

ACTION ON
ARMED VIOLENCE

AOAV

THE REVERBERATING
EFFECTS OF EXPLOSIVE
WEAPON USE IN SYRIA



Report by
Jennifer Dathan

Additional research by
Silvia Ffiore, Leo San Laureano, Juliana Suess and George Yaolong

Editor
Iain Overton

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Cover illustration Syrian children play outside their home in Gaziantep, Turkey
by Jennifer Dathan

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INTRODUCTION

The use of explosive weapons, particularly in populated areas, causes wide-spread and long-term harm to civilians. Action on Armed Violence (AOAV) has been monitoring casualties from the use of explosive weapons around the globe since 2010. So extreme has such harm been in Syria in recent years that, by the end of 2017, Syria had overtaken Iraq as the country most impacted by explosive violence since our monitor began.

The conflict in Syria that began with a peaceful uprising against President Assad early in 2011 has turned into a conflict comprising many actors – the regime, rebels, extremist groups, Russia, the US-led coalition, Turkey, and Kurdish groups among others – with civilians struggling to avoid the impacts of the heavy use of explosive weapons that have marked the conflict.

In almost 8 years of conflict in Syria, between 2011 and 2018, AOA V recorded 79,206 casualties from explosive weapons – of these, 85% (67,263) were civilians. Casualties in Syria hit their highest levels in 2016, when AOA V recorded 13,313 civilian casualties from explosive weapons in the country. However, AOA V

noticed the following year that, whilst total civilian casualties (deaths and injuries) were just below that of the previous year, civilian deaths had increased by 50% (from 5,639 in 2016 to 8,463 in 2017). As the war continued, injuries were increasingly less likely to be recorded – particularly in incidents where there were high levels of civilian deaths. Therefore, it is likely that the number of casualties from explosive violence in Syria is much higher than our methodology can capture.

It is not just the direct casualties from explosive violence, however, that must concern – it is likely that these account for a minority of total casualties caused by the impacts of explosive weapons. The use of explosive weapons in Syria has destroyed key infrastructure; deprived communities of clean water, sanitation, electricity, medical care, and forced many to flee their homes and neighbourhoods. Many civilians also have suffered profound psychological harm, while interruptions to education and employment can stunt development for years, leaving many in poverty. Land often remains contaminated for decades, causing further casualties and preventing

families from both returning to their homes and using their land. Such impact has devastating and lingering consequences for communities and cultures.

In this report, AOA V seeks to better understand the reverberating harms from the explosive violence in Syria, both current and anticipated, through an analysis of four broad areas: health, economy, environment, and society and culture.

METHODOLOGY

AOA V researchers visited Turkey in October 2018, travelling to Istanbul and areas with large Syrian refugee populations. Interviews were conducted with academics, experts, NGOs and UN personnel, as well as with refugees and other civilians. Further interviews were conducted remotely with relevant personnel in Syria, Jordan, the UK and the United States. In total, 50 separate and in-depth interviews were conducted.

For the Explosive Weapons Monitor Project methodology please see, *The Burden of Harm: Monitoring Explosive Violence* in 2017.



A Syrian refugee in the room she shares with her family in Gaziantep, Turkey.

