SYRIA
JOINT DAMAGE ASSESSMENT
OF SELECTED CITIES

DECEMBER 2022

WORLD BANK GROUP

Funded by
the European Union

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1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

With support from the European Union:

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Design: Sarah Alameddine

Editing: Mark Mattson

Disclaimer: This is a largely remotely conducted exercise which relies primarily on data from satellite imagery and social media analytics, corroborated and validated by other sources and means, including data from partners, the European Union, and the Joint Research Center (JRC). Although all efforts have been made to be accurate, and to use publicly available ground-based data when feasible, a remote assessment is a broad, indicative picture of the effects of the conflict on physical infrastructure and the quality of services. This damage assessment is not comprehensive for all cities and regions; it provides estimates for select cities and sectors to the extent possible, and monetary values reflect pre-conflict replacement costs.

The Joint Damage Assessment report does not reflect the views of the European Union, the World Bank Group or its Board of Executive Directors, or the governments they represent.

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Acronyms

BPD	Barrels Per Day
CEmONC	Comprehensive Emergency Obstetric and Neonatal Care
CFS	*Chemins de Fer Syriens*
CPI	Consumer Price Index
DA	Damage Assessment
DNA	Damage and Needs Assessment
EIA	Energy Information Administration
ERW	Explosive Remnants of War
ESA	European Space Agency
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GHE	General Housing Establishment
IA	Imagery Analysis
IDFA	Identifier for Advertisers
IDP	Internally Displaced Persons
JRC	Joint Research Center
KBAs	Key Biodiversity Areas
LAU	Local Administrative Units
MCM	Million Cubic Meters
MDGs	Millennium Development Goals
MENA	Middle East and North Africa
MoLAE	Ministry of Local Administration and Environment
MoT	Ministry of Transportation
NDVI	Normalized Difference Vegetation Index
NES	North East Syria
NWS	North West Syria
PAI	Publicly Available Information
PEDEEE	Public Establishment for Distribution and Exploitation of Electric Energy
PEEGT	Public Establishment for Electricity Generation and Transmission
PPP	Purchasing Power Parity
RESTREND	Residual Trend Analysis
RPBA	Recovery and Peacebuilding Assessment
SDK	Software Development Kit
SHR	Syrian Hejaz Railways
SMEB	Survival Minimum Expenditure Basket
SYP	Syrian Pound
TIMSS	Trends in Mathematics and Science Study
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	UN High Commissioner for Refugees (UN Refugee Agency)
UNICEF	United Nations Children's Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
VIIRS	Visible and Infrared Imaging Suite
WHO	World Health Organization
WSS	Water Supply and Sanitation

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The assessment was prepared by a multidisciplinary team from the World Bank Group led by Joy Aoun (Disaster Risk Management Specialist, TTL) under the guidance of Saroj Kumar Jha (Regional Director, Mashreq Region) and Jaafar Friaa (Practice Manager for Urban, Disaster Risk Management, Resilience & Land, Middle East and North Africa (MENA) Region). The core team in charge of overall management, coherency of the report, and drafting the executive summary and introductory chapters was comprised of Needa Malik (Disaster Risk Management Analyst), Shahrzad Mobasher (Consultant), Ghizlane Aqariden (Consultant), Muhammad Malik (Consultant), Fares Salem (Consultant), and Elke-Esmeralda Dikoume (Consultant).

Individual sector chapters were drafted by the following specialists from the World Bank Group:

- **Agri-food Value Chains:** Armine Juergenliemk and Tobias Baedeker
- **Cultural Heritage:** Guido Licciardi
- **Education:** Dina Abu-Ghaida and Almedina Music
- **Electricity:** Alexis Madelain and Ghassan Al-Akwaa
- **Environment:** Lamia Mansour, Phoebe Spencer, A S Harinath, Frank Van Woerden, Ahmed Ali Al-Saedi, and Amer Abdulwahab Ali Al-Ghorbany
- **Health:** Sherin Varkey, D. Priyanka Kanth, and Katriel Friedman
- **Housing:** Sateh Chafic el-Arnaout and Waad Tammaa
- **Municipal Services:** Phoram Shah
- **Macroeconomic Impacts**: Luan Zhao, Ali Ibrahim Almelhem, and Ola Hisou
- **Poverty and Welfare Impacts:** Silvia Redaelli
- **Public Institutions:** Roland Lomme, Rima Koteiche, and Rim Atoui
- **Transport:** Anne-Cecile Souhaid, Mira Morad, Hakim A. A. Al-Aghbari, Ikram Saoud, and Gaelle Samaha
- **Water Supply and Sanitation**: Sally Zgheib, Amal Talbi, and Iyad Rammal

The report benefited from contributions received from:

World Bank Group: Raja Rehan Arshad (Lead Disaster Risk Management Specialist), Harun Onder, (Sr. Economist), Ayaz Parvez (Lead Disaster Risk Management Specialist), Alain Willy Aeschlimann (Consultant), and Mounir Mahmalat (Consultant).

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EXECUTIVE SUMMARY

The 2022 Syria Joint Damage Assessment (DA), conducted by the World Bank Group in collaboration with the European Union (EU), provides an overview of the effects of the ongoing conflict in Syria. The Syria DA is a broad-brush and largely remote-based exercise, focusing on 14 cities and 11 sectors. The DA draws on satellite imagery, remotely collected data, secondary sources of information, and publicly available ground-based assessments to assess damage to physical infrastructure assets and the accessibility and provision of public services. The objective of the DA is to provide information on the effects of the current crisis on population, physical infrastructure, and quality of service delivery in those cities. Since the DA was conducted during an ongoing conflict, it is not a comprehensive evaluation and cannot be cannot be considered as a substitute for an in-depth analysis.

This report is the sixth World Bank Group assessment conducted during the ongoing conflict; however, it is the first conducted jointly with the EU. The DA distinguishes itself from previous ones by expanding the geographic and sectoral scope. Five cities - Daraya, Al Hasakah, Rastan, Tell Abiad and Zabadani have been added to cities covered by the 2019 report. Moreover, the Agri-food Value Chains, Municipal Services, Cultural Heritage, and Environmental sectors have been added to those assessed in the 2017 report. Similar remote-based damage detection methods were used in this assessment as in previous assessments, which allowed each new iteration to update the damages compared to an established baseline. Figure 1 summarizes the scope and limitations of the DA while figure 2 depicts its geographic scope.

Photo credit: Shutterstock

FIGURE 1: SCOPE AND LIMITATIONS OF THE SYRIA DA FOR SELECTED CITIES

Damage Assessment is

A broad-brush and remote-based methodology utilizing a **mix of inventory** (facility level) and percentage-based assessment depending on **assets and sectors**.

Damage assessment for **14 cities** and **11 sectors**.

An **assessment** of damages.

Based on **some primary (satellite imagery)** and mainly **secondary data sources**.

Damage Assessment is NOT

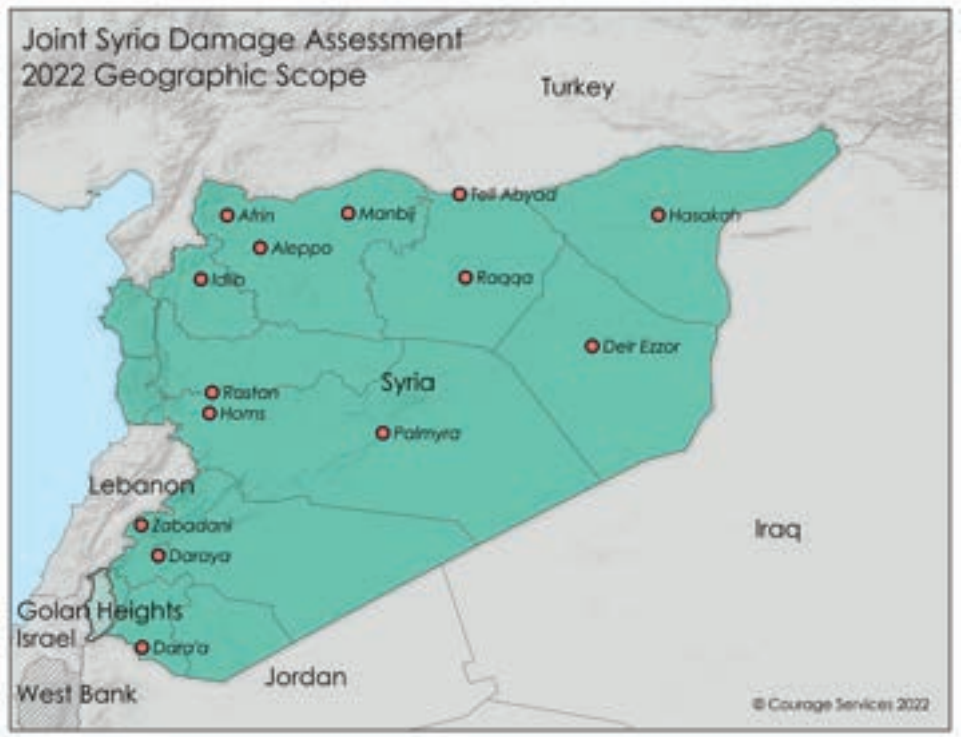
A detailed and **ground-based** assessment.

A needs, loss and **macroeconomic impact** assessment.

Mainly based on **primary data sources**.

Countrywide assessment. Social, economic, institutional, governance, etc., analyses.

FIGURE 2: GEOGRAPHIC SCOPE OF THE JOINT SYRIA DAMAGE ASSESSMENT



KEY FINDINGS

Significant damage to physical infrastructure, deteriorating public services, and growing danger have led millions of Syrians to flee the country, reducing the prewar population by almost 18 percent to 17.5 million[1] and internally displacing 6.7 million Syrians in 2021.[2] By September 2021, the crisis had claimed more than 350,200 lives.[3] Around 13.4 million people need humanitarian assistance, including 5.9 million persons in acute need.[4]

Damage by Sector

As of January 2022, total damage across the assessed cities and sectors (physical infrastructure,[5] social[6] and cross-cutting[7]) was estimated at US$8.7–11.4 billion. These assessments employed low and high replacement cost estimates, based on pre-

1 United Nations (2019) "World Population Prospects 2019" UN Department of Economic and Social Affairs Population Division, available at: *https://population.un.org/wpp/*

2 Based on UNHCR's 2021 Syria Humanitarian Needs Overview, available at: https://reliefweb.int/sites/reliefweb.int/files/resources/Operational%20Update-June-%202021.pdf.

3 UN, *Syria: 10 Years of War Has Left at Least 350,000 Dead. Article can be accessed at: https://news.un.org/en/story/2021/09/1101162*.

4 UNHCR Operational Update, June 2021. Document can be accessed at: *https://reliefweb.int/report/syrian-arab-republic/syria-unhcr-operational-update-june-2021#:~:text=The%202021%20Syria%20Humanitarian%20Needs,6.7%20Million%20internally%20displaced%20Syrians*

5 Physical Infrastructure sectors are Electricity, Transport, Agri-food Value Chains, Municipal Services, Cultural Heritage and WASH.

6 Social sectors are Education, Health and Housing.

7 Cross-cutting sectors are Public Institutions and Environment.

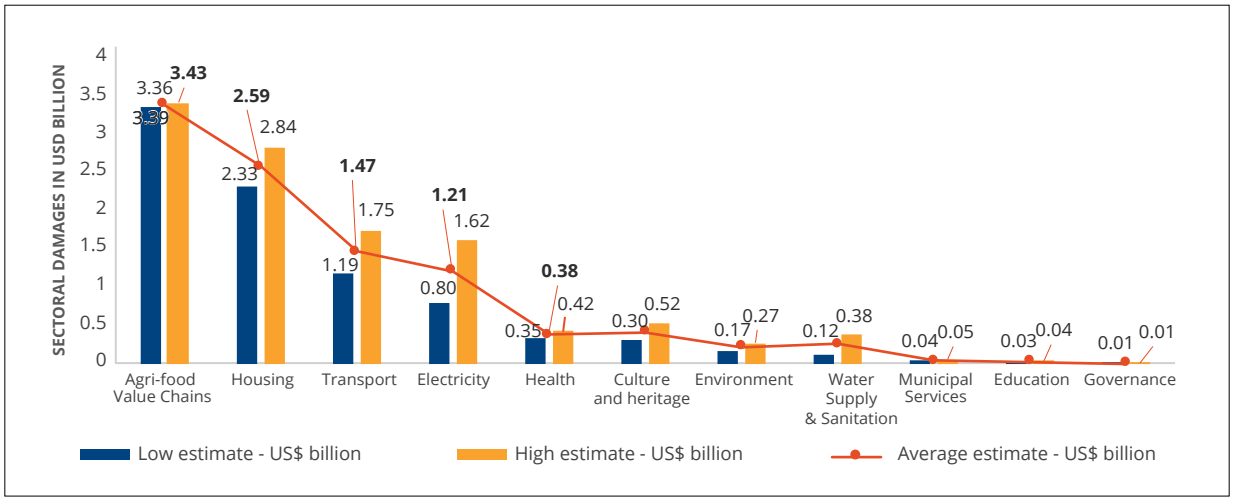
crisis unit replacements costs. For most sectors, these ranges were either based on -/+10 percent of the average unit cost, or used a reasonable range based on experience.[8]

Of the total damage estimate, 68 percent of damage or US$5.80–7.8 billion was attributed to damage in the Physical Infrastructure sectors, 30 percent or US$2.7–3.3 billion to damage in the Social Sectors, and 2 percent or US$175–278 million to Cross-Cutting sectors. Within the Physical Infrastructure sectors, Agri-food Value Chains were by far the most heavily affected (50 percent of total physical infrastructure damage or damage estimates of US$3.4 billion) largely related to irrigation systems. This was followed by Transport (22 percent of total physical infrastructure damage or damage estimates of US$1.2–1.7 billion). Damage estimates in the remaining physical infrastructure sectors, in order of magnitude, consisted of Electricity (18 percent of total physical infrastructure damage or US$0.8–1.6 billion), Cultural Heritage (6.1 percent of total physical infrastructure damage or US$0.3–0.5 billion), Water Supply and Sanitation (WSS) (3.5 percent of total physical infrastructure damage or US$125–380 million), and Municipal Services[9] (0.5 percent of total physical infrastructure damage or US$38–46 million).

Within the **Social sectors,** the Housing sector incurred the greatest damage (86 percent of total Social sector damage or US$2.3–2.8 billion), followed by Health (13 percent of total Social sector damage or US$346–423 million) and Education (1 percent of total Social sector damage or US$25–38 million) (Figures 2, 3, 4 and Table 1).

Under the **Cross-Cutting sectors,** Environment was the most heavily affected sector (97 percent of total Cross-cutting sector damage or US$168–269 million), followed by Public Institutions[10] (3 percent of total Cross-cutting sector damage or US$7.0–8.5 million).[11]

FIGURE 3: OVERALL DAMAGE BY SECTOR (US$ BILLION)



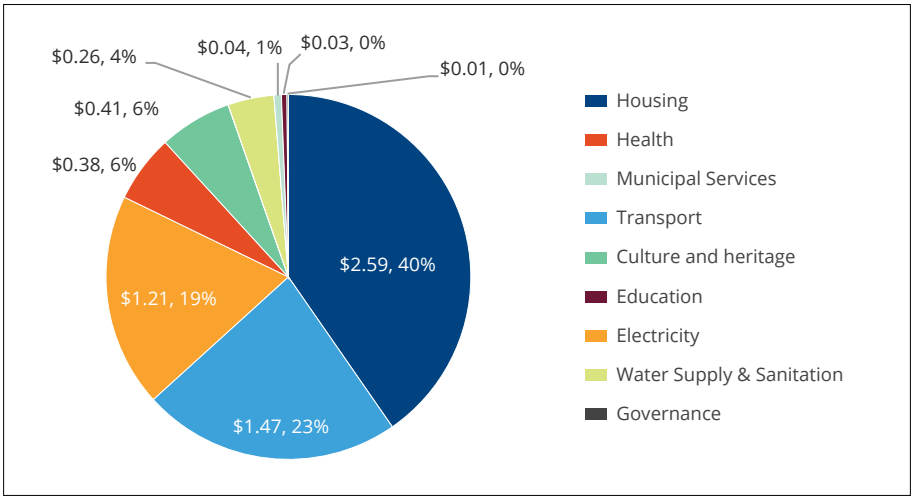
8 With the exception of the Housing and Environment sectors which relied on a fixed cost.

9 Municipal services cover community halls and markets, affordable housing, municipal administration and libraries, and parks and entertainment. While the impact on solid waste management has not been quantified, the impact on service delivery is presented in the Municipal Services chapter of the report.

10 The Public Institutions sector covers a wide range of government facilities including national, municipal, and provincial administrative buildings, courthouses, prisons, fire stations, police stations, vehicle registration offices, civil defense, police traffic offices, post offices, real estate registration offices and other offices and buildings.

11 It is important to note that the damage estimates are not conclusive or representative of the entire sector. The scope of each sector assessment is defined in its chapter. Given data limitations, some sectors had a wider coverage than others.

FIGURE 4: DAMAGE ESTIMATES ACROSS SECTORS (US$ BILLION, % OF TOTAL DAMAGE ESTIMATES)*



This graph excludes the Agri-food Value Chain Sector damages which are mostly in rural areas.

TABLE 1: DAMAGE BY SECTORS (US$)

Sector	Low estimate	High estimate
Physical Infrastructure Sectors		
Electricity*	804,220,000	1,621,640,000
Transport*	1,187,448,665	1,749,931,553
Agri-food Value Chains[12]	3,362,307,466	3,427,230,453
Municipal Services	37,728,156	46,182,869
Cultural Heritage*	303,660,000	520,560,000
Water Supply & Sanitation*	124,934,966	379,666,027
Physical Infrastructure Sectors - Total	5,820,299,253	7,745,210,902
Social Sectors		
Education*	25,266,897	37,900,346
Health	345,926,357	422,798,881
Housing**	2,326,594,312	2,843,615,270
Social Sectors - Total	2,697,787,566	3,304,314,497
Cross-cutting sectors		
Environment**	167,649,813	269,039,360
Public Institutions	6,951,735	8,496,565
Cross-cutting sectors – Total	174,601,548	277,535,925
Total	**8,692,688,367**	**11,327,061,324**

**The more than 20 percent deviation in low and high estimates relative to the median value for Electricity, Transport, Cultural Heritage, WASH and Education is explained by the wider range of the low and high unit cost estimates.*
***For the Environment and Housing sectors, the deviation is explained by the number of housing units that have been partially damaged under the low and high scenarios. The extent of damage ranges from a completely destroyed to partially damaged ratio of 1:2 under the low scenario to a ratio of 1:6 under the high scenario. Unit cost estimates are identical for low and high damage scenarios.*

Source: Based on World Bank staff estimates.

12 The low and high damage estimates for the Agri-food Value Chains sector are similar because damage estimates for irrigation systems are considered to be fixed across the low and high estimates, and are based on publicly available estimates provided by the FAO, which have been cleared by the government.

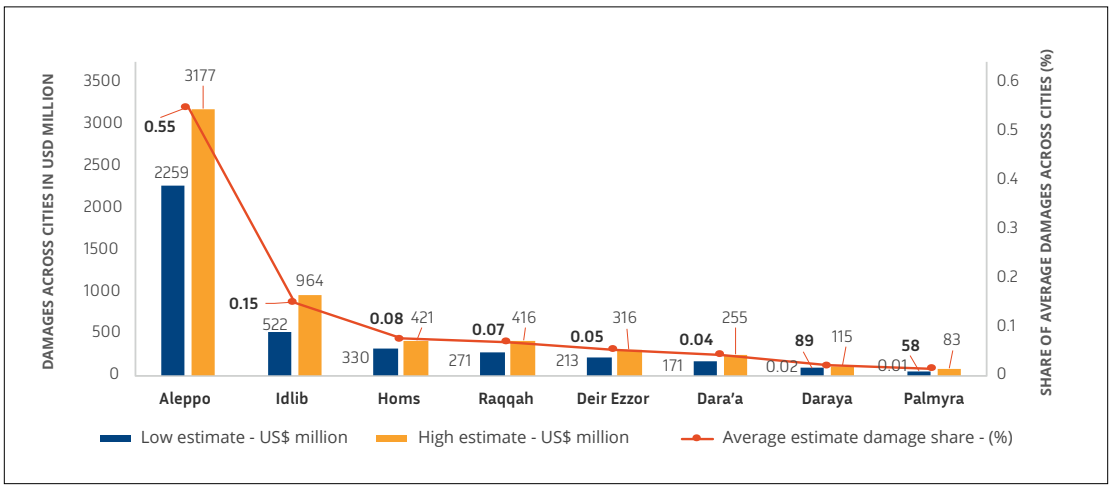
Damage by City

The city analysis reveals that Aleppo incurred the brunt of the damage, followed by Idlib, Homs and Ar-Raqqa. The high damage estimates for Aleppo stem largely from the Housing sector, and from the Electricity, Health and Transport sectors. Damage in Idlib was largely in the Electricity and Housing sectors. In Homs, the Housing and Health sectors accounted for most of the damage. Finally, in Ar-Raqqa, damage to the Housing, Water and Sanitation sectors accounted for much of the overall damage (Figure 5 and Table 2).

While not estimated comprehensively in this assessment, economic losses are also considered for the Agri-food Value Chains and Environment sectors, in addition to damages. These losses were estimated because of the importance of the agriculture sector to a large part of the population the population, the vulnerability of farmers to shocks, and because the sector typically incurs more losses than damages. Furthermore, the assessment considered losses in net landcover change (i.e., green cover such as grass/shrubland/sparse vegetation areas) in 11 of the 14 cities as these changes alter the value of ecosystem services. In addition to significant damage to its physical infrastructure, the Agri-food Value Chains sector has incurred significant crop and livestock losses as a result of the conflict.

Conflict, displacement, and the collapse of economic activities and social services have all contributed to the decline of the welfare of the Syrian population. The composite deprivation index, which is based on damage and functionality assessments in various sectors, reflects access to basic public services across cities.[13] The cities of Daraya, Ar-Raqqa and Palmyra have higher deprivation than other cities. Palmyra and Rastan, both in the Homs governorate—had the highest human capital deprivation and living standards deprivation, respectively. Cities had very different human capital and living standards indices, notably in Palmyra, Idlib, Rastan and Afrin; in contrast, Aleppo, Daraya and Tell Abiad ranked similarly for these indices.

FIGURE 5: DAMAGE TO CITIES (US$ MILLION)



13 The index is based on measures of human capital (health and education) and living standards (water and sanitation, municipal services and housing). In addition, human capital and living standards indexes also consider the damage to and functionality of "enabling sectors," which include Public Institutions, Transport and Electricity.

TABLE 2: DAMAGE BY CITY[14] (US$)

City	Low estimate	High estimate
Afrin	18,330,747	23,906,768
Aleppo	2,258,615,406	3,177,457,695
Dar'a	171,091,865	254,787,982
Daraya	88,936,166	115,402,733
Deir-ez-Zor	213,428,481	316,471,224
Al Hasakah	30,366,797	41,356,906
Homs	329,978,730	421,496,453
Idlib	521,971,093	963,807,711
Manbij	9,185,416	13,342,764
Palmyra	58,216,031	83,369,610
Ar-Raqqa	270,842,972	416,436,546
Rastan	21,362,766	27,471,625
Tell Abiad	22,286,018	27,372,497
Zabadani	3,639,713	5,021,641
Total	**4,018,252,201**	**5,887,702,153**

Scope

Temporal Scope: The Syrian crisis started in 2011; therefore, the damage is calculated against the actual or estimated pre-2011 baseline of physical assets, established in the December 2014 assessment.[15]

Geographic scope: The assessment is conducted for the following 14 cities: Afrin, Aleppo, Dar'a, Daraya, Deir-ez-Zor, Al Hasakah, Homs, Idlib, Manbij, Palmyra, Ar-Raqqa, Rastan, Tell Abiad, and Zabadani. Within these major cities, the data are disaggregated at the neighborhood level while for the rest of the governorate, the data are disaggregated at the district level.

Sectoral scope: The assessment covers the following key 11 sectors:

Physical infrastructure sectors: Transport, Electricity, Water Supply and Sanitation, Municipal Services, Cultural Heritage, and Agri-food Value Chains.

Social sectors: Housing, Health, and Education.

Cross-cutting sectors: Environment and Public Institutions.

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14 **Reasons why the city-level disaggregation does not equal the sector wise disaggregated total:**
*Excludes Agriculture Sector damages which are mostly in rural areas, and hence, regional analyses have not been conducted by sector specialists
*Environment sector - For medical e-waste, it should be noted that the total number of facilities at city level with partial damage/destroyed is less than the total number of facilities at national level, which is why the total e-waste generation rates at these levels are not the same
*In the Transport sector, costs for ports, railways and airports could not be disaggregated at city level so this table does not include those numbers
*Excludes Dead Cities damage calculation from the Cultural Heritage sector

15 The comparison is also made relative to 2018 for the same cities which were assessed in the previous assessment.

Photo credit: World Bank

Methodology

This Syria Damage Assessment (DA) provides a broad-brush estimate of the effects of the Syrian conflict on physical assets and service delivery. It relies primarily on a remote-based assessment methodology, and uses high resolution satellite imagery, social media analytics, data mining, and publicly available information.[16] However, it uses damage data from publicly available ground-based assessments to confirm findings whenever possible.

Based on the reported damage level, each asset was assigned a physical damage status based on three classifications: no damage, partially damaged (less than 40 percent of the asset is damaged), or completely destroyed (more than 40 percent of the asset is damaged, or the damage is structural). For the damage estimation, the average was calculated based on the number of damaged facilities, their physical status (partially damaged or completely destroyed), and the estimated pre-crisis unit cost associated with each asset class. Whenever possible, the DA also assessed the operational status of facilities (functional or nonfunctional) to determine the level and quality of service delivery across the different sectors. The assessment adopts from the Post-Disaster Needs Assessment (PDNA) methodology jointly developed by the European Union, World Bank, and United Nations, and has been utilized in numerous analytical assessments around the world.[17,18]

Summaries of Sector Reports

1. MACROECONOMIC IMPACT

The economic impact of the conflict is large and growing. By 2019, GDP in Syria had shrunk by more than half its 2010 level. Economic activity has contracted in all sectors but devastatingly so in the Hydrocarbon sector because of damage to energy infrastructure. International trade has also declined sharply, especially exports, due to conflict-related

16 These sources of public information include EU, and JRC's agricultural dataset and geospatial data.

17 European Union, World Bank, United Nations. Post-Disaster Needs Assessments, *Volume A Guidelines (2013).* <*https://www.gfdrr.org/sites/default/files/publication/pdna-guidelines-vol-a.pdf*>.

18 The PDNA methodology draws from the Damage and Loss Assessment (DaLA) and the Human Recovery Needs Assessment (HRNA) methodology.

disruptions and international sanctions. The persistent trade deficit has led to drawdown of foreign exchange reserves, currency depreciation and hyperinflation. These conditions have greatly reduced fiscal revenues and resulted in a large and sustained fiscal deficit. Overall, the conflict has severely affected Syria's economy through the combined effects of destruction of capital, casualties, forced migration, and economic disorganization.

2. POVERTY AND WELFARE EFFECT

The effects of conflict have been widespread across sectors and locations, and detrimental to household welfare. Destruction of assets and the limited functionality of remaining ones have a direct impact on household welfare and key services. Based on the Damage Assessment, cities have been ranked according to a composite deprivation index of damage and functionality in various sectors. Two broad categories were considered for the welfare assessment: human capital (health and education) and living standards (water and sanitation, municipal services, and housing).[19] In addition, human capital and living standard indexes also consider the damage to and functionality of "enabling sectors", which include Public Institutions, Transport and Electricity. On average, Daraya, Ar-Raqqa and Palmyra have the highest relative deprivation. Palmyra—in the Homs governorate— ranks first in terms of human capital deprivation, while Rastan—also in the Homs governorate—is first in terms of living standards deprivation. As detailed in the report, conflict has had diverging impacts across sectors within cities. Cities such as Palmyra, Idlib, Rastan and Afrin rank differently for human capital and living standards indexes while other cities, such as Aleppo, Daraya and Tell Abiad rank similarly across these two indices.

3. TRANSPORT

Overall damage in the Transport sector is estimated at US$1.2–1.7 billion. Approximately 11 percent of the total length of motorways, trunk roads, primary roads, secondary roads, and bridges in the 14 cities sustained damage, with primary and secondary roads accounting for nearly 85 percent of the total damage. The percentage of damaged roads varies widely among cities, from 1.4 percent of motorways, trunk roads, primary and secondary roads in Aleppo, to 63 percent in Afrin, 28 percent in Ar-Raqqa and 23 percent in Idlib. The three cities with the longest lengths of damaged roads (Ar-Raqqa, Idlib and Homs) account for around 65 percent of all road damages in the 14 cities, with Ar-Raqqa alone accounting for 42 percent of the total damage to roads and bridges. Across the 14 cities studied, in 2021, about 1,150,000 people, or 23 percent of the population, were unable to access a health care facility within 20 minutes, and about 550,000 people, or 11 percent of the population, were unable to reach a health care facility within 30 minutes. Similarly, 18 percent, or over 900,000 people must travel over 10 minutes by car to reach education facilities, a typical threshold for education accessibility, and 2 percent, or over 100,000 people, have no access to education facilities in their neighborhood. The monetary value of Transport sector damage to roads in the 14 cities ranges between US$127.4—169.9 million. No data are available for the Railway sector except a 2018 publication by the Ministry of Transport which estimates damage at around US$1–1.5 billion, including equipment, which also has an impact on urban-rural linkages and passenger and freight transport.

4. ELECTRICITY

The Electricity sector suffered damages estimated between US$804.2–1,621.6 million across the 14 cities, with Aleppo and Idlib

19 It was not possible to include livelihoods in the welfare assessment due to a lack of data for the Agriculture and Industrial sectors.

experiencing most of the damage, with 28 percent and 60 percent of their electricity infrastructure damaged, respectively. Approximately 6.5 percent of facilities have some degree of damage, while approximately 6 percent are completely destroyed. Three out of the 14 power plants assessed (which are the most expensive assets in the sector), which provide over 20 percent of capacity in the country, have some degree of damage while 9 of the 49 substations are damaged. Service delivery has been severely impacted, with persistent power outages common in many cities. While efforts are being made to rebuild the sector, several challenges remain, including inadequate investment, power outages, electricity theft, and limited fuel to power the thermal plants.

5. WATER SUPPLY AND SANITATION

Damage costs to the water supply and sanitation infrastructure in the 14 cities are estimated between US$124.9–379.7 million. The Water sector's main physical infrastructure was damaged during the conflict. Around 17 percent of assets, predominantly wells and water towers/tanks, have been damaged, mainly in Aleppo and Idlib. Although a large part of the physical infrastructure was undamaged, 51 percent suffered from reduced functionality, including 11 percent that is not functioning, which is a significant problem for the most affected cities. The 11-year-long crisis has led to lack of maintenance, lack of assets, and financial limitations which have greatly impacted WSS services. Alternative service providers have sprung up, providing expensive tankered water (e.g., about US$7 per m^3) of unregulated quality and provenance.

6. AGRI-FOOD VALUE CHAINS

The Syrian war has resulted in an estimated US$3.4 billion[20] in damage to silos, agricultural infrastructure and assets, including irrigation and wholesale markets in the assessed areas. In addition, the lack of irrigation, limited inputs, security constraints, and climatic variability has led to US$12.9–18.1 billion in agricultural output losses from annual and perennial crops, livestock, and aquaculture over the last decade (with agricultural crops accounting for most lost production).

7. HOUSING

Total damage to the Housing sector across the 14 assessed cities is estimated at US$2.3–2.8 billion. The conflict is estimated to have affected up to 210,000 housing units—with approximately 30,000 units destroyed and up to 180,000 partially damaged. Aleppo has lost an estimated 135,000 housing units to the conflict, equating to around 21 percent of houses in the city and 70 percent of damaged housing stock in the 14 cities. Informal areas were disproportionally impacted by the conflict, exacerbating their dire living conditions.

8. CULTURAL HERITAGE

Damage to cultural and heritage sites is estimated at US$303.7–520.6 million. Syria is home to some of the most globally varied and important cultural heritage sites in the Mediterranean, where tangible and intangible heritage have intertwined over many millennia. Syria hosts six World Heritage Sites[21], all of which are on the List of World Heritage in Danger, and 11 sites on the World Heritage Tentative List. Cultural heritage as a

20 (1) the urban-related data provides estimates for the selected cities whereas the rural estimates provide the impact on the national scale, (2) the damage of the irrigation system had a spillover effect on the ag production beyond the area of damage; (3) damage in the agricultural output attributable to the conflict is difficult to separate from those caused by climate change or natural variability.

21 The sites are: Site of Palmyra; Ancient City of Bosra; Ancient City of Aleppo; Crac des Chevaliers; Qal'at Salah El-Din; Ancient Villages of Northern Syria.

whole has been heavily affected by the crisis. This assessment included partial data on mosques, churches, convents, monasteries, shrines, museums, archives, heritage buildings, archaeological sites and dead cities. This assessment includes deep dives on Aleppo, Palmyra, and Dead Cities due to higher levels of damage. Historic housing is accounted for in the housing section.

9. HEALTH

Total damage to the Health sector in the assessed cities is estimated at US$345.9–422.8 million. About 28 percent of facilities have been partially damaged and 8 percent of health facilities are estimated to be completely destroyed. Palmyra has suffered the greatest damage, with 3 of 4 health facilities reported damaged, while Daraya suffered most lost functionality, with 7 out of 8 facilities not functioning. In terms of damage percentage, Deir-ez-Zor was the second most affected city, reporting 32 of 43 facilities as either partially damaged or completely destroyed, while Palmyra suffered the most completely destroyed facilities (1 of 4). Across the 14 cities covered by the DA, 62 percent of health facilities are functioning.

10. EDUCATION

Total damage to the Education sector is estimated at US$25.3–37.9 million. About 13 percent of education facilities have been partially damaged, and 5 percent completely destroyed across the 14 cities. Palmyra suffered from the highest impact, with 87 percent of education facilities reported as damaged and non-functional. Ar-Raqqa was the second most affected city, with 57 percent of facilities either partially damaged or completely destroyed, while Aleppo suffered from the highest proportion of destroyed facilities (15 percent). Across the cities, almost 70 percent of education facilities are functioning, regardless of facility type, with primary schools reporting the highest share of non-functional facilities.

While many educational facilities are undamaged or have been repaired, access is severely restricted. The main barriers to access include: (i) insecurity in travelling to and from school; (ii) fear of being targeted while in school; (iii) lack of teachers and limited teaching and learning materials; and (iv) a need for children and young people to supplement family income by foregoing education in order to work.[22] Therefore, while facilities are functional, this means little if they are not used, and their use is likely overreported. Indeed, the services and learning opportunities available to students remain limited given the risks associated with the ongoing conflict.

11. MUNICIPAL SERVICES

The total cost of damage to municipal infrastructure, covering municipal assets and road networks, is estimated at US$37.7–46.2 million. These assets include municipal administration buildings and libraries, parks and cultural sites, community halls and markets, and affordable housing; the damage to these assets is substantial at US$21.3–25.7 million.[23] This, combined with damage to road infrastructure which is estimated at US$16.4–20.5 million, has resulted in a significant loss in provision of and access to public services. The highest damage is estimated to be among community halls and markets (US$13.4–15.0 million), followed by affordable housing (US$3.8–4.8 million), municipal administration and libraries (US$2.4–3.0 million), and parks and entertainment (US$1.7–2.9 million). The most affected physical infrastructure is affordable housing

22 UNOCHA.

23 The cities considered in the damage assessment of municipal services are Afrin, Aleppo, Dar'a, Daraya, Deir-ez-Zor, Al Hasakah, Homs, Idlib, Manbij, Palmyra, Ar-Raqqah, Rastan, Tell Abiad and Zabadani.

buildings (57 percent partially functioning or not functioning) followed by community halls and markets (38 percent partially functioning or not functioning), parks and entertainment (23 percent partially functioning or not functioning) and municipal administration facilities and libraries (8 percent partially functioning or not functioning). In addition to this physical damage, access to public services has been adversely affected by the damage to municipal roads. Finally, solid waste management and wastewater management, which were poor before the conflict, have deteriorated significantly, exposing much of the population to health risks. The extensive accumulation of debris resulting from the conflict, which is yet to be removed, is another health risk for the population. Key challenges in providing municipal services remain the lack of funding to restore damaged assets and the loss of institutional capacity.

12. PUBLIC INSTITUTIONS

Damage to public institutions is estimated at US$7.0–8.5 million across the 14 cities. About 10 percent (13 out of 127) of the assessed facilities (post offices, courthouses, national administrative buildings, provincial administrative facilities, police stations, etc.) across the 14 cities have been damaged in the conflict; 2 percent are completely destroyed, and 8 percent are partially damaged. Manbij, Palmyra and Ar-Raqqa are the cities most affected by the conflict. In Ar-Raqqa, 3 out of 9 facilities have been completely destroyed; 1 out of 3 facilities in Manbij, and 1 out of 3 in Palmyra have been partially damaged. Other cities that have been impacted are Zabadani (25 percent of assessed facilities), Idlib (13 percent), Deir-ez-Zor (13 percent), Aleppo (13 percent) and Dar'a (4 percent). The damage to these administrative buildings has adversely affected the delivery of public services.

13. ENVIRONMENT

Environmental damage accounted for in this DA totals US$167.6–269.0 million. This damage is comprised of the cost of clearing and managing rubble from damaged housing (US$167.3–268.7 million), and of processing electronic waste from health facilities (US$0.4 million). The cost of ecosystem service losses is estimated at US$36 million. However, it is not possible to estimate the total cost of environmental degradation due to displacement and conflict, and mismanaged solid waste and wastewater (due to significantly reduced government capacity at local level) within the scope of this DA. The toll of the conflict on Syria's environment has been immense, with analyses of environmental damage finding widespread contamination and pollution related to extraction, infrastructure, and weapons. The DA estimated that 160 tons of e-waste has been generated from destroyed and partially damaged health facilities while 17.6–28.3 million tons of rubble comes from damaged housing. The highest environmental damage from special waste at the city level is in Aleppo, followed by Dar'a, Ar-Raqqa, Homs, Idlib and Daraya. The second category of environmental damage relates to natural ecosystems, changes in land use, and the impacts of conflict and displacement on environmental services.

