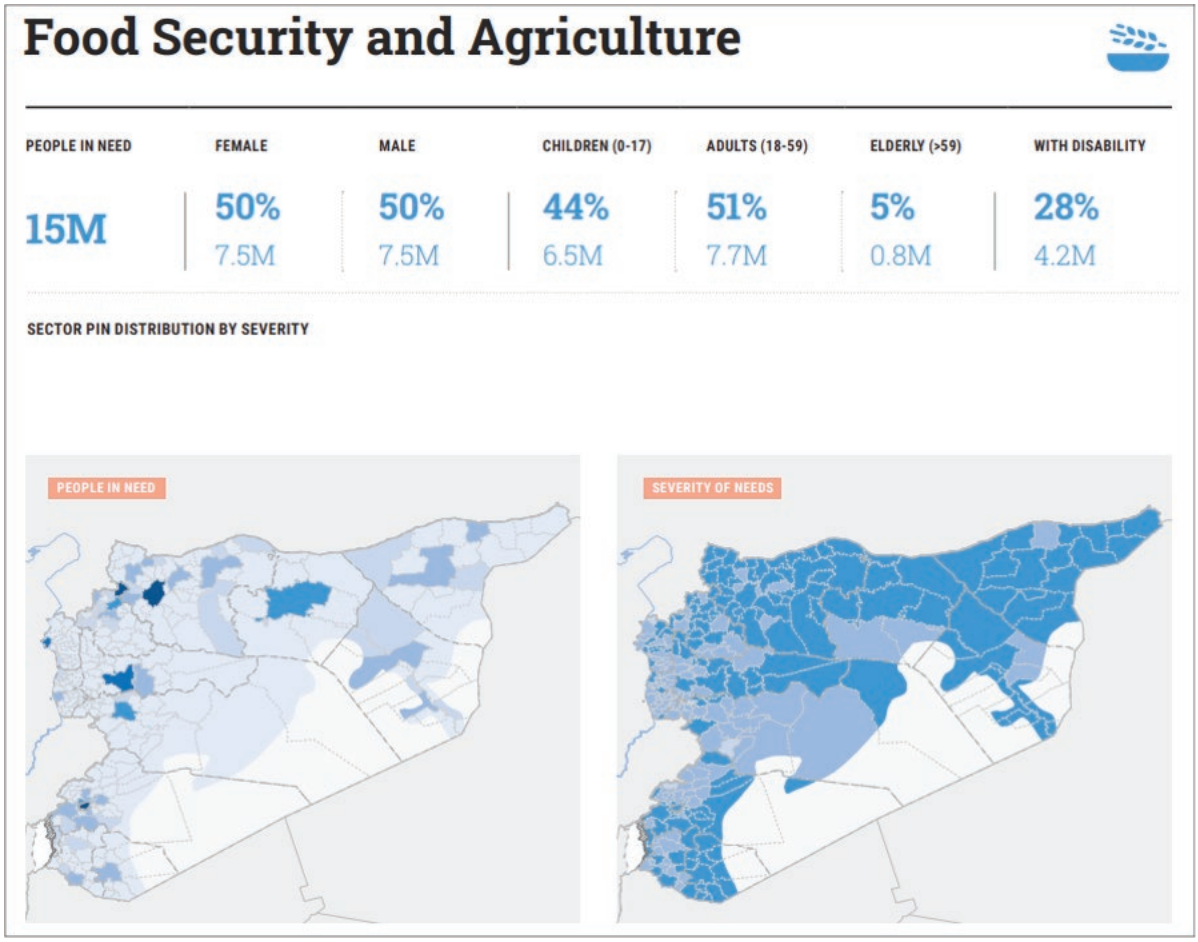
Agriculture

Background and Analysis of Pre-Crisis Conditions and Trends

Agriculture has always been a very significant contributor to Syria's economy. Prior to the Syrian conflict, the country played an important role in global agricultural trade, connecting supply routes between Eastern Europe, Central Asia, the Russian Federation, and the Gulf Cooperation Council countries.[82] Extensive irrigation projects, indirect water subsidies, and direct wheat subsidies led to intensive wheat production in the 1990s.

The ongoing conflict in Northwest Syria has significantly impacted agricultural production in the region. Farmers face a range of challenges including crop destruction, displacement, and limited access to inputs such as seeds and fertilizers. Agricultural input prices, in particular, have drastically increased in 2022 compared to previous years.[83] The difficult and worsening economic situation continues to increase the prices of most foods, including vegetables and fruits.[84] Furthermore, recent years have seen severe droughts in Syria impacting food production, especially in the North and Northeast governorates, with growing food insecurity across Syria but especially in the Northwest (see Figure 34).

Figure 34:
People in need and severity of need across districts in Syria. Source: Syria Food Security Cluster/Sector Whole of Syria 2023



82 *https://carnegieendowment.org/sada/78286*
83 *https://fscluster.org/gaziantep/news/insights-northwest-syria-issue-6*
84 *https://fscluster.org/sites/default/files/documents/afsms_nov_dec_2022.pdf*

Twelve years of conflict have displaced nearly 3 million people from their homes and left them living in precarious conditions. The latest available mobile Vulnerability Analysis and Mapping bulletin by the World Food Programme from January and February 2021 paints an alarming picture for the governorates within the scope of this RDNA; 49 percent of households reported inadequate food supplies and the reduced Coping Strategy Index (rCSI) averaged 18.92, with much higher values for IDPs and returnees. This means for instance that about half of all households resorted to reduced food consumption by adults in favor of children.[85]

b. Inventory of Infrastructure Assets (general aggregate figures)

Agriculture and food-related infrastructure assets in the 6 governorates are provided in Table 49 below

TABLE 49: AGRICULTURE AND FOOD-RELATED INFRASTRUCTURE ASSETS

Infrastructure Assets	Baseline Number
Silos and Warehouses	41
Wholesale markets	45
Mills	52
Bakeries	473
Public buildings and research institutions	16
Greenhouses	96,824
Crops (on field, nearing harvest maturity), in ha	NA

The value of crops in the field nearing harvest maturity was estimated based on the cropping patterns in the affected areas.

c. Importance of the sector in total GPD growth for 2023

The ongoing conflict and displacement of people have made it difficult to collect and report accurate data. The most recent data (2020) estimates that the share of agriculture, forestry and fishing to GDP across Syria is 36.6 percent.

Assessment of Disaster Effects: Damage and Loss Estimates

Disaster effects are the **tangible and intangible changes** in comparison to baseline data.

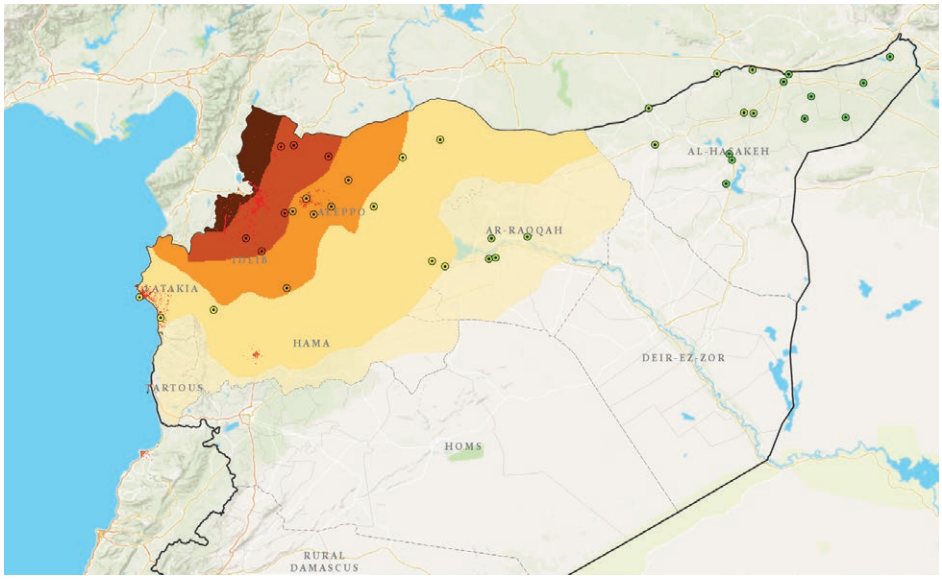
a. Aggregate quantitative and qualitative effects on infrastructure and physical assets (Damage) (overview of what has been assessed, overall damage levels in numbers and percentages relative to the baseline (pre-earthquake inventory), damage by asset type, geographic trends).

The assessment covered the infrastructure asset categories listed in the Table above. Damages were found to be heavily concentrated in the Northwest along the border with Türkiye. The following estimates were developed:

- **8 percent of silos, warehouses and mills** were assessed to be partially damaged, based on geospatial data showing the presence of debris in the immediate vicinity. The distribution of sites across impact areas shown in Figure 36 below and more detailed information on damage to similar facilities in nearby Türkiye indicate that this is likely to be a significant under-estimate.
- **29 percent of wholesale markets** were assessed to be damaged with 9 percent estimated to have been destroyed. Estimates were based on extrapolations from survey information on the destruction of market shops. Further data are needed; the assessment was limited to non-government-controlled areas in the governorates of Aleppo, Hama and Idlib. The REACH market survey similarly indicated that most markets in Northwest Syria appear to be resilient and functioning overall.7
- **7 percent of bakeries** are estimated to have been damaged, and 3 percent to have been destroyed. Further data is needed, as the assessment is based on the number of bakeries and extrapolations from the data on first response needs regarding bakeries. No data was available on Government-controlled areas, including the entire governorates of Latakia and Tartous.
- **38 percent of public buildings and research institutions** are estimated to be partially damaged, based on known locations of facilities and extrapolations from data on the destruction of shelters limited to areas outside of Government-controlled areas.

85 ***Data excludes Idlib governorate***.

Figure 35:
Distribution of silos & mills across impact areas



Source: World Bank

- **10 percent of greenhouses** were estimated to be at least partially damaged. In the absence of impact data (geospatial, surveys or social media), this is a conservative lower bound estimate based on the share of greenhouses in the relevant governorates and a minimum of partial damages expected based on other damage data.
- **A total of US$127 million in crop damages** was estimated for damages to croplands, with US$ 6 million for flooded fields on an area of 2,865 hectares in the Upper Orontes Basin (see Figure 37). Other flooded areas were excluded because attribution to the earthquake was not possible. The most flood-affected crops appear to be wheat and cotton; however, the geospatial information did not allow the differentiation of other crops on about 57 percent of the affected cropland area with at least minor damage. The remaining damages were estimated as a conservative lower bound based on geospatially observed transport restrictions on croplands affecting 0.5 million ha and an assumption that 10 percent of these areas could not be harvested.