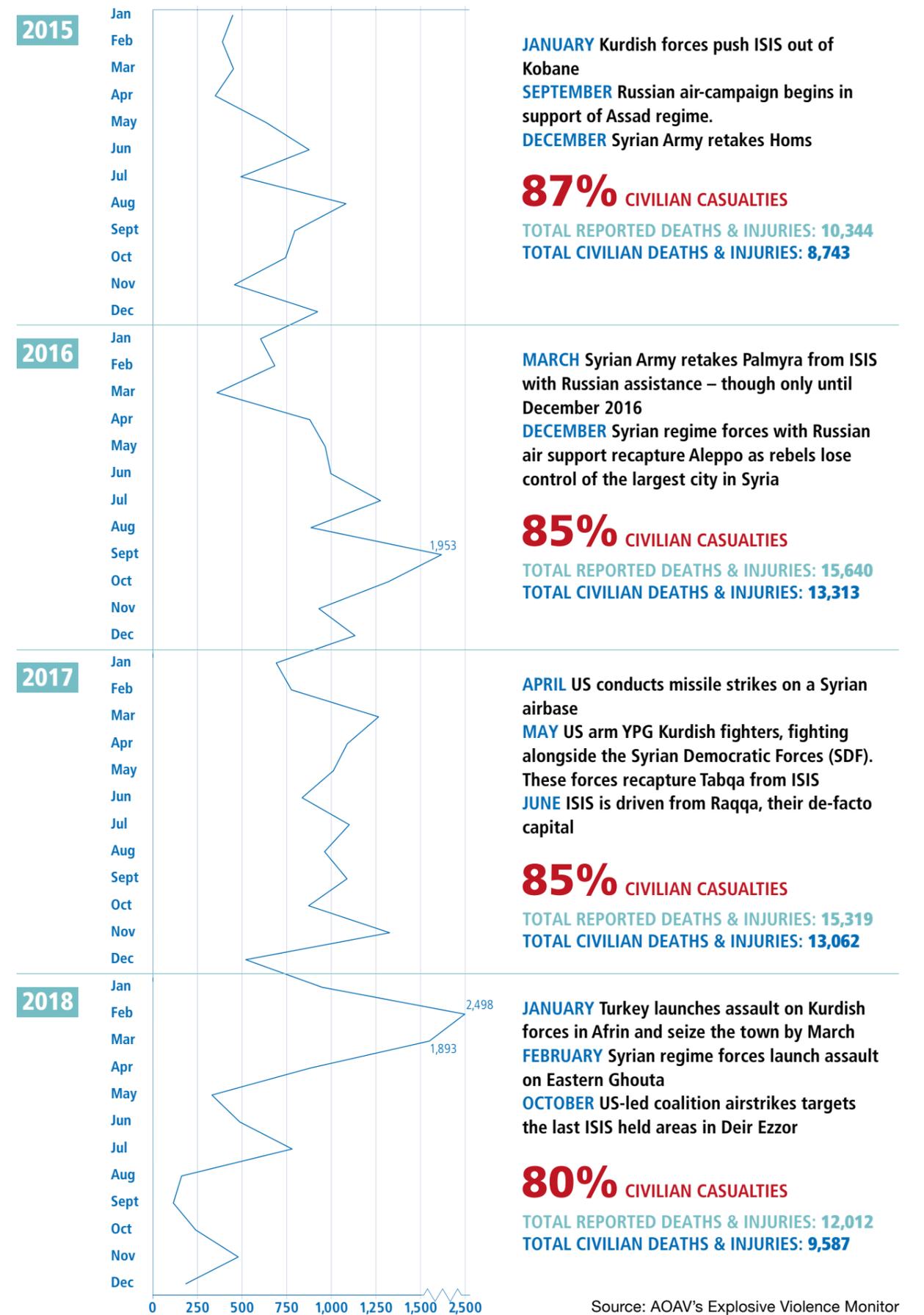
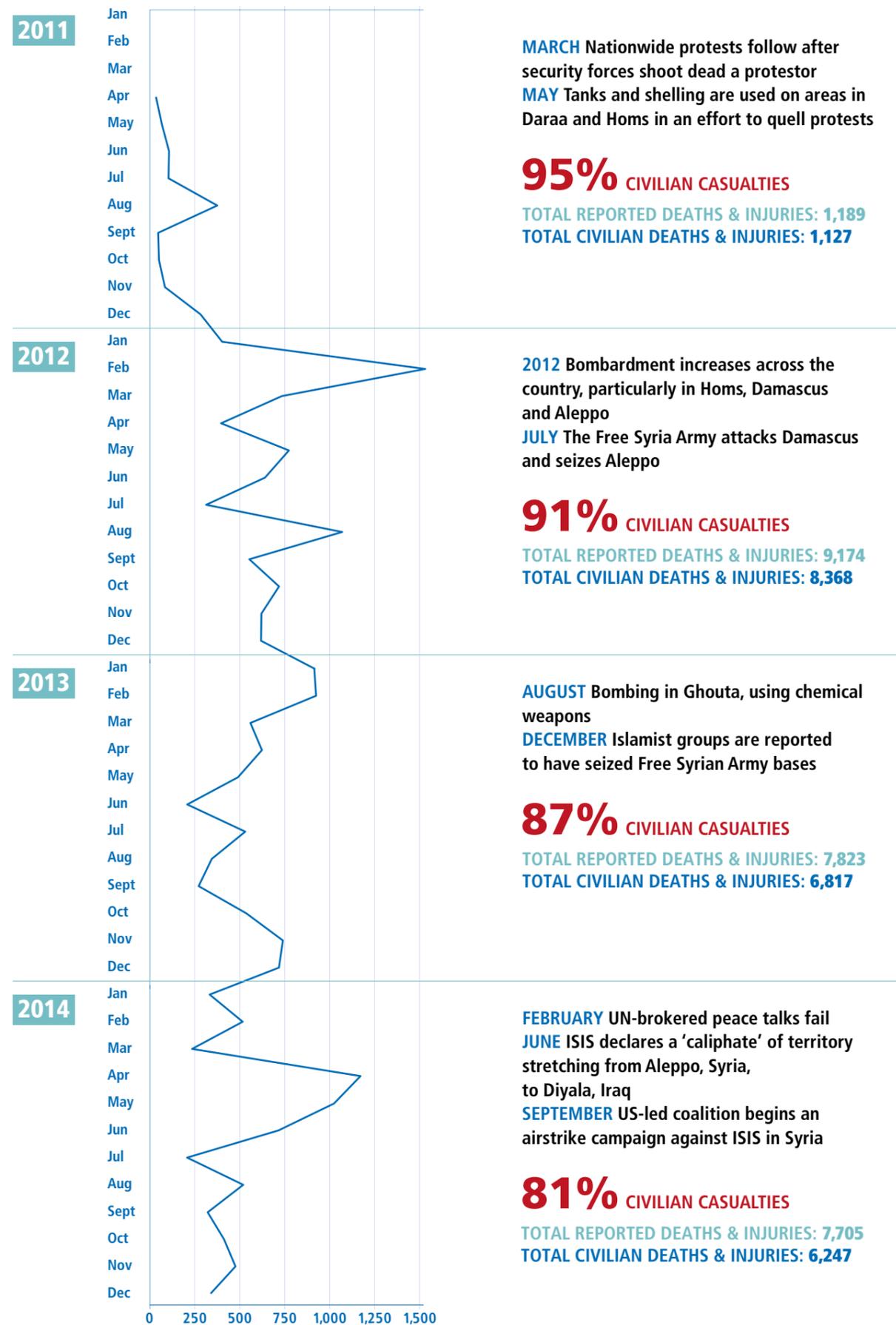