ملخص تنفيذي

يقدم التقييم المشترك للأضرار في سوريا لعام 2022، الذي أجرته مجموعة البنك الدولي بالتعاون مع الاتحاد الأوروبي، عرضاً عاماً للآثار الناجمة عن الصراع الدائر في البلاد. ويُعد هذا التقييم بمثابة عملية تقدير عامة للأضرار نُفذت إلى حد كبير عن بُعد، وانصب تركيزها على 14 مدينة و11 قطاعاً مختاراً. واعتمد التقييم على صور الأقمار الصناعية وبيانات جرى جمعها عن بُعد ومصادر ثانوية للمعلومات، وتقييمات متاحة في الفضاء العام جرى تنفيذها على الأرض لتقييم حجم الأضرار التي لحقت بأصول البنية التحتية المادية وإمكانية الوصول إليها واستخدامها ومستوى تقديم الخدمات العامة. ويهدف التقييم إلى توفير معلومات عما خلفته الأزمة الحالية من آثار على السكان والبنية التحتية المادية وجودة الخدمات المتاحة في المدن التي شملها التقييم. **ونظراً لأن هذا التقييم أُجري في وقت لا يزال الصراع فيه مستمراً، فلا ينبغي اعتباره تقييماً شاملاً أو بديلاً عن عمل تحليلي يتسم بالعمق والشمول.**

على الرغم من أن هذا هو التقييم السادس الذي تجريه مجموعة البنك الدولي في أثناء الصراع المستمر في سوريا، إلا أنه أول تقييم يتم إجراؤه بالاشتراك مع الاتحاد الأوروبي. وما يميز هذا التقييم هو أن نطاقه الجغرافي والقطاعي أكبر وأوسع من التقييمات السابقة. فبالإضافة إلى المدن التي غطاها تقييم عام 2017، شمل تقييم هذا العام خمس مدن إضافية هي **داريا والحسكة والرستن وتل أبيض والزبداني**. علاوة على ذلك، تمت إضافة قطاعات الزراعة والخدمات البلدية والتراث الثقافي والبيئة إلى تلك التي تم شملها تقييم عام 2019. وجرى استخدام طرق مماثلة للكشف عن الأضرار عن بُعد في هذا التقييم كما هو الحال في التقييمات السابقة، ما مكن من تحديث البيانات حول حجم الضرر الجديد عبر المقارنة مع خط أساس جرى وضعه من خلال التقييمات السابقة. ويلخص الشكل 1 نطاق وحدود التقييم، بينما يوضح الشكل 2 نطاقه الجغرافي.

Photo credit: Shutterstock

الشكل 1: نطاق وحدود التقييم في مدن سورية مختارة

تقييم الأضرار هو:

تقييم عام جرى تنفيذه عن بُعد باستخدام مجموعة من الأدوات لتقييم نسبة الضرر في الأصول والقطاعات

تقييم للأضرار في 14 مدينة و11 قطاعاً

تقييم للأضرار

قائم على بعض المصادر الأولية (صور الأقمار الصناعية) وبشكل رئيسي على مصادر ثانوية للبيانات

تقييم الأضرار ليس

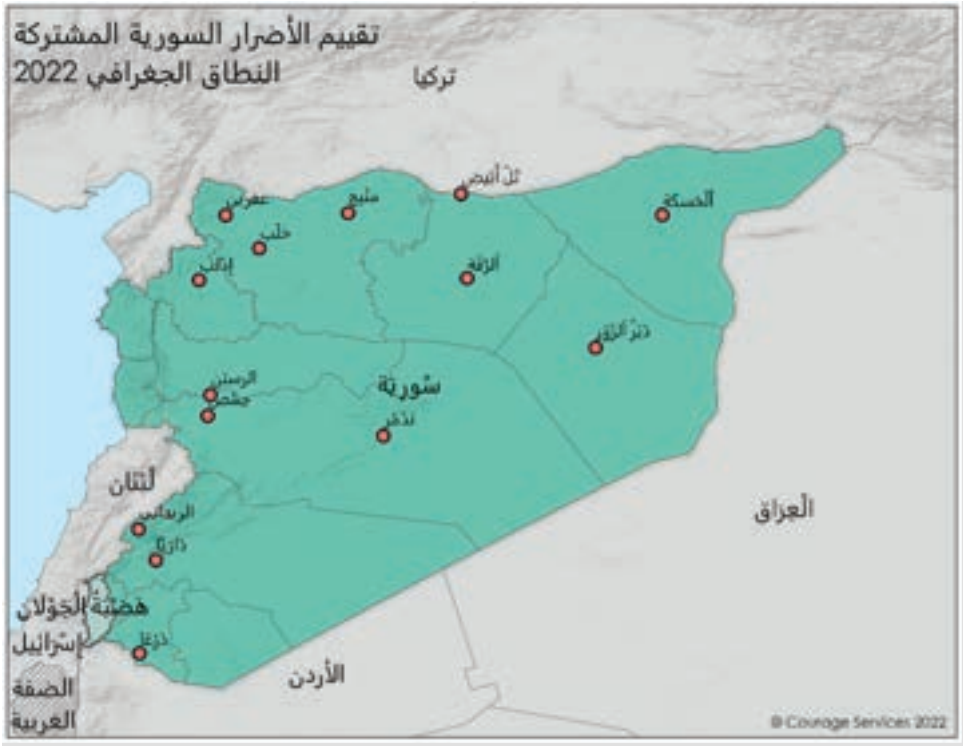
تقييماً مفصلاً جرى تنفيذه على الأرض

تقييماً للاحتياجات أو تقييماً للأثر الاقتصادي الكلي

تقييماً قائماً على مصادر رئيسية للبيانات

تقييماً شاملاً للبلاد، أو تحليلاً للوضع الاجتماعي، أو الاقتصادي، أو المؤسسي، أو الإداري، أو غير ذلك

الشكل 2: النطاق الجغرافي لتقييم الأضرار المشترك في سوريا



النتائج الرئيسية للتقييم

أدت الأضرار الجسيمة التي لحقت بالبنية التحتية المادية وتدهور الخدمات العامة والمخاطر المتزايدة الناجمة عن الصراع إلى فرار ملايين السوريين من البلاد، مما أدى إلى انخفاض عدد السكان بنسبة 18% تقريباً إلى 17.5 مليوناً[1] ناهيك عن نزوح 6.7 ملايين شخص داخل البلاد بحلول عام 2021.[2] وبحلول سبتمبر/أيلول 2021، كانت الأزمة قد أودت بحياة أكثر من 350200 شخص.[3] كما يحتاج حوالي 13.4 مليون شخص إلى مساعدات إنسانية، بمن فيهم 5.9 ملايين شخص هم في حاجة ماسة إليها.[4]

الأضرار حسب القطاع

لغاية يناير/كانون الثاني 2022، قُدر إجمالي حجم الأضرار في المدن والقطاعات التي شملها التقييم (البنية التحتية المادية[5] والأضرار الاجتماعية[6]، وأضرار القطاعات المشتركة[7]) بمبلغ يتراوح من 8.7 مليارات دولار إلى 11.4 مليار دولار. واستخدمت هذه التقييمات تقديرات تكلفة استبدال منخفضة ومرتفعة، **بناءً على تكاليف استبدال الوحدات قبل الأزمة**. وبالنسبة لمعظم القطاعات، كانت هذه النطاقات إما تستند إلى -/+ 10% من متوسط

1 «التوقعات السكانية في العالم 2019» - شعبة السكان التابعة لإدارة الشؤون الاقتصادية والاجتماعية بالأمم المتحدة، https://population.un.org/wpp/

2 استناداً إلى تقرير «نظرة عامة حول الاحتياجات الإنسانية في سوريا لعام 2021» الصادر عن المفوضية السامية للأمم المتحدة لشؤون اللاجئين، https://reliefweb.int/sites/reliefweb.int/files/resources/Operational%20Update-June-%202021.pdf.

3 الأمم المتحدة، «سوريا: 350 ألف قتيل خلال 10 سنوات. https://news.un.org/en/story/2021/09/1101162.

4 تقرير عمليات المفوضية السامية للأمم المتحدة لشؤون اللاجئين، يونيو 2021. https://reliefweb.int/report/syrian-arab-republic/syria-unhcr-operational-update-june-2021#:~:text=The%202021%20Syria%20Humanitarian%20Needs,6.7%20Million%20internally%20displaced%20Syrians

5 تشمل قطاعات البنية التحتية المادية الكهرباء والنقل والزراعة والخدمات البلدية والتراث الثقافي وخدمات المياه والصرف الصحي والنظافة الصحية.

6 القطاعات الاجتماعية هي التعليم والصحة والإسكان.

7 القطاعات المشتركة هي المؤسسات العامة والبيئة.

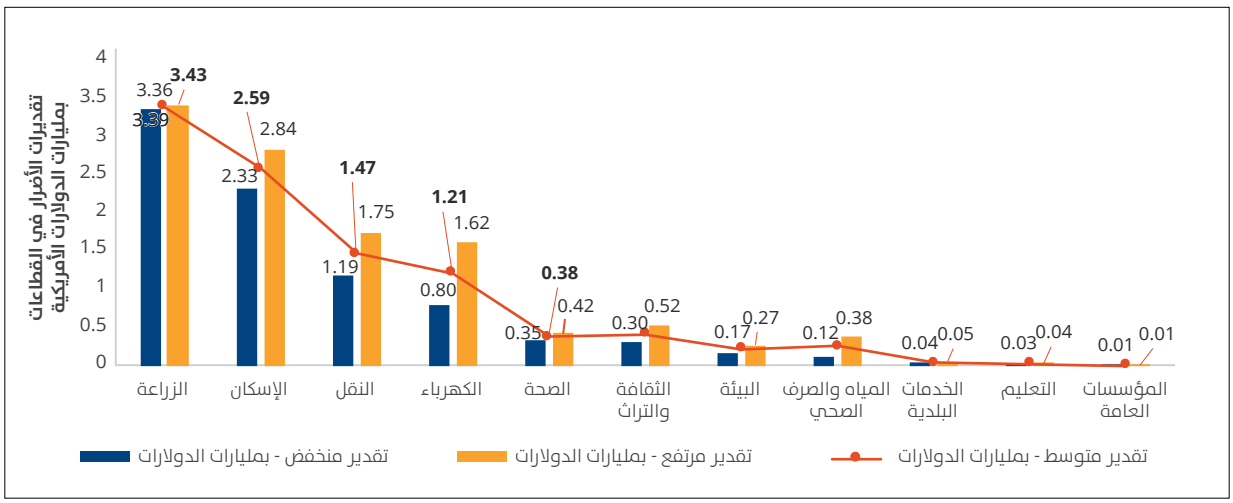
تكلفة الوحدة، أو تستخدم نطاقاً معقولاً بناءً على الخبرة.[8]

من إجمالي الأضرار المقدرة، كان 68% من الضرر أو ما يتراوح قيمته من 5.8 إلى 7.8 مليارات دولار في قطاعات البنية التحتية المادية، و30% أو ما يتراوح من 2.7 إلى 3.3 مليارات دولار في القطاعات الاجتماعية، و2% أو ما يتراوح من 175 إلى 278 مليون دولار في القطاعات المشتركة. وفي قطاعات البنية التحتية المادية، كانت سلاسل القيمة الغذائية الزراعية هي القطاع الفرعي الأكثر تضرراً إلى حد بعيد (تكبد هذا القطاع الفرعي ما نسبته 50% أو ما يعادل 3.4 مليارات دولار من إجمالي الأضرار التي لحقت بقطاع البنية التحتية المادية) وخصوصاً في أنظمة الري. وتبع ذلك قطاع النقل (تكبد هذا القطاع الفرعي ما نسبته 22% من إجمالي الأضرار أو ما يتراوح من 1.2 إلى 1.7 مليار دولار). وشملت تقديرات الأضرار في قطاعات البنية التحتية المادية المتبقية، مُرتبة حسب نسبة وحجم الضرر، الكهرباء (ما نسبته 18% من إجمالي الأضرار أو ما يتراوح من 800 مليون إلى 1.6 مليار دولار)؛ التراث الثقافي (ما نسبته 6.1% من إجمالي الأضرار أو ما يتراوح من 300 مليون إلى 500 مليون دولار)؛ المياه والصرف الصحي والنظافة الصحية (ما نسبته 3.5% من إجمالي الأضرار أو ما يتراوح من 125 مليون إلى 380 مليون دولار)؛ الخدمات البلدية[9] (ما نسبته 0.5% من إجمالي الأضرار أو ما يتراوح من 38 مليون إلى 46 مليون دولار).

فيما يتعلق **بالقطاعات الاجتماعية**، تعرض قطاع الإسكان لأكبر قدر من الضرر (86% من إجمالي أضرار القطاعات الاجتماعية أو ما يتراوح من 2.3 مليار إلى 2.8 مليار دولار، يليه قطاع الصحة (13% من إجمالي أضرار القطاعات الاجتماعية أو ما يتراوح من 346 مليون إلى 423 مليون دولار)، ثم التعليم (1% من إجمالي أضرار القطاعات الاجتماعية أو ما يتراوح من 25 مليون إلى 38 مليون دولار) (الأشكال 2 و3 و4 والجدول 1).

فيما يتعلق **بالقطاعات المشتركة**، تعرض قطاع البيئة لأكبر قدر من الضرر (97% من إجمالي أضرار القطاعات المشتركة أو ما يتراوح من 168 مليون إلى 269 مليون دولار)، تلاه قطاع المؤسسات العامة[10] (3% من إجمالي أضرار القطاعات المشتركة أو ما يتراوح من 7 إلى 8.5 ملايين دولار).[11]

الشكل 3: حجم الأضرار الكلية حسب القطاع (بالمليار دولار)



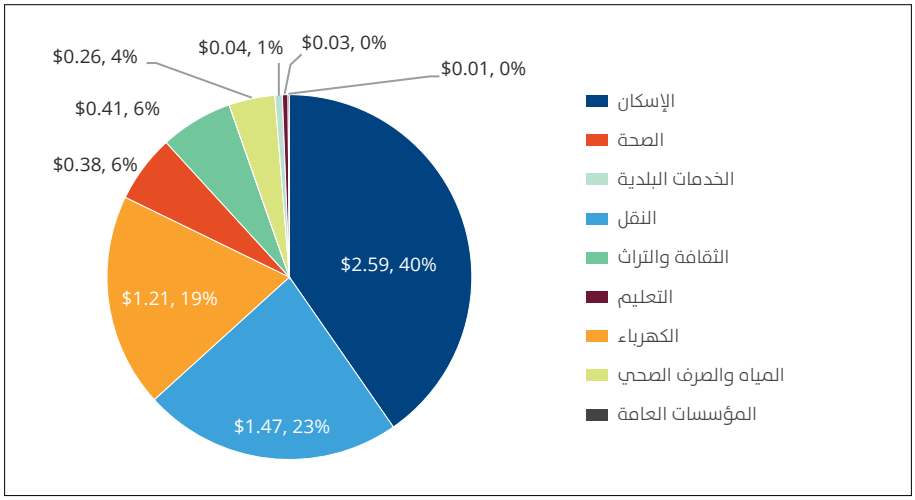
8 باستثناء قطاعي الإسكان والبيئة اللذين كانا يعتمدان على تكلفة ثابتة.

9 تغطي الخدمات البلدية القاعات والأسواق المجتمعية، والإسكان ميسور التكلفة، والإدارة البلدية والمكتبات، والمتنزهات ومرافق الترفيه. ولم يتم تقدير حجم الضرر الذي تركه الصراع على إدارة النفايات الصلبة، ولكن تم عرض التأثير المترتب على تقديم الخدمات في فصل الخدمات البلدية من هذا التقرير.

10 يغطي قطاع المؤسسات العامة مجموعة واسعة من المرافق الحكومية بما في ذلك المباني الإدارية الوطنية والبلدية والمحلية والمحاكم والسجون ومراكز الإطفاء ومراكز الشرطة ومكاتب ترخيص المركبات والدفاع المدني ومكاتب المرور التابعة للشرطة ومكاتب البريد ومكاتب التسجيل العقاري وغيرها من المكاتب والمرافق الأخرى.

11 من المهم ملاحظة أن تقديرات الأضرار ليست قاطعة أو ممثلة للقطاع بأكمله، ويرد نطاق تقييم كل قطاع في الفصل الخاص به. ولكن نظراً لمحدودية البيانات، كان لبعض القطاعات تغطية أوسع من غيرها.

الشكل 4: تقديرات حجم الأضرار حسب القطاعات الفرعية (كنسبة مئوية من القطاعات الرئيسية)



يستثني هذا الرسم البياني الأضرار التي لحقت بقطاع سلسلة القيمة الغذائية الزراعية لأنها تقع في الغالب في المناطق الريفية

الجدول 1: الأضرار حسب القطاع (بالدولار)

القطاع	تقدير منخفض	تقدير مرتفع
قطاعات البنية التحتية المادية		
الكهرباء*	804,220,000	1,621,640,000
النقل*	1,187,448,665	1,749,931,553
سلاسل القيمة الزراعية الغذائية[12]	3,362,307,466	3,427,230,453
الخدمات البلدية	37,728,156	46,182,869
التراث الثقافي*	303,660,000	520,560,000
إمدادات المياه وخدمات الصرف الصحي*	124,934,966	379,666,027
قطاعات البنية التحتية المادية - إجمالي حجم الأضرار	**5,820,299,253**	**7,745,210,902**
القطاعات الاجتماعية		
التعليم*	25,266,897	37,900,346
الصحة	345,926,357	422,798,881
الإسكان**	2,326,594,312	2,843,615,270
القطاعات الاجتماعية - إجمالي حجم الأضرار	**2,697,787,566**	**3,304,314,497**
القطاعات المشتركة		
البيئة**	167,649,813	269,039,360
المؤسسات العامة	6,951,735	8,496,565
القطاعات المشتركة - إجمالي حجم الأضرار	**174,601,548**	**277,535,925**
الإجمالي	**8,692,688,367**	**11,327,061,324**

*يتم تفسير الانحراف بأكثر من 20% في التقديرات المنخفضة والمرتفعة بالنسبة إلى القيمة المتوسطة لقطاعات الكهرباء والنقل والتراث الثقافي والمياه والصرف الصحي والنظافة الصحية والتعليم من خلال النطاق الأوسع لتقديرات تكلفة الوحدة المنخفضة والمرتفعة.
**بالنسبة لقطاعي البيئة والإسكان، يفسر الانحراف بعدد الوحدات السكنية التي تعرضت لأضرار جزئية في ظل السيناريو المنخفض والسيناريو المرتفع. ويتراوح مدى الضرر من نسبة تبلغ 2:1 للوحدات السكنية المدمرة كلياً إلى تلك التي تعرضت لأضرار جزئية في ظل سيناريو التقدير المنخفض إلى نسبة 6:1 في ظل السيناريو المرتفع. تقديرات تكلفة الوحدة متطابقة لسيناريوهات الضرر المنخفض والمرتفع.
المصدر: تقديرات خبراء البنك الدولي.

12 التقديرات المنخفضة والمرتفعة للأضرار في قطاع الزراعة متشابهة لأن تقديرات الأضرار التي لحقت بأنظمة الري تظل ثابتة سواء كان التقدير منخفضاً أو مرتفعاً للقطاع الرئيسي، وتستند إلى التقديرات المتاحة للجمهور والتي قدمتها منظمة الأغذية والزراعة للأمم المتحدة وأقرت بها الحكومة السورية.

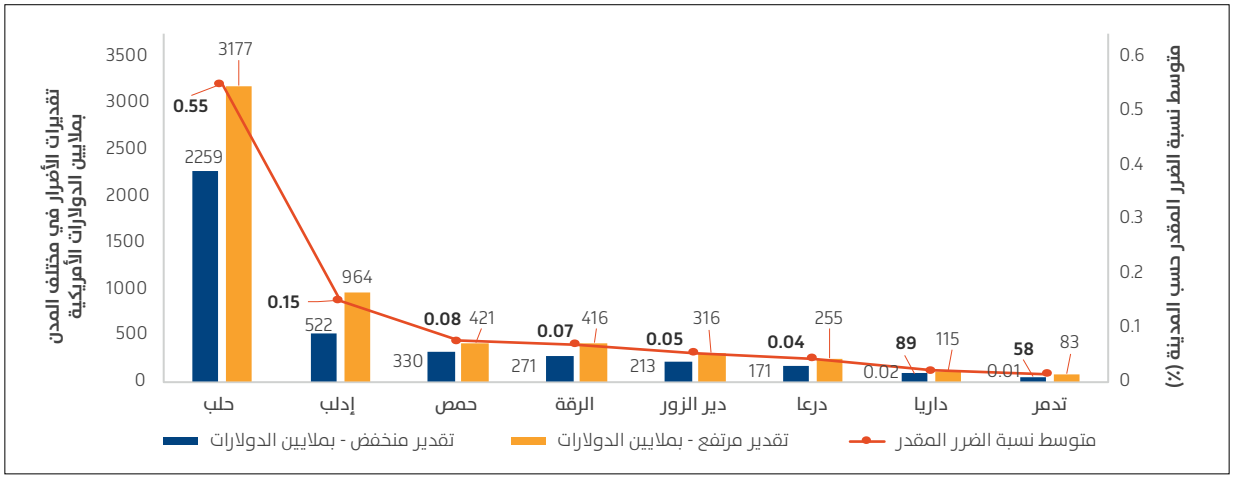
الأضرار حسب المدينة

يكشف تحليل حجم الأضرار في المدن أن مدينة حلب تعرضت للقدر الأكبر من الضرر، تليها مدن إدلب وحمص والرقة. وتركّزَ القدر الأكبر من الضرر المقدر المرتفع في حلب في قطاعات الكهرباء والصحة والنقل. أما في مدينة إدلب، فقد تركز الضرر في قطاعات الكهرباء والإسكان. وفي مدينة حمص، تكبدت قطاعات الإسكان والصحة القدر الأكبر من الضرر. وأخيراً في الرقة، كانت قطاعات الإسكان والمياه والصرف الصحي هي القطاعات الأكثر تضرراً (الشكل 5 والجدول 2).

على الرغم من أن هذا التقييم لا يضع تقديراً شاملاً لحجم الخسائر الاقتصادية الناجمة عن الصراع، إلا أنه جرى أخذها بعين الاعتبار عند حساب خسائر وأضرار قطاعي الزراعة والبيئة. وقد تم تقدير هذه الخسائر بسبب أهمية قطاع الزراعة بالنسبة السكان، وحقيقة أن قدرة المزارعين على مواجهة الصدمات هي أقل من قدرة غيرهم، وكذلك لأن هذا القطاع يتكبد عادة خسائر مالية أكثر من أضرار مادية ملموسة. علاوة على ذلك، أخذ التقييم في الاعتبار الخسائر في صافي التغير في الغطاء الأرضي (أي الغطاء الأخضر مثل العشب/ الشجيرات/ مناطق الغطاء النباتي المتناثر) في 11 من أصل 14 مدينة لأن مثل هذه التغيرات تغير بدورها قيمة خدمات النظم الإيكولوجية. وبالإضافة إلى الأضرار الكبيرة التي لحقت بالبنية التحتية المادية، فقد تكبد قطاع الزراعة خسائر كبيرة في المحاصيل والثروة الحيوانية نتيجة للصراع.

أدى الصراع والنزوح وانهيار الأنشطة الاقتصادية والخدمات الاجتماعية إلى تدهور الأوضاع المعيشية للسوريين. ويعكس مؤشر الحرمان المركب، الذي يستند إلى تقييمات الأضرار وتقييمات القدرة التشغيلية مختلف القطاعات، مستوى توفر الخدمات العامة الأساسية في مختلف المدن.[13] وتعاني مدن داريا والرقة وتدمر من الحرمان أكثر من غيرها من المدن. وتعاني مدن تدمر والرستن على التوالي، وكلتاهما في محافظة حمص، من أعلى معدلات الحرمان من رأس المال البشري ومستويات المعيشة. تباينت مؤشرات المدن بشكل كبير من حيث الحرمان من رأس المال البشري ومستويات المعيشة، لا سيما مدن تدمر وإدلب والرستن وعفرين. في المقابل، حلت مدن حلب وداريا وتل أبيض في مرتبة مماثلة على هذه المؤشرات.

الشكل 5: حجم الأضرار في المدن (بالمليون دولار)



13 يعتمد المؤشر على مقاييس رأس المال البشري (الصحة والتعليم) ومستويات المعيشة (المياه والصرف الصحي والخدمات البلدية والإسكان). بالإضافة إلى ذلك، تأخذ مؤشرات رأس المال البشري ومستويات المعيشة في الاعتبار الضررَ الذي لحق بـ «القطاعات الداعمة» وقدرتها التشغيلية، والتي تشمل المؤسسات العامة والنقل والكهرباء.

الجدول 2: الأضرار حسب المدينة[14] (بالدولار)

المدينة	تقدير منخفض	تقدير مرتفع
عفرين	18,330,747	23,906,768
حلب	2,258,615,406	3,177,457,695
درعا	171,091,865	254,787,982
داريا	88,936,166	115,402,733
دير الزور	213,428,481	316,471,224
الحسكة	30,366,797	41,356,906
حمص	329,978,730	421,496,453
إدلب	521,971,093	963,807,711
منبج	9,185,416	13,342,764
تدمر	58,216,031	83,369,610
الرقة	270,842,972	416,436,546
الرستن	21,362,766	27,471,625
تل أبيض	22,286,018	27,372,497
الزبداني	3,639,713	5,021,641
الإجمالي	**4,018,252,201**	**5,887,702,153**

نطاق التقييم

النطاق الزمني: اندلع الصراع في سوريا عام 2011 ولذلك، جرى احتساب وتقدير حجم الضرر من خلال المقارنة مع خط أساس فعلي أو مقدر لما كان الوضع عليه قبل عام 2011 للأصول المادية، والذي تم تحديده في تقييم ديسمبر/كانون الأول 2014.[15]

النطاق الجغرافي: شمل التقييم المدن الـ 14 التالية: عفرين وحلب ودرعا وداريا ودير الزور والحسكة وحمص وإدلب ومنبج وتدمر والرقة والرستن وتل أبيض والزبداني. وضمن هذه المدن الرئيسية، تم تصنيف البيانات على مستوى الأحياء بينما بالنسبة لبقية المحافظة، يتم تصنيف البيانات على مستوى المناطق.

النطاق القطاعي: شمل التقييم 11 قطاعاً رئيسياً:

- **قطاعات البنية التحتية المادية:** النقل والكهرباء وإمدادات المياه والصرف الصحي والخدمات البلدية والتراث الثقافي وسلاسل القيمة الغذائية الزراعية.
- **القطاعات الاجتماعية:** الإسكان والصحة والتعليم.
- **القطاعات المشتركة:** البيئة والمؤسسات العامة.

منهجية التقييم

يقدم تقييم الأضرار هذا تقديراً عاماً للأثر الذي خلفه الصراع الجاري في سوريا على الأصول المادية وتقديم الخدمات. واعتمد التقييم في المقام الأول على منهجية تنفيذ عن بعد لجمع البيانات والخروج بالتقديرات، واستخدم صور أقمار صناعية عالية الدقة، وتحليلات للمنشورات على وسائل التواصل الاجتماعي،

14 **أسباب التباين بين الأضرار على مستوى المدن وبين إجمالي الأضرار حسب القطاع:**
*لأنه يستثني الأضرار التي لحقت بالقطاع الزراعي والتي وقعت في الغالب في المناطق الريفية، وبالتالي، لم يتم إجراء تحليلات على مستوى المناطق من قبل المتخصصين في القطاع
*في قطاع البيئة - بالنسبة للنفايات الطبية الإلكترونية، تجدر الإشارة إلى أن العدد الإجمالي للمرافق على مستوى المدن والتي تعرضت لأضرار جزئية أو تدمرت بالكامل هو أقل من إجمالي عدد المرافق على المستوى الوطني، وهذا هو السبب الذي يفسر الاختلاف بين إجمالي معدلات توليد النفايات الإلكترونية عند هذه المستويات
*في قطاع النقل، لا يمكن تفصيل التكاليف التي تكبدتها الموانئ والسكك الحديدية والمطارات على مستوى المدن، لذا فإن هذا الجدول لا يشمل هذه التكاليف
*باستثناء حساب أضرار المدن الميتة من قطاع التراث الثقافي

15 كما تم إجراء التقييم من خلال الرجوع إلى التقديرات الواردة في تقييم عام 2018 للمدن نفسها التي شملها التقييم السابق.

Photo credit: World Bank

واستخراج البيانات، وكذلك على المعلومات المتاحة للجمهور.[16] وفي الوقت نفسه، ولتأكيد الاستنتاجات التي تم استخلاصها، استخدم في التقييم بيانات حول الأضرار جرى أخذها من تقييمات نفذت على الأرض وكانت متاحة للجمهور.

استناداً إلى مستوى الضرر المحدد، جرى وضع كل أصل من الأصول تحت تصنيف من ثلاث تصنيفات تحدد حالة ذلك الأصل من حيث تعرضه أو عدم تعرضه للضرر على النحو التالي: غير متضرر، أو متضرر جزئياً (عندما يكون أقل من 40% من الأصل متضرراً)، أو مدمر بالكامل (عندما يكون أكثر من 40% من الأصل متضرراً أو عندما يكون الضرر بنيوياً). ولتقدير حجم الضرر، تم حساب المتوسط بناءً على عدد المنشآت المتضررة، وحالتها المادية (متضررة جزئياً أو مدمرة كلياً)، وتكلفة الوحدة المقدرة قبل الأزمة المرتبطة بكل فئة من فئات الأصول. كما استهدف التقييم أيضاً، وكلما كان ذلك ممكناً، تقييم الحالة التشغيلية للمرافق (تعمل أو لا تعمل) لتحديد مستوى وجودة تقديم الخدمات في مختلف القطاعات. وقام التقييم في جزءٍ منه على منهجية تقييم الاحتياجات بعد وقوع الكوارث التي تم وضعها بشكل مشترك من قبل الاتحاد الأوروبي والبنك الدولي والأمم المتحدة، وتم استخدامها في العديد من التقييمات التحليلية حول العالم.[17,18]

ملخصات تقارير القطاعات

1. أثر الصراع على الاقتصاد الكلي

خلف الصراع في سوريا آثاراً اقتصادية كبيرة ومتزايدة. فبحلول عام 2019، كان إجمالي الناتج المحلي للبلاد قد تقلص بأكثر من النصف مقارنة بمستواه المسجل عام 2010. فلقد تقلص النشاط الاقتصادي في جميع القطاعات، ولكنه تقلص بشكل مدمر في قطاع الهيدروكربونات نظراً للأضرار الجسيمة التي لحقت بالبنية التحتية لهذا القطاع. كما تراجعت التجارة الخارجية للبلاد بشكل حاد، لا سيما الصادرات، بسبب الاضطرابات المرتبطة بالصراع والعقوبات الدولية. وأدى العجز التجاري المستمر إلى تراجع احتياطيات البلاد من

16 تشمل مصادر المعلومات العامة هذه الاتحاد الأوروبي، ومجموعة البيانات الزراعية والبيانات الجغرافية المكانية التابعة لمركز الأبحاث المشترك.

17 الاتحاد الأوروبي، البنك الدولي، الأمم المتحدة. تقييمات الاحتياجات بعد وقوع الكوارث، تعليمات المجلد «أ» (2013). <https://www.gfdrr.org/sites/default/files/publication/pdna-guidelines-vol-a.pdf>.

18 تقوم منهجية تقييم الاحتياجات بعد وقوع الكوارث على تقييم الأضرار والخسائر (DaLA) ومنهجية تقييم احتياجات التعافي البشري (HRNA).

العملات الصعبة وانخفاض قيمة العملة وإلى حالة من التضخم المفرط. ونجم عن كل هذه الظروف انخفاض كبير في الإيرادات المالية، كما أدت إلى عجز مالي كبير ومزمن. وبشكل عام، أثر الصراع بشدة على الاقتصاد السوري نتيجة تدمير رأس المال والخسائر البشرية والهجرة القسرية واختلال النظام الاقتصادي للبلاد.

2. أثر الصراع على الفقر والأحوال المعيشية

كانت آثار الصراع واسعة وجلية في مختلف القطاعات والمناطق، وأضرت كثيراً بمستويات معيشة الأسر. فقد كان لتدمير الأصول وتراجع قدرتها التشغيلية تأثير مباشر على المستويات المعيشية للأسر وتقديم الخدمات الرئيسية. وبناءً على تقييم الضرر، جرى تصنيف المدن وفقاً لمؤشر الحرمان المركب للضرر والقدرة التشغيلية للأصول في مختلف القطاعات. وقد تم النظر في فئتين عريضتين لتقييم الحالة المعيشية: رأس المال البشري (الصحة والتعليم) ومستويات المعيشة (المياه والصرف الصحي، والخدمات البلدية، والإسكان).[19] بالإضافة إلى ذلك، تأخذ مؤشرات رأس المال البشري ومستويات المعيشة في الاعتبار الضرر الذي لحق بـ «القطاعات الداعمة» وقدرتها التشغيلية، والتي تشمل المؤسسات العامة والنقل والكهرباء. وفي المتوسط، تبين أن مدن داريا والرقة وتدمر تعاني من أعلى معدلات الحرمان النسبي. وتأتي مدينة تدمر بمحافظة حمص في المرتبة الأولى من حيث الحرمان من رأس المال البشري، بينما تأتي مدينة الرستن بمحافظة حمص في المرتبة الأولى من حيث الحرمان من مستوى المعيشة. وكما هو مفصل في التقرير، كان للنزاع آثار متباينة بين مختلف القطاعات داخل المدن. فتحتل مدن مثل تدمر وإدلب والرستن وعفرين مرتبة مختلفة من حيث موقعها على مؤشرات رأس المال البشري ومستويات المعيشة، بينما تقع مدن أخرى، مثل حلب وداريا وتل أبيض، في المرتبة نفسها على هذين المؤشرين.

3. النقل

تتراوح التقديرات الإجمالية للأضرار التي لحقت بقطاع النقل من 1.2 إلى 1.7 مليار دولار. فقد تعرض ما يقرب من 11% من إجمالي طول الطرق الدولية السريعة والطرق السريعة الداخلية والشوارع الرئيسية والثانوية والجسور في 14 مدينة لأضرار، حيث وقع ما نسبته 85% من مجمل الأضرار في الطرق الرئيسية والثانوية. وتتفاوت نسبة الطرق المتضررة بشكل كبير بين المدن، من 1.4% من الطرق الدولية السريعة والطرق السريعة الداخلية والشوارع الرئيسية والثانوية في حلب، إلى 63% في عفرين، و28% في الرقة، و23% في إدلب. ولوحظ أن ما نسبته 65% في إجمالي الأضرار التي لحقت بالطرق والشوارع الرئيسية والجسور كان في ثلاث مدن (الرقة وإدلب وحمص) من بين جميع المدن الـ 14 التي شملها التقييم. فقد استحوذت الرقة وحدها على 42% من إجمالي الأضرار التي لحقت بالطرق والجسور في المدن التي شملها التقييم. وفي المدن الـ 14 التي شملها التقييم، لم يكن حوالي 1,150,000 شخص، أو ما نسبته 23% من السكان، قادرين على الوصول إلى مرفق من مرافق الرعاية الصحية خلال 20 دقيقة من مساكنهم في عام 2021، ولم يكن حوالي 550,000 شخص، أو ما نسبته 11% من السكان، قادرين على الوصول إلى مرفق من مرافق الرعاية الصحية خلال 30 دقيقة. وبالمثل، يضطر أكثر من 900 ألف شخص، أو ما نسبته 18% من السكان، إلى التنقل بالسيارة لأكثر من 10 دقائق للوصول إلى المرافق التعليمية، وهو حد طبيعي من حيث بعد المسافة عن المرافق التعليمية. ولكن في المقابل، لا يستطيع أكثر من 100 ألف شخص، أو ما نسبته 2% من السكان، الوصول إلى المرافق التعليمية في مناطقهم. وتتراوح القيمة المالية للأضرار التي لحقت بالطرق ضمن قطاع النقل في الـ 14 مدينة التي شملها التقييم من 127.4 إلى 169.9 مليون دولار. ولا تتوفر بيانات عن قطاع السكك الحديدية باستثناء منشور صادر عن وزارة النقل السورية لعام 2018 والذي قدر الأضرار بحوالي 1.5 مليار دولار، بما في ذلك الأضرار التي لحقت بالمعدات. وأثرت الأضرار في هذا القطاع أيضاً على شبكات النقل بين المناطق الحضرية والمناطق الريفية وعلى نقل الركاب والبضائع.

19 لم يكن من الممكن تضمين سبل كسب العيش في تقييم الأحوال المعيشية بسبب نقص البيانات لقطاعي الزراعة والصناعة.

4. الكهرباء

تكبد قطاع الكهرباء أضراراً تراوحت قيمتها بين 804.2 مليون دولار و1,621.6 مليون دولار في 14 مدينة، كان أغلبها في حلب وإدلب، حيث تضررت البنية التحتية الكهربائية في حلب بنسبة 28% في حين بلغت نسبة الضرر في إدلب نحو 60%. وتعرض ما يقرب من 6.5% من المرافق إلى درجة معينة من الضرر، في حين أن ما يقرب من 6% من المرافق قد دمرت بالكامل. وتعرضت ثلاث من أصل 14 محطة طاقة شملها التقييم (وهي أغلى الأصول في القطاع)، والتي توفر أكثر من 20% من إمدادات الكهرباء في البلاد، إلى درجة معينة من الضرر بينما تعرضت 9 من أصل 49 محطة فرعية لأضرار. وبالنتيجة، تأثرت إمدادات الطاقة بشدة بشكل باتت معه الانقطاعات المتواصلة في التيار الكهربائي أمراً متكرراً في الكثير من المدن. وفي الوقت الذي تُبذل فيه جهود لإعادة بناء القطاع، لا تزال هناك العديد من التحديات دون حل، بما في ذلك عدم كفاية الاستثمارات، وانقطاع التيار الكهربائي، وسرقة الكهرباء، وقلة الوقود اللازم لتشغيل المحطات الحرارية.

5. إمدادات المياه وخدمات الصرف الصحي

تقدر قيمة الأضرار التي لحقت بشبكات إمدادات المياه والبنية التحتية للصرف الصحي في 14 مدينة من 124.9 مليون دولار إلى 379.7 مليون دولار. وتضررت البنية التحتية المادية الرئيسية لقطاع المياه خلال الصراع، إذ تضرر حوالي 17% من الأصول، كانت في الغالب آباراً وأبراجاً/ خزانات مياه، لا سيما في حلب وإدلب. وعلى الرغم من أن معظم البنية التحتية المادية المتبقية لم تتضرر، إلا أن القدرة التشغيلية لحوالي 51% منها تراجعت، بما في ذلك 11% لا تعمل كلياً، وهي مشكلة كبيرة بالنسبة للمدن الأكثر تضرراً. فقد أدت الأزمة المستمرة منذ 11 عاماً إلى تقويض عمليات الصيانة ونقص الأصول وخلقت قيوداً مالية أثرت بشكل كبير على خدمات المياه والصرف الصحي والنظافة الصحية. وفي الوقت نفسه، انتشر البدلاء من مقدمي الخدمات الذين يقومون بتوفير المياه المنقولة بالصهاريج وبتكلفة عالية (حوالي 7 دولارات لكل متر مكعب) ودون أي ضوابط بشأن مصدر المياه ونوعيتها.

6. سلاسل القيمة الزراعية الغذائية

أسفرت الحرب السورية عن أضرار تقدر قيمتها بنحو 3.4 مليارات دولار[20] في الصوامع والبنية التحتية والأصول الزراعية، بما في ذلك شبكات الري وأسواق الجملة في المناطق التي شملها التقييم. بالإضافة إلى هذه الأضرار، أدى نقص إمدادات المياه المستخدمة في الري، وقلة مدخلات الإنتاج، والقيود الأمنية، والتقلبات المناخية إلى خسائر في الإنتاج الزراعي من المحاصيل السنوية والدائمة، والثروة الحيوانية، وتربية الأحياء المائية خلال العقد الماضي (كان الإنتاج من المحاصيل الزراعية هو الأكثر تضرراً).