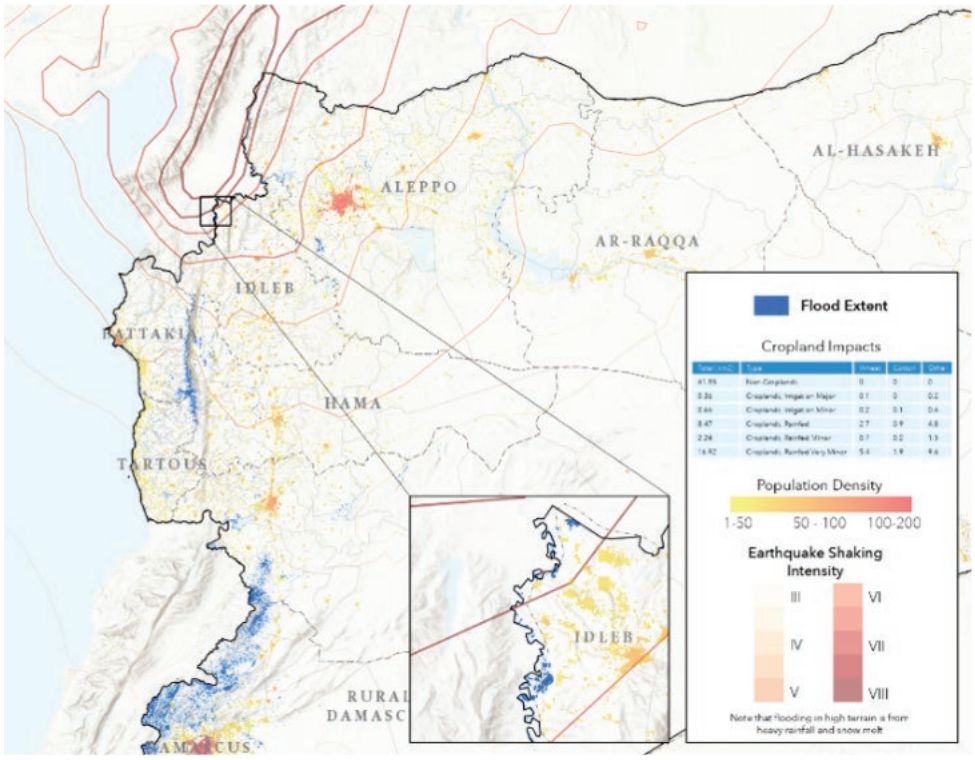
b. Aggregate quantitative and qualitative effects on production and delivery of goods and services, access to services and goods (Loss)

Estimates of losses in agricultural production and food security need to be considered highly preliminary and a lower bound:

Agricultural activity: Few data were available on most economic aspects of agricultural value chains and trade (inputs, perennials, annuals, livestock or aquaculture), with five exceptions: (i) based on damage data for silos, it was possible to estimate a loss in revenue in wheat storage of US$14.8 million; (ii) the losses in the bread value chain (milling and bakeries) amounted to US$6.8 million; (iii) the loss of agricultural labor income based on existing estimates of displaced people, which amounted to close to US$58.6 million and represent a lower bound; (iv) reduced access to fields will have significant impact on farmers ability to prepare fields for the growing season, leading to further losses of approximately US 84 million; (v) loss in food trade activity, amounting to approximately $1.3 billion based on the foregone revenue by local food system actors resulting from 800,000 food insecure households having to instead rely on externally provided food assistance (see food security needs below).[86] Additional and more granular survey data is needed to provide a robust estimate.

86 WFP identified food security assistance need to 4 million food insecure people (around 800,000 households), in addition to 160,000 households for nutrition assistance (to babies and lactating women).

Figure 36:
Overview of Flood damages following earthquake



Source: World Bank

TABLE 50: DAMAGE AND LOSS INVENTORY TABLE (IN US$ MILLION)

	Asset Types	Baseline	Partially Damaged	Completely Destroyed	Total Cost
DAMAGE	Silos and Warehouses	41	4	0	79.1
	Wholesale markets	45	9	4	2.5
	Mills	52	3		4.0
	Bakeries	473	20	16	26.4
	Gov offices and research institutions	16	6	0	0.8
	Greenhouses	96,824	9682.44	0	319.5
	Crops (in USD)	NA	84,036,014	4,682,756	126.9
	Total Damage				**559.2**
LOSS	Wheat storage and trade				14.8
	Bread Value Chain Loss				6.8
	Disruption of upcoming growing season because of lack of road				84.0
	Ag labor				58.6
	Food Trade				1,104.0
	Total Loss				**1,268.3**
Total Effect (Damage and Loss)					**1,827.5**

TABLE 51: TOTAL DAMAGE AND LOSS BY GOVERNORATE (IN US$ MILLION)

Governorate	Total Damage	Total Loss
Aleppo	142.7	372.9
Idlib	71.0	368.3
Raqqah	0.8	124.7
Hama	4.1	124.7
Tartous	127.8	137.7
Latakia	212.9	140.1
Total	**559.1**	**1,268.3**

TABLE 52: TOTAL DAMAGE AND LOSS BY AREAS OF CONTROL

Areas of Control	Total Damage	Total Loss
Government-controlled areas	321.8	729.3
Autonomous Administration of North and East Syria	150.6	342.4
Opposition-Controlled Areas	86.8	196.6
Total	**559.1**	**1,268.3**

3. Sectoral Recovery and Reconstruction Needs Assessment (including cost estimates)

Priority short and medium term needs:

- **Recovery needs:** Service delivery and production, and access to services and goods are to be restored by addressing pre-existing and new risks related to the disaster.

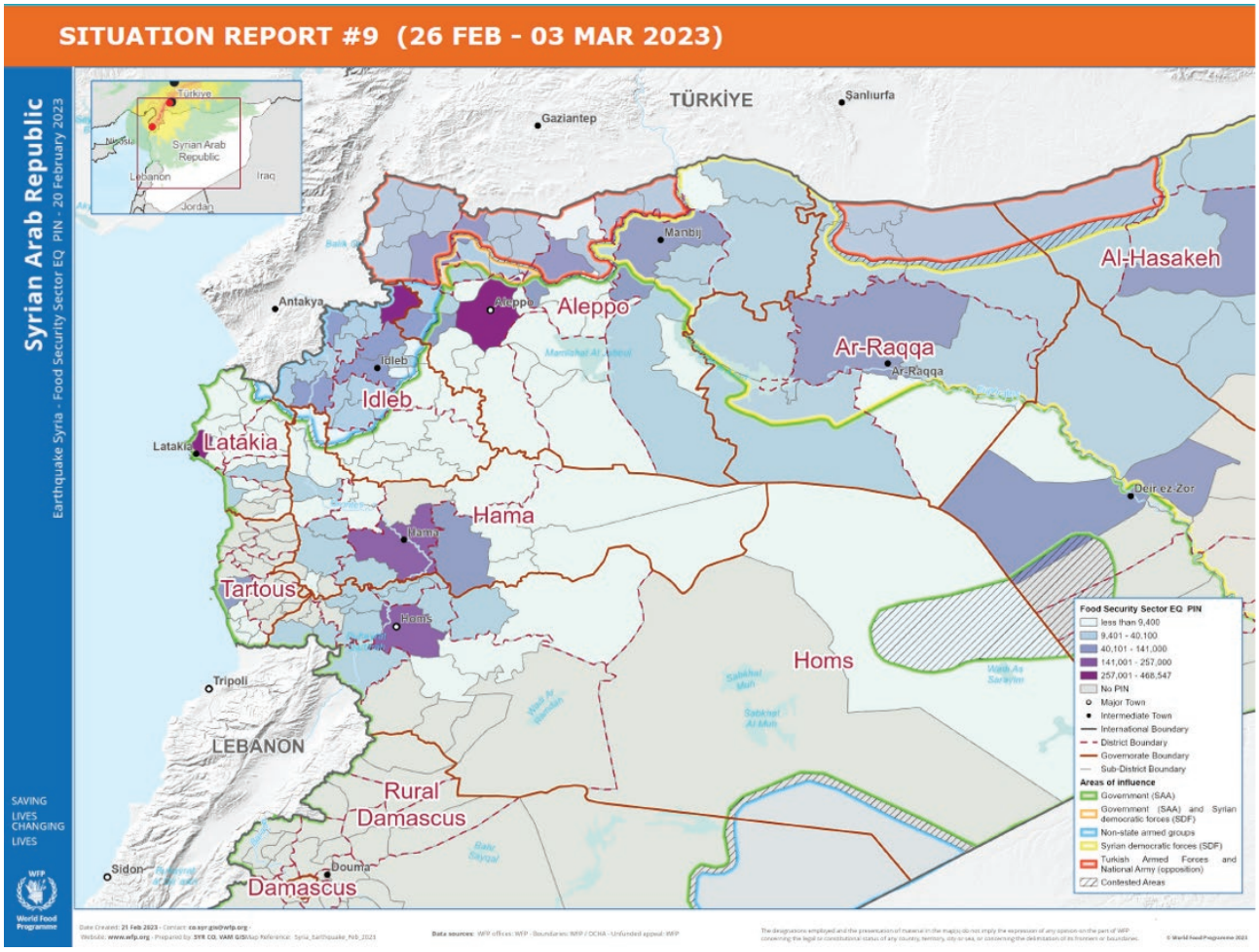
The following priority recovery needs have been identified and are proposed to be sequenced as follows:

- **Food insecurity**: Needs related to food security are expected to amount to US$ 1.2 Billion in humanitarian assistance over the next 12 months as damages and losses related to agriculture are likely to further worsen an already extremely severe food insecurity status as noted above. This was estimated based on 4 million people (800,000 Households) being food insecure as a result of the earthquake[87]. A recent overview of the food security situation is provided in figure 38 below. The needs were then computed based on latest available prices of the standard reference food basket for households for a period of 12 months,[88] including an assumed 10% overhead to cover the cost of providing the assistance. Due to access and political issues, these estimates are not based on survey data (no such data was available at time of writing) and are hence not very robust.

87 Whole of Syria Food Security Sector

88 ***Latest price data are from December 2022***. An additional 22% inflation (around 11% MoM) is applied based ***on latest market updates***.

Figure 37:
Situation report on food insecurity in Norther Syria (WFP 2023)



- **Coordination:** A large number of actors are currently responding with regard to early recovery needs. Beyond the UN system and international non-governmental organizations (iNGOs), these include smaller actors, NGOs and state-related actors that are not yet fully included in established coordination mechanisms. To ensure effective delivery, coordination would need to be improved.
- **Access to agricultural production inputs including labor and land:** Access to land currently appears to be highly restricted due to debris blocking roads. Moreover, a large number of newly IDPs are likely to reduce the availability of on-farm labor. Finally, pre-earthquake, very high input prices linked to a weakening exchange rate against the dollar and international prices had already constrained access to inputs for farmers. This situation is also likely to worsen. To avoid failed harvests and delays in planting for the next growing season, recovery interventions are needed to address these issues related to access to inputs. These findings are in line with FAO's recent call to support 300,000 rural families with agriculture-related assistance to secure the summer crop.8
- **Reconstruction needs: Infrastructure** and assets are to be restored to pre-disaster levels with inclusive BBB to reduce risks and vulnerabilities to future disasters.