Destruction in Bab Dreeb area in Homs, Syria. By Bo Yaser, 5th April 2012. From Wikimedia Commons.



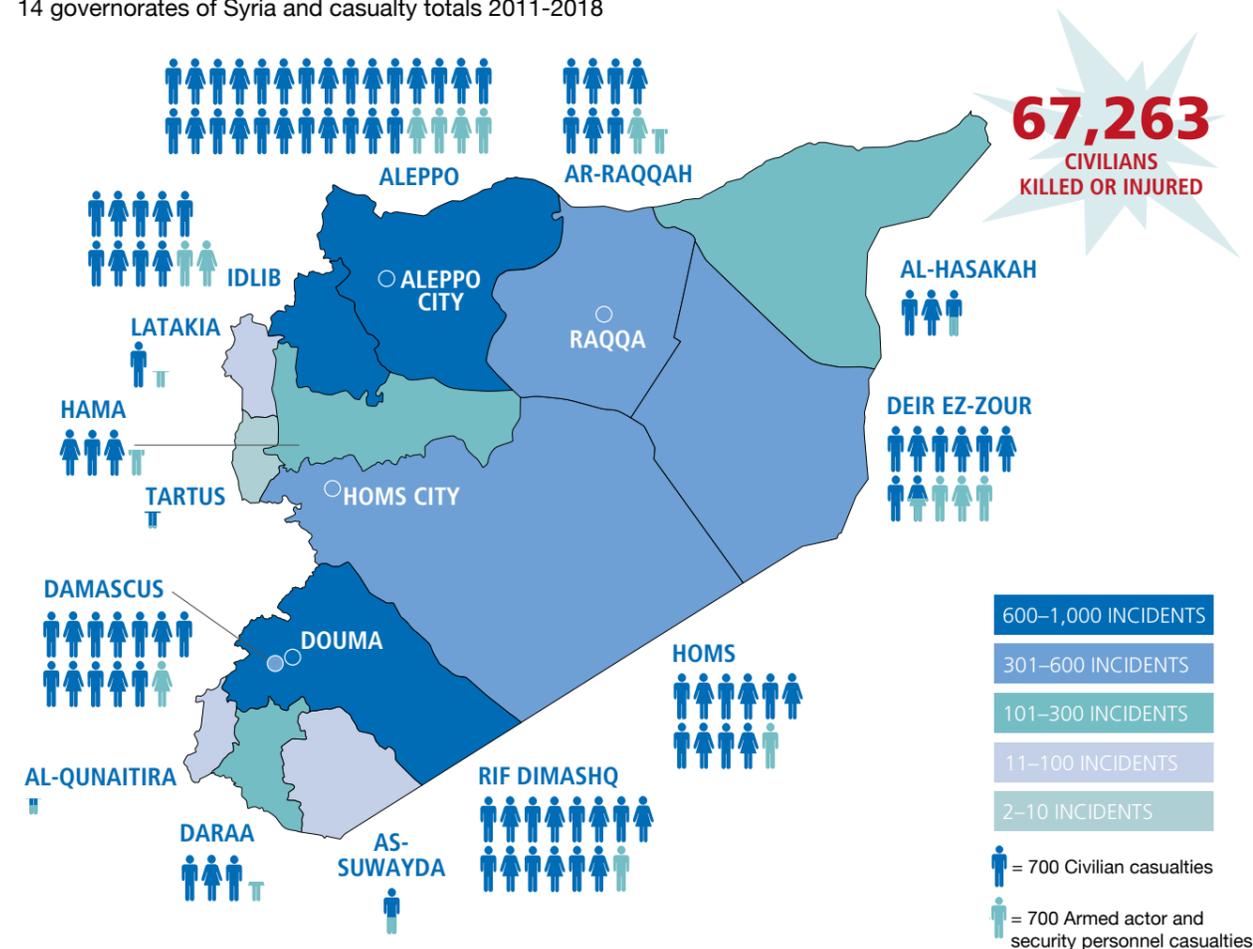
Children at the Rainbow centre in Gaziantep, Turkey.