7. الإسكان

يتراوح إجمالي الأضرار المقدرة التي تكبدها قطاع الإسكان في 14 مدينة شملها التقييم من 2.3 إلى 2.8 مليار دولار. وتشير التقديرات إلى أن الصراع قد أثر على ما يصل إلى 210 ألف وحدة سكنية، حيث تعرض ما يقرب من 30 ألف وحدة منها إلى تدمير كامل في حين عانت 180 ألف وحدة من أضرار. وخسرت حلب ما يقدر بنحو 135 ألف وحدة سكنية بسبب الصراع، أي ما يعادل حوالي 21% من المنازل في المدينة وما يعادل 70% من المساكن المتضررة في 14 مدينة. كما تأثرت المناطق السكنية غير الرسمية أكثر من غيرها بالصراع، مما أدى إلى تفاقم الظروف المعيشية فيها.

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20 (1) توفر البيانات ذات الصلة بالمناطق الحضرية تقديرات للمدن المختارة، بينما توفر التقديرات الريفية الأثر على النطاق الوطني؛ (2) كان لأضرار شبكة الري آثار أثر غير مباشرة على الإنتاج الزراعي خارج منطقة الأضرار؛ (3) من الصعب فصل الأضرار في الإنتاج الزراعي التي تُعزى إلى الصراع عن الأضرار الناجمة عن تغير المناخ أو التقلبات الطبيعية.

8. التراث الثقافي

تتراوح قيمة الأضرار المقدرة التي تكبدتها المواقع الثقافية والتراثية من 303.7 إلى 520.6 مليون دولار. تضم سوريا مجموعة من أهم وأكثر مواقع التراث الثقافي العالمي تنوعاً في منطقة البحر الأبيض المتوسط، حيث كانت مهداً للتراث المادي وغير المادي على مدى آلاف السنين. ويوجد في سوريا ستة مواقع للتراث العالمي[21]، وكلها مدرجة في قائمة التراث العالمي المعرض للخطر، و11 موقعاً على قائمة التراث العالمي المؤقتة. لقد تأثر التراث الثقافي ككل بشدة جراء الأزمة. وقد تضمن هذا التقييم بيانات جزئية عن المساجد والكنائس والأديرة والأضرحة والمتاحف والمحفوظات والمباني التراثية والمواقع الأثرية والمدن الميتة. وشمل التقييم دراسات عميقة عن حلب وتدمر والمدن الميتة بسبب ارتفاع مستويات الأضرار فيها. ويرد إيجاز عن المساكن التاريخية والتراثية في قسم قطاع الإسكان.

9. الصحة

يتراوح إجمالي الأضرار المقدرة التي تكبدها قطاع الصحة في 14 مدينة شملها التقييم من 345.9 إلى 422.8 مليون دولار. وتعرض حوالي 28% من المرافق إلى أضرار جزئية في حين يقدر أن 8% من المرافق الصحية قد تدمرت بالكامل. وتعرضت مدينة تدمر لأكبر قدر من الضرر، حيث تم الإبلاغ عن تضرر 3 من أصل 4 مرافق صحية، بينما خسرت داريا معظم مرافقها الصحية، حيث تعطلت 7 من أصل 8 مرافق. ومن حيث نسبة الضرر، كانت دير الزور ثاني أكثر المدن تضرراً، حيث تعرضت 32 منشأة من أصل 43 لأضرار جزئية أو تدمرت كلياً، بينما كانت تدمر هي الأكبر من ناحية المرافق التي تعرضت لتدمير كلي (1 من 4). في الـ 14 مدينة التي شملها التقييم، لا يزال يعمل 62% فقط من المرافق الصحية.

10 التعليم

تتراوح قيمة إجمالي الأضرار المقدرة التي تكبدها قطاع التعليم من 25.3 إلى 37.9 مليون دولار في المدن الـ 14 التي شملها التقييم. وتعرض حوالي 13% من المرافق التعليمية إلى أضرار جزئية في حين يقدر أن 5% من المرافق قد تدمرت بالكامل. وتكبدت تدمر القدر الأكبر من الضرر، إذا تبين من خلال التقييم أن ما نسبته 87% من المرافق التعليمية في المدينة قد تضررت وأنها لا تعمل. وكانت الرقة ثاني أكثر المدن تضرراً، حيث تضررت 57% من المرافق بشكل جزئي أو تدمرت بالكامل، في حين كانت حلب هي الأعلى من حيث نسبة المرافق التعليمية المدمرة بالكامل (15%). وفي عموم المدن الـ 14 المشمولة في التقييم، لا يزال ما نسبته 70% من المرافق التعليمية عاملاً، بغض النظر عن نوع المنشأة، في حين كانت المدارس الابتدائية هي أكثر المرافق التعليمية تعطلاً. وفي الوقت الذي لم يتعرض فيه الكثير من المرافق التعليمية إلى أي أضرار أو تم إصلاحها، تظل القدرة على الوصول إليها صعبة بشكل كبير. تشمل العوائق الرئيسية التي تحول دون الوصول إلى المرافق التعليمية ما يلي: (1) انعدام الأمن عند الذهاب إلى المدرسة والعودة منها؛ (2) الخوف من التعرض للاستهداف في أثناء التواجد في المدرسة؛ (3) نقص المعلمين وعدم توفر مواد التدريس والتعلم؛ (4) إبعاد الأطفال والشباب عن التعليم وانشغالهم في أعمال هدفها توفير مداخيل لأسرهم.[22] وعليه، ورغم أن هذه المرافق لم تتعرض لأضرار، إلا أنه قليلاً ما يتم استخدامها على الرغم من القول بعكس ذلك. في الواقع، لا تزال الخدمات التعليمية وفرص التعلم المقدمة للطلاب محدودة نظراً للمخاطر المرتبطة بالصراع المستمر.

11. الخدمات البلدية

تتراوح قيمة إجمالي الأضرار المقدرة التي تكبدها قطاع البنية التحتية البلدية، والتي تغطي الأصول البلدية وشبكات الطرق، من 37.7 إلى 46.2 مليون دولار. وتشمل هذه الأصول مباني الإدارة البلدية والمكتبات

21 تشمل هذه المواقع ما يلي: موقع تدمر، مدينة بصرى القديمة، مدينة حلب القديمة، قلعة الحصن، قلعة صلاح الدين، القرى القديمة في شمال سوريا.

22 مكتب الأمم المتحدة لتنسيق الشؤون الإنسانية.

والحدائق والمواقع الثقافية والقاعات والأسواق المجتمعية والإسكان ميسور التكلفة. الأضرار التي لحقت بهذه الأصول كبيرة وتتراوح من 21.3 إلى 25.7 مليون دولار.[23] وقد أدى ذلك، إلى جانب الأضرار التي لحقت بالبنية التحتية للطرق والتي تقدر بنحو 16.4-20.5 مليون دولار، إلى خسارة كبيرة في مستوى توفر الخدمات العامة والقدرة على الوصول إليها. وتشير التقديرات إلى أن أكبر ضرر تكبدته قاعات المجتمع والأسواق (من 13.4 إلى 15 مليون دولار)، يليه الإسكان الميسور التكلفة (من 3.8 إلى 4.8 ملايين دولار)، والإدارة البلدية والمكتبات (من 2.4 إلى 3 ملايين دولار)، والمتنزهات والترفيه (من 1.7 إلى 2.9 مليون دولار). وكانت البنية التحتية المادية الأكثر تضرراً هي المباني السكنية ميسورة التكلفة (57% منها صالح جزئياً أو غير صالح كلياً) تليها القاعات والأسواق المجتمعية (38% منها صالح جزئياً أو غير صالح كلياً)، ومن ثم الحدائق والترفيه (23% منها صالح جزئياً أو غير صالح كلياً) وأخيراً مرافق الإدارة البلدية والمكتبات (8% منها صالح جزئياً أو غير صالح كلياً). وبالإضافة إلى هذا الضرر المادي، تأثرت القدرة على الوصول إلى الخدمات العامة سلباً بسبب الأضرار التي لحقت بالطرق البلدية. أخيراً، تدهورت إدارة النفايات الصلبة وإدارة مياه الصرف الصحي، والتي كانت أصلاً سيئة قبل الصراع، بشكل كبير، مما عرض الكثير من السكان لمخاطر صحية، إذ يشكل التراكم الكبير للحطام الناتج عن الصراع، والذي لم تتم إزالته بعد، خطراً صحياً آخراً على السكان. ولا تزال التحديات الرئيسية التي تعوق توفير الخدمات البلدية تتمثل في نقص التمويل المطلوب لاستعادة الأصول المتضررة وفقدان القدرات المؤسسية.

12. المؤسسات العامة

تتراوح قيمة الأضرار المقدرة التي تكبدتها المؤسسات العامة من 7 إلى 8.5 ملايين دولار في 14 مدينة مدرجة في التقييم. فقد تضرر نحو 10% (13 من أصل 127) من المرافق التي تم تقييمها (مكاتب البريد، والمحاكم، والمباني الإدارية الوطنية، والمرافق الإدارية الإقليمية، ومراكز الشرطة، وما إلى ذلك) في الـ 14 مدينة التي شملها التقييم جراء الصراع، حيث تعرض 2% منها إلى دمار كامل، في حين تعرض 8% إلى أضرار جزئية. وكانت مدن منبج وتدمر والرقة هي المدن الأكثر تضرراً في هذا الصدد. وعلى نحو أكثر تفصيلاً، تعرض 3 من أصل 9 منشآت في الرقة إلى تدمير كامل، في حين تعرضت واحدة من أصل 3 منشآت في منبج، وواحدة من أصل 3 منشآت في تدمر إلى أضرار جزئية. المدن الأخرى التي تعرضت المؤسسات العامة فيها إلى أضرار هي: الزبداني (25% من المرافق التي تم تقييمها)، إدلب (13%)، دير الزور (13%)، حلب (13%)، درعا (4%). وقد أثرت الأضرار التي لحقت بهذه المباني الإدارية بشكل سلبي على تقديم الخدمات العامة.

13. البيئة

يتراوح إجمالي الأضرار البيئية التي خلُص إليها هذا التقييم من 167.6 إلى 269.0 مليون دولار. وتشمل قيمة الأضرار البيئية تكلفة إزالة الأنقاض من المساكن المتضررة والتعامل معها (167.3 - 268.7 مليون دولار)، ومعالجة النفايات الإلكترونية الصادرة عن المرافق الصحية (0.4 مليون دولار). وتقدر تكلفة خسائر خدمات النظم الإيكولوجية بحوالي 36 مليون دولار. ومع ذلك، ليس من الممكن تقدير التكلفة الإجمالية للتدهور البيئي الناجم عن النزوح والصراع، وسوء إدارة النفايات الصلبة ومياه الصرف الصحي (بسبب التراجع الكبير في قدرات وإمكانيات السلطات المحلية) ضمن نطاق هذا التقييم. لقد كانت تكلفة الصراع على البيئة في سوريا هائلة، حيث وجدت تحليلات الأضرار البيئية حالة كبيرة من التلوث الناجم عن الأنشطة الاستخراجية وتدمير البنية التحتية، ناهيك عن التلوث الناجم عن استخدام الأسلحة. ووجد التقييم أن ما يقدر بنحو 160 طناً من النفايات الإلكترونية جاءت من المرافق الصحية المدمرة والمتضررة جزئياً، بينما أتى ما يتراوح من 17.6 إلى 28.3 مليون طن من الركام من المساكن المتضررة. وكانت مدينة حلب هي الأكثر تضرراً من النفايات الخاصة، تليها مدن درعا والرقة وحمص وإدلب وداريا. وتتعلق الفئة الثانية من الأضرار البيئية بالنظم الإيكولوجية الطبيعية، والتغيرات في استخدام الأراضي، وتأثيرات الصراع والنزوح على الخدمات البيئية.

23 المدن التي شملها تقييم الأضرار التي لحقت بالخدمات البلدية هي مدن عفرين، وحلب، ودرعا، وداريا، ودير الزور، والحسكة، وحمص، وإدلب، ومنبج، وتدمر، والرقة، والرستن، وتل أبيض، والزبداني.

Photo credit: Shutterstock

INTRODUCTION

> ***More than half of the country's pre-conflict population (of almost 21 million) has been displaced—one of the largest displacements of people incurred by a country since World War II.***

Context

Since 2011, the conflict in Syria has devastated its people, their cities, and economy. More than 400,000 deaths have been directly attributed to the conflict so far, with millions more casualties known to have occurred indirectly. More than half of the country's pre-conflict population (of almost 21 million) has been displaced—one of the largest displacements of people incurred by a country since World War II.

Poor healthcare, education, housing, and food shortages have worsened the effects of the conflict and pushed millions of people into unemployment and poverty. Diminished social cohesion as a result of the conflict is another concern for the long-term recovery of Syria. With a severely degraded healthcare system, Syrians remain extremely vulnerable to additional shocks, such as the COVID-19 outbreak still unfolding.

Damage to urban areas has been significant, and Syria has become highly urbanized during the conflict. Initial estimates indicate that in urban areas such as Aleppo and Homs, which experienced prolonged conflict, more than 50 percent of the urban fabric has been moderately or severely damaged. Over 65,000 units of housing stock are estimated to have been totally destroyed in Homs, which is more than 35 percent of the pre-war housing stock. An increase in rural-urban migration has made it harder for local municipalities to provide housing and services.

Objective of the Damage Assessment (DA)

The Syria DA is a broad-brush and largely remote-based exercise, focusing on 14 cities, and drawing on satellite imagery and existing secondary sources of information, including social media analytics, existing public information, and partner organizations' data to assess damage to physical infrastructure and the state and availability of public services. Specifically, the DA aims to:

- **Assess the impact** of the crisis on the population and service delivery.
- **Provide contextual information** related to institutional capacity, impacts of deteriorating security conditions and displacement.
- Improve **future planning and programming** and strengthen relationships with international partners.

This DA serves as a corner stone for future discussions with the international community on Syria and provides a working model for scaling-up when a comprehensive Damage and Needs Assessment (DNA) and additional forward-looking assessments and analytical work are needed. By establishing baselines, updating damage estimates, and enhancing partnerships, the joint assessment lays the foundation for future planning and recovery. Since the DA was conducted during an ongoing conflict, it is not a comprehensive evaluation founded on detailed, ground-based data as would be the case for a Recovery and Peacebuilding Assessment (RPBA).

Scope

The 2022 Syria DA is a follow-up to five previous DAs that covered many of the same cities and sectors. This assessment is the sixth undertaken by the World Bank Group during the crisis and the first conducted with its partners. For the 2022 DA, all but five cities[24] had been previously assessed using similar remote-based damage detection means. Similarly, many sectors assessed during this exercise had been assessed in previous DAs, namely, Health, Education, Water and Sanitation, Electricity, Public Institutions, Municipal Services and Agri-food Value Chains. For these sectors, the scope of analysis was established with sector specialists. Previous assessments were a key part of the 2022 analysis.

The selection of cities for this phase of the assessment was based on several criteria - the extent of physical damage caused by the conflict, the security conditions, the accessibility of the area, the presence of humanitarian actors, the ethnic diversity of the population, the mix of government and opposition-controlled areas, and the number of internally displaced persons (IDPs). Sectors were decided through a combination of factors including data access and impact.

Temporal Scope: The Syrian crisis started in 2011; therefore, the damage is calculated against the actual or estimated pre-2011 baseline of physical assets, established in the December 2014 assessment.[25]

Geographic scope: The assessment was conducted for the following 14 cities: Afrin, Aleppo, Dar'a, Daraya, Deir-ez-Zor, Al Hasakah, Homs, Idlib, Manbij, Palmyra, Ar-Raqqa, Rastan, Tell Abiad, and Zabadani. Within these major cities, the data are disaggregated at the neighborhood level while for the rest of the governorate, the data are disaggregated at the district level.

Sectoral scope: The assessment covers the following key 11 sectors:

- **Physical infrastructure sectors:** Transport, Electricity, Water Supply and Sanitation, Municipal Services, Cultural Heritage, and Agri-food value chains.
- **Social sectors:** Housing, Health, and Education.
- **Cross-cutting sectors:** Environment and Public Institutions.

Methodology

Overview

This Syria Damage Assessment (DA) provides a broad-brush estimate of the effects of the conflict on physical infrastructure and service delivery. It relies primarily on a remote-based assessment methodology, and uses high resolution satellite imagery, social media analytics, data mining, and publicly available information.[26] Wherever possible, it uses damage data from publicly available ground-based assessments to confirm findings. The assessment adapts from the Post-Disaster Needs Assessment (PDNA) methodology jointly developed by the European Union, World Bank, and United

24 These five cities are: Kobane, Qamishli, Yabroud, Al-Bab, and Tadmour.
25 The comparison is also made relative to 2018 for the same cities which were covered in the previous assessment.
26 These sources of public information include EU, and JRC's agricultural dataset and geospatial data.

Nations and has been utilized in numerous analytical assessments around the world.[27, 28]

Damage information from these sources was assessed against the baseline. Much of the baseline data relied on baselines established in previous assessments. The baseline asset inventories were gathered from pre-crisis government sources (circa 2011) and crowdsourced mapping data, and therefore describe assets prior to the crisis. Based on the damage level, each asset was assigned a physical damage status: no damage, partial damage (less than 40 percent of the asset is damaged) and complete destruction (more than 40 percent of the asset is damaged, or the damage is structural). Whenever possible, the damage assessment also estimated the operational status of facilities (functional or non-functional) to determine the level and quality of service delivery in that sector. Numerous sources of information and data were used, including social media, local and international media, satellite imagery analysis, mobile signal data, and inferences from previous assessments when none of these sources were available. This analysis was based on the facilities' physical status (based primarily on satellite imagery) and qualitative data from social media, news reports, and assessments from other organizations.

For the damage estimation, the average damage value was based on the number of damaged facilities, their physical status (partially damaged or destroyed), and the estimated pre-crisis unit cost[29] for each asset class. In line with standard DA methodology, destroyed assets were costed at 100 percent of their unit cost and partially damaged assets at 40 percent.[30] The largely remote nature of the assessment and the difficulty to estimate unit replacement costs required a damage range for each sector. The low and high damage estimates were calculated within a margin of the average damage cost. The size of the range varied from sector to sector depending on the level of confidence.

Key challenges include data fragmentation and confidentiality, lack of baseline information, limited timeframes for damage data relevance, data accuracy due to the broad-brush nature of the work, and varying DA methodologies. While satellite imagery data were corroborated with other sources and means, including social media analysis, night-time lights data, and mobile signal data, a remote assessment is broad-brush and provides only an indicative overview of impacts. While not all observed impacts can be attributed to the conflict, for example, the changes in agricultural output in Syria reflect a combination of conflict, weather conditions, and input prices etc, the DA methodology makes every effort to contain the estimation to the effects of the conflict. Such assessments are useful to describe the nature and extent of impacts and broadly define enabling conditions for the return of displaced populations. This can inform later, in-depth assessments.

Facility-Level Functionality and Damage Assessments

For the education, health, electricity, WASH, cultural heritage, public institutions, and municipal service sectors, facility-level research was carried out to assess whether facilities in the asset baseline were damaged and/or functioning. Sources and methods used include targeted searches of publicly available information (including NGO reports

27 European Union, World Bank, United Nations. Post-Disaster Needs Assessments, *Volume A Guidelines (2013).* <*https://www.gfdrr.org/sites/default/files/publication/pdna-guidelines-vol-a.pdf*>.

28 The PDNA methodology draws from the Damage and Loss Assessment (DaLA) and the Human Recovery Needs Assessment (HRNA) methodology.

29 Pre-crisis unit cost was adopted as part of the cost calculation methodology, since only damages were assessed in this report. This is the standard practice to estimate damages as the methodology for damage estimation is backward-looking.

30 With the exception of the Transport sector in which destroyed assets are costed at 60 percent instead of 100 percent in line with prior damage assessments.

and social media), inferences based on overall sector functionality, satellite imagery analysis, and anonymized mobile phone signal data.

Publicly Available Information Searches

Publicly Available Information (PAI) from government and NGO reporting, local media, and social media for information about facility functionality and damage were reviewed. Whenever possible, imagery analysis was used to visually confirm reports of damage or functionality, preferably using pictures in which the facility name is visible.

Three tiers of sources were used to triangulate the data:

- **Tier 1 Sources** provide incontrovertible visual corroboration for damage or functionality assessments. These might be a photo or video in which the facility name is visible, or its facade can be easily identified, and may come from partners such as JRC, international NGOs, or other neutral outlets such as unaffiliated Western media.

- **Tier 2 Sources** include likely visual corroboration for damage or functionality assessments, such as a photo or video from the inside of a facility in which the name is not visible. These include reporting from international media that may be biased.

- **Tier 3 Sources** provide no visual corroboration and/or are obviously biased. Inferences are also considered Tier 3. Most local and social media is Tier 3 unless it has corroborating visual evidence.

Facility functionality was assessed by assigning one of the three following conditions:

- **Functioning:** Facility is or appears to be functioning at or near pre-crisis levels

- **Partially Functioning:** Facility appears to be functioning at 40 percent or more of pre-crisis levels, due to lack of resources, physical damage, high demand, etc.

- **Not Functioning:** Facility is not functioning. All destroyed facilities are inferred to be not functioning. Facilities converted from their original uses (i.e., schools to IDP shelters) are also considered not functioning.

Imagery Analysis

Imagery analysts used 50cm commercial imagery to assess damage for the 14 cities and compared their results with images provided by JRC for selected sectors. Imagery analysts assessed damage by classifying facilities and/or sectors as follows:

- *No Damage*
- *Partially Damaged:* <40 percent of the facility/sector is damaged
- *Destroyed:* >40 percent of the facility/sector is damaged, or the damage is structural. Indicators of greater than 40 percent include debris around the facility and in close proximity, clear changes in the facility's exterior, damage to nearby roads that may impact functionality, and damage to the roof.

Mobile Signal Data

The task team relied on Software Development Kit (SDK) mobile location data gathered across Syria from February 2020 to February 2021 to assess facility-level functionality for the Health, Education, Public Institutions, Municipal Services, and Cultural Heritage sectors in the 14 cities. Data were compared prior to COVID (February 2020) and during COVID, but not during the COVID lockdown (February 2021) to calculate a city-wide average of cell phone signal density for each city. This normalized the impacts of variation in cell phone coverage over time and space. Only facilities at which the number of

FIGURE 6: IMAGERY ANALYSIS SHOWING NO DAMAGE

Example of a facility classified as No Damage.

signals within 150 feet of the location was 20 percent or more above the city-wide mean were assessed as likely functioning. The dataset consisted of billions of data points from across Syria. SDK data, such as time and location, are gathered from third-party applications with the permission of the mobile phone user. These data are associated with a cell phone user's mobile advertising ID, such as Apple's Identifier for Advertisers (IDFA) or a Google Advertising ID (Advertising ID/Ad ID), rather than publicly identifiable information, and are anonymized before delivery. The data also include information such as the device type, whether a user was driving when the data were collected, and the data source (i.e., cell tower triangulation, Wi-Fi/internet connection, GPS data).

Inferences

For facilities for which none of the above sources were available, damage and functionality from the previous assessment were inferred. This is based on the assumption that major repairs or additional damage would have been reported in social media; however, it does not preclude the possibility that facilities have reopened under different names. Finally, inferences based on previous assessments are more reliable for facilities that:

(1) show no damage/continuous functionality in cities that have not experienced significant conflict between 2018 and 2021; or

(2) show damage/no functionality in cities that have experienced significant conflict between 2018 and 2021.

Sectoral Asset Baselines

For the cities of Rastan, Tell Abiad, Al Hasakah, Daraya, and Zabadani, the task team did not have asset baselines from previous

FIGURE 7: IMAGERY ANALYSIS SHOWING DESTRUCTION

Example of a facility classified as Destroyed.

assessments. Similarly, because the sectors of Cultural Heritage, Municipal Services, and Public Institutions were systematically assessed for the first time in this assessment, these sectors did not have asset baselines either.

To build asset baselines, Google Maps, Wikimapia, and OpenStreetMap were used to identify the locations and names of facilities in a city. At least two of these sources were used wherever possible to confirm and validate both facility name and location. Where possible, pre-crisis government databases were used to identify major facilities, such as universities, hospitals, and power infrastructure in each city. However, facilities without at least a neighborhood-level location were excluded, as experience has shown that these facilities are difficult to identify in subsequent iterations, and introduce noise to the dataset.

Sector-Specific Methodologies

The task team relied on Publicly Available Information (PAI) and imagery analysis to assess facility damage, and PAI and mobile signal data to assess functionality for many of the sectors considered.

For the **Health sector,** qualitative assessments were also conducted to include information on staff shortages, vaccine distribution within local health facilities, lab testing availability, treatment of non-communicable diseases, the status of pharmacies, availability of drugs and a city's ability to cope with COVID-19 information.

For the **Education sector**, additional qualitative assessments were conducted on private education, staff shortages, kindergartens and pre-Ks, and a city's ability to cope with COVID-19, including an assessment of distance learning availability.

For the **Housing sector**, the task team used imagery at the neighborhood level to determine representation of damage across housing classes. Representative samples for each neighborhood and asset type were collected by imagery analysts.

To estimate cleared rubble, analysts used a rubble estimate formula to calculate total rubble in 2018, then subtracted the 2021 rubble estimates from this figure. This figure was only based on city-level housing decreases. Therefore, it did not account for situations in which a net damage decrease obscured increased damage in some areas and larger damage decreases in others. Relatedly, cities that had a net overall housing damage increase could not be assessed with this methodology - therefore, Afrin and Aleppo were not included. Cities that were not assessed in the previous assessment (Al Hasakah, Daraya, Tell Abiad, Rastan and Zabadani) were not included either.

For the **Electricity sector,** the task team used the Visible and Infrared Imaging Suite (VIIRS) of satellite sensors, run by NASA. This allowed the task team to assess Power sector trends, and to infer, for instance, that increased night-time illumination indicates expanding electricity use. Some assets, such as power lines and transformers, were assessed individually using publicly available information because they were too small to identify using satellite imagery and did not have specific names that could be searched using PAI. A qualitative assessment of the use, availability, and cost of solar panels was conducted whenever possible.

For the **Transport sector**, the task team sampled each city's overhead imagery for visible examples of conflict damage, and dropped point markers for each instance of this.

For the **Water and Sanitation sector**, given that many WASH facilities, such as wells and water tanks or towers do not have unique names, they cannot be searched using PAI and are therefore assessed using only imagery analysis. If these facilities did not have accurate coordinates or could not be assessed using satellite imagery, their functional status was inferred using publicly available reporting on neighborhood-level water access. In some cases, inferences are based on city-level water access reporting. Finally, if neither neighborhood nor city-level reporting are available, functional and damage statuses may be inferred from the previous assessment.

For **Cultural Heritage** sites, the task team also relied on a list of functioning mosques published by the Ministry of Religious Endowments (Awqaf) to infer functionality. These lists, published in late 2020, include Homs, Zabadani, Daraya, and Rastan. For the historical housing neighborhoods in Aleppo and Ar-Raqqa, the task team identified shapefiles that captured the extent of these historic areas, and then used the housing damage assessment to assess historical housing damage. This method assumed that all or almost all buildings in the historic areas are historic buildings. To identify Dead Cities (i.e., St. Simeon, Stylites, Ebla, and Serjilla) the task team used imagery analysis and PAI research to assess site-specific damage, threats, and status. The qualitative assessment also provided a higher-level assessment of threats and damage to the Dead Cities in general.

For the **Environmental sector**, changes in forest cover at the district level were calculated using the Global Forest Watch forest loss dataset from 2011–2020.

For the **Agri-food Value Chains sector**, irrigated and rainfed agriculture areas were delineated using the European Space Agency (ESA) Climate Change Initiative's 300m resolution land cover dataset from 2019. NDVI values were derived from the MODIS Terra satellite at 500m resolution. The median NDVI from March to June (growing season for most Syrian crops) for each agri-food value chain type in each governorate was calculated for the years 2011, 2015, 2018 and 2021.

For the **macroeconomic assessment**, the task team also relied on night-time lights data. Finally, for population movements, the team compiled reports from key NGOs, including IOM and OCHA, and PAI from international, Syrian, and local media.

Key Challenges

Data Fragmentation

While information about the impact of the conflict exists both inside and outside Syria, its use is limited for two key reasons: the information is fragmented (e.g., by sectors, institutions, and not always representative), and critical data are often confidential. Fragmentation across sectors, time, and countries makes it hard to compare data, and to corroborate findings from multiple data sources. While the remote methodology used in this assessment is effective to broadly estimate the impact of the conflict, some assets are less compatible with remote methodologies and cannot be measured as robustly. In addition, broken vertical reporting lines from municipalities to subnational authorities and ministries make it difficult to share data between institutions. Finally, confidentiality issues, and reluctance to share data also leads to fragmentation, and gaps in information.

Lack of Baseline Information

Absence of baseline information at the city level is another challenge. Most humanitarian actors on the ground report damage to facilities, but not with reference to a pre-damage baseline; this makes it difficult to systematically assess the effects of conflict on sectors and services. This DA addresses this lack of baseline information by collecting data across various sources to formulate a baseline for each sector against which more recent damage data may be compared and contrasted.

Limited Timeframe for Damage Data Relevance

Given the dynamic situation of an ongoing conflict, and the frequency and rapidity with which damage occurs, data may not remain accurate for long, while escalations in conflict may make ground surveys of assets very difficult.

Data Accuracy

This is largely a remotely conducted exercise which relies mostly on remote-based data and publicly available information. Data from satellite imagery have been corroborated and validated by other sources and means, including social media analysis, night-time lights data, mobile signal data and publicly available ground-based assessments. While all efforts are made to improve accuracy, a remote assessment is broad-brush and provides only an indicative overview of impacts. Such assessments are useful to understand the nature and extent of impacts and the broad enabling conditions for return of displaced populations. This can inform in-depth assessments and help to craft strategies and roadmaps for coordinated interventions.

Damage Assessment Methodology

Given the dynamic situation on the ground and ongoing fighting, the challenge was to have a quick, low cost, and replicable assessment. To respond to this need, this assessment sought to establish baselines disaggregated by neighborhood.

Displacement Dynamics

The conflict has and continues to displace millions, with most IDPs having lost their livelihoods. The closing of borders with Jordan and Turkey made it increasingly difficult for IDPs to seek asylum abroad, resulting in protracted internal displacement. Many IDPs live in highly vulnerable conditions and are forced to rely on already scarce public services. With the exception of Ar-Raqqa, Deir-ez-Zor and Al Hasakah, which lost 53, 28 and 27 percent of their populations during the conflict, other governorates witnessed a significant influx of IDPs since 2011. Idlib, for example, has doubled its population to over 2.7 million, with IDPs comprising almost two thirds of its population in 2021. Many camps and informal settlements remain overcrowded, mostly in the Idlib and Aleppo governorates. In the northeastern governorates, more than 100,000 individuals live in camps, many without services or any immediate prospect to return home. Although humanitarian organizations operating in these areas provide basic resources and services, these are often unavailable in other parts of the country while many returnees struggle to get sufficient humanitarian assistance.

With the conflict abating and amid slightly improved security conditions, the northeastern regions registered a drop in IDP arrivals in 2021 compared to 2020. While humanitarian organizations secure some basic services,[31] drought and water scarcity, however, depress economic revival and lower quality of life. As a consequence, accumulated displacements still exceeded returns in the northeastern governorates from 2017 to mid-2022 (Figure 8). While the vast majority of both refugees and IDPs wishes to return, overall returns remain low as many IDPs and refugees avoid returning to areas under government control, fearing arbitrary arrest, detention, forced conscription, and Housing, Land and Property (HLP) issues.[32] While hostilities have declined overall, many drivers of conflict have remained or even intensified. Among others, economic collapse has further eroded purchasing power and exacerbated the vulnerability of poor and displaced populations. Destruction of physical infrastructure and limited government resources undermine service delivery in all sectors. In that way, the conflict caused a significant decline in virtually all indicators of well-being and overall life satisfaction to a level that is unparalleled worldwide,[33] giving rise to continued protests, riots, and conflicts over scarce resources.

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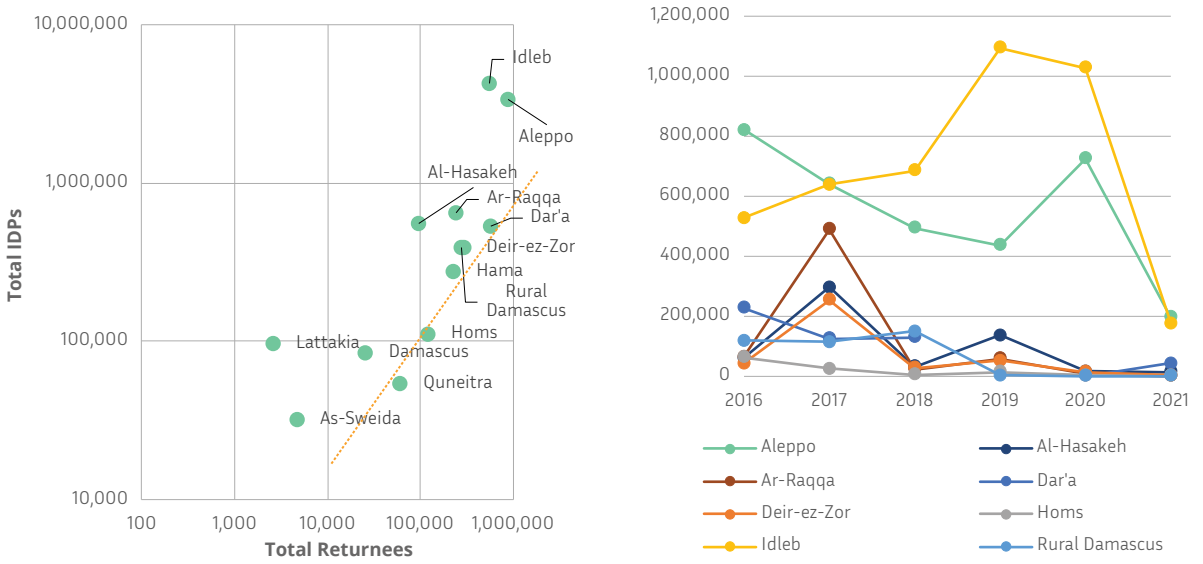
31 European Asylum Support Office (2020) "Syria – Internally displaced persons, returnees and internal mobility." Country of Origin Information Report.

32 Syrian Association for Citizen's Dignity (2020) "We Are Syria – Survey of 1,100 Displaced Syrians on the Reasons for Displacement and Minimum Conditions for Return." Available at: https://syacd.org/we-are-syria/; European Institute for Peace (2019). "Refugee Return in Syria: Dangers, Security Risks, and Information Scarcity." European Asylum Support Office (2020). "Syria – Internally displaced persons, returnees and internal mobility." Country of Origin Information Report.

33 European Institute for Peace (2019) "Refugee Return in Syria: Dangers, Security Risks, and Information Scarcity." European Asylum Support Office (2020). "Syria – Internally displaced persons, returnees and internal mobility." Country of Origin Information Report; Joseph K. Young, "Repression, Dissent, and the Onset of Civil War." Political Research Quarterly 66, no. 3 (2013): 516–532; David Cingranelli et al., "Human Rights Violations and Violent Internal Conflict." Social Sciences 8, no. 41 (2019), https://doi.org/10.3390/socsci8020041.

FIGURE 8: IDP ARRIVALS TO RETURNEES PER GOVERNORATE FROM 2016 TO AUGUST 2022 AND TOTAL NUMBER OF IDP ARRIVALS PER GOVERNORATE FROM 2016 TO 2022



Source: Based on UN OCHA (2022) IDP movements and IDP spontaneous return movements data.

Photo credit: World Bank

Photo credit: Shutterstock

MACROECONOMIC IMPACTS

Pre-Crisis Trends

Before 2011, Syria was a fast-growing, lower middle-income country. The Syrian economy had expanded since the turn of the century, albeit from a low base. Real GDP rose at an annual rate of 4.3 percent, on average, from 2000 to 2010, entirely driven by growth in the non-oil sectors. The annual inflation rate was 4.9 percent, on average. The current account was largely in balance, and by the end of 2010, Syria was estimated to have international reserves to cover over nine months of imports. The value of Syrian trade (measured in terms of value of imports and exports) reached 76.5 percent of GDP prior to the global financial crisis, which was relatively high compared with the average of 70.3 percent of GDP for the Middle East and North Africa (MENA; excluding oil-exporting high-income countries). Despite this momentum, Syria's 2010 GDP per capita of US$2,949 measured at current prices was lower than those of neighboring countries (Iraq: US$4,521, Lebanon: US$8,846, and Jordan US$3,736).

Effects of the Conflict on Economic Activity

MACROECONOMIC IMPACTS

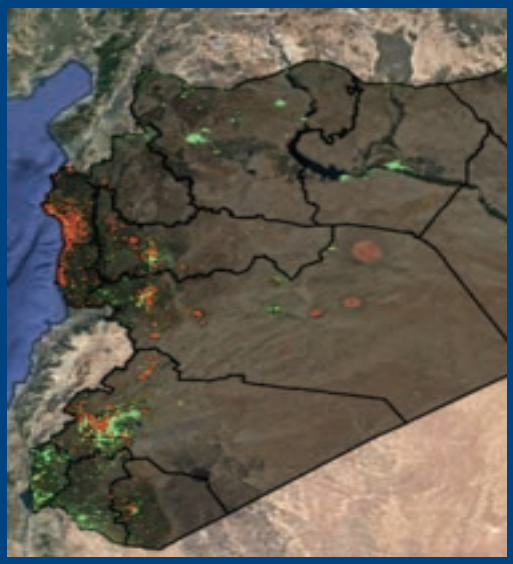
The conflict has led to a substantial contraction of Syria's economy. Between 2010 and 2019, Syria's real GDP shrank by 52 percent. The most severe contraction took place in 2012 and 2013, when economic activity fell by over 26 percent each year as the conflict intensified and spread across the country. Syria's GDP contracted less in subsequent years owing partly to de-escalation of the conflict in some regions of the country, and even registered marginal growth in 2018 and 2019. The country's economic conditions deteriorated again after 2020, however, following persistent conflict, a deepening economic crisis in neighboring Lebanon, and the COVID-19 pandemic which limited economic activity. The findings from night-time lights data, which are consistent with national accounts data, indicate a 72 percent reduction in light intensity from April 2012–April 2015, and a 50 percent recovery by April 2021. The pace of recovery is uneven across regions. Demonstrating the persistent impact of the conflict, light intensity has further declined in some war-affected areas since April 2015 (Figure 9).

Economic activity has contracted in all sectors since the onset of the conflict. Economic disruption has been acute in the hydrocarbon sector. Crude oil production plunged from 416,000 barrels per day (bpd) in 2010 to 79,000 bpd in 2021, owing largely to damaged energy infrastructure networks (Figure 10). There were significant losses in agricultural production as a result of damage to irrigation systems, severe droughts, and shortages of labor, seeds, fertilizer, and fuel. Industrial production also declined following shortages in fuel and power, limited access to capital, destruction of physical infrastructure, and the relocation of major manufacturing bases. The service sector suffered as

FIGURE 9: LUMINOSITY TRENDS IN SYRIA

A. Change in night-time light emissions, April 2012–April 2015

B. Change in night-time light emissions, April 2015–April 2021



Source: World Bank staff calculations.
Note: Red represents light intensity lost; green represents light intensity gained.

economic activity declined, security threats prevented tourism, and economic sanctions were imposed (Figure 11).