The following priority reconstruction needs have been identified and are proposed to be sequenced as follows:

- **Critical food security infrastructure**: Northwest Syria depends on cereal imports for much of its food security. Damage to silos and other facilities providing strategic storage greatly increases vulnerability to food insecurity.
- **Reconstruction and rehabilitation of on-farm agricultural assets, including on-farm irrigation systems**: The earthquake likely damaged perennial crops (e.g., olive trees), aquaculture installations, on-farm irrigation systems and other farm assets. In a BBB approach, recovery should be combined with technical assistance on e.g., efficient water use.

TABLE 53: TOTAL COST OF NEEDS BY GOVERNORATE (IN US$ MILLION)

Governorate	Needs category	Cost
Aleppo	Infrastructure Reconstruction, Service Delivery Restoration, and Food Security	595.6
Idlib	Infrastructure Reconstruction, Service Delivery Restoration, and Food Security	497.5
Raqqah	Infrastructure Reconstruction, Service Delivery Restoration, and Food Security	138.1
Hama	Infrastructure Reconstruction, Service Delivery Restoration, and Food Security	142.4
Tartous	Infrastructure Reconstruction, Service Delivery Restoration, and Food Security	317.6
Latakia	Infrastructure Reconstruction, Service Delivery Restoration, and Food Security	430.8
Total		**2,122.1**

TABLE 54. TOTAL COST OF NEEDS BY AREA OF CONTROL (IN US$ MILLION)

Areas of Control	Needs category	Cost
Government-controlled areas	Infrastructure Reconstruction, Service Delivery Restoration, and Food Security	1,337.6
Autonomous Administration of North and East Syria	Infrastructure Reconstruction, Service Delivery Restoration, and Food Security	138.1
Opposition-Controlled Areas	Infrastructure Reconstruction, Service Delivery Restoration, and Food Security	646.4
Total		**2,122.1**

Recommendations and Limitations

MAIN LIMITATIONS OF THE ASSESSMENT

This assessment should be considered preliminary:

- For most asset classes, Government-controlled areas were excluded due to lack of data.
- Estimates of losses in economic activity from agriculture are highly rudimentary given a lack of survey-based information and the difficulty of assessing such losses in the agri-food sector using geospatial information.
- No comprehensive holistic assessments of food security impacts exist to date and any needs assessment therefore remains speculative in nature.9

LINKS BETWEEN SECTOR AND CROSS-CUTTING THEMES

There are strong linkages to damage in the water sector related to dams and irrigation infrastructure, which could have major implications for losses in areas that depend on irrigation water for agricultural production and local food consumption.

Other linkages include the broader private sector with respect to downstream agri-food value chains as well as the Humanitarian Sector with respect to food security.

BRIEF OVERVIEW OF POTENTIAL INTERVENTIONS

In the immediate and short term, humanitarian aid is required to address the severe food security crisis following the earthquake.

This includes agricultural inputs to harvest crops currently in the field, and to prepare fields for the next growing season. Critical inputs include seeds, fertilizer, pesticides, and farm tools.

In the medium to long-term, structural interventions will be required to enable recovery and meet the challenges of ongoing conflict. As such, key interventions include:

- **Access to Markets**: The earthquake disrupted already severely constrained supply chains, making it difficult for farmers to sell their produce. Creating market linkages and providing access to markets can help farmers sell their products at fair prices, thereby enhancing their income and economic sustainability. This can be achieved through value chain-oriented interventions to incentivize private sector investment.
- **Access to Finance**: Farmers and agribusinesses have been starved of access to finance of both operating and investment capital while reconstruction related needs – both conflict- and earthquake related – are enormous.
- **Reestablishment of basic public enabling services for agrifood sector:** Farmers will require assistance to adapt to new farming techniques that are more resilient, particularly to climate change. Extension services can provide farmers with information on climate-resilient crops, sustainable land use practices, and post-harvest management techniques. This will help farmers increase their crop yields and improve their livelihoods. Other basic services, such as those related to food safety, will need to be restored.

These interventions will help to revitalize the agriculture sector in the conflict-affected Northwest Syria post-earthquake. They will enable farmers to restart farming activities and improve livelihoods, thereby contributing to the overall recovery of the region.

Recommendations for future assessments

The assessment focused on urban areas when procuring high-resolution geospatial data – which limited the extent to which impacts in rural areas could be captured.

Moreover, even with high-resolution imagery, not all impacts on agricultural production can be captured. This makes on the ground survey work essential to develop more robust estimates.

Digital Development

Background and Analysis of Pre-Crisis Conditions and Trends

Even before the earthquake, telecom operators in Syria have had to contend with diverse challenges, including a constraining policy and regulatory environment, disruptions in the national transport and energy infrastructure, high levels of poverty, and low digital literacy. Operators have also faced challenges resulting from high fuel prices, currency inflation, and the blockade of equipment imports due to international sanctions. Telecom Law 18/2010 grants the Ministry of Communications and Technology the prerogative to develop policy and legislation, and tasks the Syrian Telecommunications Regulatory Authority with regulation.

In the fixed broadband market, state-owned Syrian Telecom (ST) has exclusive operation of the backbone network and international gateways and is the principal provider of fixed broadband in Government-controlled areas. Fixed broadband subscriptions totaled US$1.9 million in September 2022, while household penetration stood at 43.9 percent.4 The market has seen consistent growth in recent years, as the government began to consolidate control over the territory, allowing for the reconstruction and repair of damaged infrastructure and the building of new networks, most significantly with the rollout of fiber infrastructure in key cities. Supply issues arose in 2020 due to international sanctions and the impact of COVID-19 on global supply chains, and steep price hikes were applied in October 2021 and June 2022 amid rising fuel prices and the deteriorating value of the Syrian pound. Mobile subscriptions stood at approximately US$15.7 million in September 2022, equivalent to a mobile penetration of 70.1 percent.5 The market is home to three cellular operators: MTN Syria6 (2G, 3G, 4G), SyriaTel (2G, 3G, 4G), and new entrant Wafa Telecom (4G). In areas outside the government's control, internet services are reportedly available from Iraqi and Turkish companies, with most adopting Wi-Fi – supported by microwave or satellite backhaul – for last-mile access.

Assessment of Disaster Effects: Damage and Loss Estimates

Damage data were collected exclusively through space-based remote sensing, and the figures obtained are likely an underestimation of the true damage incurred, as fixed assets such as copper and fiber-optic cables are buried underground, and some mobile assets may not be large enough to show up on satellite imagery. Overall, only one out of 115 detected mobile assets (56 mobile towers and 59 mobile antennas) in Ad-Dana, Afrin, Aleppo, Azaz, Jableh, Jandairis, Latakia, and Sarmada appeared partially damaged7 on March 4, and none destroyed. No data was available on mobile assets in Idlib. Based on the data collected, the cost of damage is estimated at US$60,000 in Aleppo city and US$180,000 in Aleppo Governorate, with no detected damage in the other governorates.

In terms of network connectivity, a multi-source ground data survey administered between February 9 and 11 in 700 locations in the Aleppo, Hama, and Idlib Governorates revealed that the residents of 20 out of 32 subdistricts and from 90 out of 607 communities across the three governorates reported severe or major damage in telecom and internet networks, with 98 communities stating the need for the repair or rehabilitation of telecom assets. Almost 2.5 million people (69 percent of the surveyed population) were affected, and more than 300,000 people (less than 1 percent of the surveyed population) across 79 communities in the Aleppo and Idlib Governorates have cited telecom and internet coverage damages as their first recovery priority (no communities in Hama reported telecom and internet as their first recovery priority). The results of this ground survey are corroborated by network connectivity data collected by the International Telecommunication Union (ITU) in its Disaster Connectivity Map (DCM)8 for Syria and Türkiye, which was activated on February 6 and continues to be updated every hour using more than 205,000 datapoints collected within a 200-kilometer radius of the earthquake's epicenter. DCM data reported on February 6 in Ad-Dana, Afrin, Aleppo, Azaz, Idlib, Jableh, Jandairis, Latakia, and Sarmada shows widespread network degradation and outages in all nine cities. However, services appeared to be gradually restoring during the first week following the earthquake and were largely restored after two weeks. As of March 5, 2023, DCM shows telecom services were almost entirely restored in all nine cities;1 however, data download/upload speeds appear to be lower than 10 Mbps for most locations.1 In the absence of more granular data, it is difficult to assess the present quality, reliability, and usability of telecom services in the affected areas.

The economic consequences of the earthquake's disruption of the information and communication technology (ICT) sector include reduced growth, productivity, and employment in the crucial Service Sector, which requires stable and reliable connectivity and in 2017 contributed 61 percent to the GDP. In addition, inequality is likely to increase, as the poorest are most likely to remain in areas with degraded telecom infrastructure, and to suffer from the adverse effects of having slow, sporadic, or no internet access. Finally, opportunities that previously existed due to the availability of internet connectivity (e.g., online education and online work) are also less likely to materialize for those people – especially women – remaining in areas with damaged digital assets.

Sectoral Recovery and Reconstruction Needs Assessment

The priority short-term recovery needs amount to US$390,000; out of which US$300,000 is for infrastructure recovery and restoration of broadband and mobile assets where damage occurred, while US$90,000 is for service delivery needs. These estimates incorporate the BBB premium of 40 percent above the damage estimates. At the city level, the only asset that needs to be reconstructed is a damaged cell phone tower in Aleppo, and the full restoration of services remains a priority in all affected locations. The prioritized and sequenced needs are shown in Table 55.

The availability of reliable telecom services, for both basic voice and internet, is essential for the return of residents to the affected areas and is a cornerstone of the development of commercial and economic activities. Restoring basic connectivity in the areas still affected by outages, through the provision of emergency communications (for example, through Very-Small-Aperture Terminals (VSAT)) in the immediate term, can ameliorate the adverse effects of the earthquake on internet access. However, as internet connectivity for educational institutions, hospitals, and government institutions cannot be sustained through satellite connectivity alone, restoring broadband connectivity is critical for the effective functioning of Public Institutions (education, health care, governmental services), and for the return of the private sector (especially service-oriented firms) that will drive the recovery of the affected regions. Recovery plans should consider the needs of all types of users: individuals, the private sector, governmental agencies, and humanitarian agencies.

Recovery plans should prioritize the reconstruction of: (i) the access network that reaches major commercial and public establishments such as schools and hospitals; and (ii) the network upon which data service providers and mobile operators rely to facilitate internet and data traffic between cities. In the medium and long terms, it is important to increase investment in the national fiber backbone infrastructure and to license extra radio spectrum to increase the resilience of the telecom network to future disasters by providing additional mobile broadband capacity to reduce network congestion.