A TIMELINE OF EXPLOSIVE VIOLENCE IN SYRIA



WORST LOCATIONS

14 governorates of Syria and casualty totals 2011-2018



WORST INCIDENTS

Date	Incident	Location	Civilian casualties
30/10/2015	Multiple aerial bombs hit a crowded marketplace in Douma ¹	Douma, Rif Dimashq	620
20/02/2018	Airstrikes and regime shelling across Eastern Ghouta kills hundreds ²	Eastern Ghouta, Rif Dimashq	598
07/04/2018	Air strikes and barrel bombs laced with toxic gas are dropped on Douma ³	Douma, Rif Dimashq	570
10/05/2018	Two consecutive 1,000kg car bombs target the city centre in Damascus ⁴	Damascus, Damascus	427
25/09/2016	Regime carries out airstrikes across Aleppo ⁵	Aleppo, Aleppo	385
19/02/2018	Government forces use airstrikes, rocket fire and shelling across Eastern Ghouta ⁶	Eastern Ghouta, Rif Dimashq	362
21/02/2012	250 rockets and artillery shells land on Homs over two hours ⁷	Homs, Homs	361
25/07/2018	ISIS conduct seven suicide blasts as part of attacks across Suwaida ⁸	Suwaida	315
12/12/2016	Dawn airstrikes, including barrel bomb, are carried out on ISIS-held villages around Oqayrabat ⁹	Hama	303
16/08/2015	Airstrikes land on a busy market during rush hour in Douma, including potentially a vacuum bomb ¹⁰	Douma, Rif Dimashq	296

Although the map illustrates the governorates that have seen the most civilian casualties, what follows is an analysis of the cities that have seen the most harm.

ALEPPO

Aleppo, one of the oldest continuously inhabited cities in the world and Syria's largest city before the war, is the city (and governorate) that witnessed the highest numbers of civilian casualties from explosive violence. Most civilian casualties occurred during the battle for Aleppo in 2016, when AOVAV recorded 7,959 civilian deaths and injuries from explosive weapons in the wider governorate, with 84% (6,683) in Aleppo city alone. By December 2016, Syrian regime forces with Russian air support had captured Aleppo, but did so with some of the heaviest airstrikes seen since the beginning of the war, with Russian air support taking a significant toll. Over 3.4 million civilians fled the city.¹¹ Over 1.6 million of those sought refuge outside of Syria's borders – 1.8 million were internally displaced. So far, over 300,000 have returned.

Such destruction has left a clearance task of immense proportions, with civilian infrastructure highly damaged, including 30% of housing units.¹² According to the Urban Resilience Platform about 15 million tonnes of debris litters the city.¹³ It is estimated that it will take at least six years of continuous clearance to clear the rubble, at a cost of some \$112 million.¹⁴ The total cost of the damage to Aleppo is estimated to range somewhere between \$6.2 billion and \$7.6 billion - 66% of this is attributed to housing.¹⁵ The worst hit zones in Aleppo have seen 70% or more of the buildings damaged – particularly in the city's industrial areas.

Other figures reveal the extent of the devastation. 60% of healthcare facilities have been damaged or destroyed – with 35% being completely destroyed.¹⁶ By 2014, the city had seen 99% of their physicians either depart or be killed.¹⁷ Almost three-quarters of education facilities in Aleppo have been damaged or destroyed.¹⁸

DAMASCUS

Damascus, the Syrian capital, has seen casualties from explosive violence throughout the war. Unlike other impacted cities in Syria, though, the majority of civilian casualties in the capital, where the perpetrator's status was identified, were from non-state actors

– the capital has been a key target for rebel and other armed groups. The neighbouring areas of Eastern Ghouta, such as Douma, have predominantly been the target of state violence.

Damascus' suburbs have seen the worst destruction to infrastructure, the centre having enough relative stability to reconstruct and rebuild quickly. In this sense, whilst Damascus has seen high levels of civilian casualties, the visible damage has been largely addressed by quick reconstruction efforts led by the government.

In total, Damascus has seen at least 8,006 casualties from explosive weapons of which 95% (7,633) were civilians. Over 1 million fled Damascus over the course of the war, with 718,420 fleeing to other areas of Syria and 386,006 leaving Syria's borders.¹⁹

HOMS

Homs, which was initially nicknamed the 'capital of the revolution',²⁰ was one of the first cities subjected to bombing campaigns by state forces. While it is one of the worst impacted cities in Syria since the war began in 2011, most of the destruction there occurred during the early months of the conflict. In February 2012, the regime began its campaign to retake the city and that year saw the most civilian casualties – 1,621 - of the whole war from explosive violence there; the majority of these - 94% - were caused by regime shelling.

Such bombardments left considerable infrastructural damage. There are an estimated 5.3 million tonnes of debris in Homs, which, if work to clear this was carried out continuously, would take at least 2.5 years to clear.²¹ 23% of housing units there were left damaged or destroyed.