Both private and public investment shrank sharply. Investors exited Syria due to insecurity and the poor business environment, causing private investment as a share of GDP to decline from 12.3 percent in 2010 to 4.4 percent in 2019, while public investment fell from 8.2 to 2.5 percent of GDP as revenues declined and spending on arms rose (Figure 12). On average, investment only accounted for 7.6 percent of GDP over 2015–2019, an extremely low contribution, even among fragile and conflict-affected economies (Figure 13).

International trade declined severely, especially exports, due to conflict and international sanctions. Mirror statistics from the UN Comtrade database show that exports fell from US$18.4 billion in 2010 to US$1.5 billion in 2019, driven by declining oil and tourism revenues. Earnings from these sectors, which amounted to about US$12.8 billion in 2010, are now insignificant due to the conflict (Figure 14). Imports also contracted, particularly those linked to industrial production, from US$22.7 billion in 2010 to US$7.1 billion in 2019 (Figure 15). Given the decline in exports relative to imports, the trade deficit has deepened, falling from 35 percent of GDP in 2014 to about 15 percent in 2019.

FIGURE 10: PETROLEUM AND OTHER LIQUIDS PRODUCTION (THOUSAND BARRELS PER DAY)

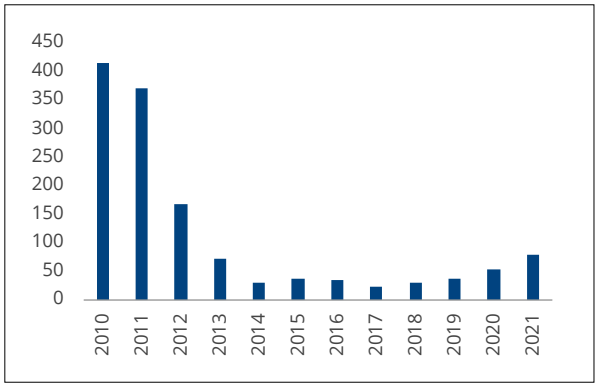
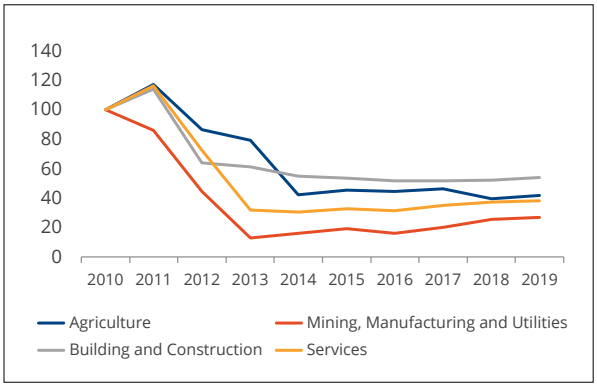


FIGURE 11: GDP BY SECTOR (CONSTANT NATIONAL PRICES, INDEX, 2010=100)



Source: Central Bureau of Statistics of Syria; Energy Information Administration (EIA)

FIGURE 12: PUBLIC AND PRIVATE INVESTMENT (SHARE OF NOMINAL GDP)

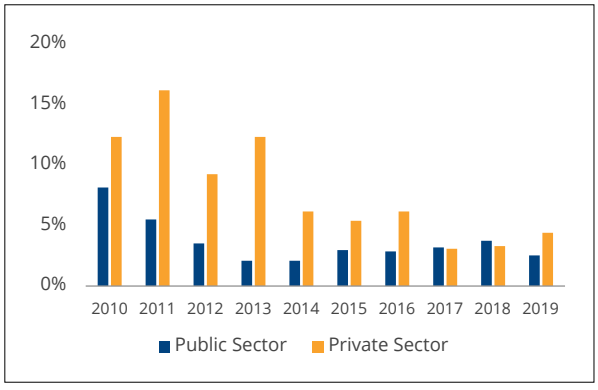
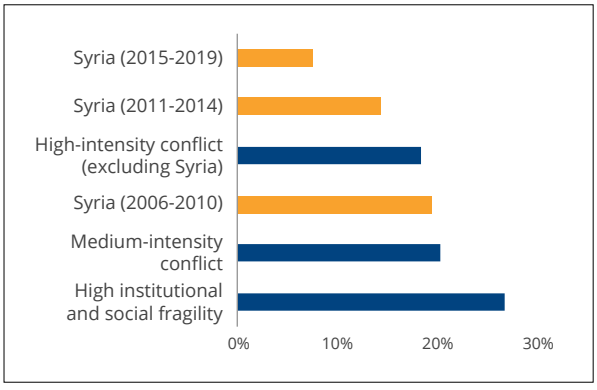


FIGURE 13: GROSS FIXED CAPITAL FORMATION (SHARE OF NOMINAL GDP, 2015-19)



Source: Central Bureau of Statistics of Syria; Find My Friends Tool using the IMF WEO
Note: The classification is from the FY22 list of fragile and conflict-affected countries situations, released by the World Bank.

FIGURE 14: GROSS EXPORTS (US$, BILLIONS)

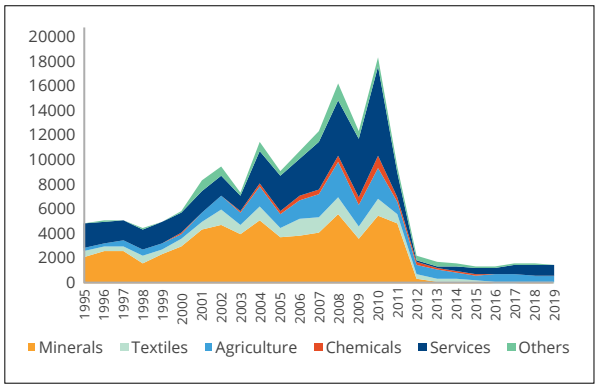
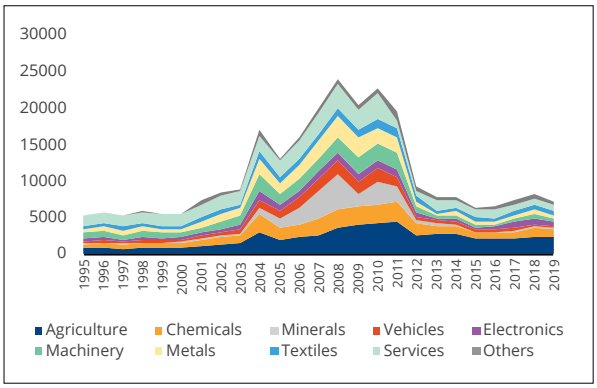


FIGURE 15: GROSS IMPORTS (US$, BILLIONS)



Source: Central Bureau of Statistics of Syria; Atlas of Economic Complexity, Center for International Development at Harvard University

FIGURE 16: SYRIAN POUND EXCHANGE RATE (RELATIVE TO THE U.S. DOLLAR)

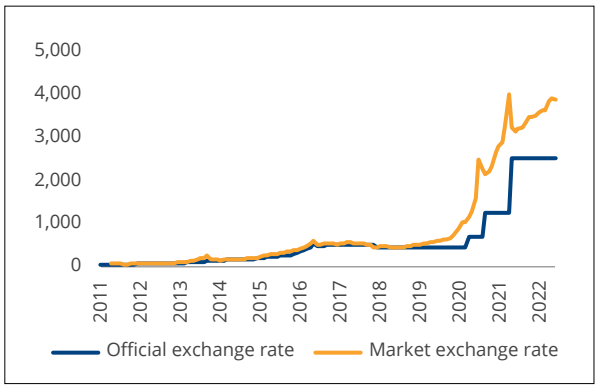
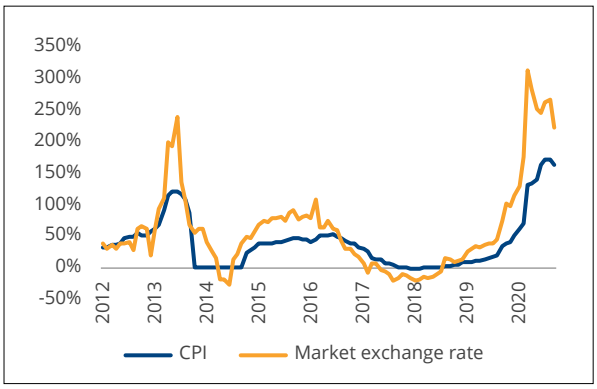


FIGURE 17: CPI AND MARKET EXCHANGE RATE (ANNUAL PERCENTAGE CHANGES)



Source: Central Bank of Syria; Syrian Pound Today

FIGURE 18: FISCAL BUDGET (US$, BILLIONS; SHARE OF NOMINAL GDP)

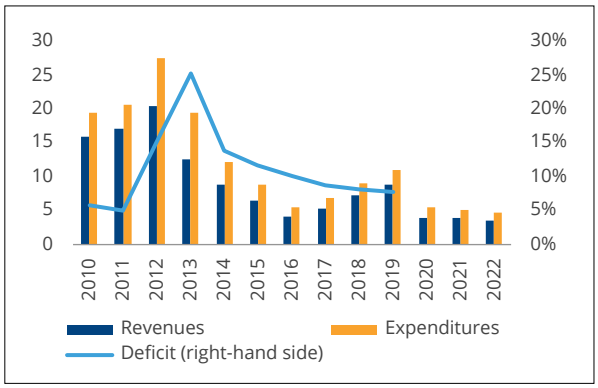
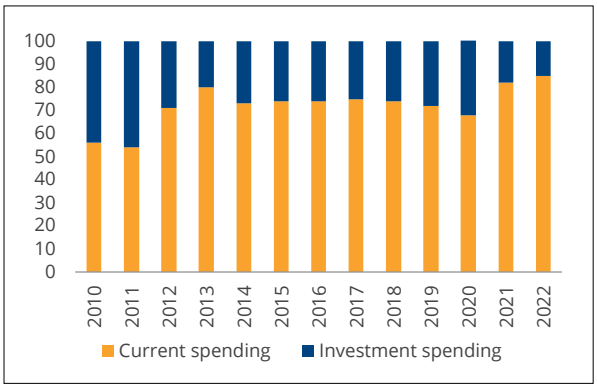


FIGURE 19: SHARE OF BUDGETED SPENDING (US$, BILLIONS)



Source: Central Bureau of Statistics of Syria; Central Bank of Syria.

Syria's foreign exchange reserves have been almost completely depleted. The persistent trade deficit has resulted in a drawdown of foreign exchange reserves. In addition, due to sanctions and conflict, Syria has suffered major capital flight, while capital inflows have ceased, adding to the loss of foreign reserves. Increasing international aid, estimated at US$1.5 billion in 2019 based on the official balance of payments statistics, and increased net remittance inflows, estimated at US$1.6 billion in 2019, have been major sources of foreign currency since the conflict began. On balance, foreign reserves have declined severely from US$19.5 billion in 2010 to less than US$1 billion in 2020. Syria further tightened import restrictions and capital flows in 2021 due to the scarcity of foreign reserves.

The conflict has brought about a steep increase in prices. With depressed export revenues and the decline in international reserves, the official exchange rate of the Syrian pound has declined 0-fold since the conflict began, and reached 2,512 SYP/USD in May 2022. In comparison, the market exchange rate depreciated 80-fold, falling to 3,905 SYP/USD in May 2022, about 1.6 times the official rate (Figure 16). Syria has adopted a multiple exchange rate system with substantial price regulations, which has restricted the efficiency of monetary policy and deprived the economy of a nominal anchor to reduce inflationary expectations. With such unstable monetary policy, exchange rate pass-through to domestic inflation has been substantial. This currency depreciation has triggered sharp domestic price increases since the conflict. During 2011–2020, the average annual inflation rate in Syria was 38 percent (Figure 17).

The deteriorating external position of the country has reduced fiscal revenues and led to fiscal adjustment. In dollar terms, revenues dropped by about 75 percent between 2010 and 2021, largely due to losses in oil and tax revenues, the collapse of international trade due to sanctions, a growing informal economy, and weak tax collection capacity. In response to this shortfall, government spending in dollar terms was cut back by about 75 percent during this period, especially capital expenditure (Figure 18). Between 2010–2022, capital expenditure fell from 44 to 14 percent of fiscal expenditure (Figure 19). The fiscal deficit was estimated to be 12 percent of GDP, on average, during 2011–2019. This deficit has been mostly financed through central bank borrowing, which may have worsened inflation.

The conflict and international sanctions have caused significant losses in the banking sector. Domestic banks had to reduce their operations as the economy shrank, sanctions tightened, investments dried up and the conflict affected businesses. Meanwhile, foreign entities with strategic partnerships in the sector have mostly taken a passive approach, while some have cut all relations with Syria. Assets in Syrian banks are estimated to have declined from US$45.5 billion in 2010 to US$16.9 billion in 2020.

The economic impact of the conflict has been devastating. The Syrian conflict did not only damage strategic physical infrastructure (the destruction channel), but also caused a sharp rise in fatalities, forced outmigration, domestic displacement (the displacement channel), and the breakup of economic networks (the disorganization channel). When a natural disaster destroys physical infrastructure in a well-functioning market economy with strong institutions (a "capital destruction only" shock), investments typically increase, the capital stock recovers quickly, and the negative growth effects are short-lived. But in the case of conflict, reduced investments due to heightened risk, population displacement, institutional degradation, and escalating rent-seeking compound the effects of physical capital damage. As a result, the effective losses from physical capital damage are amplified, and persist for longer than those caused by natural disasters.

Photo credit: Shutterstock

POVERTY AND WELFARE IMPACTS

Pre-Crisis Poverty Trends

Before the conflict, extreme poverty in Syria – as measured by the 2011 US$1.90 purchasing power parity (PPP) international poverty line – was virtually non-existent. On the other hand, based on the official national poverty line - which was close to the international lower middle-income poverty line of US$3.20 in 2011 PPP - about 2.4 million people were estimated to be living in poverty in 2006/2007 i.e. about 12.3 percent of Syria's population. Poverty in Syria had a strong urban-rural divide, with rural populations poorer in monetary and non-monetary terms.

Regionally, poverty was concentrated in the Northeast, home to 56 percent of Syria's poor, and in which approximately one in five inhabitants was living in poverty. Not only were living conditions in the Northeast worse than elsewhere in the country, but they had worsened during the pre-conflict period. The gap across regions widened prior to the conflict, and poverty increased in poorer regions. Poverty in the Southern and Central regions declined between 1997 and 2004, driving overall poverty rates in Syria down in 2003–2004. The rural Northeast was the only area in which poverty increased between 1997 and 2004. Over the period 2004–2007, only the Southern region (the urban South in particular) and the rural Northeast experienced increases in poverty rates. The reason for this decline in welfare was the drought in the rural Northeast and consequent migration of people to the Southern urban region, which also experienced a large influx of Iraqi refugees.

Effects of the Conflict on Poverty

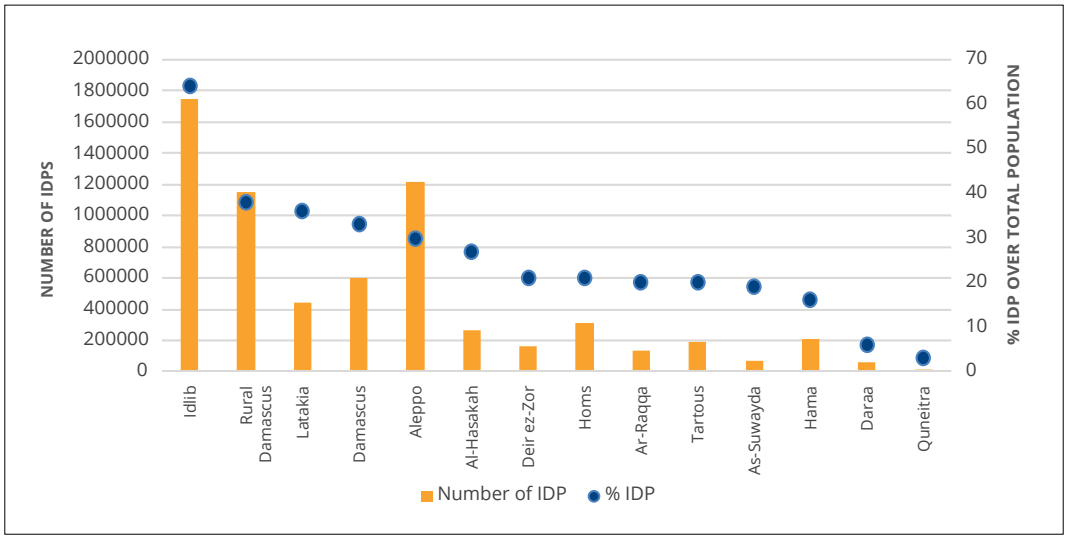
Conflict in Syria has had devastating impacts. Conflict, displacement, and the collapse of economic activities and social services have all contributed to declining welfare. It is estimated, that over the last 10 years, that conflict has claimed the lives of at least 350,209 individuals and displaced (internally and/or internationally) over 50 percent of the population. As of May 2021, almost one third of Syria's population are internally displaced, with the governorates of Idlib, Rural Damascus, Latakia, Damascus and Aleppo having the highest incidence of IDPs relative to resident populations (Figure 20).

Both monetary and non-monetary dimensions of welfare have been profoundly impacted. Extreme poverty has consistently risen since the onset of the conflict, reflecting deteriorating livelihood opportunities and progressive depletion of household coping capacity. In non-monetary terms, access to shelter, livelihoods, health, education, water and sanitation have all worsened dramatically since the conflict began.

After a decade of conflict, Syrians face the compounding effects of multiple crises with devastating impacts on their welfare. Since January 2020, the Syrian pound has depreciated by over 150 percent, leading to rampant inflation and further declines in welfare. The COVID-19 pandemic has reduced incomes, distorted already dysfunctional markets, and disrupted basic services, tragically increasing the Survival Minimum Expenditure Basket (SMEB) from 9 percent in January 2020 to 22 percent in January 2021. According to recent WFP estimates, 12.4 million Syrians (60 percent of the population) are food insecure while 1.3 million cannot survive without food assistance.

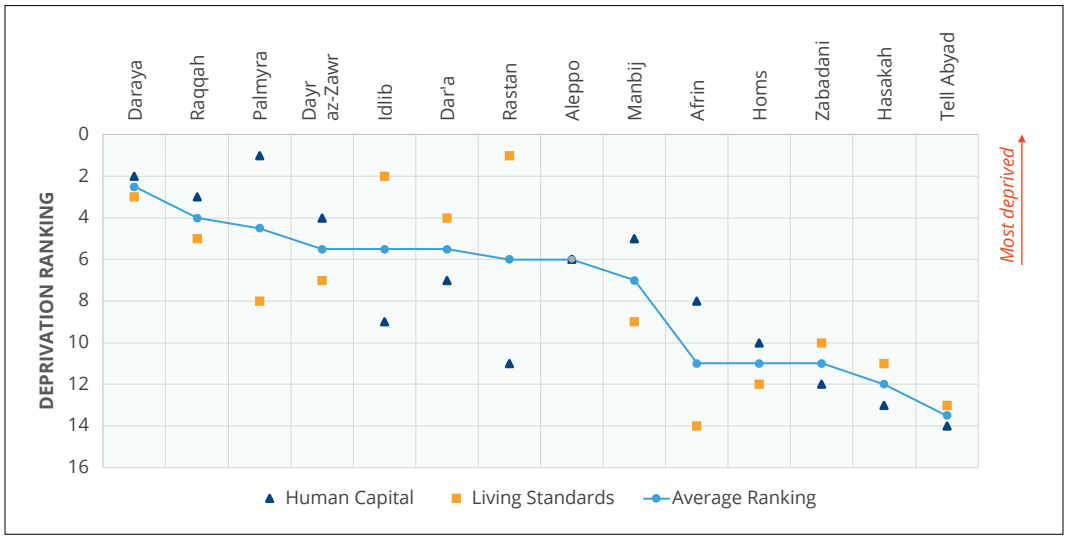
The destruction wrought by conflict has been widespread across sectors and locations, with detrimental effects on household welfare. Based on information collected through the Damage Assessment exercise, cities have been ranked according to a composite deprivation index which considers damage and functionality assessments of various sectors. Two broad indexes are considered for the welfare assessment:

FIGURE 20: DISTRIBUTION OF IDPS BY GOVERNORATE



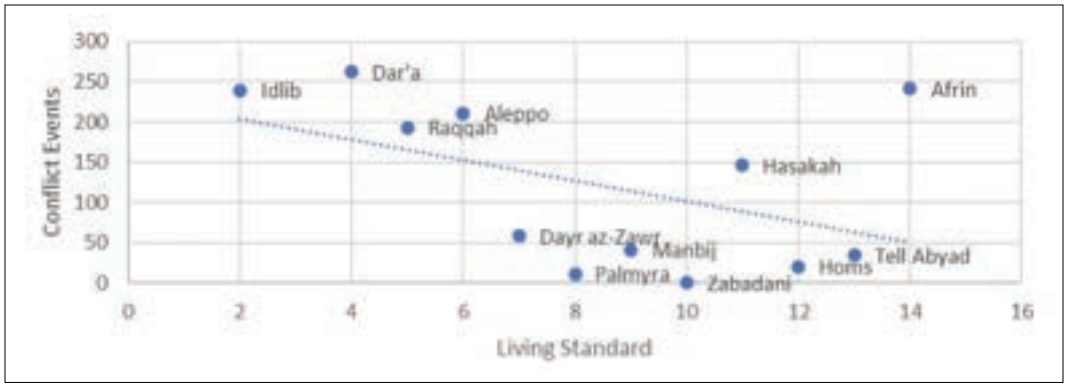
Source: HNAP Population Assessment, May 2021.

FIGURE 21: DEPRIVATION RANKINGS BY CITY AND WELFARE DIMENSION



Source: World Bank calculations.
Note: Aleppo ranks equally on both human capital and living standards indexes.

FIGURE 22: LIVING STANDARDS AND CONFLICTS, OCTOBER 2018–JULY 2021



Source: ACLED.

human capital (health and education) and living standards (water and sanitation, municipal services, and housing).[34] In addition, these indexes also consider the damage to and functionality of "enabling sectors," which include Public Institutions, Transport and Electricity. Figure 21 shows deprivation rankings. On average, Daraya, Ar-Raqqa and Palmyra are the most deprived cities. Palmyra – in the Homs governorate – has the highest human capital deprivation, while Rastan – also in the Homs governorate – has the most deprived living standards. As detailed in the report, conflict has had differing impacts across sectors within cities. Some, such as Palmyra, Idlib, Rastan and Afrin show marked differences in indices, while Aleppo, Daraya and Tell Abiad rank similarly for both.

> ***The regions with the lowest living standards have the most conflict.***

The regions with the lowest living standards have the most conflict. Conflict has degraded living conditions, and the lack of resources and public services drives new conflicts, including protests and riots. The regions with the lowest living standards for water and sanitation, housing, and municipal services are subject to the most conflict, including social conflict in the form of protests and riots, as well as clashes and shelling (Figure 27). From October 2018 until July 2021, Idlib, Dar'a and Ar-Raqqa experienced repeated protests and riots, while better serviced cities such as Tell Abiad, Zabadani and Homs had less social conflict. Afrin is a notable exception, as services generally remain more widely available than in other conflict-affected parts of the country, despite recurring clashes and shelling. Continuous conflict, however, retards the economic and institutional development needed to recover living standards, weakens business networks needed for productive sectors, and slows human capital development as millions of children and students are unable to study.[35] Notably in government-held areas, arbitrary detentions, political exclusion, and other forms of repression drive ongoing protests and violence.

34 Lack of location specific assessments for Agriculture and industries prevented inclusion of "Livelihoods" in the welfare assessment.

35 World Bank. 2017. The Toll of War. The economic and social consequences of the conflict in Syria.

IMPACT ON PHYSICAL INFRASTRUCTURE AND AGRICULTURAL ASSETS

Photo credit: Shutterstock

Transport

Pre-Crisis Sector Conditions

BACKGROUND AND ANALYSIS OF SECTOR CHARACTERISTICS, CONDITIONS, AND TRENDS PRIOR TO THE CONFLICT

Information on the institutional structure of the Transport sector in Syria is very limited. The Ministry of Construction and Development is responsible for the construction and maintenance of Motorways and Trunk roads, and Local Administrative Units (LAUs) under the Ministry of Local Administration and Environment (MoLAE) are responsible for Primary and Secondary Road networks. Syrian railroads are operated by two companies, the *Chemins de Fer Syriens (CFS),* a subdivision of the Ministry of Transportation, and the now defunct Syrian Hejaz Railways (SHR).

Prior to the conflict, Syria's road network had rapidly expanded to keep pace with the growing population. Generally, secondary roads were in good condition, and construction was underway to extend the major highway network to join Latakia and Aleppo. In the prewar period, the purchase of vehicles grew each year by an average of 13 percent. Similarly, passenger numbers on commercial flights grew as the country attracted tourists and foreign travelers who accounted for an average of 84 percent of all air travel between 2007 and 2010. In 2010, Syrian airports saw more than 2.4 million departing passengers and over 2.5 million incoming passengers.

In terms of rail transport, Syria had one of the Middle East's most extensive railway systems prior to the war. The major rail routes connected Syria's main cities, and a freight-only line for phosphates connected Homs to the port of Tartous. During the first decade of the 21st century, trains carried goods and passengers throughout the country, and transported over 3.5 million passengers and more than 8 million tons of goods in 2010.

Concerning maritime transport, Tartous and Latakia ports also grew significantly in container activity prior to the war, with incoming and outgoing containers at Tartous port doubling between 2005 and 2010.

INVENTORY OF PHYSICAL INFRASTRUCTURE ASSETS (GENERAL AGGREGATE FIGURES)

The road network in Syria is estimated to be 97,401 km, of which 19,490 km are paved, including 1,103 km of expressways

(motorways). In 2010, there were 2.07 million vehicles in Syria, i.e., 0.1 vehicle per inhabitant. Syria has three main international airports in: Damascus, the governorate of Latakia, and Aleppo. Prior to the crisis, the Deir-ez-Zor Airport was also a large airport with three military and two civilian runways; however, at the start of the crisis the airport was converted to a military facility, including a warehouse for weapons and heavy equipment. Syria has two major ports on the Mediterranean coast, Tartous and Latakia, which orchestrate the country's maritime transport. Syria also has around 2,400 km of railroad throughout the country, with around 1,900 km of standard gauge and 400 km of narrow-gauge track. Prior to the war, Syria owned 138 diesel-electric train engines and 10 diesel-hydraulic train engines. In terms of rail cars, Syria had 483 passenger carriages (358 passenger, 19 restaurant, 45 sleepers, and 33 baggage vans) and 5,151 freight cars. There are 20 border crossings between Syria and its neighboring countries: nine with Turkey, four with Iraq, two with Jordan and five with Lebanon.

Sectoral Damage Assessment

AGGREGATE SECTOR ANALYSIS

The damage assessment in the Transport chapter covers physical damage to the following asset classes: Motorway, Trunk, Primary, Secondary Roads and Bridges, while damage to the remaining road classes is accounted for in the Municipal Services chapter. The assessment indicates that approximately 11 percent of intra-city roads were damaged as of September 2021, out of which around 4 percent were destroyed and require major repair, and 7 percent were partially damaged and need maintenance to restore service delivery and access. In addition to conflict-related damage and neglect, armed groups have reportedly looted railway stations for scrap metal.

CITY-LEVEL ANALYSIS

Percentage damage to the road network in each city includes damage to motorways, trunk roads, primary and secondary roads. Damage to bridges is discussed separately.

- **Aleppo:** Approximately 25 percent of bridges in Aleppo are uncrossable, and 1.4 percent of roads need maintenance and repair due to conflict-related damage and lack of maintenance. Imagery analysis and publicly available information suggest that Aleppo International Airport is largely undamaged, except for some structural damage and rubble primarily at the airport's western end. Aleppo Airport ceased all commercial flights between 2012 and 2020 but continued to function primarily as a military facility; in February 2020 civilian flights reportedly resumed after the eight-year hiatus. Aleppo's three train stations appear to be functioning and have sustained little or no damage. Local and social media reports claim that there are multiple weekday trains between Aleppo's central railway station and Jibreen railway station east of the city. The railroad line between Aleppo and Homs was expected to reopen in May 2021, though there are no indications this has happened.

- **Dar'a:** Dar'a sustained damage to 10 percent of its road network, of which 33 percent needs major repair and 66 percent requires maintenance. Since the start of the crisis, Dar'a train station has been a front line between government- and opposition-held parts of the city, and Facebook pictures from December 2018 show extensive damage to this station from conflict and neglect. Satellite imagery from 2021 confirms that the station has continued to degrade and does not appear operational, with no visible efforts to maintain or restore it.

- **Deir-ez-Zor: D**eir-ez-Zor sustained damage to around 9 percent of its road network, of which 33 percent needs major repairs and 66 percent requires maintenance to restore service delivery and access. Deir-ez-Zor also sustained damage to around 59 percent of its bridges, of which 96 percent need major repair and 4 percent require maintenance. As of September 2020, Deir-ez-Zor Airport was used as a Russian military base and civilian flights were suspended. However, image analysis from 2017–2020 suggests it is no longer frequently used, although it is not damaged. Deir-ez-Zor train station does not appear to be functioning either. According to image assessment, it does not appear to have incurred extensive conflict-related damage; however, ground images suggest it has significantly deteriorated due to neglect. In July 2020, local media reported that railway tracks, maintenance equipment, and some railway stations between Al Hasakah and Deir-ez-Zor had been looted, and the metal sold for scrap in Turkey, Syria, and Lebanon.

- **Al Hasakah:** Al Hasakah sustained damage to around 3 percent of its road network, of which 33 percent needs major repair and 67 percent requires maintenance. While local media claimed work had begun on an internal Al Hasakah rail line, image analysis suggests that Al Hasakah train station has not been in use since August 2021. The station's tracks appear overgrown and a damaged hangar near the railway station has not been repaired.

- **Homs:** Homs sustained damage to 6 percent of its road network, of which 33 percent needs major repair and 66 percent requires maintenance. According to image analysis, Homs train station appears to be functioning and to have sustained little damage. In September 2021, the Ministry of Transportation (MoT) announced that 500 tons of gravel per day were being loaded from Homs quarry for railway reconstruction in Tartous, Aleppo and Adra.

- **Ar-Raqqa**: With damage to 28 percent of the road network, road damage in Ar-Raqqa accounts for 42 percent of all road damage in the 14 cities. Local media reported that Ar-Raqqa train station was heavily damaged in January 2018, and as of August 2021 no efforts to repair the station could be detected in images, even though much of the surrounding area has been cleared and/or rebuilt. The station seems to have been abandoned and appears not to be functioning.

- **Manbij**: Manbij sustained damage to 13 percent of its road network, of which 33 percent needs major repair and 67 percent requires maintenance to restore access and service delivery.

- **Afrin**: Afrin sustained heavy damage to 63 percent of its road network, of which 33 percent requires major repair and 66 percent requires maintenance.

- **Palmyra**: The city sustained damage to nearly 13 percent of its road network, of which 33 percent requires major repair and 66 percent requires maintenance.

- **Idlib:** The city sustained damage to 23 percent of its road network, of which 35 percent requires major repair and 65 percent requires maintenance to restore service delivery and access.

- **Daraya:** The city sustained damage to 7 percent of its road network, of which 33 percent needs major repair and 67 percent requires maintenance. According to image analysis, Daraya train station seems to have been abandoned and appears partially damaged.

- **Zabadani:** The city sustained damage to 3 percent of its road transport assets, of which 33 percent requires major repair and 66 percent requires maintenance.

- **Rastan:** No damage data were reported.

- **Tell Abiad:** Tell Abiad sustained damage to 5 percent of its road network, of which 33 percent requires major repair and 67 percent needs maintenance. Image analysis suggests that Tell Abiad train

station, which connects northern Aleppo and the surrounding area to Turkey, was not operational until 2019. Since then, it appears to have expanded, with new buildings recently built. The facility also appears to have resumed functioning, at least sporadically.

CONFLICT IMPACT ON CONNECTIVITY AND ACCESSIBILITY

Connectivity and Accessibility of the Road Network

Damage to roads compromises the larger road network, as parts of this network may be rendered inaccessible by damage to short segments. Connectivity and accessibility are the main indicators for service delivery in the road transport sector. Road network availability at the city level generally decreased between 2011 and 2021 due to road damage. Connectivity i.e., density of roads for a given population size, changed from 2011 to 2021 due to road damage, population displacement, and resulting declines in population density. While the damage assessment in the Transport sector only covers physical damage to motorways, trunks, primary roads, and secondary roads and bridges, the accessibility analysis in the following sub-sections is based on combined damage to all roads as reported in the Transport and Municipal chapters, as all of them affect accessibility.

Accessibility to Health Care Services

Across the 14 cities studied in 2021 about 1,150,000 people, or 23 percent of the population, are unable to reach a health care facility within 20 minutes, and about 550,000 people, or 11 percent of the population, are unable to reach a health care facility within 30 minutes. Notably, no neighborhoods in Idlib are within 30 minutes of an operational health care facility. In Daraya, while city residents can access health care within 10.5 minutes on average, 43 percent of the population are unable to reach the nearest health care facility within 20 minutes. Similarly, in Aleppo, while residents can find health care within 7.8 minutes on average, 29 percent of them cannot reach their nearest facility within 20 minutes, and 14 percent (over 180,000 people) have no access within 30 minutes. Barriers to health care accessibility include the general shortage of operational facilities and damage to roads.

Accessibility to Schools

Access to schools varies within cities and depends on the number of operational schools and on road damage. Across the 14 cities, 18 percent, or over 900,000 children and others must travel over 10 minutes by car, a standard threshold for education accessibility. Similarly, 2 percent, or over 100,000 people have no access to education facilities in their neighborhood. To make matters worse, in cities such as Ar-Raqqa, Rastan and Daraya, larger populations are concentrated in neighborhoods with lower access to schools. In Afrin, three schools in the city center are closed, and road damage restricts access to the city center compared to outlying neighborhoods. In Ar-Raqqa, schools are open, but road damage in outlying areas means that residents may drive for over 20 minutes to reach a school.

DAMAGE TO ASSETS AND PHYSICAL INFRASTRUCTURE

Damage to assets and physical infrastructure in the Transport sector in the 14 cities amounts to US$1.2–1.7 billion, as detailed in the table below.

TABLE 3: DAMAGE INVENTORY (IN US$)

Asset Type	Baseline	Total Damaged	Partially Damaged	Completely Destroyed	Low estimate, US$	High estimate, US$
Motorway	81,478	-	-	-	-	-
Trunk	240,446	17,644	11,858	5,787	4,929,085	6,572,113
Primary	539,857	61,460	41,430	20,031	17,154,209	22,872,279
Secondary	405,750	55,003	36,548	18,455	7,707,691	10,276,921
Bridge	13,999	3,318	1,816	1,502	97,657,680	130,210,240
Total Roads and Bridges	**1,281,530**	**137,425**	**91,652**	**45,775**	**127,448,665**	**169,931,553**
Railways	No damage data are available. The Syria Railway Company has costed damage to the railway network in detail, but their data are unavailable at this stage.				1,000,000,000	1,500,000,000
Ports	Ports are functioning. The estimated amount is to cover emergency maintenance and repairs to critical physical infrastructure and support facilities.				30,000,000	40,000,000
Airports	Airports are functioning. The estimated amount is to cover emergency maintenance and repairs to critical physical infrastructure, support facilities, and safety and security equipment.				30,000,000	40,000,000
Total					**1,187,448,665**	**1,749,931,553**

TABLE 4: CITY-LEVEL DAMAGE COSTS TO ROADS (IN US$)

City	Low Estimate	High Estimate
Afrin	1,437,625	1,916,834
Aleppo	75,995,435	101,327,246
Dar'a	1,126,113	1,501,483
Daraya	254,387	339,182
Deir-ez-Zor	24,617,982	32,823,976
Al Hasakah	573,493	764,657
Homs	2,721,465	3,628,620
Idlib	4,721,847	6,295,796
Manbij	1,683,536	2,244,714
Palmyra	547,961	730,614
Ar-Raqqa	13,386,195	17,848,260
Rastan	-	-
Tell Abiad	248,596	331,462
Zabadani	134,031	178,708
Total	**127,448,665**	**169,931,553**

Effects of the Conflict

Damage and obstructions to roads have disrupted traffic flows, and hindered movement of people and goods, and access to employment and services. Road closures have forced road users to choose alternative, longer routes, which increase travel time and transport costs for passenger and freight traffic. Damage to roads is all-the-more intractable because of the shortage and costs of resources and materials, the loss of human capital, weak institutional and implementation capacities, limited finance and ongoing conflict.

As of August 2021, the only border crossing authorized by the United Nations was the Bab al-Hawa crossing with Turkey. Between July 2014 and July 2021, 37,405 trucks passed through this border post.

According to Syrian Government data, passenger numbers on Syrian aircraft fell by 32 percent between 2011 and 2019 while freight air miles grew by 130 percent over the same period, perhaps because of the destruction of the country's railways and growing dangers on its highways. In February 2020, following an eight-year hiatus, civilian flights at Aleppo Airport reportedly resumed, before being shut down again due to COVID-19 restrictions; however while the airport reportedly resumed civilian flights as of January 202123, satellite images from 2021 suggest that the airport's primary purpose remains military, but for sporadic international flights.

Following the start of the civil war in 2012, rail transport of freight and passengers ceased throughout most of the country, causing a 79 percent loss of users and a 91 percent decrease in freight traffic between 2010 and 2019. Trains have only recently begun to operate again - particularly between Tartous and Latakia to serve students at the University of Tishreen and other passengers; between Aleppo and Jibreen for students, workers and other passengers; and between Homs and Aleppo, and Tartous and Adra to transport gravel from the Homs quarry for railway reconstruction.

Limitations

The Damage Assessment is based on remote data and image analysis, which were used to estimate percentage damage per asset. Due to limitations in satellite imagery coverage, facilities outside of the cities were assessed using only qualitative sources. In addition, the assessment only covers physical damage to roads and bridges, and does not include damage to road traffic furniture such as traffic lights, signs, or infrastructure such as drainage or protection structures. The damage assessment for the Road sector focused on inter-urban road connections classified as: motorways, trunk roads, primary roads, secondary roads and bridges as these roads carry large volumes of traffic and the Ministry of Transport is responsible for their development, operation, and upkeep. Damage to tertiary roads, tracks, residential roads and service roads is covered in the Municipal Services Chapter.

Electricity

Pre-Crisis Sector Conditions

The Electricity sector in Syria operated as a vertically integrated, state-controlled model under the Ministry of Electricity. The Public Establishment for Electricity Generation and Transmission's (PEEGT) mandate was to plan and develop generation and transmission assets while the Public Establishment for Distribution and Exploitation of Electric Energy (PEDEEE) did the same for the Distribution sector.