TABLE 55: PRIORITIZED AND SEQUENCED NEEDS TABLE (IN US$)

City/Governorate/Area	Needs Category	Early Recovery (0-12 months)	Short-term (1 to 3 years)
Aleppo city	Infrastructure Reconstruction	100,000	0
	Service Delivery Restoration	30,000	0
	Total	**130,000**	**0**
Aleppo governorate	Infrastructure Reconstruction	300,000	0
	Service Delivery Restoration	90,000	0
	Total	**390,000**	0
Government-controlled areas	Infrastructure Reconstruction	300,000	0
	Service Delivery Restoration	90,000	0
	Total	**390,000**	0

Recommendations and Limitations

The assessment of the ICT sector relies largely on live internet connectivity data from the nine focus cities, as well as on-the-ground user surveys conducted in the governorates of Aleppo, Hama, and Idlib in the immediate aftermath of the earthquake (February 9-11). Both sources focus on interruptions in service delivery, which cannot pinpoint the exact location and type of damaged assets. Moreover, service seems to have been almost entirely re-established in the affected areas, rendering the survey data obsolete (except possibly for Idlib, for which the ITU map has only one connectivity data point).

Most fixed-network assets – such as copper and fibre-optic cables – are buried underground and cannot be detected via satellite imagery, and some mobile assets are too small to be seen from space. The cost of damage, therefore, was limited to that obtained via remote analytics for 115 cell phone towers and antennas in the focus cities (except for Idlib, for which no remote sensing data was available). In addition, no data were obtained from fixed and mobile internet service providers (ISPs) in the affected governorates, and the additional cost estimates (e.g., debris removal, staff relocation expenses) were not quantified. Finally, it was not possible to assess sectoral losses due to the unavailability of telecom providers' financial data.

Source: Ipsos

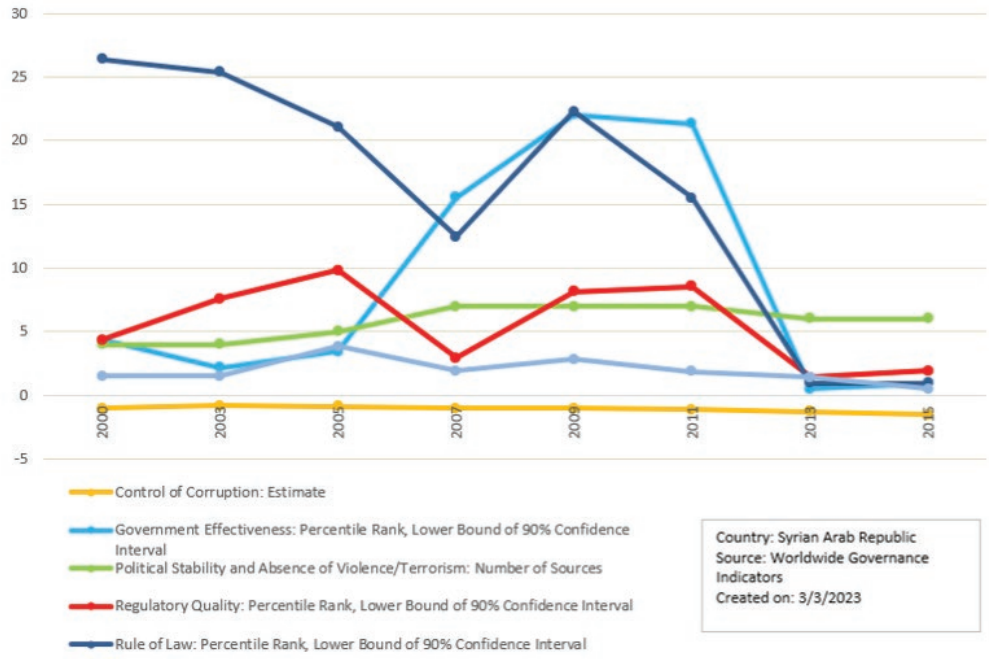
Impact on Cross-cutting Sectors

Public Institutions

Background and Analysis of Pre-Crisis Conditions and Trends

Syria is characterized by poor governance, as highlighted in the different governance indicators ratings. The conflict has impacted heavily on government effectiveness and regulatory quality:

Figure 38:
Syria's ranking under World Governance Indicators from 2000 to 2015



Syria has experienced a series of compounding crises that have worsened the humanitarian situation in the country. The 12 years of conflict have nearly decimated the country's economy. The depreciation of the Syrian pound left a clear impact on the lives of Syrians in areas that depend on the pound as the main currency. As a result, daily price hikes hit all commodities and basic materials.

The steep decline in the national currency was accelerated by structural issues in the Syrian economy, including decreasing foreign currency revenue streams, sanctions, low foreign currency reserves, rampant corruption in public institutions, lack of production, decline in the growth of domestic products, and dependence on foreign markets, in addition to the large deficit in the trade balance, and the balance of payments.

The fiscal space has shrunk by at least two thirds while public investment has decreased further by around 90 percent. According to the International Monetary Fund (IMF), the ratio of revenue to GDP

decreased from 21.5 percent in 2010 to 6 percent in 2015. In 2021, revenue decreased further by 83 percent compared to the pre-war level. This resulted essentially from the loss of oil revenue, which along with other non-tax revenues amounted to two thirds of total revenue in 2010. In 2021, US$2.1 billion of revenue was appropriated as compared to US$6.8 billion of expenditure, widening the budget deficit to close to US$1 billion. The budget deficit is estimated at an average of 32 percent since the conflict started.

Figure 39:
State budget since 2010 in US$ billions (in real terms)

Source: Christou W. & Shaar K., 2020, 2021 budget reveals the depth of Syria's economic woes., Atlantic Council.

As highlighted in the published Syria Joint Damage Assessment[89] (DA) (December 2022), the country was already confronted with several governance and structural challenges prior to the conflict, which included, most notably, moving from a planned economy towards a liberalized market economy and reducing poverty via targeted interventions to enhance human development. The conflict has impacted the government's ability to provide public services. Earthquake-affected areas will further suffer poor public service delivery. As the structure of the economy hindered the development of a private sector that would provide sufficient employment opportunities for new entrants into the labor market, public sector employment became part of the social contract before the crisis era.

89 ***Syria Joint Damage Assessment (2022)***

Assessment of Disaster Effects: Damage and Loss Estimates

1. SECTOR IMPACT ANALYSIS:

For Public Institutions, the assessment covered physical damage to government facilities including national, municipal, and provincial administrative buildings, courthouses, prisons, civil registry, civil defense, traffic police offices, post offices, real estate registration offices and others. At the city level, the assessment focuses on Afrin, Aleppo, Jandairis, Harem, Ad-Dana, Jableh, Latakia, Sarmada, and Azaz. At the governorate level, the assessment focuses on six governorates that have been badly affected by the earthquake: (1) Aleppo, (2) Raqqa, (3) Hama, (4) Idlib, (5) Latakia, (6) Tartous. The facilities examined consist of police stations, fire stations, courthouses, and post offices.

2. PHYSICAL DAMAGE TO PUBLIC FACILITIES:

From the information gathered, total damage for the nine cities is estimated at US$2.9 million, while the bulk of this cost is associated with damages to courthouses of US$1.6 million; the most badly damaged courthouse is in Aleppo with damages estimated at US$1.11 million (see Table 56 for the rest of the facilities). The damage to these buildings may have impacted their functionality. However, as of the date of the report, 20 of 91 facilities assessed are confirmed to be fully functional, while the remaining facilities' functionality remains unknown. About 15 percent of the assessed facilities (14 out of 91) in Aleppo have been damaged because of the earthquake, out of which three percent are destroyed. The fully destroyed area consists of one courthouse and two traffic police stations. Courthouses, municipal and national administration buildings and post offices have had two of each facility partially damaged. One of the two prisons has also been partially damaged (see Table 56).

TABLE 56: DAMAGE AND LOSS INVENTORY (IN US$ MILLION)

Asset Type	Baseline	Partially Damaged Cost Average	Completely Destroyed Cost Average	Total Damages Cost Average
Civil defense and other	3	0.0	0.00	0.0
Courthouse	16	0.5	1.1	1.6
Municipal Administration	4	0.1	0.0	0.1
National Administration	9	0.3	0.0	0.4
Post office	29	0.23	0.0	0.2
Prison	2	0.1	0.0	0.1
Provincial Administration	11	0.0	0.0	0.0
Real estate registration	4	0.0	0.0	0.0
Traffic police office	8	0.0	0.5	0.5
Civil Registry	5	0.0	0.0	0.0
Grand Total	**91**	**1.23**	**1.6**	**2.9**

Public Institutions' facilities were affected only in three cities (Afrin, Aleppo, and Harem), and Aleppo city reflecting 90 percent of them. In Aleppo, around 23 percent of the assessed administrative facilities (9 out of 40) have been damaged, with three facilities fully destroyed consisting of one courthouse and two traffic police stations. Public services across other sectors (civil defense, national administration, and post offices) have also been affected. The city satellite map of Aleppo, the most impacted city, shows the damage and severity concentration for Public Institutions' assets. The deep dive assessment of facilities in Jandairis, Ad-Dana, Jableh, Latakia, and Azaz did not reveal any obvious damage to related facilities.

Across the six Governorates of 2,351 facilities assessed, only an estimated 5 percent of the facilities (106) suffered damage. Most damage and loss in the sector occurred in the Aleppo Governate, with US$26.6 million of damage and US$2.7 million of loss. Aleppo Governorate reported an estimated 62 out of 928 facilities damaged, out of which six are destroyed (four police stations, one fire station, and one courthouse). In Idlib, three out of the 18 damaged facilities were fully destroyed. No facilities were destroyed in Hama, Latakia and Tartous.

TABLE 57: TOTAL DAMAGES AND LOSSES BY GOVERNORATE (IN US$ MILLION)

Governorate	Total Damages	Total Losses
Aleppo	26.55	2.65
Raqqa	1.68	0.02
Hama	4.03	0.40
Idlib	7.73	0.77
Latakia	4.70	0.47
Tartous	2.35	0.24
Grand Total	**47.05**	**4.70**

TABLE 58: TOTAL DAMAGES AND LOSSES BY AREAS OF CONTROL (IN US$ MILLION)

Areas of Control	Total Damages	Total Losses
Autonomous Administration of North and East Syria	2.7	0.25
Opposition-Controlled Areas	21.5	2.15
Government-controlled areas	22.85	2.3
Grand Total	**47.05**	**4.70**

As a result of the earthquake, the institutional capacity for service delivery will be impacted by the resulting displacement of Public Institutions' workers and the lack of financial resources. This will see alternative service providers offer services at higher costs, a phenomenon that has been a result of the war in Syria. Division of the city across Government-Controlled and Opposition-controlled Areas fragmented governance and service provision during the conflict and will deepen it following the earthquake. While the government relocated administrative bodies to Government-controlled areas, parallel administrative and public institutions' structures have been established in Opposition-Controlled Areas but remain weak. Until now, government funding remains unavailable in former Opposition-Controlled Areas and most of their public assets are not operational.

Prioritized recovery and reconstruction needs

The damage caused to administrative buildings has adversely affected the delivery of public services to the population even though public facilities are not always needed for government core functions (including justice, policing, cadastral records, etc.).

The Tables below show the prioritized and sequenced needs by city and by governorate. The reconstruction needs include infrastructure and assets to be restored to pre-disaster level, following BBB principles, so to reduce risks and vulnerabilities and increase resilience to future disasters. As for the recovery needs, they consist of service delivery, production, and access to services and goods to be restored by addressing pre-existing and new risks.