In total, AOVAV recorded at least 3,729 casualties from explosive violence in Homs between 2011 and 2018, of which 98% (3,638) were civilians. In addition, 58% of health facilities were damaged or destroyed, three-quarters of educational facilities were destroyed and over one million people were forcibly displaced from the city.²² Of these, 607,943 fled to Syria and 445,223 remain internally displaced.

RAQQA

It has been reported that more artillery shells were

launched at Raqqa than at any other city since the end of the Vietnam War. And, according to Donatella Rovera, Amnesty International's Senior Crisis Response Advisor, "given that artillery shells have a margin of error of over 100 metres, it is no surprise that the result was mass civilian casualties."²³

In Raqqa, the highest levels of civilian harm were seen in 2017, as the US-led coalition stepped up efforts to 'liberate' the besieged city from ISIS. This effort left thousands of civilians dead and injured, even more displaced, and a city reduced to rubble. In 2017 alone, AOA V recorded 2,531 casualties from explosive weapons in Raqqa, as reported in English-language media. Of these, 96% (2,423) were civilians. Air strikes were the main cause of harm – responsible for 91% of civilian casualties. In total, AOA V has recorded at least 3,634 casualties between 2011 and 2018 from explosive violence in Raqqa, of which 92% (3,326) were civilians.

The city was littered with over 8,000 explosives, leading to continued casualties and frustrating efforts towards reconstruction.²⁴ It is a city where 65% of civilian buildings and 17% of housing units are estimated to be destroyed,²⁵ where 88% of health facilities and 58% of schools have been damaged or destroyed.²⁶ In September 2017 it was estimated that approximately 300,000 people had been displaced from Raqqa since fighting to retake the city began.²⁷ By May 2018, some 132,000 had returned to the city, but many still remain displaced.²⁸

DOUMA (AND EASTERN GHOUTA)

Douma has been one of the cities in Syria worst impacted by explosive violence – as have the surrounding areas of Eastern Ghouta, one of the final rebel strongholds that stands in close proximity to

the Syrian capital Damascus. Douma lies just 10km away from central Damascus and, along with Eastern Ghouta, have been witness to significant levels of explosive violence from the regime and its allies, in attacks that continued through to 2018.

In Douma, the majority of civilian casualties from explosive weapons occurred in 2015, with 1,654 civilian casualties that year. Over three-quarters of these casualties were from airstrikes. On one day - August 16th 2015 - airstrikes hit Douma's streets during rush hour, killing 96 and injuring over 200.²⁹ While an attack on October 30th, 2015, when multiple aerial bombs were dropped over the city, saw the worst incident AOA V has recorded in Syria killing 70 and wounding 550.³⁰ Other areas of Eastern Ghouta were also highly impacted during this period – however the most intense period of bombardment was seen in early 2018, when Eastern Ghouta re-emerged as a significant target for the regime and its allies, leading to some of the highest civilian casualties since the war began. On February 19th 2018, Syrian forces, backed by Russian airstrikes, escalated the offensive there. By April 12th, Eastern Ghouta was declared under the Syrian government's control. In this period over 4,000 civilians were killed and injured in attacks using explosive weapons across the area.

Overall, in Douma alone, AOA V recorded at least 3,066 casualties between 2011 and 2018 from explosive weapons, of which 99% (3,042) were civilians. Many further casualties were seen in surrounding towns and villages in Eastern Ghouta. In addition, Douma also saw 23% of housing units damaged (as of 2017), 100% of health facilities damaged (by 2017, only two facilities in the city were functioning) and, by 2017, 90% of all education facilities being partially damaged.³¹

WEAPONS TYPES

AIR-LAUNCHED



Airstrikes have been responsible for, by far, the majority of civilian harm in Syria, accounting for 45% of all civilian casualties between 2011 and 2018. Civilian casualties from airstrikes increased each year to 2017, when at least 8,767 civilian casualties were recorded by these weapons in Syria.

The main perpetrators of airstrikes have been Syria, the US-led coalition and Russia (see data on perpetrators). The types of bombs dropped, amongst the more conventional, have included: bunker busting bombs, barrel bombs and cluster munitions.

GROUND-LAUNCHED



Ground-launched weapons, such as mortars, rockets and grenades, have caused 30% of civilian casualties between 2011 and 2018. Of the 20,317 civilian deaths and injuries recorded in this period, most (38%) have been recorded under general 'shelling', with 29% under mortar and 10% under rocket.

Of civilian casualties caused by ground-launched attacks, 83% identified the perpetrator status. Where this was identified, non-state groups accounted for 54% of the civilian casualties and state actors accounted for 46%.

IMPROVISED EXPLOSIVE DEVICES (IEDS)



IEDs account for 18% of the civilian casualties caused by explosive weapons between 2011 and 2018.