Prior to the conflict the Electricity sector was growing. Between 2002–2007 demand grew at a rate of approximately 7.5 percent per annum - driven by a growing economy, subsidized energy tariffs, and an influx of Iraqi refugees. 99 percent of the population had electricity and approximately 85 percent of consumers were residential and industrial (the other 15 percent were commercial and government consumers). Compared to other intermediate income countries, the demand from industry was high and that for commercial needs relatively low. However, despite high electricity access, the sector faced growing challenges during this period, including: 1) rapidly growing demand led to supply/demand gaps and frequent load shedding; 2) large total losses in the network (26 percent loss[36]); 3) deteriorating finances and need for large government subsidies; 4) fuel security issues due to inadequate domestic gas for power generation; 5) persistent power outages (approximately 43 days of power outage per year[37]).

Sectoral Damage Assessment

AGGREGATE SECTOR ANALYSIS

The assessment identified power plants, dams, substations, towers, transformers, and administrative offices as the main assets of the Electricity sector, and found some cities substantially more damaged than others. These include Aleppo, Idlib and Deir-ez-Zor. The electricity infrastructure of Afrin, Homs, Manbij, Palmyra, Ar-Raqqa, Rastan, Tell Abiad and Zabadani was undamaged.

Most damage was to power plants and substations. Damage estimates to the three

36 Hatahet, Sinan, and Karam Shaar. 2021, Syria's Electricity Sector After a Decade of War: A Comprehensive Assessment.
37 Hatahet, Sinan, and Karam Shaar. 2021, Syria's Electricity Sector After a Decade of War: A Comprehensive Assessment.

FIGURE 23: ELECTRICITY SECTOR – BY CITY

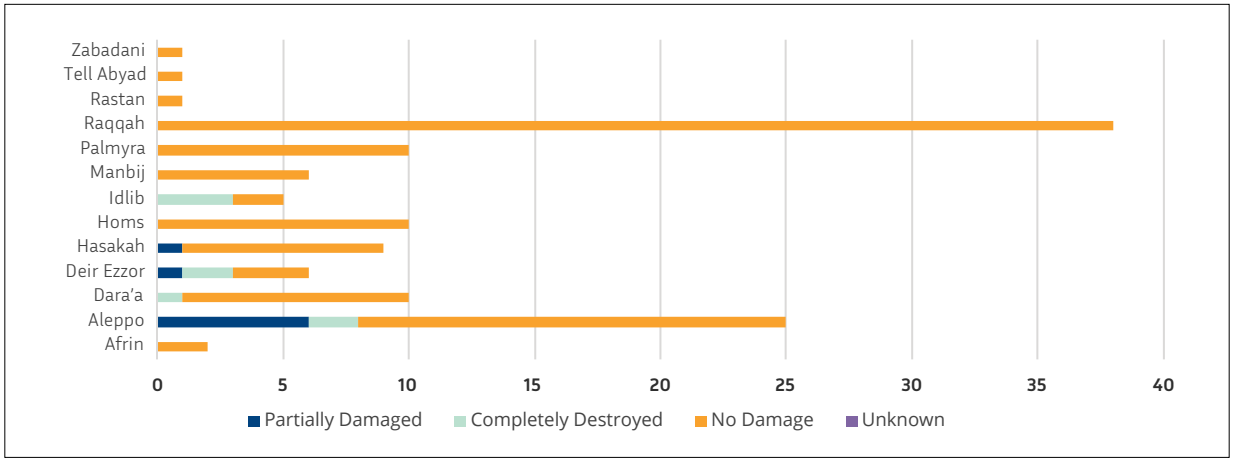
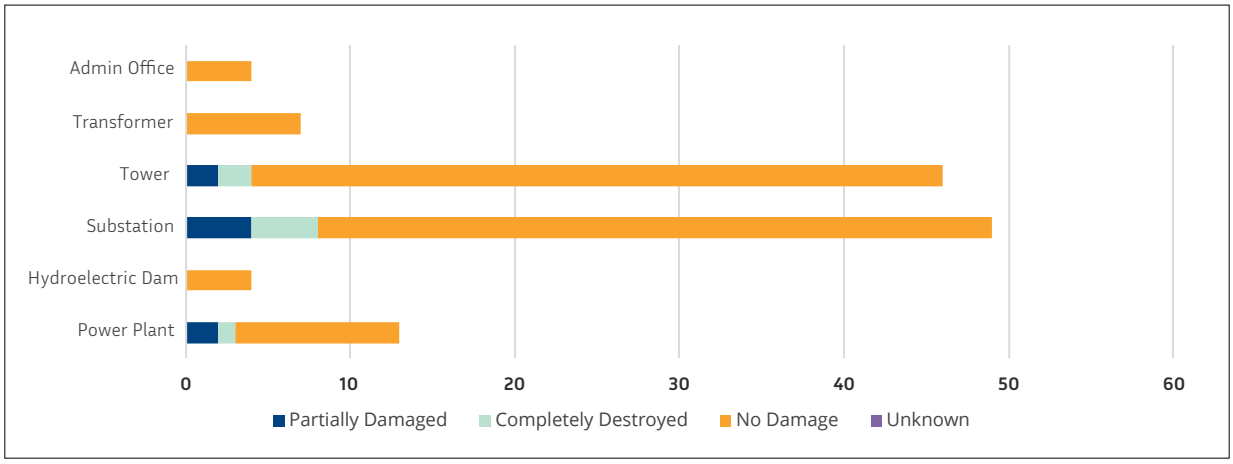


FIGURE 24: ELECTRICITY SECTOR – BY TYPE



power plants assessed ranged from US$784–1,568 million (97 percent of the estimated cost of all damage in the assessed cities); nine substations at approximately US$19.8–52.8 million; and four towers at approximately US$420,000–840,000.

CITY-LEVEL ANALYSIS

Afrin

Afrin has limited electricity infrastructure, and only two substations. Public electricity was reportedly unavailable for over eight years.

Aleppo

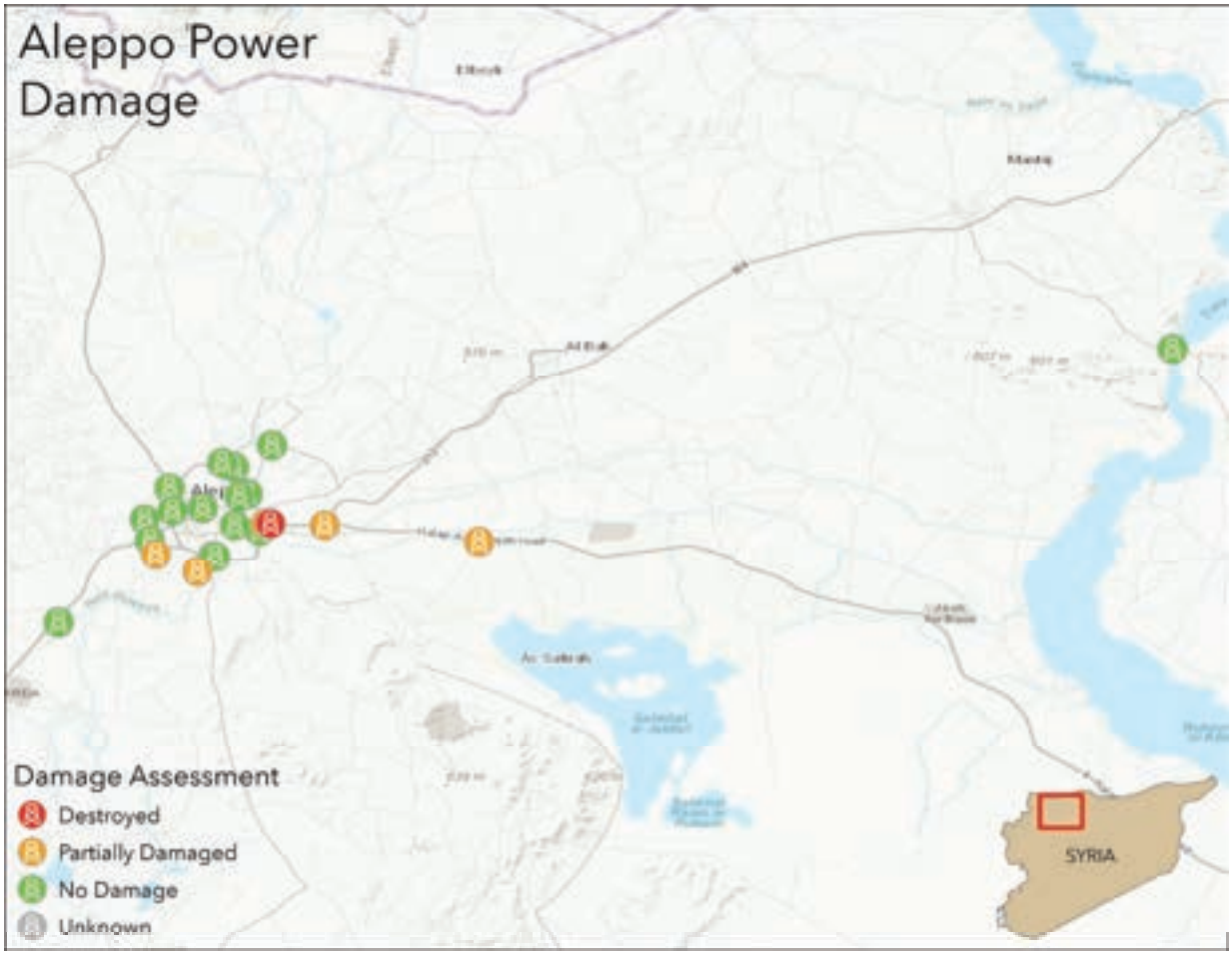
Aleppo has one power plant, one dam, and 16 substations, much of which were destroyed in the conflict. Aleppo's[38] thermal power plant is the largest in the country, with a capacity of 1,100 MW, and has been damaged and out of service for the past few years.

Twelve substations are undamaged, three are partially damaged and one is destroyed. The main substation, Al-Zarba, was damaged and could not operate, but according to local reports was repaired in March 2021 and now functions; six other partially damaged substations were repaired in 2020/2021 and now function.[39]

38 Based on geographical location, and knowing that the link between area-specific damage and overall functionality (or service availability) is unclear, as power grids are typically interconnected country-wide. Fuel shortages also affect generation capacity. The status of transmission infrastructures between main load centers (cities) also plays a critical role in service delivery, but was beyond the scope of this assessment, which focused only on selected cities.

39 Enabling change in voltage levels and interfacing transmission and distribution systems.

FIGURE 25: ELECTRICITY INFRASTRUCTURE DAMAGE IN ALEPPO



Dar'a

There are three power plants, three substations, and three towers, which do not appear significantly damaged. As of August 2021, all power plants were undamaged, and two were operating. All substations and towers except for one are undamaged, and repairs have been done according to government reports.

Deir-ez-Zor

There are two power plants and four substations; one power plant is partially damaged and the other does not operate due to fuel shortages. Al Tayyim power plant was damaged in 2017 but has been repaired, reportedly between 2019 and 2021. Of the four substations, one operates, two are destroyed, and the status of the fourth is unknown. Electricity from the public network is unreliable as the main power plant supplying power to Deir-ez-Zor (Jandar Power Plant) has not operated since July 2021 due to fuel shortages.

Al Hasakah

There are two power plants, a hydroelectric dam and five substations. One substation is partially damaged, and most assets function or partially function. Al-Swaydiyah power plant is the main source of electricity to non-residential sites in the city because of decreased supply from the Thawrah and Tishrin dams. The Tishrin hydroelectric dam can function at full capacity, but electricity production fell in 2021 with decreasing water levels in the lower Euphrates river.

Homs

Homs has three power plants and seven substations, none of which are damaged. However, according to local media, they

function only some of the time, due to fuel shortages. According to local media reports from 2020, six of seven substations function partially and one is completely functional.

Idlib
Idlib has a power plant and four substations. Zayzun power plant has four gas turbines - three with a capacity of 128 megawatts and one with a capacity of 160 megawatts. The plant, and two substations were substantially damaged by fighting between 2015 and 2016, and remain so. The remaining substations have been repaired, but electricity supply is unreliable.

Manbij
There is one substation and five high tension towers. While damage has not been reported, media reports in May 2021 stated that blackouts lasting 20 hours per day were common.

Palmyra
There is one power plant, two substations and seven transformers. Jandar Power Plant functions, and according to local reports, the substations were repaired in 2019 after not operating for six years. The seven transformers were repaired in 2018 and now operate.

Ar-Raqqa
Ar-Raqqa has two dams, four substations, and 32 towers. The Taqba Dam was badly damaged in 2017 and repaired in 2018; however, Ar-Raqqa's dams do not operate at full capacity due to low water levels. 30 towers function, one does not, and the status of another is unknown.

Rastan
There is one power plant, the Al Zara Thermal Power Plant, which is undamaged and estimated to provide 40 percent of the country's electricity.

Tell Abiad
There is one working substation.

Zabadani
Data unavailable.

DAMAGE TO ASSETS AND PHYSICAL INFRASTRUCTURE

TABLE 5: DAMAGE INVENTORY (IN US$)

Asset Type	Baseline	Total Damaged	Partially Damaged	Completely Destroyed	Unit Cost (Low Estimate)	Unit Cost (High Estimate)	Total Damage Cost (Low estimate)	Total Damage Cost (High Estimate)
Power Plant	13	3	2*	1**	800,000/ MW ***	1,600,000/ MW***	784,000,000	1,568,000,000
Hydroelectric Dam	4	0	0	0			-	-
Substation	49	9	4	5	3,000,000	8,000,000	19,800,000	52,800,000
Tower	46	4	2	2	150,000	300,000	420,000	840,000
Transformer	7	0	0	0			-	-
Admin Office	4	0	0	0			-	-
Total	**123**	**16**	**8**	**8**	**3,950,000**	**9,900,000**	**804,220,000**	**1,621,640,000**

**The damage assessment is based on the productive capacity of the two power plants, which is 1,200 MW.*
***The damage assessment is based on the productive capacity of the power plant, which is 500 MW.*
****The unit cost is the cost of producing 1 MW of electricity.*

TABLE 6: CITY-LEVEL DAMAGE COST (IN US$)

City	Damage Cost (low estimate)	Damage cost (high estimate)
Aleppo	358,870,000	722,140,000
Dar'a	150,000	300,000
Deir-ez-Zor	38,000,000	80,000,000
Al Hasakah	1,200,000	3,200,000
Idlib	406,000,000	816,000,000
Total	**804,220,000**	**1,621,640,000**

**Cities listed are those which had damaged electricity infrastructure.*

Effects of the Conflict

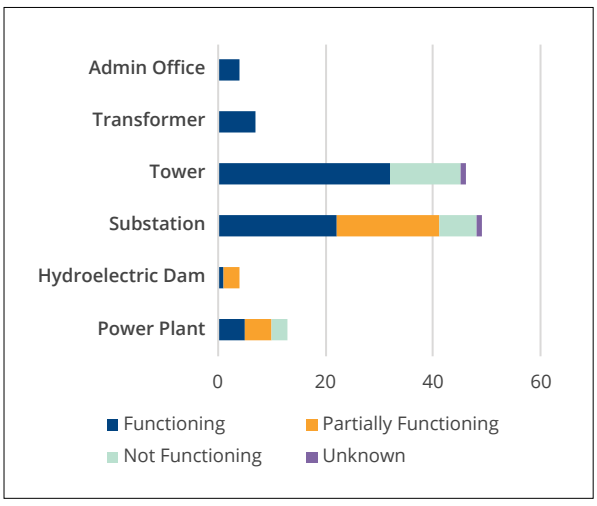
The conflict has severely affected electricity service delivery. With two major power plants partially damaged and one completely destroyed, approximately 20 percent of the country's generation capacity is affected, and this has led to load shedding; while damage to transmission and distribution infrastructure (substations and towers) has greatly affected service delivery. Also, the conflict has led to fuel shortages, causing some assets to operate below full capacity. Many cities have persistent blackouts, some up to 15 hours a day. Social media analytics revealed that electricity theft and illegal connections were a persistent problem. The conflict has also made it difficult for the public utility to bill and collect payments, and hindered maintenance.

The challenges currently faced by the sector relate mainly to damaged transmission and distribution networks, particularly in areas outside of government control, while fuel for power stations is difficult to obtain due to the country's dwindling oil and gas production. Expensive private generators are increasingly used.

Limitations

This assessment has two main limitations. First, while damage ratings to specific assets are reasonably accurate, damage to transmission and distribution networks is harder to assess. Second, the assessment relied mostly on social media analytics and qualitative reports, and did not use satellite imagery to support its findings.

FIGURE 26: OPERATIONAL STATUS BY FACILITY



Water Supply and Sanitation (WSS)

Pre-Crisis Sector Conditions

SECTOR CHARACTERISTICS AND CONDITIONS AS PER THE PREVIOUS DAMAGE ASSESSMENT

Water resources in Syria. Syria has an arid climate and receives most of its precipitation during winter. Syria depends on transboundary rivers (Tigris, Euphrates, Orontes, and Yarmouk) for most of its surface water. Groundwater is a major source of water, and it is over exploited.

Before 2011, Syria had high-quality WSS services, with good coverage, managed by the state. The sector faced typical challenges pre-crisis including inadequate preventive maintenance and challenges in rural supply e.g. in Idlib. Tariffs were set by the central government and applied uniformly throughout the country. Despite three-yearly increases recently, costs remain low for water services, and charges are negligible, if any, for sanitation.

Inventory of Physical Infrastructure Assets. The major asset classes investigated in this study include wells, water tanks/towers, water treatment plants, sewage treatment plants, dams, dikes, pumping stations, storage reservoirs, and water and sanitation offices. There are 366 facilities, mainly wells (153), water towers/tanks (158) and pumping stations (25) distributed among 14 main cities. Aleppo has the highest number of facilities with 198, followed by Idlib (30) and Homs (27).

Sectoral Damage Assessment

AGGREGATE SECTOR ANALYSIS

This assessment covers 14 cities in Syria. Around 366 WSS infrastructure assets were assessed across these cities. The total damage to known assets is 17 percent (10 percent partially damaged and 7 percent destroyed), while the extent of damage/functionality for the remaining assets was unknown. WSS infrastructure is found only in the following cities: Afrin, Manbij, Tell Abiad and Zabadani. 153 **wells were assessed. Aleppo has the**

highest number (114 wells), followed by Idlib (23 wells), Dar'a and Ar-Raqqa (4 wells each), Deir-ez-Zor and Palmyra (3 wells each), and Afrin and Zabadani (1 well each). 26 wells were partially damaged and 13 destroyed. The destroyed wells are in Aleppo (6 wells) and Idlib (7 wells). In Idlib, 16 wells are partially damaged. Where wells are still operational, there is a lack of diesel for the pumps which reduces the wells' operating time. 11 bulk **water tower/tanks** were destroyed (5 in Aleppo, 3 in Ar-Raqqa, 2 in Dar'a, and 1 in Homs, with 2 partially damaged out of a total of 158).

It was reported that the "El Jadida" **water treatment plant** in Ar-Raqqa was destroyed between May 2015 and May 2016, but it is not known whether it functioned prior to the conflict. The assessment found that the **sewage treatment plant** in Daraya (41,000 cubic meters per day) was partially damaged, and as of February 2021 did not function. Six **dams** were assessed, in Afrin, Al Hasakah, Idlib and Manbij, and found to be functioning. These dams are used for water supply and irrigation. The storage reservoir in Dar'a was repaired in 2017 and is back in service. 25 **pumping stations** were assessed, out of which two were destroyed, in Aleppo and Rastan, and three are partially damaged in Al Hasakah, Rastan and Idlib. Finally, all the **water and sanitation** offices assessed in Deir-ez-Zor, Al Hasakah, Homs and Ar-Raqqa are operating and undamaged.

Increased damage was reported in Ar-Raqqa (29 percent), followed by Aleppo, Homs and Dar'a (5 percent, 4 percent and 4 percent, respectively). There was no increase in damage in Deir-ez-Zor, Idlib or Palmyra.

CITY-LEVEL ANALYSIS

The study provides a partial perspective on the damage sustained by the water infrastructure. It was difficult to assess the state of sub-surface piped networks through satellite observation, and the assessment is therefore qualitative. Thus, it is a major source of uncertainty for the Water sector damage assessment and will require a quantitative approach when more information is available.

Most WSS infrastructure is undamaged or repaired. Data indicate that 10 percent of the centralized physical infrastructure was partially damaged, and 81 percent undamaged. Most water infrastructure, such as major dams, pumping stations, and reservoirs that feed irrigation networks have been rehabilitated.

Aleppo and Idlib have the most physical infrastructure damage, but all cities in the assessment have been affected by a shortage of power to operate water facilities. Services are still affected by major physical infrastructure damage and poor maintenance, and potable water is scarce (e.g., one-day supply per week through the network, or less, due to low quality or low pressure).

The main source of water supply in Idlib is from the Az-Zarqa Spring via the Sayjar Water Pumping Station. Most of the pumps, cables, valves, and transformers in the pumping station were reportedly stolen in 2019. Wastewater facilities and the sewer network were extensively damaged during the conflict. Residents (e.g., in Deir-ez-Zor) had adapted to the lack of a functioning sewerage system by digging septic tanks or channels to move sewage from their property towards public areas. Such approaches damage buildings and roads, pose serious health risks, and lead to a general deterioration in sanitary conditions; this has led to an increase in water-borne illnesses (e.g., in Ar-Raqqa).

DAMAGE TO PHYSICAL INFRASTRUCTURE

Tables 7 and 9 present estimated costs of damage for the 14 cities. Estimates were based on discussions with engineers and a review of similar projects.

It is important to note that costs are underestimated as they do not include damages to dams (table 8) and past, and ongoing repair/rehabilitation costs; and also, because these repair/maintenance costs are higher in conflict zones due to security factors.

As shown in Table 9, the highest damage costs for WSS infrastructure are in Ar-Raqqa and Aleppo.

> ***Increased damage was reported in Ar-Raqqa (29 percent), followed by Aleppo, Homs and Dar'a (5 percent, 4 percent and 4 percent, respectively).***

TABLE 7: DAMAGE INVENTORY (IN US$)

Asset Types	Baseline (#)	Damage (#)			Unit Cost (US$)		Total Damage Cost (US$)	
		Total Damaged	Partially Damaged	Completely Destroyed	Low estimate	High estimate	Low estimate	High estimate
Well	153	39	26	13	$26,483	$42,373	$619,702	$991,528
Water Tower/ Tank	158	13	2	11	$2,000,000	$16,000,000	$23,600,000	$188,800,000
Water Treatment Plant	10	3	2	1	$40,000,000	$80,000,000	$72,000,000	$144,000,000
Sewage Treatment Plant	6	2	2	0	$32,000,000	$50,000,000	$25,600,000	$40,000,000
Dam	6	1	1	0			$-	$-
Dike	0	0	0	0			$-	$-
Levee	0	0	0	0			$-	$-
Other Drainage Structure	2	0	0	0			$-	$-
Pumping Station	25	5	3	2	$973,520	$1,835,781	$3,115,264	$5,874,499
Storage Reservoir	1	0	0	0			$-	$-
Water/ Sanitation Office	5	0	0	0			$-	$-
Total (Phase VI)	**366**	**63**	**36**	**27**	**$75,000,003**	**$147,878,154**	**$124,934,966**	**$379,666,027**

TABLE 8: DAM DAMAGE INVENTORY

City	Dam	Status	Capacity - million cubic meter (MCM)	Use	Damage
Afrin	Afrin Dam	no damage, functioning	190	water supply/ irrigation	No Damage. In 2021, the NGO Bahar handed over responsibility for the dam to local authorities after repairing it and operating it for a year.
Al Hasakah	Al Hasakah East Dam Reservoir	no damage, functioning	0.2	irrigation	No damage, functioning according to local government
Al Hasakah	Al Hasakah West Dam Reservoir	no damage, functioning	0.09	irrigation	No damage, functioning according to local government
Idlib	Al-Duwaysat	no damage, functioning	3.6	water supply/ irrigation	No damage, functioning since 2019
Idlib	Al-Bale'a	no damage, functioning	14.5	water supply/ irrigation	Prior to the conflict, water was pumped from Az-Zarqa to the dam. Due to a lack of electricity, bombing of pumps, and lack of repair, this no longer happens, and Al-Bale'a's level has fallen. The dam was damaged, and out of service for five years, but repairs began in 2019 and appear to be complete.
Manbij	Tishreen Dam	no damage, functioning	0.026		The dam is undamaged according to regional officials
Dar'a	Al Sad	no damage		water supply	The dam has been out of service since 2017, according to local media, due to sabotage, theft, and drought.

TABLE 9: CITY-SPECIFIC DAMAGE COSTS[40]

City Name	Damage Cost (Low estimate)	Damage Cost (High estimate)
Afrin	0	0
Aleppo	$12,806,570	$95,008,663
Dara'a	$20,000,000	$64,000,000
Daraya	$12,800,000	$20,000,000
Dayr az-Zawr	$16,010,593	$32,016,949
Hasakah	$389,408	$734,312
Homs	$2,000,000	$16,000,000
Idlib	$744,280	$1,302,111
Manbij	0	0
Palmyra	$12,821,186	$20,033,898
Raqqah	$46,000,000	$128,000,000
Rastan	$1,362,928	$2,570,093
Tell Abyad	0	0
Zabadani	0	0
Total	**$124,934,966**	**$379,666,027**

40 The cost excludes damage to water supply and sewerage networks, which is significant, and unknown.

Effects of the Conflict

In most areas, water delivery requires pumps, and thus a power infrastructure. Delivery thus relies on the electric grid, generators and fuel. Services are disrupted mainly by lack of electricity, and also by damage to wells and water towers, and some cities have developed back-up plans, and deliver water with water trucks.

Water trucks provided an important secondary source of drinking water in all cities between October 2018 and August 2021, but rising diesel prices and increasing demand makes the use of trucks increasingly unaffordable, especially for IDPs (prices per cubic meter range between US$3.97–5.80 in cities like Aleppo and Dar'a, and up to US$7.0 in some areas of Idlib). There is a risk that water will emerge as a driver of protracted social conflict and unrest.

All of the cities assessed depend on support from international humanitarian or public agencies to restore, maintain and operate water supplies systems, and to extend them to more people. However, water supply is declining at source as river flows in the Euphrates fall, well levels drop, and water quality and infrastructure decline. There has been a gradual increase in cases of waterborne illnesses from contaminated water in the Euphrates (e.g. in Ar-Raqqa).

Limited functionality of WSS facilities and alternative water suppliers. Even where physical infrastructure is undamaged, the state of WSS facilities is a significant problem, and many of them operate below standard, and require maintenance. This has pushed the residents of cities to dig their own wells and to buy water from water tankers at high prices.

Water quality degradation. The damaged wastewater system, reduced water flow in rivers, and over-extraction of ground water has impacted water quality.

Water provision relies on electricity, and conflict has led to frequent power outages which have shut down water pumping stations and damaged water lines.

Providing water is not only a technical exercise, and Syria's challenges include a lack of skilled people to operate critical physical infrastructure, lack of finance, and weak financial and asset management.

Limitations

MAIN LIMITATIONS OF THE ASSESSMENT

This qualitative assessment has provided context-disaggregated data for the current situation. However, with better access, more details about the damage to piped drainage, sanitation facilities, water distribution networks and household connections; and descriptions of water treatment plants will be needed to better estimate damage costs.

Cultural Heritage

Pre-Crisis Sector Conditions

Syria contains some of the most globally varied and important cultural heritage sites in the Mediterranean, in a place where tangible and intangible heritage have intertwined over many millennia. This assessment included data on mosques, churches, convents, monasteries, shrines, museums, archives, heritage buildings, archaeological sites and the Dead Cities. Syria also has remarkable heritage housing, and damage to these houses is described in the housing section, based on the value of these treasures to the Syrian people.

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. 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.

A multi-disciplinary approach to heritage rehabilitation has been adopted in this assessment by considering archaeological, historical, architectural, technical, sociological, economic and environmental elements and impacts.

Sectoral Damage Assessment

Damage, based on available data, is between US$303,660,000 and US$520,560,000. This assessment includes deep dives on Aleppo, Palmyra, and Dead Cities where damage is highest.[41]

Escalating violence in Syria has devastated the country's cultural heritage sites since 2011, from the ancient souk, or marketplace, in Aleppo, to the iconic Crac des Chevaliers—two castles that were built between the eleventh and thirteenth centuries as regional fortifications during the Crusades—to Qal'at al-Mudiq, an archaeological tell in the classical city of Apamea. As highlighted by the World Monuments Fund, among other inestimable losses is Aleppo's seventeenth-century souk, engulfed by fire in 2012 to the detriment of its 150 traders. The Great Mosque of Aleppo was also damaged by the fire, and its minaret

41 This damage assessment is based on the historical replacement value of totally or partially destroyed assets.

destroyed in 2013. And in August 2012, the Ayyubid-era entrance to Aleppo's historic citadel—one of the world's oldest and largest castles, in use for at least 4,000 years—was partially destroyed by a missile attack.

The destruction of Syria's most significant and symbolic sites is of urgent concern and has irreversible implications for the country's historical and architectural legacy. These cultural resources have been highlighted by the global media to raise awareness of threats to this shared heritage in times of war and conflict, and to galvanize the technical skills and resources of the international community in anticipation of a time when it is safe to return to the country.

Box 1 Aleppo

The Syrian government had invested heavily in restoration of Aleppo's ancient city and historical buildings, with 49 sites reporting some degree of rehabilitation or restoration between 2018 and 2021. In 2018, UNESCO conducted a survey of historic buildings in Aleppo's Ancient City and identified 56 destroyed, 82 severely damaged, and 270 moderately damaged, out of a total of 436 historic buildings; many of these sites have since undergone at least cosmetic repairs.

The most affected sites in Aleppo have been the Citadel, Great Mosque, and Historic Markets.

The Aleppo Citadel is damaged yet functioning. The citadel, a UNESCO World Heritage site, was one of Syria's major tourist attractions prior to 2011. In 2012, the outer gateway was repeatedly shelled, and in 2015 an explosion damaged some of the citadel's ancient, inner-city walls.

The Great Mosque of Aleppo is damaged and therefore not open to the public. The Great Mosque is both a religious and historical site which was built in 717 A.D. by the Umayyad Caliph Suleyman and contains the tomb of the Prophet Zakaria from the fifteenth century AD. Sadly, the conflict caused a fire and severe damage to the sanctuary and the northern and southern pathways. Aleppo's Old City has at least 30 historic markets which were active until the conflict began, and as of 2021, high-profile efforts have restored some of these sites to limited functionality. However, satellite images show that much work remains, and the markets' many merchants, some of whose families have traded there for generations, have not all returned; sadly, the markets now appear to serve largely as tourist attractions or for photo-ops.

Photo credit: Shutterstock

The Ancient City of Palmyra was destroyed during its occupation in 2015 and 2017. The most seriously damaged sites within the ancient city include the Temple of Bel, the Temple of Baal Shamin, the Arch of Triumph, and columns in the Valley of Tombs. The Palmyra Museum was vandalized and looted[42], and reportedly further damaged by airstrikes in 2015. UNESCO and other international actors have offered to rebuild Palmyra's ancient city.

In October 2019 French and Portuguese tourists visited the Ancient City of Palmyra; however, the site is largely destroyed.

Box 2 Palmyra

The Dead Cities are a cluster of approximately 600 ancient settlements in northwest Syria abandoned between the 8th and 10th centuries. Prior to the crisis, the Syrian Government had worked to promote them as historical and cultural attractions, but these treasures have since been badly degraded through conflict, looting, and squatting.

Most damage appears to have been caused by bombing and occupation by IDPs, while looting, vandalism, and illegal excavations have diminished the historical value of sites. Some looters have connections to international black markets.

On average, the Dead Cities have sustained moderate to heavy damage during the war, most of which occurred either in the presence of occupying armed forces, or in the vicinity of conflicts at nearby strongholds. Because many of the Dead Cities are in the southern "border" region of Idlib Governorate, many experience low- to mid-level shelling and over-the-horizon attacks. Despite discussions on rehabilitation, there is no evidence that damage assessments or rehabilitation efforts have begun in St. Simeon, Serjilla, or Ebla.

Box 3 Dead Cities

42 Allegedly, 3,500 artifacts were sold abroad

DAMAGE TO ASSETS AND PHYSICAL INFRASTRUCTURE

Cultural heritage in Syria has been badly affected by the crisis. This assessment includes limited data on mosques, churches, convents, monasteries, shrines, museums, archives, heritage buildings, archaeological sites and the Dead Cities.

TABLE 13: DAMAGE INVENTORY (IN US$ MILLION)

Asset Type	Baseline	Size Sq m	Not Damaged	Partially Damaged	Completely Destroyed	Unknown	Unit Cost US$	Low Estimate US$	High Estimate US$
Mosque	595	576,830	520	41	22	12	500,000	13,440,000	23,040,000
Church	60	41,755	44	6	9	1	750,000	5,985,000	10,260,000
Convent or Monastery	4	9,598	4	0	0	0	150,000	0	0
Shrine	4	2,498	3	0	1	0	450,000	315,000	540,000
Museum	13	36,081	8	4	1	0	10,000,000	18,200,000	31,200,000
Archive	0	0	0	0	0	0	4,000,000	0	0
Heritage Building	10	12,735	7	3	0	0	3,000,000	2,520,000	4,320,000
Archaeological site	18	93,675	14	4	0	0	10,000,000	11,200,000	19,200,000
Total	704	773,172	600	58	33	13	n.a.	303,660,000	520,560,000
Dead cities	600	n.a.	300	200	100	0	2,000,000	252,000,000	432,000,000

TABLE 14: CITY-LEVEL DAMAGE COST (IN US$ MILLION)

City Name	Low Estimate US$	High Estimate US$
Afrin	0	0
Aleppo	10,500,000	18,000,000
Dar'a	1,260,000	2,160,000
Daraya	2,660,000	4,560,000
Deir-ez-Zor	7,035,000	12,060,000
Al Hasakah	140,000	240,000
Homs	1,260,000	2,160,000
Idlib	3,640,000	6,240,000
Manbij	490,000	840,000
Palmyra	14,560,000	24,960,000
Ar-Raqqa	9,205,000	15,780,000
Rastan	280,000	480,000
Tell Abiad	0	0
Zabadani	630,000	1,080,000
Dead cities	252,000,000	432,000,000
Total	**303,660,000**	**520,560,000**

Effects of the Conflict

Syria's World Heritage sites have suffered considerable and sometimes irreparable damage. Four of them have been used for military purposes or turned into battlefields: Palmyra, the Crac des Chevaliers, the Saint Simeon Church (part of the UNESCO World Heritage site of the ancient villages of Northern Syria), and Aleppo, including the Aleppo Citadel. Archaeological sites have been systematically looted and an illicit trade in artefacts has burgeoned. Before the conflict, the Tourism sector in Syria employed 20 percent of the workforce and cultural tourism had much potential for development. With the conflict, this share has dropped nearly to zero, with dramatic consequences for the economy, and the many women and youth who were preferentially employed in this sector. Lost employment has been pronounced in the poorer areas in the northeastern regions where the Dead Cities are found, and tourists visited before the crisis. This deprives affected communities of vital opportunities to develop and sustain their livelihoods, and of sources of foreign income.

Photo credit: Shutterstock

Agri-food Value Chains

Pre-Crisis Sector Conditions

SECTOR CHARACTERISTICS AND CONDITIONS AS PER THE PREVIOUS DAMAGE ASSESSMENT

The agriculture sector (excluding agri-food processing) contributed 20 percent of Syria's GDP in 2010.[43] The agricultural labor force accounted for 14.5 percent of total employment in 2010, given that 44 percent of Syria's population lived in rural areas. Prior to the Syrian conflict, the country played an important role in global agricultural trade, connecting supply routes between Eastern Europe, Central Asia, Russia, and the Gulf Cooperation Council countries.[44] Extensive irrigation projects, indirect water subsidies, and direct wheat subsidies led to intensive wheat production in the 1990s. A 2017 Food and Agriculture Organization (FAO) report estimated that 65 percent of cereal production relied on irrigation in 2011.[45] Between 2006 and 2010, food prices increased by almost 40 percent, in part due to drought between 2007–2009.[46] Prior to the conflict, Syria became increasingly reliant on food imports, despite the fact that 31 percent of all Syrian exports consisted of agricultural products in 2011.[47]

Sectoral Damage Assessment

AGGREGATE SECTOR ANALYSIS

Aggregate physical damage (overview of what has been assessed, overall damage levels, damage by asset type, geographic and sub-sector damage trends)

In the Syrian Arab Republic, the food security situation continued to deteriorate in late 2020, with around 12.4 million individuals estimated to be acutely food insecure, by far the highest number ever recorded (WFP, 2021).[48] Despite the crisis in Syria, agriculture remain a key part of the economy. The sector accounts

43 https://databank.worldbank.org/views/reports/reportwidget.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=SYR
44 https://carnegieendowment.org/sada/78286
45 http://www.fao.org/3/i7081e/i7081e.pdf
46 https://cadmus.eui.eu/bitstream/handle/1814/65465/MED_WPCS_2019_17.pdf?sequence=1
47 https://www.jadaliyya.com/Details/42366; https://reliefweb.int/report/syrian-arab-republic/reverberating-effects-explosive-violence-agriculture-syria
48 WFP, 2021. Syrian Arab Republic Annual Country Report 2020, Country Strategic Plan. 2019 – 2021. Available at https://docs.wfp.org/api/documents/WFP-0000125415/download/

for 26 percent of GDP and provides a critical safety net for 6.7 million Syrians (FAO, 2017). However, losses in agricultural productivity, following problems with irrigation, movement of livestock to neighboring countries, and security constraints, have made agricultural livelihoods increasingly precarious. These challenges have been exacerbated by the abrupt breakdown of centralized agriculture support systems for crops and livestock, and a bad fire season in 2019.

Vast areas of agricultural land under annual and perennial crops have been destroyed, and farmers are facing shortages of agricultural inputs (seeds, fertilizers, fuel for irrigation pumps, etc.), or are unable to afford them due to soaring prices (FAO, 2017). The situation has been compounded by climate change. Prior to the crisis, the Government subsidized agriculture, but this support was significantly withdrawn (44 percent of communities interviewed) or stopped (41 percent; FAO, 2017). In terms of damage, the highest estimations come from Hasakah (23 percent), Aleppo (18 percent) and Raqqah (14 percent), followed by Deir Ezzor (12 percent) and Hama (9 percent; FAO, 2017). Based on the FAO's survey of the four Governorates accounting for most irrigated land before the crisis, 50 to 95 percent of households reported damage to their irrigation equipment and physical infrastructure. Furthermore, overall food imports have fallen by approximately 43 percent since the start of the crisis.

DAMAGE TO ASSETS AND PHYSICAL INFRASTRUCTURE

The Syrian war has resulted in at least US$3.4 billion in damage[49] and US$12.9–18.1 billion in losses to the agri-food sector. [50]

TABLE 10: DAMAGE AND LOSSES IN THE AGRICULTURAL SECTOR (US$)

Physical Infrastructure Asset Type	Damage - Low estimate	Damage - High estimate
Silos	58,717,101	82,203,942
Agricultural infrastructure and assets, including irrigation[51]	3,200,000,000	3,200,000,000
Wholesale markets	428,343	599,680
Agricultural Production	**Losses (2010–2019) – Low estimate**	**Losses (2010–2019) – High estimate**
Perennial Crops	2,289,390,199	3,205,146,279
Annual Crops	7,982,404,070	11,175,365,698
Livestock	2,535,942,000	3,550,318,800
Aquaculture	103,162,022.12	144,426,830.96

49 The low and high damage estimates for the agricultural sector are similar because such estimates for irrigation systems are fixed across estimation ranges, based on publicly available estimates provided by the FAO and cleared by the government.