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TABLE 59: TOTAL NEEDS BY GOVERNORATE (IN US$ MILLION)

Governorate	Total Baseline	Early Recovery (0-12 months)	Short-term (1 to 3 years)	Total Needs
Aleppo	928	31.9	2.6	34.5
Raqqa	180	2.2	-	2.2
Hama	324	5.2	-	5.2
Idlib	308	8.7	1.3	10.1
Latakia	328	6.1	-	6.12
Tartous	283	3.1	-	3.1
Grand Total	**2,351**	**57.2**	**3.9**	**61.2**

TABLE 60: TOTAL COST OF NEEDS BY AREA OF CONTROL (IN US$ MILLION)

Governorate	Total Baseline	Early Recovery (0-12 months)	Short-term (1 to 3 years)	Total Needs
Autonomous Administration of North and East Syria	227	3.5	-	3.5
Opposition-Controlled Areas	685	25.8	2.2	28.0
Government-controlled areas	1,439	28.0	1.8	29.7
Grand Total	**2,351**	**57.2**	**3.9**	**61.2**

Aleppo governorate's estimated needs are the highest for an amount of around US$34.5 million. Idlib's estimated needs are US$ 10.1 million, while Latakia and Hama's needs are US$6.1 million and US$5.2 million respectively. As for Tartous and Raqqa, the estimated needs are US$3.1 million and US$2.2 million respectively. Hence the needs estimates for all six governorates are US$61.2 million.

The needs are mainly for infrastructure i.e., police stations, provincial buildings, and a fire station that exhibited the most impact by the earthquake in the different governorates. It is estimated that 15 percent of facilities in these six governorates are damaged, and 1 percent fully destroyed.

The governance system, which was already weak before the crisis, has worsened. The armed conflict and a situation in which non-state actors seized power in some governorates led to the fragmentation and deterioration of the governance system. Although the intensity of fighting has declined, the rule of law, and accountability in governance have continued to deteriorate. While Syria ranked below the MENA average on several governance indicators before the crisis, including, perception of corruption, rule of law, government effectiveness, and voice and accountability, those indicators remain low and, in many instances, further deteriorated during the conflict. In 2022, Syria's rank dropped to 178th (out of 180 countries) in the corruption perception index, down from a rank of 144th in 2012.

As shown in Table 60 above, most of the needs are concentrated in Government-Controlled and Opposition-Controlled Areas. The estimated needs are US$29.7 million and US$28 million respectively. The cost of early recovery needs is estimated at US$57.2 million, needed to rehabilitate the partially damaged facilities in these areas. On the other hand, the fully destroyed facilities will necessitate around US$ 3.9 million and will require a longer time horizon to be reconstructed.

As highlighted in an earlier Syria RDNA (December 2022), the sidelining or undermining of civilian institutions at a local level by armed groups and retaliation against social groups deemed hostile represent a more serious challenge to local government: there is anecdotal evidence that, both in government and opposition-controlled areas, armed groups either compete with or take over local governments and that reconstruction plans aim at social engineering to consolidate political constituencies. Opinion surveys provide a nuanced reflection of the social contract which signals a misalignment with government policy: although a large percentage of respondents (close to 30 percent) claim to face discrimination based on their religion or ethnicity by public institutions, most of them support equal rights for all Syrians irrespective of their religious, sectarian, or ethnic affiliation.

Limitations

The difficulty of accessing damaged buildings affects the quality and accuracy of data, and not all damaged assets in these cities have been captured in this assessment. The assessment of fiscal damage is limited by a lack of information on budget execution at central government level, and of data on local finances.

Environment

Background and Analysis of Pre-Crisis Conditions and Trends

Syria's landscape contains rich biodiversity and resources, yet the country has long faced serious environmental challenges including water scarcity and contamination, soil degradation, air pollution, solid waste management, biodiversity loss, and coastal and marine pollution. In 2009, before the war, environmental degradation costs were estimated at 2.3 percent of the country's GDP.[90] Before the crisis, approximately one-third of the country's land was arable, and more than half the country was natural pastures, steppe, desert, and mountainous areas. Northwest Syria is characterized mainly by cultivated areas, which have expanded over the past two decades,[91] as well as urban and peri-urban areas.

Assessment of Disaster Effects: Damage and Loss Estimates

The main environmental concerns related to the earthquake include hazardous waste streams (e.g., from oil or chemical spills), pollution, and rubble. Each of these damages can result in harm to environmental health and safety, as well as key natural resources and habitats.

Hazardous waste streams are a concern following the earthquake due to their potential for health and environmental harm. In Northwest Syria, these hazards are mainly related to factories, storage facilities, trucks, and plants. Oil and gas fields are not located in this region, and therefore are not of concern. There is also little evidence that industrial facilities have produced spills due to the earthquake. Hazards from spills like oil or chemicals were not assessed through this exercise due to a lack of sufficient information on spill occurrence.

Pollution, like hazardous waste, poses threats to human health and the environment. Air pollution is a concern due to the risk of fires started during the earthquake that would raise particulate matter levels, as well as airborne contamination due to hazardous substances released into the air from buildings (e.g., asbestos) and spills. In the case of asbestos, elevated levels require special care in handling. Soil and water contamination can occur from sewage, oil, or chemical spills that are not adequately contained or wastewater treatment plants that are uncontained, or from special waste streams like e-waste. No evidence was found that wastewater treatment plant damage from the earthquake caused contamination that would affect local water quality levels. A recent World Bank Damage Assessment estimated that the cost to treat and safely dispose of e-waste resulting from health facilities damaged due to the conflict in 14 cities is around US$ 0.4 million at a cost of US$ 2,250 per ton.[92] Pollution due to the earthquake is not assessed here due to a lack of data. However, given that the amount of rubble produced due to the earthquake is in the same order of magnitude as in this previous assessment, it is expected that e-waste would also run in a similar range, yet no Figures are available on this.

Rubble was quantified in the World Bank's 2017 economic and social assessment of the conflict in Syria, which revealed rubble accumulation in Aleppo and Homs of approximately 14.9 and 5.3 million tons, respectively, and flagged the difficulties of rubble removal and processing, and environmental and social risks of the rubble and its management. The 2022 World Bank Damage Assessment estimated that 14 Syrian cities contain a total of between 17.6 million and 28.3 million tons of rubble, with costs to manage and dispose of this rubble ranging between US$167.3 million and US$268.7 million. Rubble estimates are assessed here using a similar methodology as the previous World Bank DNA.

Rubble estimates are calculated based on damage to buildings stock, including housing. The damage assessment calculation of rubble mass is based on buildings/housing damage assessments at city level, converted from m3 to tons. Cost estimates to clear, transport, process, and dispose of rubble have considered environmental and

90 Delegation of the European Commission to Syria (2009). Country Environmental Profile for the Syrian Arab Republic: Final Report.
91 Mohamed et al. 2020. ***Monitoring of Changes in Land Use/Land Cover in Syria from 2010 to 2018 Using Multitemporal Landsat Imagery and GIS***.
92 World Bank. 2022. ***Syria Joint Damage Assessment of Selected Cities***.

TABLE 61: TOTAL DAMAGES AND LOSSES BY GOVERNORATE

Governorate	Total Building Damage	Total Building Loss	Amount of Rubble (millions of tons)
Aleppo	51,735	5,255	30.2
Harem	31,206	4,201	11.1
Raqqah	10,333	218	3.8
Hama	15,289	573	10.2
Tartous	6,987	57	1.6
Latakia	6,504	325	1.1
Total	**122,054**	**10,629**	**58.0**

social safeguards and are based on a prior World Bank study.[93] While this study provided three scenarios for rubble management, the damage assessment adopted a unit cost approach based on Scenario 2 of US$ 9.5/ton of rubble.[94] To account for changes in cost levels since the beginning of the conflict, this rate has been increased by 10 percent, resulting in a unit value of US$ 10.6/ton of rubble.

Rubble is aggregated by damaged and destroyed assets for the informal, formal, and apartment datasets. The building footprints used are derived from satellite imagery based on OSM and Microsoft AI combined footprints. Calculations for apartments are based on five-story buildings with building footprints for the six areas measured from Earth Observation (EO) imagery. The presented debris volumes are derived from data provided on space volumes of damaged and destroyed buildings, and estimation of debris tonnage per unit of building space volume. With an estimated 58 million tons of debris and an assumed cost of US$ 10.6/ton of rubble to clear it, total damages are estimated at US$614.6 million.

Sectoral Recovery and Reconstruction Needs Assessment (including cost estimates)

Rubble clearance is a key priority under this damage and needs assessment. Aleppo, Idlib, and Hama governorates hold the largest volumes of rubble, and therefore also the highest costs for rubble clean-up. Areas with large concentrations of destroyed and heavily damaged buildings should be prioritized for rubble management, as these have the greatest risk of contamination from rubble (e.g., via release of asbestos). Areas with high concentrations of rubble also may have blocked roads and access to services, which can be dangerous to residents.

93 World Bank. 2017. Aleppo Pilot Environmental Damage Assessment.

94 Scenario 2 was selected as it reflects common practice based on international development experience in this field in Syria, and the unit cost of rubble management under this scenario was also used in the 2022 Syria Joint Damage Assessment. The scenario reflects the following interventions: a network of small and medium capacity debris crushing sites is set up. These sites all produce a recycled aggregate with 70% of the produced debris and the remaining 30% is sent for disposal to the same sites as identified in Scenario 1.

TABLE 62: TOTAL COST OF NEEDS BY GOVERNORATE (US$ MILLION)

Governorate	Needs category	Cost
Aleppo	Rubble management	320.4
Harem	Rubble management	40.2
Raqqah	Rubble management	107.9
Hama	Rubble management	118
Tartous	Rubble management	11.2
Latakia	Rubble management	16.9
Total		**614.6**

TABLE 63: TOTAL COST OF NEEDS BY AREA OF CONTROL (IN US$ MILLION)

Areas of Control	Needs category	Cost
Government-controlled areas	Rubble management	353.4
Autonomous Administration of North and East Syria	Rubble management	166.0
Opposition-Controlled Areas	Rubble management	95.3
Total		**614.6**

The costs of rubble management, estimated at US$614.6 million are to be split across approximately US$ 307 million for year 1, with the remainder for year 2 and 3, as services and rubble intake locations are established. Testing of the rubble before removal for asbestos and other contaminants is extremely important for public health and safety and ensuring safe treatment and disposal. Given that solid waste management in Syria is largely unregulated and reliant upon open and informal dumpsites,7 this poses a serious challenge for governing bodies to ensure appropriate measures and waste facilities are available for rubble intake.

Rebuilding of housing stock is covered in a separate chapter of the damage and needs assessment and aligns with the findings here.

Recommendations and Limitations

Limitations of the study include assumptions around the volume of rubble generated, as described above. In addition, no air quality or hazardous material assessment was conducted for this exercise. Downstream effects from these could be present outside of the immediate area of damage (e.g., due to wind patterns or water contamination).