What's interesting about the level of harm from IEDs, is that whilst civilian casualties from airstrikes increased yearly and as more actors became involved in Syria targeting non-state groups, the level of harm from IEDs has remained relatively stable, other than the initial spike in 2012. Though in the later years, 2017 and 2018, the number of IED incidents have increased substantially, as more victim-activated IEDs are left in territories ISIS have retreated from.

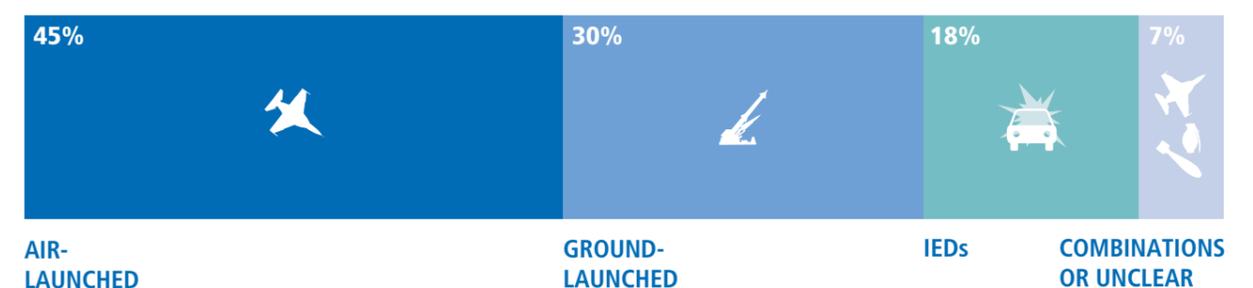
Of the IED types used, car bombs accounted for 68% of the civilian casualties caused. Incidents using multiple types of IEDs accounted for 9%, non-specific IEDs accounted for 21% and roadside bombs for 2%. In total, suicide attacks accounted for 49%.

Where the perpetrating group has been identified, ISIS have been responsible for at least 69% of civilian casualties from IEDs, or 31% of civilian casualties from all IED incidents. Al-Nusra Front (or Hay'at Tahrir al-Sham) have been responsible for 24% of civilian casualties from IED incidents where the perpetrating group was known, or 11% from total incidents.

OTHER EXPLOSIVE WEAPONS

The remaining 7% of civilian casualties were caused in incidents using multiple types of explosive weapons, landmines, naval-launched, or those with an unclear launch-method.

CIVILIAN DEATHS & INJURIES BY WEAPON LAUNCH METHOD



ACTORS

Perpetrator status of explosive violence in Syria

Perpetrator status	Total civilian casualties
Non-State Actors	16,669
State Actors	41,547
State and Non-State Actors	629
Unknown	8,418
Grand Total	67,263

Since 2011, non-state groups have been responsible for 25% of civilian harm in Syria up to the end of 2018. States, meanwhile, are reported to be responsible for 62%. 1% of civilian casualties are caused by incidents involving both state and non-state actors, and for 13%, the perpetrator status of the incidents remain unknown.

WORST ACTORS

Top perpetrating actors of explosive violence in Syria

Perpetrator	Total civilian casualties
Syria	21,153
Syrian rebel groups*	9,439
ISIS	4,181
US-led coalition	3,509
Russia	2,263

There are many states and groups using explosive violence in Syria, as mentioned in the introduction to this report. This is one of the aspects of this conflict that has made it so complex and so bloody. Below, AOA V briefly examines the harm caused by some of the biggest users of explosive violence in Syria.

While the perpetrating status of incidents responsible for 13% of civilian casualties remain unknown, it is worth noting that the perpetrating *group* remains unknown for incidents accounting for 36% of civilian casualties. It has been increasingly difficult over the course of the war, as more actors engaged, to identify the perpetrator, particularly with Russian and Syrian forces targeting the same areas.

Despite this caveat, according to data from AOA V's explosive violence monitor, the Syrian regime has clearly been responsible for the greatest share of civilian casualties in Syria, causing at least 31% of civilian casualties from explosive violence in Syria since 2011. Perhaps of even greater note is the fact that, of those civilian casualties where the perpetrator is known, Syria's responsibility rises to 49%.

Syrian rebel groups, from the FSA to the Al-Nusra Front, have been responsible for at least 14% (9,439) of civilian casualties from the use of explosive weapons in Syria. There is further difficulty distinguishing between the rebel groups, which vary significantly in their ideologies, aims and use of force, with many news sources not specifying the group involved. However, a limited breakdown is provided below where it has been possible to identify the rebel group involved.

ISIS groups have been responsible for over 4,000 civilian deaths and injuries from explosive violence in Syria since AOA V first recorded an ISIS attack in Syria in 2013, with the group gaining prominence in the country in 2015. Despite the occupation and violence in Raqqa in 2017, the worst year for ISIS explosive violence in Syria - in terms of civilian casualties - was in 2016. That year, AOA V recorded 1,740 civilian casualties from ISIS explosive weapons there. The majority of these were from a small number of very high casualty suicide bombings across the country.