50 (1) the urban-related data provides estimates for the selected cities whereas the rural estimates provide the impact on the national scale, (2) the damage of the irrigation system had a spillover effect on the ag production beyond the area of damage; (3) damage in the agricultural output attributable to the conflict is difficult to separate from those caused by climate change or natural variability.

51 Agricultural infrastructures and assets include many elements in different subsectors, including cooperative and government buildings (research, administrative and support offices), markets and agro-bank offices, commercial farms, veterinary clinics and animal sheds, greenhouses and storage facilities, production or transformation facilities (e.g. seed processing, dairy or meat processing plants, fertilizer factories, etc.) and tractors, trucks and other machinery and equipment for post-harvest processing (FAO, 2017).

Effects of the Conflict

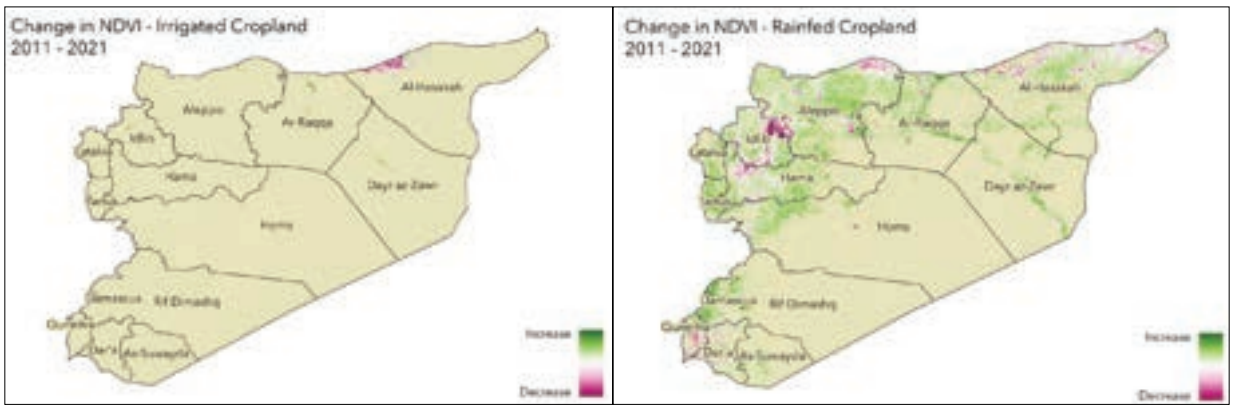
CROPLANDS

Between 2010 and 2019 crops registered the largest share of lost production in the agricultural sector (annual crops US$7.9–11.1 billion; perennial crops US$2.2–3.2 billion). Rainfed cropland has remained productive compared to irrigated cropland over 2011–2021, largely due to extensive damage to irrigation equipment and water scarcity (Figure 27). According to a FAO (2017) survey, between 50 and 95 percent of households reported damage to their irrigation equipment and physical infrastructure. Loss of functionality was also observed. For example, after repairs in 2018, Al-Tabqa Dam was undamaged as of 2020 and under the control of Kurdish Syrian Democratic Forces,[52] but low water levels reduced irrigation to around 86 000 ha. In 2021, non-profit media reported farmer claims that wheat and vegetables had suffered from lack of irrigation water.[53] Moreover, the conflict has led to intentional fires targeting agricultural land.

The map below (Figure 28) shows that plant health deteriorated between 2011 and 2020 in key agricultural production areas (increase in plant health is depicted in green, while decreased plant health is depicted in purple). A literature review revealed that many farmers stopped crop production entirely due to high prices of inputs and insecurity.

Over 25 percent of households overall (and 70 percent in Raqqah and Deir Ezzor) reported lacking seeds, and more than 50 percent lacked access to fertilizers, while 35 percent do not use fertilizers at all (FAO, 2017). Based on FAOSTAT data, average nitrogen use decreased by 83 percent, while that of potash decreased by 75 percent during 2011–2019 compared to 2005–2010. Diesel shortages have also increased the cost of growing crops, and the cost of diesel alone sometimes exceeds farmer's profits.[54]

FIGURE 27: CHANGE IN NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI), IRRIGATION AND RAINFED CROPLAND, 2011–2021



52 Hasan Al-Kassab, 2021, Syria Direct, < https://syriadirect.org/as-the-level-of-the-euphrates-river-drops-syrian-civilians-on-its-banks-pay-the-price/>

53 Hussam al-Omar, 2021, Enab Baladi, < https://www.enabbaladi.net/archives/517093>

54 Syria.tv, 2021, سوريا.. تراجع زراعة الخضار والفواكه بنسبة ٧٠ % ومخاوف من أزمة غذائية

FIGURE 28: MEDIAN NDVI CHANGE, 2011–2020

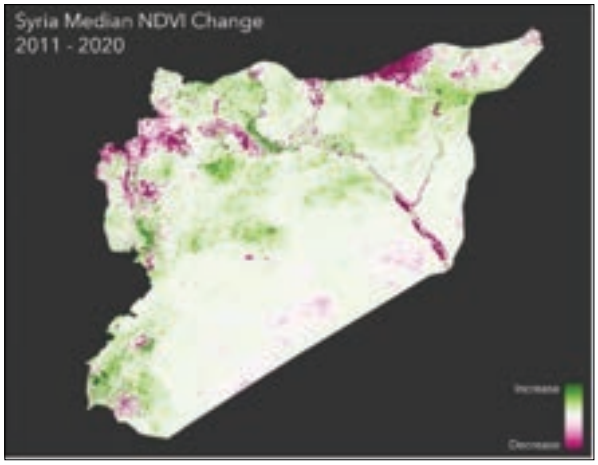
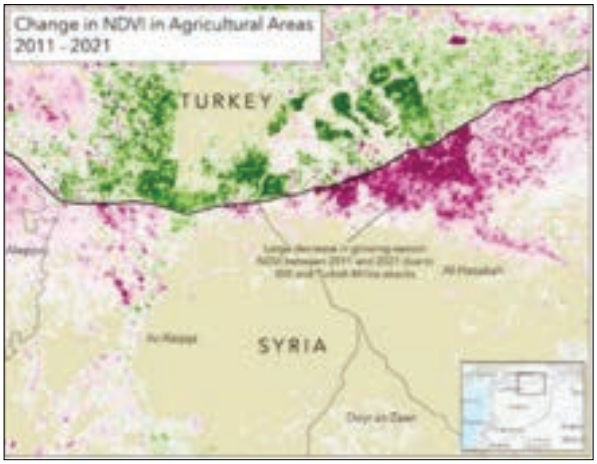


FIGURE 29: CHANGE IN NDVI IN AGRICULTURAL AREAS, 2011–2021



Source: WB Estimates

While some improvements have been observed in recent years, agricultural production continues to be adversely affected by the conflict. *Based* on Ministry of Agriculture data, and following declines in wheat production from 2010–2018, improvements in production in irrigated and non-irrigated areas have occurred in recent years. For example, wheat production in 2021 was estimated at around 1.05 million tons, down from 2.8 million in 2020, and significantly less than the pre-crisis average of 4.1 million (during 2002–2011; FAO, 2021). However, because of low and scattered rainfall in 2020/21, heatwaves, the cost of inputs, lack of irrigation water, and the high cost of fuel for pumping, the harvestable cereal area was significantly reduced (FAO, 2021). For example, the harvested wheat area was slightly over half of the area harvested in 2019, and the harvested barley area was about 75 percent less than the previous year (FAO, 2021).

Based on remote sensing data analysis conducted by UrbAN-S, human-induced land degradation decreased from 916,519 ha (46 percent of total area in 2014–2017 compared to the baseline 2001–2013) to 207,459 ha (10 percent of total area) in Aleppo.[55] Over the same period, more fires led to losses in croplands e.g. based on remote sensing estimates, in 2019 around 803,523 ha were burned, while in 2020 around 132,847 ha were burned, compared to 47,846 ha in 2010.

LIVESTOCK AND PASTURE AREAS

The livestock sector suffered high losses due to the crisis, amounting to US$2.5–3.5 billion from 2011–2019**.** Based on FAOSTAT data, a 30 percent decrease was observed in cattle numbers, and in February 2021 a non-profit media report estimated that between 40 and 50 percent of poultry and 50 percent of livestock (sheep and cows) had died or been lost through smuggling.[56] The Syrian Ministry of Agriculture also reported declines in the number and production of livestock across the

55 Land productivity is assessed using three measures of change derived from NDVI time series data: trajectory, performance, and state, measuring the rate of change in primary production over time. An advanced model is used to remove the effects of climate on the NDVI time series to derive a Human Induced Land Degradation estimate. Residual Trend Analysis (RESTREND) uses linear regression models to predict NDVI for a given rainfall amount. Trends in the difference between predicted and observed NDVI are interpreted as non-climate related changes in productivity. The change in human induced land degradation for rural areas is calculated for 2001–2013 and used as a baseline compared to the intense conflict period (2013–2017) and 2017–2020.

56 *https://baladi-news.com/ar/articles*

country from 2010–2019.[57] Cattle owners and breeders face soaring prices in oil derivatives, feed, and other supplies, and loss of animals to conflict or abandonment by fleeing farmers.

The sector suffered further when the Syrian lira depreciated rapidly, and animal feed became less affordable in 2019. Analysis of NDVI from pastureland[58] showed relatively consistent pasture health across all governorates between 2011 and 2015; however, between 2015 and 2018 it declined in all governorates except Hasakah, and then improved again after a strong rainy season in 2020, particularly in Damascus.

AGRI-FOOD VALUE CHAINS OPERATIONS

The functionality of agri-food value chains was significantly distorted by the conflict. Syria's wholesale vegetable markets have been damaged, with 82 percent of markets assessed either partially damaged or destroyed in the conflict. Local media report that local farmers have found it increasingly difficult to transport their products to wholesale markets due to security checkpoints, fuel prices, and other increases in the cost of transporting goods. Increases in the cost of transport and diesel shortages have made it difficult for many farmers to transport their goods to city markets.[59] In some cases, according to local media, farmers have lost produce to spoilage after failing to obtain diesel,[60] and diesel shortages have also affected cold storage, lowering the quality of produce and reducing sellers' margins.[61] According to anecdotal evidence, farmers from opposition-controlled areas may pay up to 25 percent of their products' value in tax when entering government-controlled areas to sell produce.[62]

The wheat-to-bread market in southern Syria was critically disrupted when the government cut off services to opposition-controlled areas at the beginning of the conflict in 2011. This led to shortages of flour and bread that continue today, compounded by the effects of prolonged conflict (RFSAN, 2021). In 2021, an assessment of 320 bakeries and 61 mills in northeast Syria (Aleppo, Hasakah, Raqqah, and Deir Ezzor) found that the mills' functionality stood at 47 percent and that operational bakeries were producing at 41 percent of their potential (RFSAN, 2021). Overall, 180 bakeries and 35 mills require maintenance of their equipment and/or buildings, with damage to silos estimated at US$59–82 million.

Limitations

The major limitation is that studies are based primarily on remote sensing and secondary data from interviews and existing reports, without field validation. Additionally, declines in production attributable to the conflict are difficult to separate from those caused by climate change or natural variability. Because fieldwork was not always possible, it was difficult to fully capture damage and losses to processing and storage facilities, farming equipment, and vehicles (e.g., tractors), and estimates rely on FAO (2017) data. The damage assessment of silos and wholesale markets is based on remote sensing data and secondary literature.

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57 http://moaar.gov.sy/main/archives/23338

58 Pastureland was identified based on the 2020 Final Country Report of the Land Degradation Neutrality Target-Setting Programme submitted to the United Nations Convention to Combat Desertification. https://knowledge.unccd.int/sites/default/files/ldn_targets/2020-08/Syria%20LDN%20TSP%20Final%20Report%20%28English%29.pdf

59 *http://ouruba.alwehda.gov.sy/investigations*

60 ibid

61 ibid

62 https://www.al-monitor.com/originals/2018/10/syria-aleppo-market-turkey-import-export.html

Photo credit: Shutterstock

IMPACT ON SOCIAL SECTORS

Housing

Pre-Crisis Sector Conditions

Before the war, and following decades of inefficiencies along the housing production value chain, the national housing shortage in Syria reached approximately 700,000 units.[63] The average annual housing deficit reached up to 130,000 housing units.[64] The formal housing supply was unresponsive to the increased demand triggered by urbanization, population growth, inter-city migration, demographic shifts, and the influx of IDPs and refugees from regional conflicts. The housing gap was significant compared to the four million houses in Syria's 14 governorates.[65]

Historically, most houses in Syria were built by the private sector. Seventy-seven percent of housing was produced by individuals, building contractors, or small real estate developers. The other 23 percent was co-produced through the social housing program by the General Housing Establishment (GHE), founded in 1961, and the housing cooperatives system, first regulated in 1950.

Formal housing supply catered to an upper market clientele, pushing more than a third of Syrians into informal housing arrangements. Formal housing provided by the private sector was expensive, and unaffordable to low- and middle-income buyers. At the same time, the supply of social housing lagged. High vacancy rates, which reached 15 percent in some cities, attested to a mismatch between supply and demand, and unhealthy housing market dynamics. As a result, low- and middle-income families continued to invest in informal housing despite more severe repercussions. Roughly 38 percent of the population lived in informal housing, and while such arrangements are recognized and primarily serviced by the state, they are not legally guaranteed, and lack security of tenure.[66]

63 Housing shortage from the *Five-year National Development Plan (2005–2010). Oxford Business Group (2011).*
64 The Syria Report: Paper – The Housing Crisis in Syria: Do Social Housing and Housing Cooperatives Still Have a Role?
65 *2010 Syrian census data- Syria Central Bureau of Statistics.*
66 *More information about housing, land and property rights can be found in the "Mobility of Displaced Syrians" report.*

Sectoral Damage Assessment

Across the 14 cities it is estimated that the war has affected up to 210,000 housing units, with total damage reaching US$2.3-2.8 billion. The remote assessment classified approximately 30,000 units as totally destroyed, and up to 180,000 units as partially damaged. A large share of Aleppo's housing stock has been destroyed, with up to 135,000 housing units damaged during the conflict, representing 21 percent of housing stock in the city and around 70 percent of all damaged housing stock across the 14 cities. Daraya has lost most houses relative to its original housing stock, with up to 43 percent of its housing stock damaged.

Given that Syria is highly urbanized, the salient typology is apartment buildings of various sizes and heights. The conflict mostly impacted this category; it is estimated that up to 184,000 apartment units have been damaged to some extent in the sampled cities, while up to 29,000 single-family homes were destroyed in the same period. Informal areas were disproportionately impacted by the conflict, worsening the conditions for people living in them.

While the assessment doesn't quantify damage to historic housing, it is estimated that this is severe, given the location of historic buildings in city centers where much of the conflict took place.

CITY-LEVEL ANALYSIS IN SELECTED CITIES[67] (ALEPPO, DARA'A, HOMS, AND DER AZZOR)

Aleppo

With an estimated baseline of 660,000 housing units, Aleppo leads in terms of damage, with up to 137,000 units damaged in the conflict, of which 22,000 were destroyed. Costs are estimated between 1.5–1.9 billion.

Nearly a third of the city's neighborhoods were badly damaged, directly affecting 1.82 million residents. Out of 109 neighborhoods, 33 were heavily damaged, and 84 were affected. Most damage is in the eastern part of the city and the Old City's neighborhoods of Al Mansour, Al Ameen, Al Mahdi, and Al Rasheed. Forty percent of Aleppo's housing is informal, and 87 percent of this typology was affected.

Dara'a

Dara'a's housing stock is badly damaged; of an estimated baseline of 31,000 housing units, up to 11,000 units have been damaged, representing 36 percent of the city's housing stock. The damage cost is estimated between US$112–137 million.

The southern area of Albalad received most of the damage in the city, including the old city and the Dara'a camp. Damage is much worse in informal housing areas. The northern part of the city has suffered the least damage, and has become overcrowded as people have moved there.

Homs

Homs's housing baseline is estimated at 216,000 units, of which up to 27,000 units are estimated to be damaged or destroyed, representing 12 percent of the city's housing stock. 74 percent of the inhabitants of Homs were affected by housing damage to some extent. The damage cost in the city is estimated between US$277–339 million.

Out of 36 neighborhoods, 18 were heavily damaged, 8 partially damaged, and 10 had minor damage. Neighborhoods including Bab al-Siba'a, Bab ad-Draib, Bab Amr, al-Bayada, al-Hamidiyah, al-Qusour, al-Shayyah, al-Qarabis, and Khalidiya have been significantly damaged. It is estimated that 40 percent of housing units in Homs are

67 Cities were selected for balanced geographic representation between north, middle, south and east regions, and for significance of impact.

informal, and that 69 percent of the heavy damage occurred in informal areas.

Deir Ezzor

Pre-conflict, Deir Ezzor had a housing stock of over 48,000 units, of which up to 8,000 have been impacted, representing 16 percent of housing stock. The damage cost is estimated at US$78–95 million.

Neighborhoods with severe damage are Tashreen, Hitteen, and Al Ba'ajeen, while the most affected neighborhoods by number of damaged units are Othmania, Hitten, Abo Abed, and Al Hamidia. Thirty-five percent of housing units in Der Azzor lack permanent records and fall under the informal category (including 4 percent squatters and 4 percent with temporary records).

DAMAGE TO ASSETS AND PHYSICAL INFRASTRUCTURE

TABLE 11: DAMAGE INVENTORY (IN US$ MILLION)

Asset Type	Baseline	Total Damage-low	Total Damage-high	Partially Damaged - low	Partially Damaged-high	Completely Destroyed	Unit cost	Total Cost
Apartment Unit	1,010,416	81,504	183,883	55,263	157,643	26,240	Average unit size 120 sq/m X Average sq/m cost of US$ 208	2,009–2,456
Single Family House	107,478	12,929	29,120	8,831	25,022	4,098		317-388
	1,117,894	94,433	213,003	64,095	182,665	30,338		2,327–2,844

TABLE 12: CITY-LEVEL DAMAGE COST (IN US$ MILLION)

City Name	Damage Cost - Low Estimate	Damage Cost - High Estimate
Aleppo	1,528	1,868
Dara'a	112	137
Deir Ezzor	78	95
Hasakah	27	33
Homs	277	339
Raqqah	135	165
Manbij	5	6
Afrin	1	1
Palmyra	8	10
Idlib	95	116
Daraya	52	63
Zabadani	2	2
Rastan	5	6
Tell Abyad	2	2
Total	**2,327**	**2,844**

Photo credit: World Bank

> ***Not only were living conditions in the Northeast worse than elsewhere in the country, but they had worsened during the pre-conflict period.***

Effects of the Conflict

Syria entered the conflict with a growing housing shortage and more than a third of its population living in informal housing with weak security of tenure. The Conflict-induced damage to housing and neighborhoods, collapse in basic services, protracted displacement, loss of civil and property rights documents, limited functionality of the cadaster system, land contamination, and explosive remnants of war (ERW) have amplified these housing and tenure issues.

It is widely known that the conflict disproportionately impacted informal areas, and that weak security of tenure in these areas may significantly affect residents' rights and access to housing in their place of origin, especially under the current institutional and legal framework. Extensive urban development projects proposed for damaged informal settlements through expropriation or land readjustment may threaten occupants of informal housing with eviction and confiscation of property.

Limitations

This assessment was performed remotely, and assessed neighborhoods for damage to different housing classes based on representative samples for each neighborhood and asset type. The *Destroyed* percentage is derived from imagery-based percentage damage for each neighborhood; the *Partially Damaged* percentage is assessed as a ratio of destruction to damage, and further validated through sample-based imagery analysis. Estimates of a low (1:2), medium (1:4), and high (1:6) ratio of destruction to damage are provided to account for the sampling methodology. Findings are recorded in a tabular dataset and the total damage level shown is the one best supported by PAI. The number of damaged buildings should be taken as a minimum as the percentage-based assessment methodology is likely to underestimate the overall damage to housing stock.

Health

Pre-Crisis Health Sector Conditions

The delivery of health services for all conditions including trauma and non-communicable diseases remains a challenge. Most health workers (70 percent) have left the country, and more than half of health infrastructure has been damaged or destroyed, greatly limiting the availability of care. Prior to the conflict, Syria's health infrastructure was comparable to other countries in the region. In 2010, the number of hospital beds per 1000 persons was 1.236, compared with 2018 figures of 1.232 for Iraq, 1.839 for Lebanon, and 1.504 for Jordan. 74.5 percent of the Syrian population could reach a health facility within 30 minutes.

Sectoral Damage Assessment

AGGREGATE SECTOR ANALYSIS

For the Health sector, the Damage Assessment covers 364 public and private facilities in 14 cities, serving clinical and non-clinical functions, and 12 types of health facilities. The Assessment shows that 20 percent of health facilities are partially damaged, while 8 percent are totally destroyed; 28 percent of health facilities are partially functioning and 3 percent do not function at all, while drug and equipment shortages are widely reported to reduce functionality. Nine cities included in this assessment were also part of the 2018 damage assessment: Afrin, Aleppo, Dar'a, Deir-ez-Zor, Homs, Idlib, Manbij, Palmyra, and Ar-Raqqa. Compared to 2018, 68 health facilities have less damage, while 9 facilities have more damage. 48 facilities have increased functionality and 16 have reduced functionality. Damage is estimated at US$347–US$425 million.

Health sector damage varies widely across the 14 cities. To illustrate this, Figure 31 shows the location and extent of damage for health facilities in Aleppo. Figure 32 shows the physical status and functionality of health facilities in the 14 cities. Damage to facilities ranges from none in Al Hasakah to 75 percent in Palmyra, while reduced functionality ranges from none in Zabadani and Tell Abiad to 88 percent in Daraya. These figures indicate the varying impacts of the war in different parts of the country.

FIGURE 30: DAMAGE AND FUNCTIONALITY BY FACILITY TYPE

FIGURE 31: ALEPPO HEALTH FACILITIES AND DAMAGE STATUS

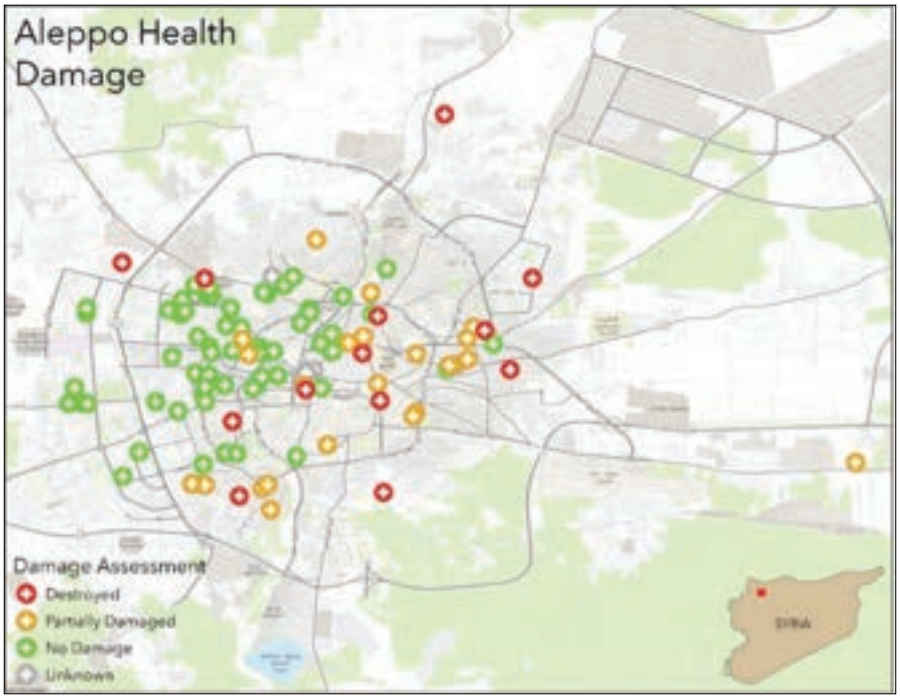


FIGURE 32: DAMAGE AND FUNCTIONALITY BY CITY

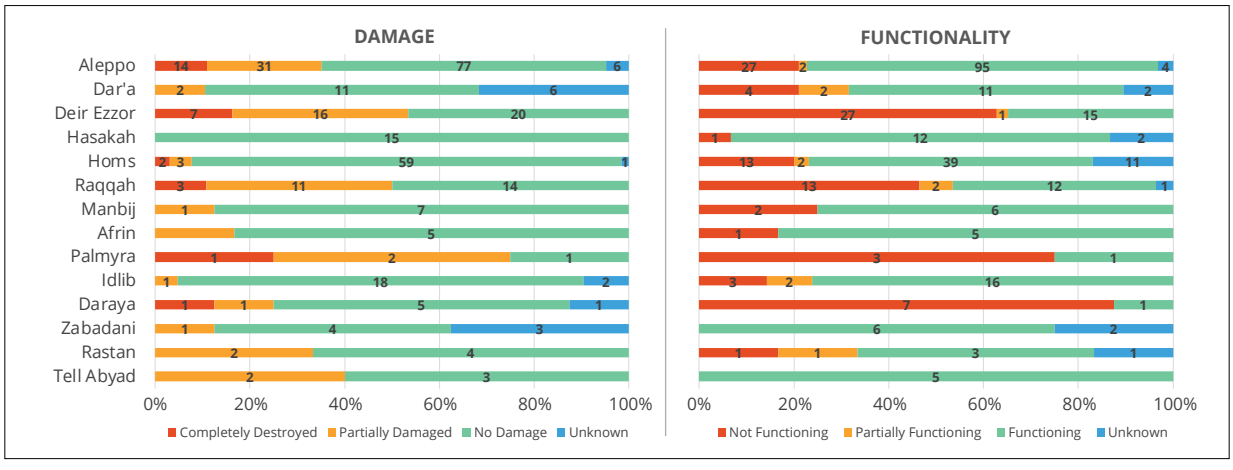
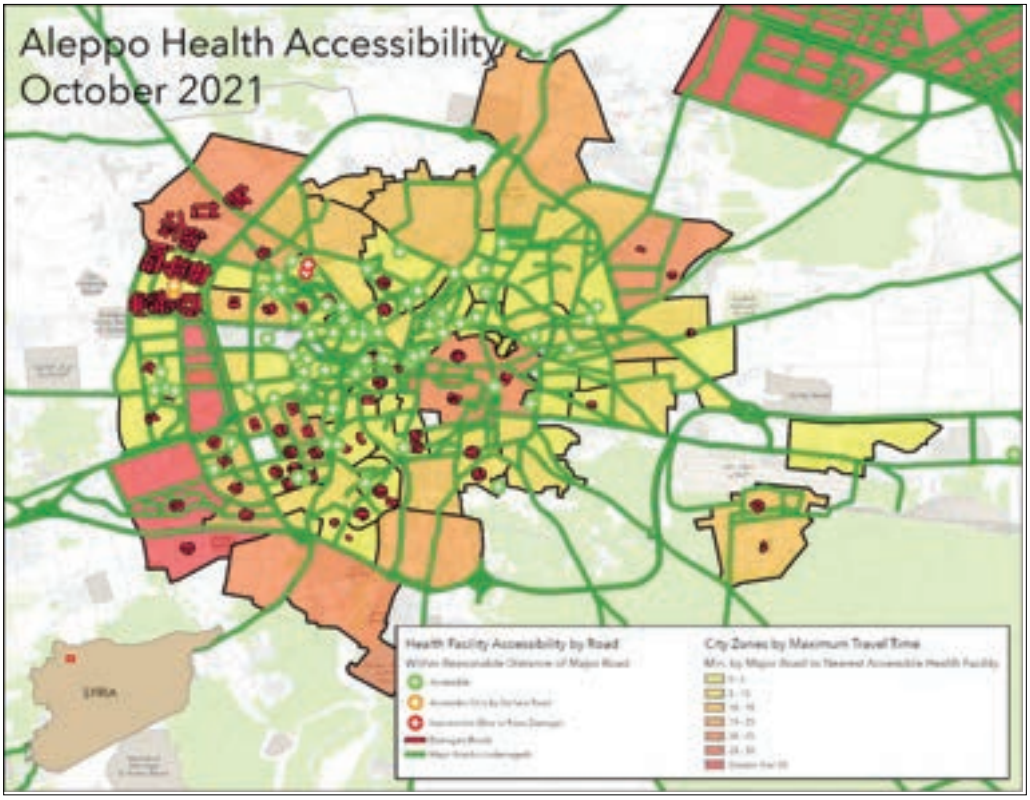


FIGURE 33: ACCESSIBILITY ANALYSIS - ALEPPO



Access to health facilities was also assessed. Using geospatial data and road maps, the time required and ease of road access to reach the nearest health facility was calculated for each neighborhood in the 14 cities. Figure 33 illustrates this analysis for Aleppo in which 6.4 percent of facilities (out of 188) were inaccessible and 1.1 percent were only partially accessible because of damage to roads. 11 percent of the population of the 14 cities are unable to reach a health care facility within 30 minutes, and 23 percent are unable to reach one within 20 minutes.

CITY-LEVEL ANALYSIS

Aleppo. Out of 128 facilities, 45 are damaged (31 partially damaged and 14 completely destroyed). The status of six facilities is unknown. 95 facilities are functioning, two are partially functioning and 27 are nonfunctional. There is evidence from satellite imagery and publicly available information of reconstruction in Aleppo's Health sector between October 2018 and June 2021, with 12 percent of facilities showing signs of repair. Two facilities remain inaccessible because of road damage, while at least 69 are accessible.

Dar'a. Out of 19 facilities, two are partially damaged and the status of six is unknown. Eleven are functioning, two are partially functioning, and four are not functional. Eleven facilities remain accessible by road. Though most facilities are undamaged and functional, Dar'a al-Balad's sole medical center was closed due to violence and threats.

Deir-ez-Zor. Out of 43 facilities, 16 are partially damaged and seven destroyed. Fifteen are functioning, one is partially functioning, and 27 are not functional. Although an assessment of publicly available information and satellite imagery suggests 40 percent of health facilities in Deir-ez-Zor have registered damage decreases, access to medical care remains sparse. Many medical facilities are not functioning at all, and those which do function lack resources, or primarily serve military forces.

Al Hasakah. The Health sector is largely functioning, though its stability is threatened by rising COVID-19 rates. Al Hasakah's 15 facilities are undamaged. Out of these 15 facilities, 12 are functioning and one is non-functional, while the status of two is unknown.

Homs: Although Homs' Health sector has largely recovered from the conflict, the city's largest pre-crisis health facility, the 800-bed Homs National Hospital, remains destroyed. Out of 65 facilities, 59 are undamaged; five are damaged with two facilities destroyed. At least 39 facilities function, while 13 are non-functional and 41 are accessible by road. COVID-19 revealed the sector's fundamental weakness, as hospitals were rapidly overwhelmed and basic treatment costs rose steeply.

Ar-Raqqa: Approximately half the facilities have some level of damage: 14 out of 28 are damaged, and three have been destroyed; only 12 are functional, and 13 are not functional.

Manbij: The Health sector is largely undamaged by conflict and appears to be functioning, although COVID-19 is impacting healthcare across the city. Out of eight facilities, seven are undamaged and six are functional.

Afrin. One out of the six health facilities was damaged in June 2021. No facilities have been repaired or further damaged since 2018, though pro-government media reported the opening of a new hospital. One other health facility was not functioning. Road damage has not rendered any facilities inaccessible. Reports of attacks and kidnappings of medical staff are numerous.

Palmyra. Three out of the four health facilities were damaged, the highest rate across the 14 cities. According to state media, one facility has been repaired, with an emphasis on the obstetrics department, the hospital administration building, and backup electricity generation. Three out of the four health facilities had reduced functionality. According to a video interview on Facebook, there is no functioning kidney dialysis or computer tomography equipment in Palmyra.

Idlib. One out of 21 health facilities is damaged, the second lowest damage rating. However, widespread road damage renders seven facilities with known coordinates inaccessible. Three facilities show repairs since 2018, while none have new damage. Five health facilities were non-functioning or partially-functioning, at least one of which was undamaged but closed its doors due to lack of funding.

Daraya. Seven out of eight health facilities were non-functioning or partially-functioning, the highest percentage. Two facilities were damaged. Limited health services despite only moderate damage may be linked to high out-migration from Daraya in 2016, and an estimated 95 percent population decline from 2010–2019. In July 2021, a new clinic offered free medical care according to pro-government media.

Zabadani. One out of eight health facilities is damaged, but all six facilities for which there is evidence are functioning. Media reports indicate that several health facilities were damaged and closed, but have now been rehabilitated. Zabadani National Hospital was the first to be designated a special quarantine center for COVID-19 in government-controlled areas.

Rastan. Two out of six health facilities are damaged and non- or partially-functioning, leaving the city without any confirmed functioning hospitals. Many patients travel to Homs for care.

Tell Abiad. Two out of five health facilities are partially damaged, but all health facilities are fully functioning. A 2019 Health sector assessment found that the city had no CT scanners and only one dialysis center. Turkish media claims that Turkey has expanded sector capacity by building and staffing new medical centers and a new hospital in Tel Abyad.

DAMAGE TO ASSETS AND PHYSICAL INFRASTRUCTURE

TABLE 15: DAMAGE INVENTORY (IN US$ MILLION)

Asset Type	Baseline	Total Damaged	Partially Damaged	Destroyed	Unit cost in US$ million	Total Cost in US$ million
Health Administration Building	2	0	0	0	0.4–0.5	0.0–0.0
Hospital (Unknown)	1	90	50	0	13.0–15.9	0.0–0.0
Medical Center	90	25	19	6	0.4–0.5	5.5–6.7
Medical Point	3	3	3	0	0.4–0.5	0.5–0.6
Medical Training Center	2	0	0	0	0.4–0.5	0.0–0.0
Pharmacy/Dispensary	2	1	0	1	0.1–0.1	0.1–0.1
Polyclinic	5	3	1	2	0.4–0.5	1.0–1.2
Private Hospital	198	54	39	15	2.4–3.0	74.4–90.9
Public Hospital	46	13	10	3	33.9–41.5	237.6–290.4
Rehabilitation Center	0	0	0	0	0.4–0.5	0.0–0.0
Specialized Medical Center	15	3	2	1	15.0–18.3	26.9–32.9
Teaching Hospital	0	0	0	0	0.0–0.0	0.0–0.0
Total Effect						**345.9–422.8**

TABLE 16: CITY-LEVEL DAMAGE COST (IN US$ MILLION)

City Name	Damage Cost
Aleppo	127.4–155.7
Dar'a	13.7–16.8
Deir-ez-Zor	40.7–49.7
Al Hasakah	0.0–0.0
Homs	39.3-–48.0
Ar-Raqqa	46.0–56.2
Manbij	0.2–0.2
Afrin	13.6–16.6
Palmyra	13.8–16.9
Idlib	1.0–1.2
Daraya	16.0–19.6
Zabadani	0.2–0.2
Rastan	14.5–17.8
Tell Abiad	19.6–23.9
Total	**345.9–422.8**

Effects of the Conflict

The crisis has had a significant impact on service delivery, and Syria's health indicators are below both their pre-crisis values and those of comparator countries. Life expectancy in Syria is approximately 72 years, having fallen below its pre-crisis figure of 75 years, and that of comparable countries and the MENA average of 74 years. Similarly, infant mortality, estimated at 17.92 infant deaths per 1,000 live births, has remained the same. Health care has been affected by conflict, damage, loss of functionality, low investment and rising poverty, all of which place it further out of reach. As an example, measles vaccine second dose coverage MCV-2 dropped from 82 percent in 2010 to 53 percent in 2020; and by mid-2021 Syria had 15,403 hospital beds i.e.

8.8 per 10,000 residents, far below the SPHERE standard of 18 beds per 10,000.

Almost one third of facilities in the 14 cities are reported to be either partially functional or non-functional. Most non-functional facilities have also been damaged, with almost 28 percent damaged or destroyed. While direct hits to physical infrastructure decreased in 2020 compared to previous years (eight attacks were reported in 2020 injuring three health workers), the security situation caused an exodus of service providers, and a shortage of medical personnel to deal with growing demand. Declining services have led to an increase in communicable diseases, the most common of which are an influenza-like illness, diarrhea and leishmaniasis. The difficulty of reaching health facilities, and equipment and medicine shortages have affected service delivery, with 6.4 percent of 188 facilities inaccessible and 1.1 percent partially accessible.

The COVID-19 pandemic has further weakened the health system in Syria. Between March 2020 and September 2021, there were 115,349 cases of COVID-19, of which 52 percent were reported from North West Syria (NWS), 26.4 percent from Damascus, and 21.4 percent from North East Syria (NES). During the same period, 3,929 related deaths were also reported. The COVID-19 vaccination roll out has been very slow, with only 13.7 percent of the population expected to be vaccinated by the end of 2021. Only 482,196 people (2.6 percent of the population) have received the first dose of vaccination, while only 290,221 (1.6 percent of the population) are fully vaccinated.

It is also important to note some of the improvements in service delivery reported over the last year. The Health Cluster HeRAMS exercise reported an 8 percent increase in hospitals providing Comprehensive Emergency Obstetric and Neonatal care (CEmONC) services, a 3 percent increase in hospitals providing Surgery/Trauma services, and an 8 percent increase in facilities providing Blood Bank Services between the first quarterly periods of 2020 and 2021. However, over the same period an alarming 33 percent decrease in facilities providing Cancer Diagnosis/ Treatment, and a 2 percent decrease in facilities providing TB Diagnosis/Treatment was also reported.

Limitations of the Assessment

The operational environment for data collection was constrained in the following ways: first, the local context has made it difficult to ground-truth damage/functionality data, and thus, there are no damage data for 19 percent of facilities, or functionality data for 6 percent of facilities; second, the lack of local data has constrained analysis; and third, the control of different parts of the country by different entities has made data collection and analysis more complex; lastly, the limited availability of pre-conflict data makes it difficult to assess the effects of conflict on delivery of health services and their utilization.

The assessment team was able to mitigate these limitations using satellite imagery, and publicly available information (PAI), including social media monitoring, and information and guidance from partners on the ground. The unavailability of accurate pre-conflict cost data in the Health sector required estimations from multiple sources to assess the costs of damage. Thus, while the findings in this assessment have been corroborated in as far as this is possible, they should be considered indicative.

Education

Pre-Crisis Sector Conditions

Before the conflict, Syria was on the verge of achieving its education targets under the Millennium Development Goals (MDGs). In 2009/2010, primary school enrollment stood at 93 percent, equal to the average for the MENA region, and 67 percent for secondary school, exceeding the MENA average of 60 percent. Learning outcomes in Syria were below international averages, but higher than in most MENA countries. In the 2007 Trends in Mathematics and Science Study (TIMSS), Syria ranked 32 and 39 out of 49 countries in eighth grade science and mathematics, respectively.