The rubble calculated predominantly stems from residential buildings, and this issue is clearly tied to the dire need to provide housing for those that have lost homes, and to ensure that people are not exposed to hazardous materials found in rubble. The environmental damage of the earthquake also impacts the quality of water required for water supply and sanitation, which may be threatened by contaminants. The removal and treatment of rubble relates to municipal services and the circular economy, as informal dumpsites have become common in Syria since the crisis and threaten human health and safety.[95]

Interventions should include solid waste (rubble) removal in the short-term, hazardous waste assessment and treatment (before, during, and after rubble removal), and continued environmental monitoring. Rubble should be removed to safe dump sites and tested before removal for toxic substances, and toxic waste should be handled according to international safety standards.

The findings of this assessment underscore the importance of developing a stronger waste management system in Syria. It is recommended that waste management be developed according to Circular Economy principles, i.e., moving beyond the unsustainable "take-make-use-waste" global economic model towards a more environmentally and economically secure system.[96] Recommendations for future assessments include air quality assessment and hazardous waste assessment including contamination of soil, waterbodies, and groundwater.

95 PAX. 2015. Amidst the debris. A desktop study on the environmental and public health impact of Syria's conflict; (2) World Bank. 2022. Syria Joint Damage Assessment of Selected Cities.

96 See, for instance: World Bank. 2022. ***Squaring the Circle: Policies from Europe's Circular Economy Transition***.

Social Sustainability and Inclusion

Background and Analysis of Pre-Crisis Conditions and Trends

Prior to the earthquake, the livelihoods of the population living in affected regions were significantly impacted by the conflict. Social inclusion consisted of a main challenge to sustaining development outcomes, with a significant portion of the population living in IDP camps and those living in communities being confronted with barriers to accessing aid and services.

Assessment of Disaster Effects: Damage and Loss Estimates

The destruction of homes and livelihoods has disproportionately impacted vulnerable segments of the population, such as, women, children, the elderly, and disabled persons, as well as the poor. Women and girls, who were already at high risk of sexual violence, face new threats due to displacement and increased economic hardship. Children who have experienced the loss of family members, their home and their community in the aftermath of the earthquake have been affected psychologically, with many suffering from post-traumatic stress disorder likely to result in long-lasting repercussions on their mental health and in their development. Elevated levels of distress have been reported among affected population, with post-traumatic stress disorder being particularly noticeable in communities. Insufficient shelter arrangements for the elderly and people with disabilities, which has led to overcrowding, combined with the lack of services for people with specific needs.[97] The earthquake has also severely impacted the population's livelihoods, particularly for smallholder farmers.

The social sustainability of development outcomes has also been compromised by the significant damage caused to infrastructure networks and to public service delivery.

Sectoral Recovery and Reconstruction Needs Assessment

The reconstruction and recovery strategy should take into consideration the needs of the most vulnerable segments of the population. This would include providing them with the safety and security they require, as well as meeting their most urgent and basic needs through adequate

97 Syrian Arab Republic: Earthquakes Situation Report No. 1 As of 25 February 2023 OCHA

provision of shelters, public services, and economic restoration activities. The reconstruction and recovery efforts should be community-driven to ensure greater ownership and to support the sustainability of development outcomes. The strategy should promote inter-sectoral programming and collaboration and include stakeholders to support the active participation of marginalized groups in the decision-making process. Women need to be involved in all aspects of the relief and recovery efforts, from planning to implementation[98].

Interventions under a reconstruction and recovery strategy would include: (i) improved access to shelter, food, health, and infrastructure networks to vulnerable segments of the population, taking into account the specific needs of the population; (ii) adoption of building back better principles in communities with a large representation of vulnerable population; (iii) establishment of an outreach program that disseminates information, and obtains feedback from citizens (particularly vulnerable groups) regarding the plans for reconstruction and recovery; (iv) adoption of a citizen-centric and gender-responsive approach (with a focus on the vulnerable) toward disaster management and resilience by strengthening citizen engagement capacities; (v) establishment of PSS activities for children, youth, and families, including specialized mental health services, and child protection case management services for vulnerable children; and (vi) establishment of Grievance Redress Mechanisms (GRMs) to address issues of conflict over aid distribution, and over resources at the local level.

Recommendations and Limitations

An improvement in the country's responses and recovery effort will help support vulnerable people's engagement in the Syrian recovery and reconstruction process, create equal opportunity for all, including, elderly people, IDPs, and persons with disability, and promote cohesion among communities leading to improved sustainability in development outcomes. The reconstruction and recovery strategy actively seeks opportunities for building back better to help reduce vulnerability to future disasters and build community resilience. Limited capacity and expertise in providing inclusive relief services may substantially impact the ability to address a vulnerable population's needs.

98 UNICEF, "Devastating Earthquakes Strike Syria and Türkiye," ***United Nations International Children's Emergency Fund***, n.d., https://www.unicef.org/emergencies/Syria-Turkiye-earthquake.

Social Protection and Livelihoods

Background and Analysis of Pre-Crisis Conditions and Trends

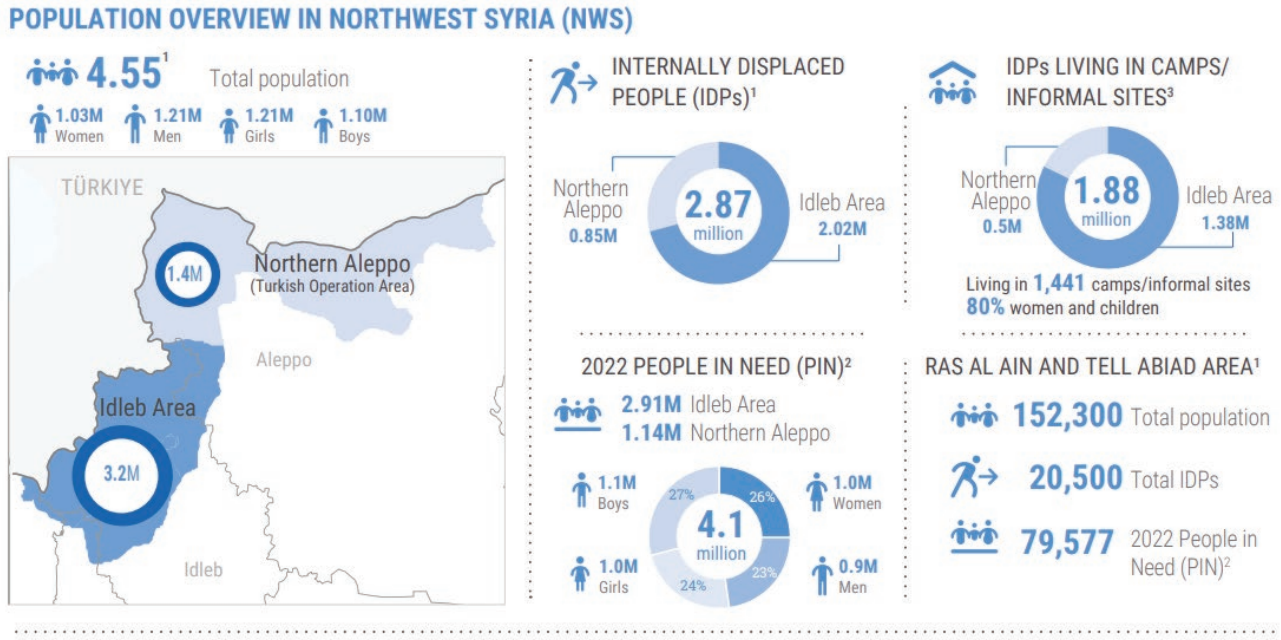
Years of conflict have resulted in a dramatic erosion of Syria's human capital and the reversal of progress achieved towards the development of a modern social protection system. The rise in poverty meant that more than 30 percent of the population was unable to meet its basic needs, predominantly in the rural areas and in the Northeast.[99] Employment in the informal sector accounted for 40 percent of the labor force and was largely concentrated in agriculture and construction, while employment in the formal sector was concentrated in the public sector. The main safety net before the conflict consisted of expensive and price-distorting subsidies, mostly on energy (11 percent of GDP) and food and other commodities (2.5 percent of the GDP).

In the early 2000s, Syria initiated a gradual economic liberalization to spur growth, and planned to launch a reform of the social protection system in order to mitigate the adverse social effects of the economic liberalization measures. Measures to support economic growth were prioritized over the development of a social safety net, and spending on social welfare decreased from 3.2 percent of GDP in 2000 to 1.9 percent of GDP by 2010[100]. A new entity was established in 2011, i.e., the National Social Assistance Fund (NSAF) under the Ministry of Social Affairs and Labor (MOSAL), to manage a national cash transfer program targeted to the poor and vulnerable. By 2012, the fund's staff included 950 social workers, supervisors and administration staff located at headquarters and the 63 district centers[101]. However, reforms of the Syrian social protection system have largely been put on hold since the beginning of the conflict, including the operationalization of the cash transfer program. Instead, over the past couple of years, around 157 organizations have provided some form of humanitarian aid to the population[102], focusing on education, early recovery and livelihoods, food and agriculture, health, protection, and shelter.

The population located in Northwest Syria ranks among the most affected by the conflict, with more than 4.6 million individuals in need of humanitarian assistance. 3 million individuals were internally displaced, of which, 1.88 million living in camps in the Aleppo and Idlib governorates (Figure 41). Medical facilities, markets, and schools have been damaged and became inoperable due to the conflict, resulting in disrupted access to food, water, healthcare, and adequate housing and created a climate of pervasive insecurity in areas already suffering from overcrowding and inadequate resources[103]. The Northern region has also been particularly vulnerable to climate change-induced land degradation, droughts, and water shortages, which has adversely impacted farmers' income and food security.

99 IMF Working Paper, Syria's Conflict Economy, 2016.
100 UN ESCWA, Social Protection in the Syrian Arab Republic, January 2020
101 Abdul Aziz, Linda, Establishing the National Social Aid Fund 'NSAF' in Syria, 2012.
102 OCHA, Organizations implementing humanitarian activities based within Syria, January – December 2022.
103 UNICEF, Humanitarian Needs Overview, Syrian Arab Republic, February 2022.

Figure 41:
Population Overview in North Syria as of January 2023 (pre-earthquake) [104]



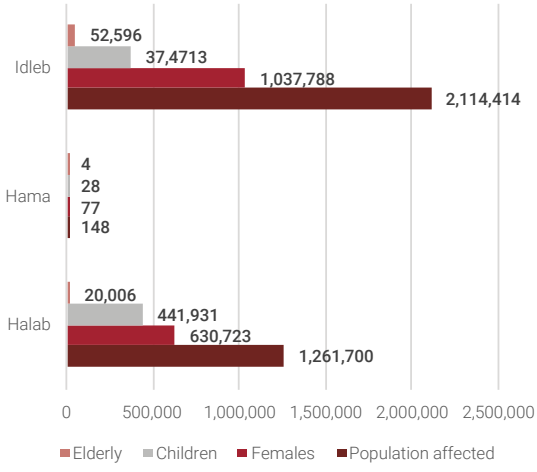
Source: OCHA factsheet as of January 20, 2023

Assessment of Disaster Effects: Damage and Loss Estimates

Damages stemming from the earthquake in Syria have exacerbated pre-existing vulnerabilities of the population in the absence of a robust social protection system. This is largely attributed to years of conflict and economic instability, which have disrupted essential services, such as healthcare and education and prevented the roll-out of a safety net system that protects the poor and the vulnerable. The lack of investment in disaster preparedness and risk reduction has further compounded this vulnerability, leaving the population at risk when natural disasters occur.