The US-led coalition has been responsible for at least 5% (3,509) of civilian casualties in Syria. Their most damaging year for civilian harm was 2017, when AOA V recorded 1,970 civilian deaths and injuries from US-led coalition bombardment: most of these were recorded in Raqqa.

Russia has been responsible for at least 2,263 civilian casualties from explosive violence in Syria. Russia, however, like Syria, has probably been responsible for more casualties than AOA V has been able to record. This is due in large part to the difficulties identifying whether Syrian or Russian forces carried out an attack. Our figures, then, are almost certainly a severe underestimate of the number of civilian casualties caused by Russia's use of explosive weapons in Syria.

Rebel groups using explosive violence in Syria

Rebel Group	No. of incidents	Total civilian casualties	Total armed actor and security personnel casualties	Total casualties
Syrian rebels (unknown group)	370	7,126	150	7,276
Al-Nusra Front	39	1,275	264	1,539
Jaish al-Islam	11	200	2	202
Tahrir al-Sham	6	201	24	225
Ajnad al-Sham	2	130	0	130
FSA	13	176	31	207
Liwaa Furson al-Haqq	1	70	0	70
Al-Nusra Front and Anrar al-ShamLiwaa Fursan al-Haqq	1	65	0	65
Jund al-Aqsa	1	64	0	64
Jaish al-Fateh	3	33	0	33
Bedoin militants	1	24	4	28
Houran Freeman Brigades	1	15	0	15
Fajr Umma	1	12	0	12
Takfiri	1	12	0	12
Ansar al-Tawhid	1	10	0	10
al-Nusra Front and Popular Front for the Liberation of Palestine-General	1	10	0	10
Command Shamiya Front	1	6	0	6
Zenki and Hayyatt Tahrir al-Sham	1	4	0	4
Liwa al-Islam	1	4	0	4
Ahrar al-Sham	2	2	7	9
Shamiya Front and Ahrar al-Sham	1	0	4	4
Islamic Front	3	0	47	47
al-Nusra Front, Islamic Ahrar al-Sham and Qalamoun Liberation Front	1	0	9	9
Ahrar Daret Ezza	1	0	1	1
Der' al-Aasimeh	1	0	31	31
Total	465	9,439	574	10,013

HEALTH

- Life expectancy in Syria dropped by over 20 years according to the Syrian Centre for Policy Research, from 75.9 years in 2010 to 55.7 in 2015
- More than 800 healthcare workers have been killed in attacks on medical facilities since 2012
- The number of physicians in Syria has decreased by 67.5%
- The percentage of children under the age of one lacking immunisation for measles doubled
- There were just 85 psychiatrists in Syria prior to the war. The number today is far lower

The impact of explosive weapons on the health of the Syrian people and on healthcare in Syria is almost indescribable. Life expectancy dropped by over 20 years, according to the Syrian Centre for Policy Research, from 75.9 years in 2010 to 55.7 in 2015.³² It is a worsening fuelled by both direct violence and the indirect impact on health and healthcare.

The direct impact of explosive weapons to human bodies is very complex and for survivors such injuries are almost invariably lifelong. Dr Emily Mayhew, a medical historian at Imperial College London, says of blast injuries: 'Blast alters everything: the way cells heal, the way skin scars, the way bones grow back, the way brains operate. Blast affects pain, memory, resilience, every basic human process of life.'³³

In short, the impact that explosive violence has had on health and healthcare in Syria, both directly and indirectly, has been profound.

INFRASTRUCTURE AND PERSONNEL

In Syria, explosive violence has left health facilities almost completely non-functional,³⁴ with 60% of health-care facilities either damaged or destroyed.³⁵ The make-shift hospitals that have been created are

often poorly staffed; it is estimated that about three-quarters of health-care workers have fled.³⁶ According to the group Physicians for Human Rights, more than 90% of attacks on healthcare facilities and medical personnel have been carried out by the Assad regime or Russia.³⁷

In total, 57% of Syrian medical personnel deaths between March 2011 and December 2017, were caused by explosive violence.³⁸ In 2017, 36 of the 38 documented attacks on medical facilities were caused by explosive weapons – 31 using airstrikes, three using barrel bombs and two using mortars, whilst 44 of the 51 deaths of civilian health professionals were caused by such weapons.³⁹ By February 2018, health facilities were being bombed at a rate of one every 24 hours.⁴⁰ More than 800 healthcare workers have been killed in attacks on medical facilities since 2012.⁴¹

According to Dr Katoub, Advocacy Manager at the Syrian American Medical Society (SAMS), in 2011 there were approximately 40,000 physicians in Syria; by mid-2018 there were just 13,000.⁴² In the North-West of the country there is just one physician per 2,600 people.⁴³

The damage to health infrastructure and harm to medical personnel has meant that, according to Dr Tedros Adhanom Ghebreyesus, WHO Director-General, Syrian civilians are 'dying from injuries and illnesses that are easily treatable and preventable.'⁴⁴ This has been amplified by the collapse of the pharmaceuticals industry, with medicine production having declined by 90% since 2010.⁴⁵ This has resulted in a scarcity of medication and the development of a black market, preventing access for treatable and chronic diseases, especially among the poor.⁴⁶

With just a third of Syria's physicians left in the country, it's also worth considering whether health-care professionals will return post-conflict. There is a general consensus that though many may say they wish to return to Syria, their home, when the conflict ends, many will not; for many, returning would either be too dangerous or they have built lives elsewhere they might not wish to then leave.