The Syrian civil war has deprived millions of children of education and destroyed much of the social fabric of the country. An estimated 2.5 million children, or one-in-three of the school-age population (ages 5–17), were already out of school by the end of 2019.[68] As families try to cope with the impacts of the conflict, children - in particular boys - have had to seek informal labor to meet their families' essential needs. Out-of-school children are particularly vulnerable to exploitative child labor, child marriage and recruitment into military forces. 82 percent of communities perceived child labor as a key factor preventing school attendance.[69] Loss of schooling also deprives children of health, clean water, and sanitation services offered through schools. In addition, COVID-19 is increasingly bringing education to a halt for many of Syria's children after over ten years of conflict, displacement and poverty.

Sectoral Damage Assessment

AGGREGATE SECTOR ANALYSIS

Overall, 1,367 education facilities were assessed. 18 percent of these have been either partially damaged or fully destroyed (i.e., 245 education facilities). About 22 percent of primary schools (i.e., 110 schools) and 16 percent of secondary schools (i.e.,30 schools) have been partially damaged or fully destroyed, and 10 of the 49 assessed colleges/

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

69 Humanitarian Needs Overview for Syrian Arab Republic; Humanitarian Programme Cycle; OCHA, March 2021.

FIGURE 34: PHYSICAL STATUS OF EDUCATION SECTOR BY FACILITY/ASSET TYPE

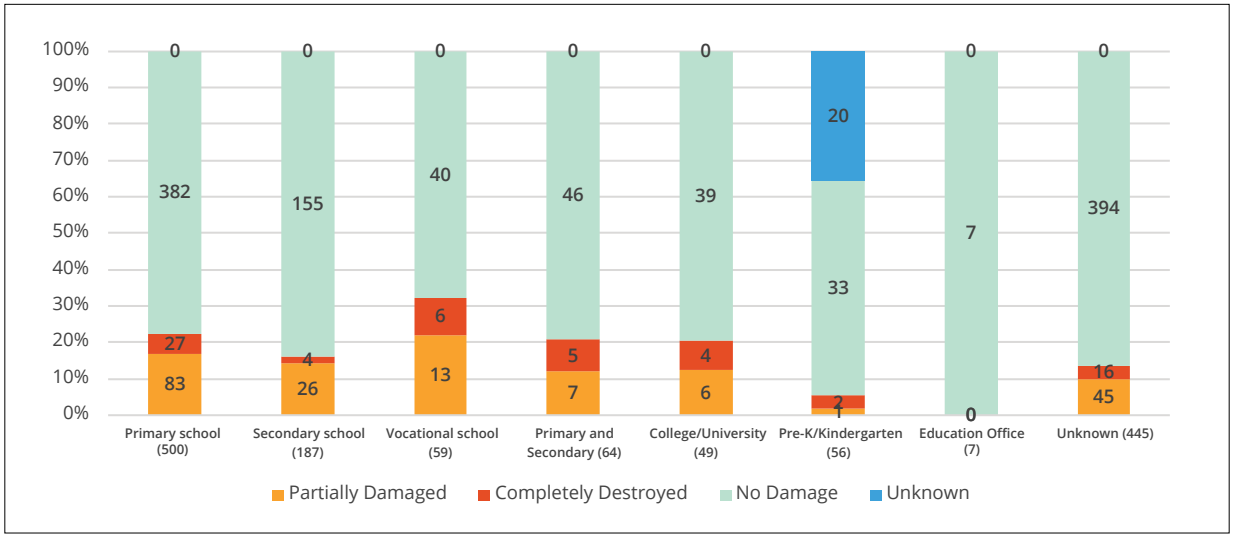
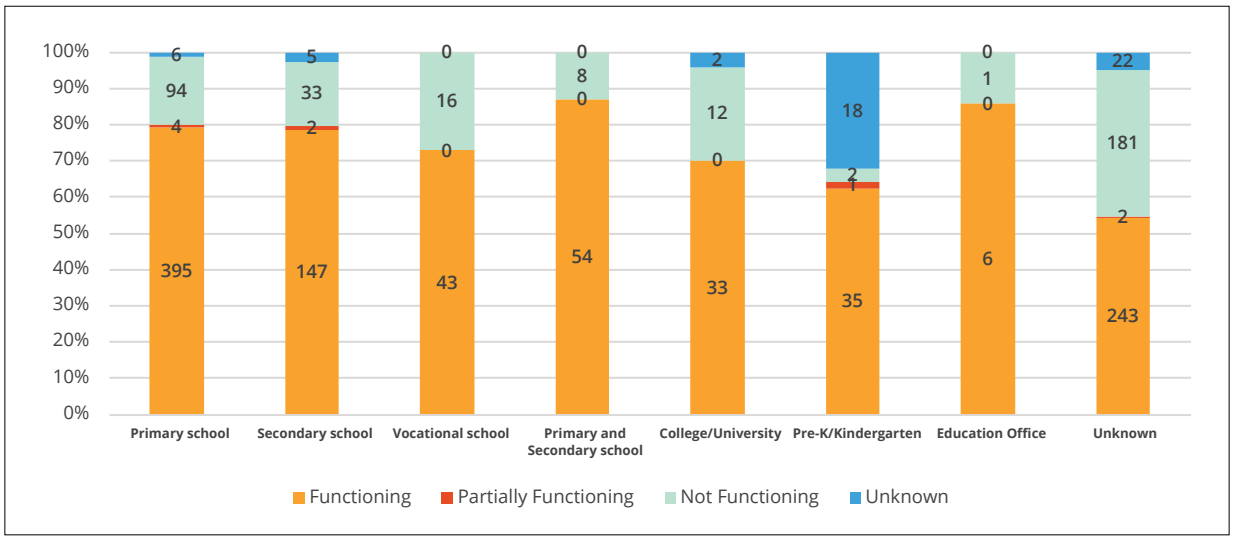


FIGURE 35: OPERATIONAL STATUS OF EDUCATION SECTOR BY FACILITY/ASSET TYPE



universities have been partially damaged or fully destroyed. 70 percent of education facilities across all cities are functional, while 25 percent of education facilities are not operational. The remaining share represents facilities for which the status is unknown.

CITY-LEVEL ANALYSIS

Aleppo

In Aleppo, 525 education facilities were assessed, the largest number in any of the cities. Of these, 16 percent have been either damaged (11 percent) or fully destroyed (5 percent); 73 percent are functioning, 24 percent are not functioning or partially functioning, and the status of those remaining is unknown. An additional 38 education facilities have been destroyed since the last damage assessment. The image below shows the location of damaged and partially damaged facilities in Aleppo.

Dar'a

In Dar'a, 137 education facilities were assessed, of which 26 percent have been either partially damaged (21 percent) or fully

FIGURE 36: PHYSICAL STATUS OF EDUCATION SECTOR BY CITY

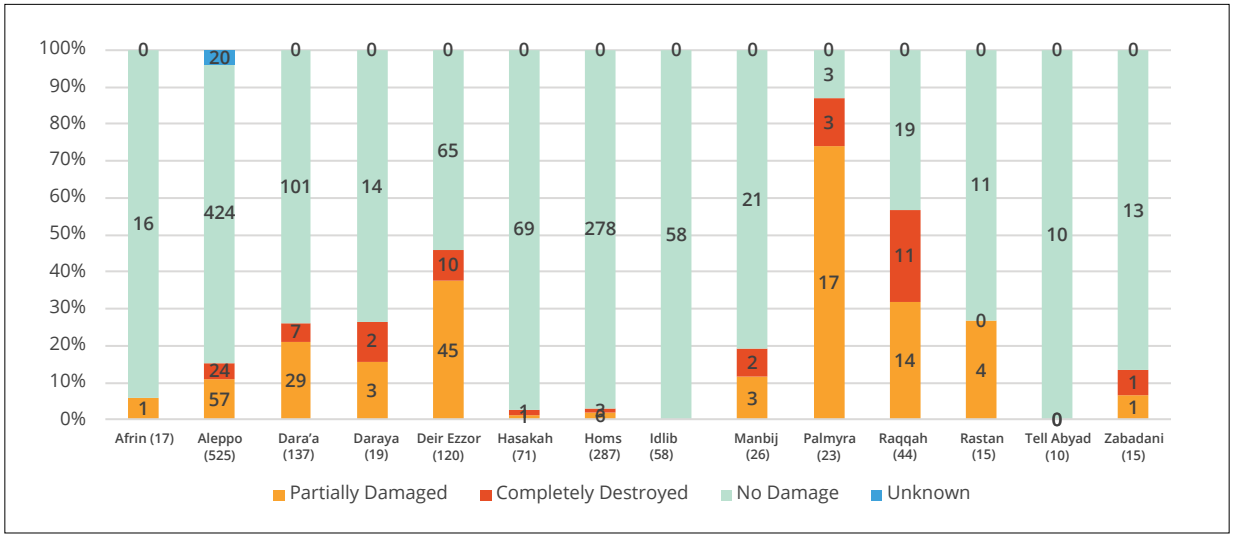
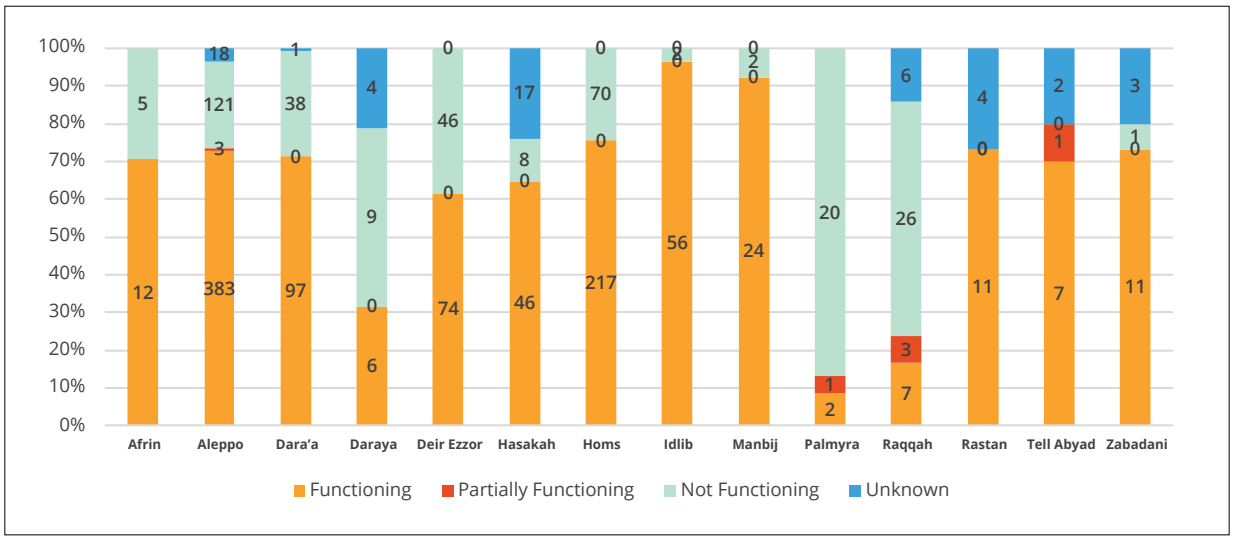


FIGURE 37: OPERATIONAL STATUS OF EDUCATION SECTOR BY CITY



destroyed (5 percent), and 28 percent (38 facilities) are not operational. The majority of non-functioning facilities are primary schools. Since the previous damage assessment, six education facilities have been damaged.

Deir-ez-Zor

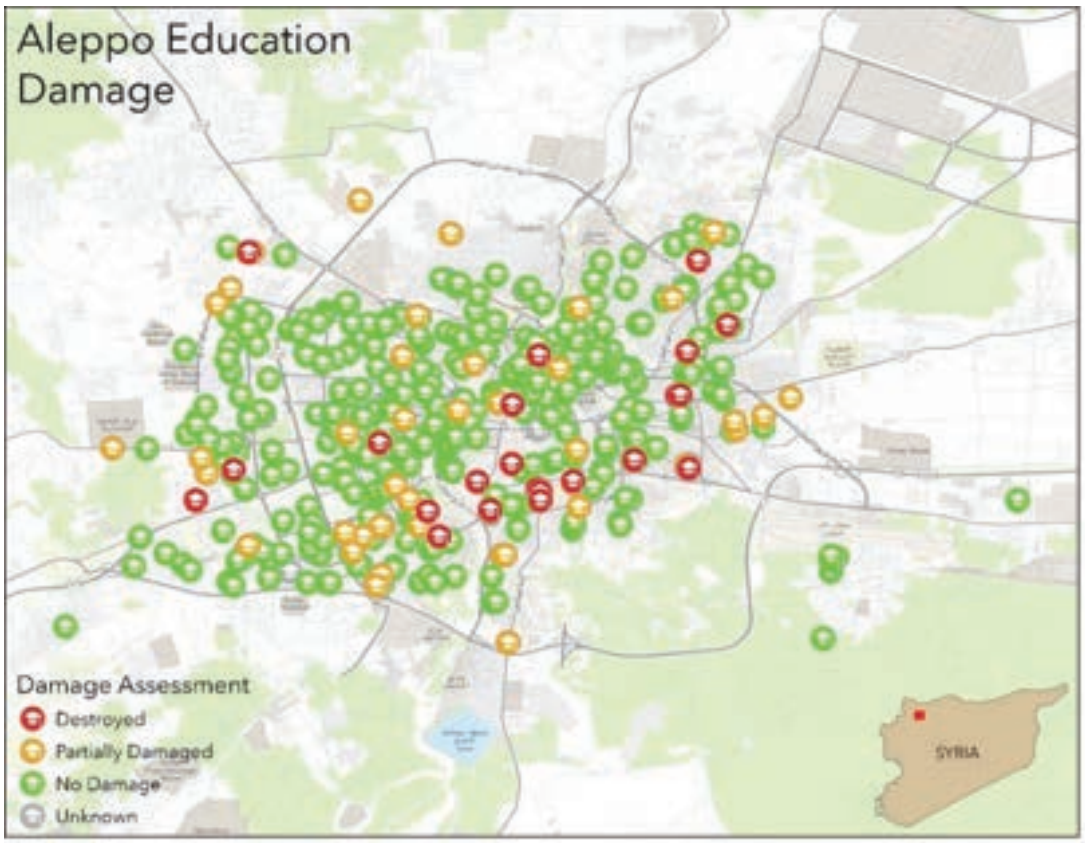
In Deir-ez-Zor, 120 education facilities were assessed, of which 45 percent have been partially damaged (38 percent) or fully destroyed (8 percent). This includes 36 primary schools and six secondary schools. 38 percent of schools are not operational, most of which are primary schools.

Al Hasakah

In Al Hasakah, 71 education facilities were assessed. Only two facilities have been partially damaged or destroyed, and 65 percent of facilities are functioning, while 8 percent are not functioning (8 facilities). The operational status of the remaining facilities (27 percent) is unknown.[70]

70 This assessment does not include the February 2022 ISIL attack on Hassakah University, which is outside its temporal scope.

FIGURE 38: DAMAGE TO EDUCATION FACILITIES IN ALEPPO



Source: World Bank Estimates.

Homs

In Homs, 287 education facilities were assessed. Almost 97 percent of these are undamaged, but 24 percent of them (70 schools) are not operational.

Ar-Raqqa

In Ar-Raqqa, 44 education facilities were assessed, of which 57 percent were either partially damaged (32 percent) or fully destroyed (25 percent), 66 percent were not operational, and the status of 13 percent (6 facilities) was unknown.

Manbij

In Manbij, 26 education facilities were assessed, of which five were either damaged (three primary schools) or destroyed (two facilities). Most facilities in Manbij are operational (92 percent), and one primary school and one college/university are not functioning.

Afrin

In Afrin, 17 education facilities were assessed. One facility, a secondary school, is partially damaged while the remaining facilities have not been damaged. Five facilities (29 percent) are not operational. Since the previous damage assessment, one facility has been damaged. The operational status decreased for three facilities but did not change for the other 14. This is the first assessment for Afrin and there are no previous data.

Palmyra

In Palmyra, 23 education facilities were assessed, of which 87 percent have been either partially damaged (74 percent) or fully destroyed (13 percent). Consequently, 93 percent of education facilities in Palmyra are not functional. Since the previous assessment, three facilities have been repaired and an additional three are functional.

Idlib

In Idlib, 58 education facilities were assessed, of which none were damaged, and all but two are operational.

Daraya

In Daraya, 19 education facilities were assessed. Of these, 14 (74 percent) are undamaged, three are partially damaged and two have been destroyed. Only 32 percent of education facilities function, 47 percent (9 facilities) do not function, and the status of four is unknown.

Zabadani

In Zabadani, 15 education facilities were assessed, of which 13 were undamaged, a secondary school is partially damaged, and a primary school has been destroyed. 11 facilities are functioning, one primary school is not operating, and the status of the other three facilities is unknown.

Rastan

In Rastan, 15 education facilities were assessed, of which four have been partially damaged, and 11 are undamaged; these 11 facilities are functioning (73 percent), and the status of four is unknown.

Tell Abiad

In Tell Abiad, 10 education facilities were assessed, and no damage was recorded. Seven of these facilities function, one functions partially, and the status of the other two is not known.

DAMAGE TO ASSETS AND PHYSICAL INFRASTRUCTURE

TABLE 17: DAMAGE INVENTORY (IN US$ MILLION)

Asset Type	Baseline	Total Damaged	Partially Damaged	Completely Destroyed	Unit Cost Low	Unit Cost High	Total Cost Low	Total Cost High
Primary school	500	110	83	27	125,581	188,372	7,559,976	11,339,964
Secondary school	187	30	26	4	200,930	301,394	2,893,386	4,340,079
Vocational school	59	19	13	6	200,930	301,394	2,250,412	3,375,617
Primary and Secondary	64	12	7	5	200,930	301,394	1,567,251	2,350,876
College/ University	49	10	6	4	803,718	1,205,578	5,143,798	7,715,697
Pre-K/ Kindergarten	56	3	1	2	125,581	188,372	301,394	452,092
Unknown	445	61	45	16	163,255	244,883	5,550,680	8,326,020
	1,365	**245**	**181**	**64**			**25,266,897**	**37,900,346**

TABLE 18: CITY-LEVEL DAMAGE COST (HIGH ESTIMATE - IN US$ MILLION)

City	Damage Cost - Low estimate	Damage Cost - High estimate
Aleppo	7,896,533	11,844,800
Dar'a	2,938,595	4,707,893
Deir-ez-Zor	5,023,240	7,734,860
Al Hasakah	228,557	342,836
Homs	791,160	1,286,740
Ar-Raqqa	4,405,381	5,843,610
Manbij	1,079,997	1,619,995
Afrin	80,372	120,558
Palmyra	1,878,692	2,918,038
Idlib	0	0
Daraya	522,417	783,625
Zabadani	205,953	358,929
Rastan	215,999	373,999
Tell Abiad	0	0
Total	**US$25.3 million**	**US$37.9 million**

Effects of the Conflict

Schools in Syria do not provide a safe and secure learning environment. This is due, in part, to damage to schools and their use for other purposes, for example, to host internally displaced people (IDP). Families report security fears as the main reason for students missing, or dropping out of school.

There are not enough qualified and experienced teachers in Syria to meet the learning needs of Syrian children. More than 150,000 teachers have been lost to the education system in recent years, due to displacement, injury or death, and schools have come to rely on unskilled teachers, which has profoundly impacted the quality of teaching. Only 32 percent of teachers have teaching certificates, while 43 percent of teachers have only one to three years of teaching experience.[71] The educational gaps and learning challenges of students are substantial, and teachers require strong pedagogical skills to guide learning within mixed-age groups and mixed ability settings. Efforts to build the skills of in-service and newly-certified teachers remain hampered, however, by the protracted crisis, shortages of teaching/learning materials, and more recently by the COVID-19 pandemic.

Teachers report the stress of teaching in a civil war and the challenges of engaging with their students. Some of their key concerns include: (i) teaching children traumatized by the conflict; (ii) how to react in an emergency; and (iii) classroom management.

Limitations

The assessment provides information on the damage to and functionality of schools. Even when children have easy access to a functional school, learning remains a challenge. While it has not been possible to conduct wide-scale learning assessments in recent years, literacy and numeracy assessments indicate that students are not attaining early foundational literacy and numeracy skills. In terms of access and retention, the COVID-19 pandemic has exacerbated vulnerabilities and likely worsened education inequalities among Syrian children.

71 Integrity (2019) Research to improve the quality of teaching and learning inside Syria. London: Integrity.

Municipal Services

Pre-Crisis Sector Conditions

PRE-CRISIS SECTOR CHARACTERISTICS AND CONDITIONS

Prior to the conflict[72], most cities provided water, sanitation, solid waste management and other municipal services. In bigger cities, such as Aleppo, the private sector also provided these services, but when the conflict erupted, its involvement decreased, adding to pressures on government and city authorities to deliver them. Even prior to the conflict, municipal services in Syrian cities were inadequate. For example, concerning solid waste management, most cities had open dumpsites outside of them, only a few of them had sanitary landfills, and most of these had problems with leaching, access control, and lack of regular monitoring. To address such problems, a "Master plan of waste management in the Syrian Arab Republic" was commissioned by the Ministry of Local Administration in the 2000s for select cities, for which the plan made recommendations for waste collection, treatment and disposal. Many of these recommendations, however, were yet to be implemented at the onset of the conflict. For water, wastewater and sanitation, a mix of institutions and city authorities provided services, but these were piecemeal, and further compromised by the conflict.

INVENTORY OF PHYSICAL INFRASTRUCTURE ASSETS

The inventory for Syria's major cities shows that, before the conflict, there were 29 community halls and markets, 187 parks and entertainment facilities, 51 municipal administration facilities and libraries, and 7 affordable housing buildings managed by municipalities.

72 According to UNHABITAT City Profiles for Various Cities including Aleppo, Dar'a, Al Hasakah, Ar-Raqqah, among others.

Sectoral Damage Assessment

AGGREGATE SECTOR ANALYSIS

Aggregate Physical Damage

For community halls and markets, 55 percent of physical infrastructure has been partially damaged or destroyed, and 38 percent is partially functioning or not functioning. For parks and entertainment facilities, 24 percent of physical infrastructure is partially damaged or destroyed, and 23 percent is partially functioning or not functioning. For municipal administration facilities and libraries, 10 percent of physical infrastructure is partially damaged or destroyed, and 8 percent is partially functioning or not functioning. Finally, for affordable housing buildings, 71 percent are partially damaged or destroyed, and 57 percent are partially functioning or not functioning. The damage to this municipal infrastructure is estimated at **US$21.3–25.7 million** (Table 19).

The assessment of road infrastructure reveals a need for significant funding to address damage. Out of 5,386,798 km of road under municipal authority, 152,069 km (or 2.8 percent of total) requires major repair, and 285,188 km (5.3 percent of total) requires maintenance repair. The cost of major repair is estimated at US$7.3–9.1 million, and the cost of maintenance is estimated at US$9.1–11.4 million (Table 20).

TABLE 19: PHYSICAL AND OPERATIONAL STATUS OF PHYSICAL INFRASTRUCTURE

Facility Classification	Pre-Crisis Baseline		Post Crisis Damage and Service Data							
			Physical Status (no of facilities)				Operational Status (no of facilities)			
	Baseline Number	Surface Area (m^2)	No Damage	Partially Damaged	Destroyed	Unknown	Functioning	Partially Functioning	Not Functioning	Unknown
Community halls and markets	29	192,078	13	12	4	0	16	3	8	2
Parks and entertainment	189	2,551,474	140	40	5	2	119	31	11	26
Municipal administration and libraries	51	156,843	45	4	1	1	35	2	2	12
Affordable housing	7	52,405	2	4	1	0	2	4	0	1

Source: World Bank staff estimates.

TABLE 20: ROAD DAMAGE AND REPAIR COSTS, 2021

Road Classification	Length (km)	Damage (km)	Requiring Major Repair (km)	Requiring Maintenance (km)	Cost of major repair (US$) (Destroyed)	Cost of maintenance (US$) (Partially Damaged)
Tertiary	588,292	39,600	13,012	25,162	624,563–780,704	805,178–1,006,472
Track	100,911	13,059	4,234	8,820	203,237–254,046	282,252–352,815
Residential	4,445,758	390,698	127,492	235,883	6,119,604–7,649,506	7,548,248–9,435,300
Service	251,836	22,718	7,332	15,324	351,923–439,903	490,354–612,942
Total	**5,386,798**	**466,074**	**152,069**	**285,188**	**7,299,327–9,124,159**	**9,126,024–11,407,530**

Source: World Bank Assessment.

AGGREGATE IMPACT ON SERVICE DELIVERY

The quality of and access to public services has been affected by conflict across all Syrian cities. The loss in functionality of municipal administration and libraries, parks and entertainment, community halls and markets, and affordable housing has curtailed public service delivery. Damage to roads, and lack of maintenance since the onset of the conflict has made public services, such as health and education, difficult to reach (see also Transport section). Finally, solid waste management, deficient in many cities before the conflict, has deteriorated further, substantially compromising the population's health, as have large accumulations of rubble in, most notably, the cities of Aleppo and Dar'a.

The conflict has compounded solid waste management challenges in many of Syria's municipalities, increasing public health risks. Prior to the conflict, there was an average of one waste collection worker per 1,000 individuals countrywide, albeit with large differences in service delivery between cities. In Aleppo, 40 neighborhoods had no waste collection prior to the conflict, which, given the large amounts of non-household waste generated in Syria's most populous city, posed a threat to health. Aleppo's large informal settlements dumped waste on their outskirts and had no solid waste management services, leading many people to contract Leishmaniasis.

The city of Deir-ez-Zor lacked the financial resources to develop sanitary landfills, and facilities to compact solid waste. The conflict made these conditions worse and many cities were unable to manage solid waste under conflict conditions. Table 21 presents pre- and post-conflict solid waste management resources for various cities in 2019. The largest decline in the number of refuse collection workers occurred in the cities of Al Hasakah (67 percent decline), Ar-Raqqa (65 percent decline), and Dar'a (51 percent decline). The cities of Ar-Raqqa, Dar'a and Deir-ez-Zor lost many of their refuse collection vehicles. While data for Aleppo do not feature in the UrbAN-S *City Profiles*, we expect the city to be severely deprived of solid waste management services (Table 21).

Rubble generated by the conflict demands a solid waste management plan. Table 22 presents city rubble estimates for low, medium and high scenarios. While some effort has been made to dispose of rubble since the last damage assessment in 2018, substantial amounts remain. Assuming a collection rate of 1,000 m3 per day of rubble, it will take 11,361 days, 15,248 days and 18,247 days for low, medium, and high scenarios, respectively, to clean it up.

TABLE 21: RESOURCES FOR SOLID WASTE MANAGEMENT IN SYRIAN CITIES, 2019 VS. PRE-CONFLICT

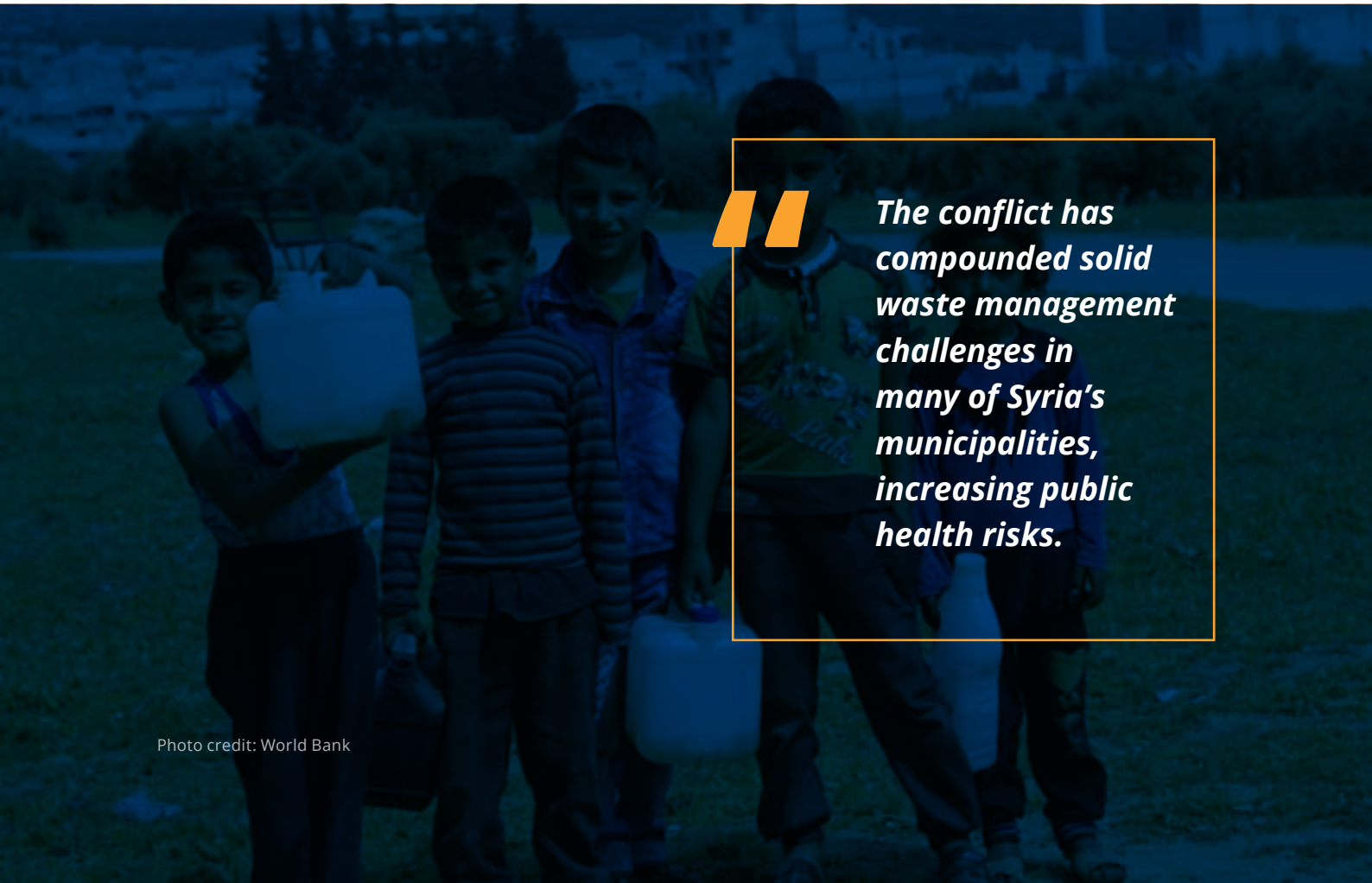
	Number of refuse collection workers		Refuse collection vehicles		Compressors		Compactors	
	Pre-conflict	2019	Pre-conflict	2019	Pre-conflict	2019	Pre-conflict	2019
Al Hasakah	150	50	30	65	2	3	2	3
Al-Qusayr	80	62	3	2	3	2	3	-
Ar-Raqqa	260	90	17	4	7	2	2	-
Rastan	3	2	2	1	0	0	10	40
Dar'a	119	58	12	4	2	1	2	1
Deir-ez-Zor	771	509	47	3	2	0	-	-

Source: UrbAN-S - City Profiles.

TABLE 22: RUBBLE ESTIMATES FOR LOW, MEDIUM AND HIGH SCENARIOS

City	Low scenario (m³)	Medium scenario (m³)	High scenario (m³)
Afrin	32,980	65,960	131,920
Tell Abiad	1,597	23,885	6,596
Aleppo	8,445,931	10,977,473	12,948,944
Dar'a	1,154,828	1,387,250	1,724,591
Daraya	291,769	383,841	411,789
Deir-ez-Zor	95,166	144,620	245,370
Al Hasakah	64,092	114,949	216,406
Homs	284,975	460,360	584,832
Idlib	493,063	657,700	822,196
Manbij	19,295	77,969	117,450
Palmyra	92,321	107,707	123,094
Ar-Raqqa	379,638	796,510	879,499
Rastan	2,906	35,130	19,241
Zabadani	2,866	14,935	15,037
Total	**11,361,428**	**15,248,288**	**18,246,965**

Source: World Bank assessment, October 2020.



> ***The conflict has compounded solid waste management challenges in many of Syria's municipalities, increasing public health risks.***

Photo credit: World Bank

CITY-LEVEL ANALYSIS

Aleppo
The city's community halls and markets, and affordable housing have been badly damaged, and its damaged residential buildings account for over 70 percent of Syria's urban rubble.

Dar'a
Roads have been badly damaged by conflict, with 3 and 7 percent needing major repair and maintenance, respectively. Two community halls and markets have been damaged, as have four of six parks and entertainment facilities. Dar'a accounts for roughly 10 percent of Syria's urban rubble.

Deir-ez-Zor
Roads have been badly damaged, with 7 and 2 percent needing major repair, and maintenance, respectively. Half of the city's parks and entertainment facilities, along with municipal administration facilities and libraries are damaged.

Al Hasakah
Roads are largely undamaged, but parks and entertainment facilities were partially damaged, and three out of 13 facilities are only partially functioning.

Homs
Two and 4 percent of roads require major repair and maintenance, respectively. Three out of 16 parks and entertainment facilities are partially damaged, and rubble accounts for roughly 3 percent of all the rubble in the cities considered.

Ar-Raqqa
Nine and 19 percent of roads need major repair and maintenance, respectively; and community halls, markets, parks, administration and recreation buildings, and libraries have been damaged and offer limited services. Rubble accounts for roughly 3–5 percent of total rubble across the low, medium and high scenarios for cities considered.

Manbij
Twenty and 41 percent of roads need major repair and maintenance, respectively; no municipal facilities were damaged.

Afrin
Conflict has significantly damaged all road types (tertiary, track, residential and service); of the 14 percent of roads affected, 5 and 9 percent require major repair and maintenance, respectively. One community hall and market has been damaged.

Palmyra
One community hall and market has been damaged.

Idlib
Eight and 15 percent of roads require major repair and maintenance, respectively. Community halls and markets, parks and entertainment facilities, and affordable housing have been damaged, but this has not affected services. Rubble makes up roughly 4 percent of all rubble in the cities considered.

Daraya
Service roads have been severely damaged (89 percent damage, 27 percent require major repair), as have tertiary roads (15 percent damage, 7 percent require major repair) and residential roads (13 percent damage, 4 percent require major repair). Parks and entertainment facilities have been damaged, and rubble accounts for roughly 2 percent of all rubble in the cities considered.

Zabadani
Service roads have been particularly damaged (36 percent of total length, 11 percent requiring major repair), while other types of roads are damaged over 3 percent of their length. Libraries, parks and entertainment facilities have been damaged.

Rastan
Tertiary roads have been badly damaged (15 percent, 5 percent require major repair), while 4 percent of residential roads are damaged (1 percent need major repair). One community facility has been completely damaged.

Tell Abiad
Roughly 5 percent of roads have been damaged (approximately half need major repair, remainder need maintenance). One asset under community halls and markets, and parks and entertainment facilities has been damaged.

DAMAGE TO ASSETS AND PHYSICAL INFRASTRUCTURE

TABLE 23: DAMAGE INVENTORY (IN US$ MILLION)

Asset Types	Baseline	Damage					Unit Cost (US$ per sq m)		Partial Damage Estimate (US$)		Completely Destroyed Estimate (US$)		Total Damage Cost (US$)	
	Numbers	Total Damaged	Partially Damaged	Completely Destroyed	No Damage	Unknown	Low estimate	High estimate	Low estimate	High estimate	Low estimate	High estimate	Low estimate	High estimate
Public Spaces and Facilities, and Affordable Housing														
Community Facility	9	2	1	1	7	0	220	300	424,000.00	530,000.00	75,800.00	94,750.00	499,800.00	624,750.00
Community Market	20	14	11	3	6	0	180	200	6,681,384.00	7,423,760.00	6,244,320.00	6,938,133.33	12,925,704.00	14,361,893.33
Entertainment	5	1	0	1	4	0	200	250	0.00	0.00	587,400.00	734,250.00	587,400.00	734,250.00
Library	1	0	0	0	1	0	200	250	0.00	0.00	0.00	0.00	0.00	0.00
Municipal Administration	50	5	4	1	44	1	200	250	1,587,853.33	1,984,816.67	800,000.00	1,000,000.00	2,387,853.33	2,984,816.67
Affordable Housing	7	5	4	1	2	0	200	250	3,221,800.00	4,027,250.00	589,700.00	737,125.00	3,811,500.00	4,764,375.00
Parks/ Playgrounds	182	44	40	4	136	2	5	10	987,213.90	1,974,427.79	103,333.33	206,666.67	1,090,547.23	2,181,094.46
Public Parking	7	0	0	0	7	0	-	-	0.00	0.00	0.00	0.00	0.00	0.00
Slaughterhouse	0	0	0	0	0	0	-	-	0.00	0.00	0.00	0.00	0.00	0.00
Sub-total	**281**	**71**	**60**	**11**	**207**	**3**			**12,902,251.23**	**15,940,254.46**	**8,400,553.33**	**9,710,925.00**	**21,302,804.56**	**25,651,179.46**
Roads	**Baseline**	**Damage**					**Unit Cost (US$ per km)**		**Partial Damage Estimate (US$)**		**Completely Destroyed Estimate (US$)**		**Total Damage Cost (US$)**	
	length in meters	**Total Damaged**	**Partially Damaged**	**Completely Destroyed**	**No Damage**	**Unknown**	**Low estimate**	**High estimate**	**Low estimate**	**High estimate**	**Low estimate**	**High estimate**	**Low estimate**	**High estimate**
Tertiary	588,292.50	39,599.55	13,011.73	25,161.80	548,692.94	-	80,000.00	100,000.00	805,177.56	1,006,471.95	624,563.03	780,703.78	1,429,740.59	1,787,175.73
Track	100,911.44	13,059.02	4,234.10	8,820.39	87,852.42	-	80,000.00	100,000.00	282,252.35	352,815.44	203,236.97	254,046.21	485,489.32	606,861.65
Residential	4,445,757.68	390,698.04	127,491.76	235,882.51	4,055,059.64	-	80,000.00	100,000.00	7,548,240.20	9,435,300.25	6,119,604.43	7,649,505.54	13,667,844.63	17,084,805.79
Service	251,836.38	22,717.67	7,331.72	15,323.56	229,118.70	-	80,000.00	100,000.00	490,354.05	612,942.56	351,922.75	439,903.44	842,276.80	1,052,846.00
Sub-total	**5,386,797.99**	**466,074.29**	**152,069.32**	**285,188.25**	**4,920,723.70**		**320,000.00**	**400,000.00**	**9,126,024.16**	**11,407,530.20**	**7,299,327.18**	**9,124,158.97**	**16,425,351.33**	**20,531,689.17**
Total									**22,028,275.39**	**27,347,784.66**	**15,699,880.51**	**18,835,083.97**	**37,728,155.90**	**46,182,868.63**

Source: World Bank Assessment, October 2020.