In the aftermath of the recent earthquake, a total of 6.6 million individuals were directly impacted (as a result of structural damage to buildings, disruption of basic services or any other direct impacts that can be attributed to the earthquake). This is in addition to around 6,000 fatalities and 12,000 injuries across the earthquake affected areas. Out of the 6.6 million, around 3,376,114 were in Idleb and Aleppo alone[105] (2,114,414 and 1,261,700 respectively). In those two governorates of the total impacted population, females constituted 49.4 percent (1,668,588) individuals), while 24.1 percent (816,672 individuals) were children under the age of five. Female-headed households accounted for 7.2 percent (209,458 individuals), and 2.5 percent (72,606 individuals) were elderly[106].

Figure 42:
Distribution of vulnerable groups by governorate



104 IDP figures in the graph are limited to Northwest Syria.
105 Humanitarian Needs Assessment Program (HNAP) Syria, accessible at ***https://hnap.info/fssportal/seeddms51x/seeddms-5.1.8/out/out.Login.php***
106 WorldPop - https://wopr.worldpop.org/

The earthquake has generated a massive internal displacement with an estimated 600,000 individuals (approximately 120,000 households) displaced across different governorates[107]. The majority of IDPs likely face a substantial drop in income as a result of disrupted employment or livelihoods. The prevalence of IDPs is also expected to exacerbate vulnerabilities among the displaced who often struggle to access basic needs, but also host communities given the increased demand placed on limited resources. Further, given the significant damages to the housing infrastructure, many IDPs are expected to reside for a prolonged duration in temporary shelters that often lack required safety and protection standards. In fact, regardless of the type of occupancy (camps, informal settlements, collective shelters or family/friends) and location (government/non-government controlled areas), IDPs, particularly women, girls and children, remain exposed to various risks, including of disease, violence, abuse and marginalization. Finally, it is worth noting that a number of public schools and healthcare centers currently serve as transitional shelters for the displaced, also impacting the provision of those services until permanent shelters are made available.

Assessment of Impact of the earthquake

Overall, the earthquake-induced loss of livelihoods and the rise in food insecurity have intensified the struggle of the impacted population, rendering the process of rebuilding their lives even more challenging. It is therefore essential to address these emergent needs - livelihoods restoration, access to clean water and food - while also addressing the pre-existing vulnerabilities such as poverty, lack of access to healthcare, inadequate education, in the absence of much-needed safety nets.

In this context, the earthquake should lead to a shift in priorities, particularly among IDPs, from multi-purpose cash or vouchers and winterization to shelter. According to a recent study carried out by REACH Initiative[108], the need for shelter has been identified as the top priority for 51 percent of newly arrived IDP households, highlighting the urgent need for adequate housing solutions, followed by winterization and cash assistance. This shift in priorities emphasizes the amplified humanitarian crisis resulting from the earthquake, which requires an agile and large-scale emergency response.

At the community level, the living conditions have also significantly deteriorated. According to the same study, food support, multi-purpose cash or vouchers, shelter support, and winterization support were identified as the most pressing needs among communities. This underscores the urgency of providing social assistance to mitigate the impact of the disaster on the affected communities. Addressing other identified needs such as nutrition support and WASH can further bolster the resilience and well-being of the population. A robust social protection system is therefore crucial to ensuring the recovery and livelihoods of the affected communities.

TABLE 64: PRIORITY NEEDS PRE-EARTHQUAKE

Pre-EQ POP	Most Reported	2nd Most Reported	3rd most Reported
1st Priority Need	MPCA (35%)	Shelter (33%)	Winterization (18%)
2nd Priority Need	Winterization (35%)	Food (17%)	MPCA (15%)
3rd Priority Need	Winterization (25%)	Food (15%)	Nutrition (14%)
Most reported needs by communities	**Winterization (26%)**	**MPCA (20%)**	**Shelter (15%)**

107 Ibid.
108 ***USAID REACH Initiative***

TABLE 65: PRIORITY NEEDS POST-EARTHQUAKE AMONG IDPS

Post-EQ IDP HHs	Most Reported	2nd Most Reported	3rd most Reported
1st Priority Need	Shelter (51%)	MPCA (29%)	Winterization (8%)
2nd Priority Need	Winterization (33%)	Food (20%)	MPCA (17%)
3rd Priority Need	Winterization (30%)	Food (17%)	MPCA (13%) & Non-Food Items (13%)
Most reported needs by communities	**Shelter & Winterization (24%)**	**MPCA (20%)**	**Food (15%)**

Sectoral Recovery Strategy and Needs Assessment (including cost estimates)

EARLY RECOVERY (0-12 MONTHS)

The needs highlighted in the previous sections necessitate an emergency response that would seek to protect the directly impacted population through targeted safety net interventions, in the form of:

- Emergency cash transfers to households who became further vulnerable following the earthquake. Priority would be given to (i) households who suffered the loss of their breadwinner, as well as households with injured member(s); and (ii) the new IDPs.
- Labor intensive public works, which would provide temporary employment to unskilled/semi-skilled individuals with labor capacity not receiving cash transfers, for the rehabilitation of damaged infrastructure in the social sectors.

The proposed response complements the proposed recovery strategies for the housing, agricultural and health sectors. It therefore builds on the following assumptions: (i) immediate provision of safe shelters, in conjunction with the rehabilitation of damaged residences; (ii) provision of agricultural livelihoods support – agriculture being the most prominent economic sector in the impacted areas; and (iii) provision of psychosocial and mental support services, specifically to categories at risk such as women and children.

SHORT TERM INTERVENTIONS (1-3 YEARS)

Following the emergency response, it is expected that a substantial number of impacted households would remain in need of social assistance. It is therefore recommended that the cash transfers initiated under the early recovery phase be maintained for poor and vulnerable households, with flexibility in revising coverage, targeting and benefits levels, for the following 1-3 years.

TABLE 66: TOTAL COST OF NEEDS

Early Recovery (0-12 months)

Intervention	Targeted population	Number	Average monthly cost ($)	Total excl. operating costs ($)	Description
Emergency cash transfers (vulnerability criteria)	Households suffering loss of breadwinner, and/or substantially injured members	18,000	150	32,400,000	6,000 deaths + 12,000 injured
	IDPs (households)	120,000	150	216,000,000	600,000 IDPs
Labor intensive public works	Adults with labor capacity, not receiving cash transfers	264,000	80	63,360,000	Four cycles, three months each, self-targeted. Indirectly benefiting around 20% of impacted population.
	Inputs/material for infrastructure rehabilitation, preferably in the social sectors	N/A	N/A	30,000,000	30% of the program.

Short Term (1-3 years)

Cash Transfers	Targeted to poor and vulnerable households	264,000	100	950,400,000	Covering the poorest 20% of the impacted population of 6.6m. Benefit adjusted and rationalized.

Type	Early Recovery (0-12 months)	Short term (1-3 years)	Total Needs (Over 0-3 years)
Social Safety Nets*	341,760,000	950,400,000	1,292,160,000
Grand Total	**341,760,000**	**950,400,000**	**1,292,160,000**

These figures exclude operating costs estimated at 20%
**The SSN needs have been rationalized based on cost affordability criteria*

Implementation Arrangements

The recovery strategy will complement the current humanitarian response involving a number of agencies that have been active in Syria even before the earthquake. The proposed interventions will also be aligned to the extent possible with the programs managed by UN agencies and other partners included in the Cash Working Group in Syria, in terms of design and implementation modality.

Recommendations and Limitations

Main limitations of the assessment:

- The assessment focused on the directly impacted areas, where social protection needs are highly critical.
- Unlike other human development sectors, the social protection challenges are compounded by the fact that the system has been dysfunctional over the past decade.
- While substantial data has been made available on the impact of the earthquake on individuals and communities, data and information remain limited on the supply of aid and protection services in the affected regions, including design and coverage.

Brief overview of potential interventions with other actors on the ground

- The humanitarian system is very active in the region, focusing on the priority needs described throughout the reports, ranging from shelter to food and non-food, winterization and WASH.

Despite all the challenges faced in the social protection sector, there is a clear need to provide assistance to the population impacted by the earthquake, including:

- Providing cash to affected population, and in the meantime collecting data and developing targeting methodology for future assistance.
- Leveraging the existing humanitarian system to provide social assistance and livelihoods support.
- Developing a recovery plan for the social protection sector that would include a vision and strategy for the future.

Source: Ipsos

Annex 1: Total Damages and Losses and by City

1.1. HOUSING: DAMAGES AND LOSSES BY CITY

City	Baseline of Housing Unit Stock	Fully Damaged	Partially Damaged	Damages (US$, Millions)	Losses (US$, Millions)
Afrin	6,394	625	460	10.9	0.9
Azaz	700	90	105	2.0	0.2
Aleppo	88,360	1,454	7,631	91.6	7.2
Jandairis	3,488	1,173	640	18.3	1.4
Ad-Dana	2,806	31	142	1.7	0.1
Harem	1,049	126	85	2.1	0.2
Idlib	1,300	33	80	1.1	0.0
Sarmada	3,385	70	135	2.1	0.2
Jableh	3,758	67	260	3.3	0.3
TOTAL	**111,240**	**3,669**	**9,278**	**133.2**	**10.5**

1.2. HEALTH: TOTAL DAMAGES AND LOSSES BY CITY (IN US$ MILLION)

City	Total Damage	Total Loss
Aleppo	62.3	29.9
Harem	0.0	0.0
Afrin	2.4	1.1
Ad-Dana	0.0	0.0
Jandairis	1.4	0.7
Azaz	33.2	16.0
Jableh	0.0	0.0
Sarmada	0.0	0.0
Latakia	17.8	8.5
Total	**117.0**	**56.2**

1.3. EDUCATION: TOTAL DAMAGES AND LOSSES BY GOVERNORATE (US$ MILLION)

Governorate	City	Total Damage	Total Loss*
Aleppo	Aleppo	17.9	15.6
	Afrin	1.9	3.1
	Azaz	0.1	0.8
	Jandairis	0	0.2
Idlib	Harem	0.2	0.2
	Ad-Dana	0	0.2
	Sarmada	0.2	0.2
Latakia	Latakia	0.9	0.1
	Jableh	0	0.1
Total		**21.2**	**20.4**

** Losses were calculated at the Governorate level and allocated across the 9 cities based on level of damage and number of schools.*