TABLE 24: CITY-LEVEL DAMAGE COST (IN US$ MILLION)

City	Damage Cost (Low estimate)	Damage Cost (High estimate)
Afrin	1,588,562.0	1,913,562.5
Aleppo	11,748,274.2	13,969,867.5
Dar'a	2,553,276.0	2,952,845.0
Daraya	582,758.5	766,698.2
Deir-ez-Zor	2,404,364.6	3,058,032.4
Al Hasakah	238,533.6	312,571.5
Homs	2,496,694.2	3,064,231.3
Idlib	3,972,676.5	4,979,990.2
Manbij	226,070.0	282,587.6
Palmyra	932,311.0	1,095,388.7
Ar-Raqqa	9,405,319.0	11,766,648.8
Rastan	255,509.9	341,773.3
Tell Abiad	544,014.8	703,931.9
Zabadani	779,791.7	974,739.6
Total	**37,728,155.9**	**46,182,868.6**

Source: World Bank Assessment, October 2020.

Effects and Impact of the Conflict

The Syrian conflict has significantly damaged municipal assets and roads, and produced debris requiring disposal. The extent of damage, and poor funding of city councils suggest many years of work to restore municipal services to pre-conflict levels. Beyond these immediate effects, the conflict has also given rise to multiple issues in urban development, planning and public institutions at city level:

- More than 80 percent of Syrian IDPs live in cities[73], and data indicate internal population movements in nearly all 14 cities (within and between cities and neighborhoods) between 2011 and 2019. This may impact these cities on two levels: i) changes in city morphology and land-use e.g. nine of the 14 cities have lost crop lands to urban expansion[74], ii) disruption of and increased pressure on services e.g. more waste may overwhelm solid waste management services, and disruption of public transport affects access to jobs and services.

- Inadequate service delivery has had adverse impacts on the environment and public health. For example, around four neighborhoods in Western Aleppo and 36 neighborhoods in Eastern Aleppo had no waste collection in 2014, which led to informal dumping. Since 2014, Al Hasakah city has eight unapproved, informal dumpsites and landfills; in some cities/areas, these are at sub-optimal sites e.g.

73 UN OCHA (2021). Humanitarian Needs Overview—Syrian Arab Republic. https://reliefweb.int/sites/reliefweb.int/files/resources/syria_2021_humanitarian_needs_overview.pdf

74 Please see Environment Chapter for detailed analysis on land-use/land-cover change.

Raqqa city's landfill occupies agricultural fields. It will be important to assess the entire cycle of solid waste management in cities – starting from waste generation-collection-disposal-treatment, in order to restore waste management services efficiently and sustainably.

- Conflict has made it harder for municipal governments to collect revenues from residents, and City Councils have struggled to plan due to governance and control issues, dwindling budgets,[75] and capacity constraints. Awareness and capacity of communities has also been compromised by conflict. Transparent public institutions at the municipal level will enhance revenue collection and build trust between local government and communities.

- There is not yet a national strategy to guide recovery and rehabilitation programs, but the international community have intervened to provide immediate rehabilitation efforts. In addition to the public sector, the international community, the private sector, and other organizations can play an important role in recovery and rehabilitation, and avenues to involve the private sector should be identified.

Limitations

For solid waste management planning, qualitative data (including social media information) and assessments from secondary sources, including city profiles, were used.

To assess damage to municipal and road infrastructure, and to calculate rubble accumulation, several assumptions were made, as mentioned in earlier sections.

75 Details of impacts on state budget can be found in Public Institutions chapter.

Photo credit: Shutterstock

CROSS-CUTTING SECTORS

Public Institutions

Pre-Crisis Sector Conditions

Prior to the war, public institutions in Syria could be characterized as follows:

- Poor rating of public institutions across the board despite limited progress on regulatory quality and government effectiveness in the years preceding the war:

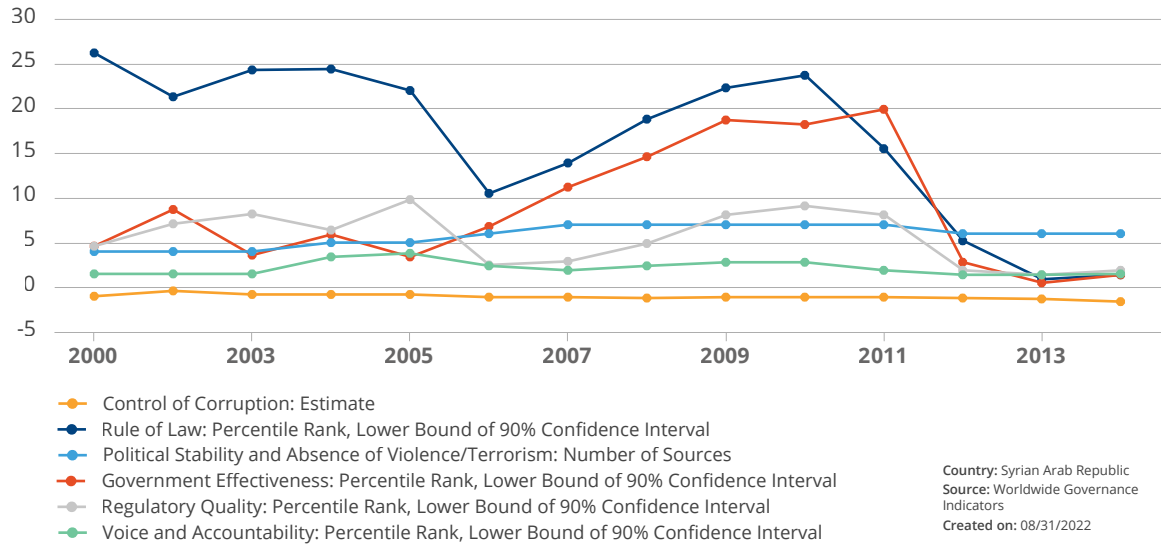
Syria faced several governance and structural challenges prior to the crisis, which included, notably, moving from a planned economy towards a liberalized market economy, and reducing poverty via interventions to enhance human development. The government's ability to provide public services was constrained by an inefficient public administration. As the structure of the economy hindered the development of a private sector that would employ entrants into the labor market, state-led employment became part of the pre-war social contract. As a result, public administration suffered from overstaffing while many civil servants, notably mid-level officials, lacked the skills for their positions, constraining sector-planning and more complex reforms and operations.[76] High subsidies on energy and fuel, and declining oil revenues constrained the government's ability to pursue human development and alleviate poverty. These factors, combined with a lack of political representation and accountability, and runaway rent-seeking by political elites led to the mass protests of 2011 to demand better governance and more inclusive public institutions.

- A large fiscal footprint but very low fiscal accountability and transparency: in 2010, revenues were estimated at 21.9 percent of GDP and public expenditure at 26.9 percent; although a PEFA assessment was conducted in 2006, its findings are not publicly available, but a joint IMF/WB mission on the modernization of PFM in 2010 found that no budget information was made publicly available and that fiscal accountability mechanisms were missing. Public procurement was monopolized by politically connected firms, and only five companies were granted half of public investment projects. Seven percent of the population was employed by the government i.e., twice as many as in Jordan.

- A high degree of centralization and lack of governance in newly-urbanized areas: substantial migration from rural areas led to rapid growth of underserved townships

76 Brück, T. et al. (2007) "Evaluating Economic Reforms in Syria" Deutsches Institut für Wirtschaftsforschung, Berlin.

FIGURE 39: SYRIA'S RANKING UNDER WORLD GOVERNANCE INDICATORS FROM 2000 TO 2014



on the outskirts of large cities; at the onset of the war, Syria was characterized as "a police state without resources" whose control over certain urban and rural territories weakened from the 1980s onwards, with for instance only a single police officer for every 500 people in Aleppo and much less in newly-built and fast-growing peripheral neighborhoods.[77]

- An identity-based/sectarian social contract: Syria is deemed to lack "a history of statehood," in contrast to Egypt, Turkey or Morocco, and it is argued that the ruling elites "relied on identity networks to safeguard their power" even though the pre-war regime was officially combatting sectarianism.

Sectoral Damage Assessment

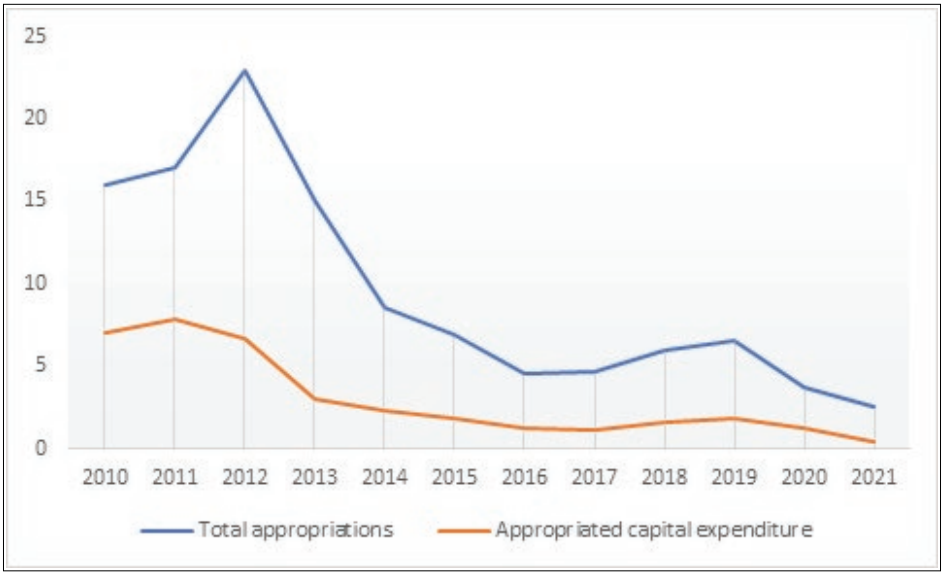
AGGREGATE SECTOR ANALYSIS

The assessment focuses on 1) damage to the fiscal space and 2) physical damage to public facilities.

1) The fiscal space has shrunk by at least two thirds while public investment has decreased further by around 90 percent. According to the IMF, the ratio of revenue to GDP decreased from 21.5 percent in 2010 to 6 percent in 2015. By 2021, revenues had decreased by 83 percent from their pre-war levels due to loss of oil revenues, which along with other non-tax revenues amounted to two thirds of total revenue in 2010. In 2021, US$2.1 billion of revenues were appropriated as compared to US$6.8 billion of expenditure, widening the budget deficit to close to US$1bn. The average budget deficit since the war started is estimated to be 32 percent.

77 Dorronsoro G., Baczko A. & Quesnay A. (eds), 2018, Civil War in Syria. Mobilization and Competing Social Orders. Cambridge University Press.

FIGURE 40: 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.

PHYSICAL DAMAGE TO PUBLIC FACILITIES

This assessment covers a wide range of government facilities including national, municipal, and provincial administrative buildings, courthouses, prisons, fire stations, police stations, vehicle registration offices, civil defense, police traffic offices, post offices, real estate registration offices and other offices and buildings. About 10 percent of these facilities in the 14 cities have been damaged (13 out of 127) by conflict, out of which two percent are completely destroyed. One prison out of three (33 percent) has been partially damaged. Five post offices out of 20 (25 percent) have been impacted, with one of them completely destroyed. Three courthouses have been partially damaged, accounting for 20 percent of courthouses. Twelve percent of national administrative buildings (2 out of 17), six percent of provincial administrative buildings (1 out of 18) and four percent of police stations (1 out of 23) have been damaged.

Manbij, Palmyra and Ar-Raqqa are the cities most affected by the conflict; in Ar-Raqqa, 33 percent of administrative facilities have been damaged, with three facilities out of nine completely destroyed. One out of three facilities in Manbij and one out of three facilities in Palmyra have been partially damaged. Thirteen percent of facilities in Deir-ez-Zor (1 out of 8) are damaged. However, other assessments show more damage in the city, with 12 facilities partially damaged and not operational, and nine facilities completely destroyed. In Homs, data indicate that one facility (fire department) is partially damaged and not operational. Other cities impacted are Zabadani (25 percent of facilities), Idlib (13 percent), Aleppo (13 percent), and Dar'a (4 percent).

Based on this information, damage is estimated at US$6.9–8.5 million, much of which is associated with the damage to the prison, estimated at US$4.4–5.3 million. For provincial administrative buildings, damages are valued at US$0.8–0.9 million, post offices at US$0.7–0.9 million, national administration US$0.6–0.7 million, courthouses US$0.4–0.5 million and police stations US$0.05–0.06 million.

Damage to these buildings has impacted their functionality, with 14 out of 127 not functioning, and 4 out of 127 only partially functioning. Four post offices, two

courthouses, two national and two provincial administrative buildings, one prison, one traffic police office, one police station and one municipal administrative building are not functioning.

Damage to administrative buildings has affected the delivery of public services, and heavily damaged/destroyed or partially damaged police stations, courthouses, prisons, and other administrative buildings may reduce the ability of government to restore security and stability. Damage to local cadastral offices and records creates difficulties for returning populations, and hinders economic recovery, and the functioning of government is further affected by losses of goods/equipment/vehicles, and significant losses of human potential.

CITY-LEVEL ANALYSIS

In Aleppo, 13 percent of administrative facilities (4 out of 30) have been partially damaged. These include a courthouse, police station, post office and national administrative building. The cadastral building in Aleppo is also out of service, threatened by rising groundwater after the breakdown of discharge pumps. Public services across other sectors have also been affected. The institutional capacity for service delivery has also been impacted by the large displacement of public sector workers and the lack of financial resources. This has allowed alternative service providers to offer services at higher costs. Governance has been compromised and government contracts are attended by bribery and corruption. The city has also been looted, which will hinder business recovery plans.

In Dar'a, four percent (1 out of 24) of facilities have been partially damaged (a post office). The division of the city into state-controlled and opposition-controlled areas fragmented public institutions and service provision. While the government relocated administrative functions to state-controlled areas, parallel structures were established in opposition-controlled areas but remained weak. Currently, government funding remains unavailable in former opposition-controlled neighborhoods and most of their public assets are not operational.

In Deir-ez-Zor, 13 percent (1 out of 8) of facilities are partially damaged (a post office). Additional data show 12 facilities to be partially damaged and not operational (courts, civil registry, directorates of finance and social affairs, municipal building, etc.) and nine facilities completely destroyed (immigration and passports administration, directorate of land registry, fire department, directorate of technical services, etc.). Administrative capacity and service delivery have been severely impacted as many government functions were either transferred or discontinued due to damage and security concerns, including courts and notary services, officiating of property transactions, and other licenses and official documentation services. Although many departments were transferred to state-controlled areas, they lost both human resources and assets. Similarly to other cities, the Deir-ez-Zor city administration has lost almost its entire staff and the bulk of its field workers. Although local police offices and courts were relocated, the efforts of police to maintain order have been undermined by the presence of armed militia. Still, other departments remained functional such as the Passports and Immigration Department and the Department of Civil Documentation.

Based on the assessment, none of the 16 administrative facilities in Al Hasakah were damaged. However, other studies indicate damage concentrated in the Arab-majority southern half of Al Hasakah city. Governance is a major challenge for citizens, as some parts of the city are controlled by the government and others by other actors. This has created dual governance, the splitting of administrative functions, and co-dependency. The different administrations work together in some areas such as health and education; natural resources produced in one area are exchanged for more specialized public services from

another. This lowers the quality of services and leads to fragmentation, redundancies, higher transaction costs, and lack of accountability.

In Homs, assessments indicate that only 18 neighborhoods have functional services, while 11 have partially functional services and 4 have poorly or non-functional services.

In Ar-Raqqa, 33 percent (3 out of 9) of administrative facilities are fully destroyed. This city, which has been severely impacted by the conflict, is suffering from weakened public service delivery and administration. Throughout the conflict, as the city fell under the control of different actors, different governance systems came into being. In Manbij, 33 percent (1 out of 3) of administrative assets have been partially damaged (a courthouse). Other studies indicate that most of the damage occurred when ISIL used public buildings as military bases.

In Afrin, according to available data, none of the six administrative facilities were damaged. However, other assessments have described the entire city as only partially functional. In Palmyra, 33 percent (1 out of 3) of administrative facilities are partially damaged (a prison). In Idlib, 13 percent (1 out of 8) of administrative buildings have been partially damaged (a courthouse). In Daraya, Rastan, and Tell Abiad, no administrative facilities were damaged. However, In Zabadani, 25 percent (1 out of 4) of facilities are partially damaged (a post office).

DAMAGE TO ASSETS AND PHYSICAL INFRASTRUCTURE

The tables below summarize damage to facilities and estimated damage costs. At the time of writing, the extent of damage to some facilities was unknown.

TABLE 25: DAMAGE INVENTORY (IN US$ MILLION)

Asset Type	Baseline	Damage				Unit Cost (US$) per m²		Total Damage Cost (US$)	
		Totally Damaged	Partially Damaged	Completely Destroyed	No Damage	Low estimate	High estimate	Low estimate	High estimate
Civil Defense	2	0	0	0	2	199.80	244.19	-	-
Courthouse	15	3	3	0	12	199.80	244.19	419,810.95	513,102.27
Fire station	10	0	0	0	9	199.80	244.19	-	-
Municipal Administration	11	0	0	0	11	199.80	244.19	-	-
National Administration	17	2	1	1	14	199.80	244.19	584,882.25	714,856.08
Office Building	1	0	0	0	1	199.80	244.19	-	-
Police station	23	1	1	0	20	199.80	244.19	48,670.26	59,485.87
Post office	20	5	4	1	13	199.80	244.19	753,350.07	920,761.20
Prison	3	1	1	0	2	199.80	244.19	4,380,003.61	5,353,337.74
Provincial Administration	18	1	0	1	17	199.80	244.19	765,018.15	935,022.18
Real estate registration	3	0	0	0	3	199.80	244.19	-	-
Traffic police office	3	0	0	0	2	199.80	244.19	-	-
Vehicle registration office	1	0	0	0	1	199.80	244.19	-	-
Total	**127**	**13**	**10**	**3**	**107**			**6,951,735.28**	**8,496,565.35**

TABLE 26: CITY-LEVEL DAMAGE COST (IN US$ MILLION)

City	Damage Cost (Low estimate)	Damage Cost (High estimate)
Afrin	-	-
Aleppo	495,573.52	605,700.97
Dar'a	-	-
Daraya	-	-
Deir-ez-Zor	171,344.88	209,421.53
Al Hasakah	-	-
Homs	-	-
Idlib	18,061.54	22,075.22
Manbij	73,444.94	89,766.04
Palmyra	4,380,003.61	5,353,337.74
Ar-Raqqa	1,740,820.87	2,127,669.95
Rastan	-	-
Tell Abiad	-	-
Zabadani	72,485.92	88,593.90
Total	**6,951,735.28**	**8,496,565.35**

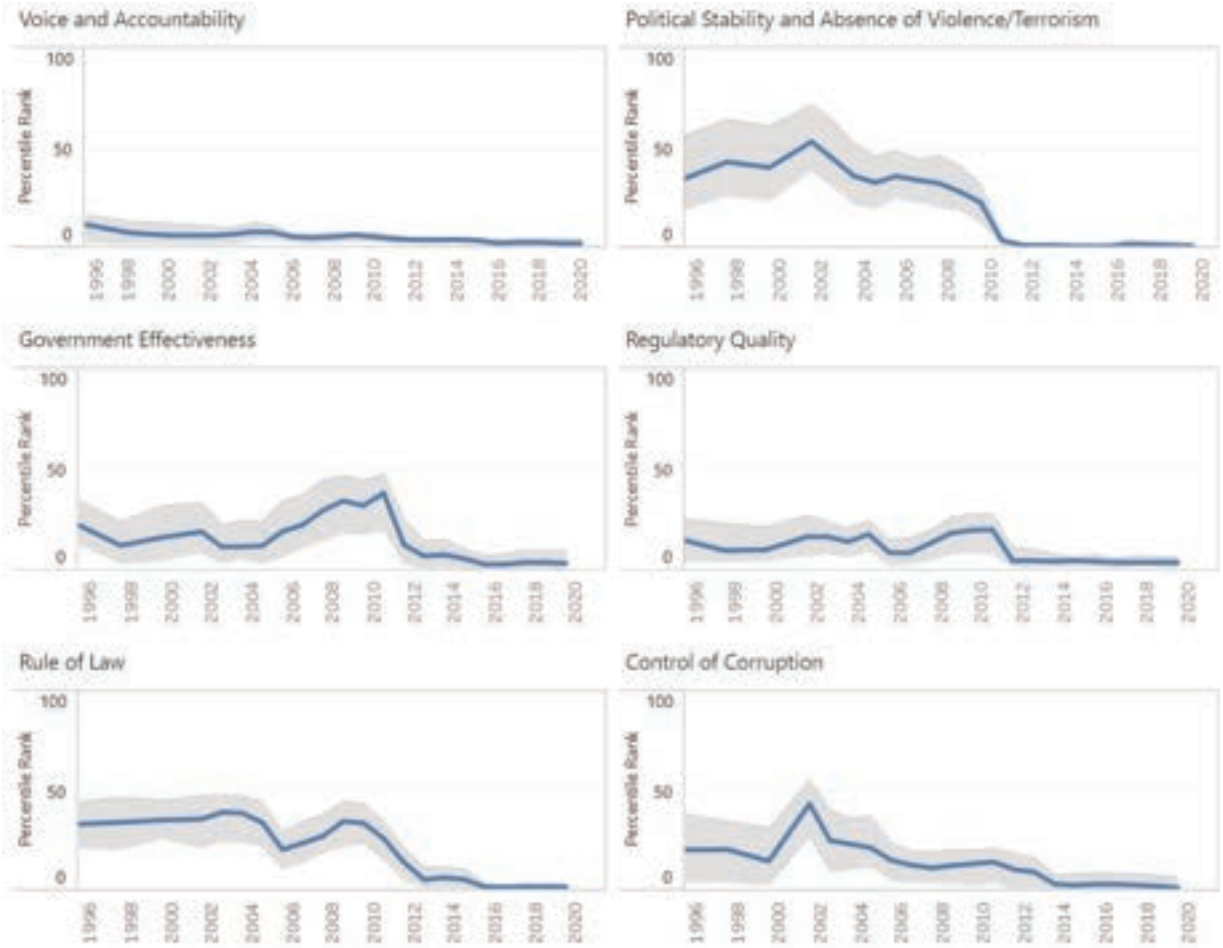
Effects of the Conflict

Damage to administrative buildings has adversely affected public services, even though the buildings themselves are not always essential (e.g. for justice, policing, cadastral records, etc.). Physical damage is only a subset of the effects of conflict on public service delivery in Syria.

The sidelining or undermining of civilian institutions at the local level by armed groups, and retaliation against social groups deemed hostile are a more serious threat to local governance: there is anecdotal evidence that, both in government and rebel-controlled areas, armed groups either compete with or take over local governments, and that reconstruction is planned to consolidate political constituencies. Surveys indicate the gulf between government policy and people's everyday experiences: official government policies uphold equal rights for all Syrians irrespective of religious, sectarian or ethnic affiliation, but nearly 30 percent of respondents claim to have faced discrimination by state institutions on these grounds.

Public institutions, already weak before the crisis, have worsened. The armed conflict, and seizure of power by non-state actors in some governorates, has further weakened public institutions. Although the intensity of fighting has declined, the rule of law, and accountability in public institutions have continued to deteriorate. Before the crisis, Syria fell below the MENA average for several governance indicators, including perception of corruption, rule of law, government effectiveness, and voice and accountability; in many instances, these low rankings deteriorated further during the conflict and have not recovered (Figure 41). In 2020, Syria dropped to 178th out of 180 countries in the corruption perception index, down from a rank of 144th in 2012.

FIGURE 41: PERFORMANCE OF SYRIA WITH RESPECT TO GOVERNANCE INDICATORS, 2000–2020



Source: World Bank Estimates

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

Pre-Crisis Sector Conditions

Syria is home to a varied and dynamic landscape with rich biodiversity and resources. Before the crisis, approximately one-third of the country was arable, and more than half comprised natural pastures, steppe, desert, and mountainous areas. Prior to Syria's crisis in 2011, the country already faced serious environmental challenges related to water scarcity and contamination, soil degradation, air pollution, solid waste management, biodiversity loss, coastal and marine pollution. The pre-war costs of environmental degradation were estimated at 2.3 percent of the country's GDP in 2009.[78]

Conflict has severely accelerated Syria's environmental degradation. Studies have found widespread contamination and pollution related to oil extraction, physical infrastructure damage, and weapons. The displacement of people has also affected the environment, causing solid waste, wastewater, and air pollution challenges with direct and indirect effects on (i) water pollution; (ii) land pollution; and (iii) air pollution, requiring a comprehensive approach to reduce pollution sources. People without solid waste management facilities, including many IDPs, often live near open solid waste dumps. At least 21 such dump sites, covering over 300 hectares, were identified in the Hasakah region of northeast Syria alone,[79] and create health and livelihood problems for both displaced and settled communities. In addition, significant changes in land use and vegetation cover reflect an increase in barren lands and urban areas, and a decrease in rangelands and agricultural areas.[80]

Prior World Bank Damage Assessments in Syria have not measured environmental damage. An exception is the World Bank's 2017 economic and social assessment of the conflict in Syria, which piloted a study to manage rubble, and of potential impacts of damaged industrial facilities in Aleppo. The study 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 the environmental and social risks that could accompany this task.[81]

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78 Delegation of the European Commission to Syria (2009). Country Environmental Profile for the Syrian Arab Republic: Final Report.

79 PAX. 2015. Amidst the debris… A desktop study on the environmental and public health impact of Syria's conflict.

80 Mohamed, M. A., Anders, J., & Schneider, C. (2020). Monitoring of Changes in Land Use/Land Cover in Syria from 2010 to 2018 Using Multitemporal Landsat Imagery and GIS. ***Land***, 9(7), 226.

81 World Bank. 2017. The Toll of War. The economic and social consequences of the conflict in Syria.

Sectoral Damage Assessment

AGGREGATE SECTOR ANALYSIS

The approach adopted to assess environmental damage, as part of the current DA, does not aim to quantify all known environmental losses, but focuses on costing key/major damages and pressures. While all damaged assets are potential sources of special waste streams, the DA focused on those that are likely to cause the most significant impacts and require specialized interventions to mitigate or minimize environmental hazards, within the limitations of the availability of information within the DA. Accordingly, damage has been assessed for the following two main categories:

Type and quantity of **special waste streams** in damaged assets, including oil, electronic waste (e-waste), and rubble. The expense incurred to manage special waste streams which affect the population and the environment constitutes the cost of the damage.

Changes in land use/landcover since the war, to identify impact on ecosystems and biodiversity. This assessment focuses on pressures and impacts of conflict and displacement on ecosystem services. Cost estimates reflect the loss of services that benefited local communities.

Special waste streams: e-waste from damaged health facilities. While data limitations make it hard to quantify many special waste streams, damaged health facility data from the DA enable estimation of e-waste from these facilities. The DA estimated that a completely destroyed hospital generates around 3,000 kg of e-waste, while other health facilities generate approximately 1,800 kg of e-waste. The DA estimated that a partially damaged facility would generate 40 percent of these waste quantities. These assumptions were applied to all asset classes except for damaged pharmacies/ dispensaries and health administration buildings. Based on these assumptions, and as summarized in Table 26 below, about 160 tons of e-waste is estimated to have been produced by the conflict. **The estimated cost to treat and safely dispose of this waste is around US$0.4 million at a cost of US$2,250 per ton.** At the city level, the cost to manage e-waste from damaged health facilities is provided in Table 26 below. This is based on an average of 2,700 kg of e-waste per facility.

TABLE 26: E-WASTE FROM DAMAGED HEALTH FACILITIES

Facility	Baseline Number	Partially Damaged	e-waste (kg)	Destroyed	e-waste (kg)
Private Hospital	220	38	45,600	13	39,000
Public Hospital	51	8	9,600	3	9,000
Hospital (Unknown)	27	6	7,200	4	12,000
Medical Center	114	19	13,300	6	10,800
Specialized Medical Center	18	2	1,400	1	1,800
Medical Point	4	4	2,800	0	0
Polyclinic	6	1	700	2	3,600
Rehabilitation Center	0	0	0	0	0
Teaching Hospital	0	0	0	0	0
Medical Training Center	3	0	0	0	0
Total	**443**	**78**	**80,600**	**29**	**76,200**

Source: World Bank Data, October 2020.

Management of rubble. The DA calculation of rubble mass is based on 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 social safeguards, and are based on a prior World Bank study.[82] While this study provided three scenarios for rubble management, the DA adopted a unit cost approach based on Scenario 2 of US$9.5/ton of rubble.[83] As per Table 27 below, the DA estimated a total of 17.6 million tons of rubble for the low damage estimation and 28.3 million tons for the high damage estimation. The estimated costs to manage and dispose of this rubble are between US$167.3 million and US$268.7 million.

TABLE 27: CITY-LEVEL ESTIMATES OF ENVIRONMENTAL DAMAGE AND COSTS FROM RUBBLE AND MEDICAL E-WASTE

City	Rubble Estimate, m3 (Low)	Cost (low est., million US$)	Rubble Estimate, m3 (High)	Cost (high est., million US$)	Partially Damaged	e-waste (kg)	Destroyed	e-waste (kg)	e-waste cost (US$)
Afrin	32,980	0.49	131920	1.94	1	1,000	-	-	2,250
Aleppo	8,445,931	124.37	12948944	190.67	31	31,000	14	37800	154,800
Dara'a	1,154,828	17.00	1724591	25.39	2	2,000	-	-	4,500
Daraya	291,769	4.30	411789	6.06	1	1,000	1	2700	8,325
Deir Ezzor	95,166	1.40	245370	3.61	1	1,000	1	2,700	8,325
Hasakah	64,092	0.94	216406	3.19	-	-	-	-	-
Homs	284,975	4.20	584832	8.61	3	3,000	2	5400	18,900
Idlib	493,063	7.26	822196	12.11	1	1,000	-	-	2,250
Manbij	19,295	0.28	117450	1.73	1	1,000	-	-	2,250
Palmyra	92,321	1.36	123094	1.81	2	2,000	-	-	4,500
Raqqah	379,638	5.59	879499	12.95	3	3,000	-	-	6,750
Rastan	2,906	0.04	19241	0.28	2	2,000	-	-	4,500
Tell Abyad	1,597	0.02	6596	0.10	2	2,000	-	-	4,500
Zabadani	2,866	0.04	15037	0.21	1	1,000	-	-	2,250
Total costs (million US$)		**167.29**		**268.66**					**0.22**

Source: World Bank Data, October 2020.

Effects of the Conflict

IMPACT OF THE WAR AND OF INTERNAL POPULATION MOVEMENT ON LAND USE AND NATURAL RESOURCES

Urban areas were expanding in Syria before the conflict, following the displacement of around 1.5 million people by drought around 2008.[84] Today, over 80 percent of Syrian IDPs live in cities.[85] The DA indicates that between 2011 and 2019, urban areas in most of the 14 cities expanded and encroached on non-urban land; nine of them lost cropland to urban expansion, while three lost barren land (see Figure 42).

82 World Bank. 2017. Aleppo Pilot Environmental Damage Assessment.
83 Scenario 2 was selected as it reflects common practice based on international development experience in this field in Syria.
84 United Nations; World Bank. 2018. Pathways for Peace: Inclusive Approaches to Preventing Violent Conflict. Washington, DC: World Bank. © World Bank.
85 UN OCHA. (2021). Humanitarian Needs Overview—Syrian Arab Republic.

The "Net Landcover Change" conducted under the DA showed loss of green cover (grass/shrubland/sparse vegetation areas) in 11 of the 14 cities, with the most loss (in km²) recorded in Deir Ezzor, followed by Aleppo, Homs, Manbij and Daraya (Table 27). The value of ecosystem services lost through land cover change across these cities is over US$35 million.[86]

FIGURE 42: PRIMARY LAND USE CHANGE IN 14 CITIES

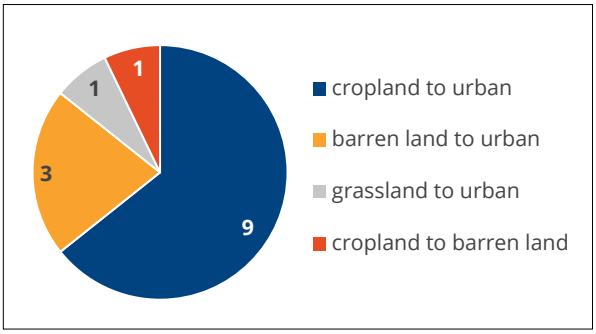

TABLE 28: NET LAND COVER CHANGE AND ECOSYSTEM SERVICES LOSS IN 14 CITIES OF INTEREST (KM²), WITH EMPHASIS ON GREEN COVER CHANGE

Net Land Cover Change 2011 – 2019 (km²)	Barren	Cropland	Green cover	Urban	Water	No change	ES total loss (2011 US$)
Afrin	-0.6	-0.8	-0.1	1.5	0	8.3	**525,732**
Aleppo	-19.4	-17.7	-3.9	40.9	0	329.4	**12,321,558**
Dar'a	-0.6	-2	-0.9	3.5	0	22.4	**1,359,083**
Daraya	-0.8	-1.4	-1.2	3.4	0	16.7	**1,069,856**
Deir-ez-Zor	-3.8	-9.3	-4.9	18.6	-0.6	127.7	**7,243,709**
Al Hasakah	-4.5	-4.7	-0.8	10	0	63.4	**3,189,340**
Homs	-1.6	-5.5	-2.1	9.2	0	165	**3,673,075**
Idlib	-0.2	-0.5	-0.2	0.9	0	20.7	**339,092**
Manbij	-1.5	-4.2	-2.1	7.8	0	38.1	**2,904,510**
Palmyra	-4.8	1	0	3.7	0	28.5	**325,358**
Raqqa	-1.6	-2.4	-0.5	4.7	-0.1	47.4	**1,719,378**
Rastan	-0.2	-0.3	-0.2	0.8	0	11	**221,894**
Tell Abiad	-0.1	-0.1	0.2	0	0	9.4	**65,377**
Zabadani	0	-1	0	1	0	11.3	**585,991**
Ecosystem services value in 2011 US$ per km² lost15	**67,783**	**585,991**	**162,702**	**No loss**	**1,231,971**	**No loss**	**35,543,953**

Source: World Bank data, unless otherwise noted.
Note: green cover refers to grass/shrubland and sparse vegetation.

IMPACT OF CONFLICT AND DISPLACEMENT ON FORESTS

Although forests make up a small portion of Syria's landscape (3.2 percent pre-conflict), this vegetation type is ecologically important and has been widely affected by the conflict. Direct effects include fires that start as a result of bombing and intentional fires targeting agricultural land. Beyond these direct effects, the conflict has worsened soil erosion, water contamination, and waste disposal problems in agricultural and urban areas throughout Syria, creating pressure to exploit protected lands. Charcoal production by those without other forms of fuel, such as IDPs and others

86 Historical loss is calculated using estimates from 2011.

living in poverty, has also damaged forests.[87] While national-level loss of forest cover was estimated at around 25 percent between 2010 and 2021[88], this DA indicates that across the forested governorates of Aleppo, Hama, Latakia, Idlib, and Tartus, over 45,000 hectares of forest were lost during that period (see Table 28), constituting approximately nine percent of the country's forest cover in 2011.[89] Continuing deforestation and worsening forest fires can also be attributed to weakened governance, lack of community forest management, and climate change.

TABLE 29: TOTAL FOREST LOSS, 2011–2020

Governorate	Lost Forest (Hectares)
Aleppo	649
Hama	15,311
Idlib	5,519
Latakia	22,299
Tartus	1,333

Source: Based on World Bank staff estimates.

IMPACT OF CONFLICT AND DISPLACEMENT ON BIODIVERSITY AND PROTECTED AREAS

According to *Protected Planet and Key Biodiversity Areas*,[90] Syria has 19 terrestrial protected areas and 52 key biodiversity areas (KBAs). KBAs cover approximately 23,000 km^2, while protected areas cover 1,293 km^2. The threat to biodiversity is exacerbated by a collapse of environmental regulations and anti-poaching enforcement. The DA compared governorate-level IDP arrivals and NDVI (Normalized Difference Vegetation Index) changes in KBAs and protected areas to allow for a broader understanding of how displacement near or through these sites—but not necessarily to them—might affect their environmental integrity. This analysis did not show a strong link between NDVI change and presence of IDPs.

IMPACT OF OIL AND DAMAGED INDUSTRIES ON WATER RESOURCES AND NEARBY POPULATIONS

Damage to oil refineries, pipelines, oil fields, oil infrastructure, and oil storage sites, in addition to makeshift oil refineries was reported as early as 2015 to cause significant environmental damage and air pollution, and local soil, surface water, and groundwater contamination.[91]

Recent reports have documented over 500 spills from oil facilities and extraction sites around the Rumeilan oil fields alone, and nearly 200 makeshift refineries are still operating in northeast Syria.[92] People working and living near oil facilities are exposed to air, water, and soil pollution that can cause acute and long-term harm to human health, ranging from respiratory and skin problems to carcinogenic and genotoxic effects, organ damage, and

87 Dathan, Jennifer. 2019. The reverberating environmental effects of explosive weapon use in Syria. Action on Armed Violence.
88 Hincks, Joseph. March 15, 2021. How Syria's Decade-Long War Has Left a Toxic Environmental Legacy. Time.
89 2011 baseline data from *https://data.worldbank.org/indicator/AG.LND.FRST.K2?locations=SY*
90 https://www.protectedplanet.net/country/SYR
91 PAX. 2015. Amidst the debris... A desktop study on the environmental and public health impacts of Syria's conflict.
92 PAX. 2021. War, Waste and Polluted Pastures.

psychological impacts. Studies have indicated strong correlations between oil-polluted soil and water and a range of health risks.[93] The 2017 WB environmental assessment in Aleppo also indicated that potential public health and environmental risks could arise in the proximity of damaged industrial sites.[94]

Limitations

Several limitations of the assessment are identified for the methodology adopted by the Environment Sector of the DA, and these merit discussion:

Assessment of potential sources of special waste streams from damaged assets: the DA should be seen as an indicative exercise for further assessments specific to environmental impacts of damaged assets. While most such assets produce environmental impacts and require specialized interventions to mitigate or minimize environmental hazards, the availability of needed information constitutes a major limitation of this DA. In future DAs, sectors such as WASH, Power, and Transport could be assessed to identify environmental damage, for example, from untreated wastewater, oil and chemicals, scrap vehicles, and other debris.

Impacts of displacement and conflict on natural resources: further studies are required to determine how conflict and population movements affect forests and natural resources, identify measures to manage these resources, and provide waste management systems and physical infrastructure, fuel, and livelihoods for vulnerable populations.

Oil and damaged industries: current assessments of environmental damage and health risks are unable to specify the damage or costs; further studies are needed to evaluate total environmental damage.

Costing of environmental degradation and valuation of ecosystem services: Studies are needed to better understand the impacts of conflict-driven degradation and its effects on local communities.

Based on recommendations from studies referred to in this DA and other related assessments, further environmental damage may be limited by enhancing:

Environmental governance through building capacity, developing management plans, and supporting affected populations.

Forest, water, and biodiversity protection by preventing forest fires, restoring forests and habitats, preventing degradation, monitoring water resources, and supporting livelihoods.

Oil pollution control through identifying environmental pollution hotspots, assessing pollution of ground and surface waters, soil, and air quality and associated health risks to communities, and urgently dealing with pollution.

93 PAX. 2020. A river of death.
94 World Bank. 2017. The Toll of War. The economic and social consequences of the conflict in Syria.