1.4. MUNICIPAL SERVICES: TOTAL DAMAGEES BY CITY (IN US$ MILLION)

City	Total Damage
Aleppo	7.2
Afrin	1.2
Azaz	2,6
Jandairis	1.4
Latakia	5
Harem	4.7
Jableh	4.7
Ad-Danah	0.6
Sarmada	0
Total	**24.6**

1.5.A. CULTURAL HERITAGE: TOTAL DAMAGES AND LOSSES INVENTORY BY CITY

Asset Types	Baseline	Partially Damaged	Completely Destroyed	No Observable Damage	Total damage (US$ in million)
Archaeological sites	7	2	0	5	$8.8
Museums	9	3	0	6	$13.2
Heritage housing	12,712	828	0	0	$72.8
Other heritage buildings	6,356	414	0	0	$45.5
Religious buildings	416	64	14	340	$17.4
Total Damage					**$157.8**

1.5.B. CULTURAL HERITAGE: TOTAL DAMAGEES BY CITY (IN US$ MILLION)

City	Total Damage
Aleppo	99.2
Afrin	6.8
Azaz	4.1
Jandairis	26.1
Latakia	14
Harem	2.4
Jableh	2.1
Ad-Dana	0.0
Sarmada	3.1
Total	**157.8**

1.6. TRANSPORTATION: TOTAL DAMAGES AND LOSSES BY CITY (IN US$ MILLION)

City	Total Damage, excluding Bridges	Total Loss
Aleppo	51.9	1.4
Harem	0.1	0.1
Afrin	0.2	0.4
Ad-Dana	-	-
Jandairis	0.9	0.4
Azaz	0.2	0.9
Sarmada	-	-
Latakia	2.5	1.0
Jableh	0.2	0.1
Total	**56.1**	**4.3**

1.7. WATER: TOTAL DAMAGES BY CITY (US$)

City	Total Damage
Aleppo	67.4
Harem	0.2
Afrin	-
Ad-Dana	-
Jandairis	-
Azaz	-
Jableh	30.4
Sarmada	-
Latakia	23.2
Harem	8.5
Total	**129.7**

1.8 POWER: TOTAL DAMAGES BY CITY (IN US$ MILLION)

City	Total Damage
Aleppo	62,764
Azaz	-
Latakia	-
Jableh	-
Harem	
Ad-Dana	-
Sarmada	63,360
Jindairis	-
Afrin	2,420,000
Total	**2,546,124**

Annex 2: Needs by City

2.1. HOUSING: RECONSTRUCTION AND RECOVERY NEEDS BY CITY (IN US$ MILLION)

City	Reconstruction and Recovery Needs	Reconstruction and Recovery Needs Including Service Cost
Afrin	14.2	17.5
Azaz	2.6	3.1
Aleppo	119.1	146.5
Jandairis	23.8	29.2
Ad-Dana	2.2	2.8
Harem	2.8	3.4
Idlib	1.5	1.8
Sarmada	2.7	3.3
Jableh	4.3	5.3
TOTAL	**173.1**	**213.0**

2.2 HEALTH: PRIORITIZED AND SEQUENCED NEEDS TABLE BY CITY (IN US$ MILLION)

City	Needs Category	Early Recovery (0-12 months)	Short-term (1 to 3 years)
Aleppo	Infrastructure Reconstruction	24.9	56.0
	Service Delivery Restoration	24.9	12.5
Harem	Infrastructure Reconstruction	0.0	0.0
	Service Delivery Restoration	0.0	0.0
Afrin	Infrastructure Reconstruction	1.0	2.1
	Service Delivery Restoration	1.0	0.5
Ad-Dana	Infrastructure Reconstruction	0.0	0.0
	Service Delivery Restoration	0.0	0.0
Jandairis	Infrastructure Reconstruction	0.6	1.2
	Service Delivery Restoration	0.6	0.3
Azaz	Infrastructure Reconstruction	13.3	29.9
	Service Delivery Restoration	13.3	6.6

City	Needs Category	Early Recovery (0-12 months)	Short-term (1 to 3 years)
Jableh	Infrastructure Reconstruction	0.0	0.0
	Service Delivery Restoration	0.0	0.0
Sarmada	Infrastructure Reconstruction	0.0	0.0
	Service Delivery Restoration	0.0	0.0
Latakia	Infrastructure Reconstruction	7.1	16.0
	Service Delivery Restoration	7.1	3.6
Total		**93.6**	**128.7**

2.3 EDUCATION: PRIORITIZED AND SEQUENCED NEEDS BY CITY (IN US$ MILLION)

City	Needs Category	Early Recovery (0-12 months)	Short term (1-3 years)	Total Needs (Over 0-3 Years)
Aleppo	Infrastructure Reconstruction	6.1	11.8	17.9
	Service Delivery Restoration	5.3	10.3	15.6
Afrin	Infrastructure Reconstruction	0.7	1.3	1.9
	Service Delivery Restoration	1.1	2.1	3.1
Azaz	Infrastructure Reconstruction	0.03	0.1	0.1
	Service Delivery Restoration	0.3	0.5	0.8
Jandairis	Infrastructure Reconstruction	0.0	0.0	0
	Service Delivery Restoration	0.1	0.1	0.2
Harem	Infrastructure Reconstruction	0.1	0.1	0.2
	Service Delivery Restoration	0.1	0.2	0.2
Ad-Dana	Infrastructure Reconstruction	0.0	0.0	0.0
	Service Delivery Restoration	0.1	0.2	0.2
Sarmada	Infrastructure Reconstruction	0.1	0.1	0.2
	Service Delivery Restoration	0.1	0.2	0.2
Latakia	Infrastructure Reconstruction	0.3	0.6	0.9
	Service Delivery Restoration	0.2	0.5	0.7
Jableh	Infrastructure Reconstruction	0.0	0.0	0
	Service Delivery Restoration	0.2	0.5	0.7
Grand Total		**14.6**	**28.3**	**42.9**

2.4. TOTAL NEEDS BY CITY (IN US$ MILLION)

City	Needs Category	Early Recovery (0-12 months)	Short-term (1 to 3 years)
Aleppo	Infrastructure Reconstruction	3,363,759	5,045,638
	Service Delivery Restoration	373,751	560,626
Afrin	Infrastructure Reconstruction	541,910	812,866
	Service Delivery Restoration	60,212	90,318
Azaz	Infrastructure Reconstruction	1,217,910	1,826,865
	Service Delivery Restoration	135,323	202,985
Jandairis	Infrastructure Reconstruction	677,881	1,016,822
	Service Delivery Restoration	75,320	112,980
Latakia	Infrastructure Reconstruction	2,354,686	3,532,029
	Service Delivery Restoration	261,632	392,448
Harem	Infrastructure Reconstruction	2,211,737	3,317,606
	Service Delivery Restoration	245,749	368,623
Jableh	Infrastructure Reconstruction	2,187,583	3,281,375
	Service Delivery Restoration	243,065	364,597
Ad-Dana	Infrastructure Reconstruction	271,677	407,515
	Service Delivery Restoration	30,186	45,279
Sarmada	Infrastructure Reconstruction	13,970	20,955
	Service Delivery Restoration	1,552	2,328
Total		**14,267,905**	**21,401,857**

2.5. CULTURAL HERITAGE: TOTAL NEEDS BY CITY (IN US$ MILLION)

City	Needs Category	Early Recovery (0-12 months)	Short-term (1 to 3 years)
Aleppo	Infrastructure Reconstruction	46.4	69,653,984
	Service Delivery Restoration	5.2	7.739.332
Afrin	Infrastructure Reconstruction	3,203,086	4,804,628
	Service Delivery Restoration	355,898	533.848
Azaz	Infrastructure Reconstruction	1,914,026	2,871,040
	Service Delivery Restoration	212,670	319.004
Jandairis	Infrastructure Reconstruction	12,199,730	18,299,596
	Service Delivery Restoration	1,355,526	2.033.288
Latakia	Infrastructure Reconstruction	6,526,634	9,789,952
	Service Delivery Restoration	725,182	1.087.772
Harem	Infrastructure Reconstruction	1,121,749	1,682,624
	Service Delivery Restoration	124,639	186.958
Jableh	Infrastructure Reconstruction	981,209	1,471,813
	Service Delivery Restoration	109,023	163.535
Ad-Dana	Infrastructure Reconstruction	0	0
	Service Delivery Restoration	0	0
Sarmada	Infrastructure Reconstruction	1.454.310	2.181.465
	Service Delivery Restoration	161.590	242.385
Total		**82.040.816**	**123.061.224**

2.6. PRIORITIZED AND SEQUENCED NEEDS TABLE BY CITY (IN US$ MILLION)

City	Needs Category	Early Recovery (0-12 months)	Short-term (1-3 years)	Total (0-3 years)
Aleppo	Infrastructure Reconstruction, excluding bridge rehabilitation	27.0	40.5	67.5
Harem	Infrastructure Reconstruction, excluding bridge rehabilitation	0.0	0.1	0.1
Afrin	Infrastructure Reconstruction, excluding bridge rehabilitation	0.1	0.1	0.2
Ad-Dana	Infrastructure Reconstruction, excluding bridge rehabilitation	-	-	-
Jandairis	Infrastructure Reconstruction, excluding bridge rehabilitation	0.5	0.7	1.2
Azaz	Infrastructure Reconstruction, excluding bridge rehabilitation	0.1	0.2	0.3
Jableh	Infrastructure Reconstruction, excluding bridge rehabilitation	-	-	-
Sarmada	Infrastructure Reconstruction, excluding bridge rehabilitation	1.3	2.0	3.3
Latakia	Infrastructure Reconstruction, excluding bridge rehabilitation	0.1	0.1	0.2
Total		**29.2**	**43.8**	**72.9**

2.7. TOTAL RECONSTRUCTION NEEDS BY CITY (IN US$ MILLION)

City	Early recovery (0-12 month)	Short term (1-3 years)	Total Needs (Over 0-3 years)
Aleppo	34.2	73.6	107.7
Idlib	0.0	0.2	0.3
Afrin	0.0	0.0	0.0
Ad-Dana	0.0	0.0	0.0
Jandairis	0.0	0.0	0.0
Azaz	0.0	0.0	0.0
Sarmada	0.0	0.0	0.0
Harem	4.3	9.3	13.7
Latakia	11.8	25.3	37.2
Jableh	15.4	33.1	48.5
Total	**65.7**	**141.6**	**207.4**

2.8. PRIORITIZED AND SEQUENCED NEEDS TABLE BY CITY (IN US$ MILLION)

City	Needs Category	Early Recovery (0-12 months)	Short-term (1 to 3 years)	Total Needs
Afrin	Infrastructure Reconstruction	0.22	-	0.22
	Service Delivery Restoration	0.02	-	0.02
Aleppo	Infrastructure Reconstruction	1.38	2.28	3.66
	Service Delivery Restoration	0.14	0.23	0.37
Harem	Infrastructure Reconstruction	0.17	-	0.17
	Service Delivery Restoration	0.02	-	0.02
Grand Total		**1.95**	**2.51**	**4.45**


WORLD BANK GROUP


GFDRR
Global Facility for Disaster Reduction and Recovery