This distance between stated intent (to return) and reality (to create a new life elsewhere) is not unique to

Syria. AOAV's wider work on post-conflict environments has repeatedly found that a scarcity of medical personnel is a common complaint. The extreme demands on doctors and other medics, along with the instability of post-conflict environments, mean that many know they can find a better quality of life in another country, and many do.

ILLNESS AND DISEASE

Since the onset of conflict in Syria in 2011, the percentage of infants under the age of one lacking immunisation for measles has more than doubled during the course of the conflict, with 20% lacking such in 2011 to 46% by 2014. That rate stood at 33% in 2017 following concerted efforts to reach children in difficult-to-access areas.⁴⁷ Similar results are also seen for a shortfall in immunisations for DTP (a combination of vaccines against three infectious diseases – diphtheria, tetanus and pertussis).⁴⁸ There has also been over a sevenfold rise in confirmed outbreaks of measles, with 733 cases confirmed in Syria in 2017, compared to 85 in 2016.⁴⁹ This might also be a tip of an iceberg – measles outbreaks are thought to have affected thousands of children in 2017, with infections reported in all 14 governorates.⁵⁰

A risk of contracting a variety of diseases is also heightened by the destruction caused by explosive weapons. Leishmaniasis, for instance, is a disease transmitted by the bite of tiny sand flies and which, in the case of cutaneous leishmaniasis, can cause severe skin lesions – also known as the 'Aleppo boil'.⁵¹ Rubble and debris caused by the explosive weapons have provided the sand fly with a perfect habitat. The incidence of that disease was estimated to have increased by at least 150% in 2014 alone, with between 25,000-40,000 cases per year prior to the war and over 100,000 cases seen in 2014.⁵² And though the situation is thought to have improved in recent years,⁵³ evidence also points to an increase in visceral leishmaniasis too – a disease which is 'almost always fatal'.⁵⁴

Another predictable consequence of bombings is that of increased rates of water-borne diseases, and other maladies related to poor hygiene. However, due to the quick and effective responses from Water, Sanitation and Hygiene (WASH) teams in Syria, it seems that the severity of the outbreaks expected from such conflicts have been avoided. According to the Syrian Relief

Network, 'the major problem is not disease outbreaks but the provision of health care and its accessibility.'⁵⁵

Nevertheless, a contamination of water sources and a widespread loss of access to clean water has meant that the rates of disease have increased.⁵⁶ This has been exacerbated by a decrease in educational access, with children not learning hygiene practices typically taught in school.⁵⁷

Overall, children in cities torn apart by bombs are particularly at risk of illness and disease. In a 2017 study using data collected by Qatar Red Crescent in May 2015, it was found that of 1,002 children assessed in homes and IDP camps across Northern Syria, 29% were suffering from a respiratory illness or disease (including 23% with a respiratory infection), 17% with a digestive illness or disease (10% had diarrhoea or bloody diarrhoea and 4% were malnourished), and 19% had a neurological illness or disease (including 7% with meningitis).⁵⁸



Prosthesis being made in IPHS clinic in Gaziantep, Turkey.

ACCESS TO TREATMENT

With profound shortages of trained personnel and functioning health facilities, as well as with damage to transport infrastructure and rising poverty, medical treatment throughout Syria has become ever harder to access. According to doctors from the Syrian Expatriate Medical Association (SEMA) there is a 'severe lack of specialised care', such as gynaecologists or orthopaedic surgeons, throughout the country, a reality not eased by the fact that donors tend to focus on funding emergency care for 'cost-effective intervention'.⁵⁹ Those in north-west Syria, for instance, have to seek care in Turkey for many specialist treatments, but many are unable to undertake such a journey due to logistics and poverty. In addition, quality of care is said to have decreased as doctors' caseloads have more than doubled.⁶⁰

In particular, blast injury survivors are most impacted by the chaos and the disruption to health services that war creates. Many of those interviewed for this report talked of limited access to rehabilitation, with the injured and disabled expressing particular trouble doing such.

Due to ongoing explosive violence and instability, follow-up care is also notoriously difficult. In many cases, patients have been forcibly displaced before they could attend doctor's follow-up appointments, and so have subsequently been unable to continue treatment.⁶¹ Others have been unable to seek medical assistance due to the costs of treatment or the logistics in accessing such.

Recognising such challenges, Hand in Hand for Aid and Development (HIHFAD) have begun mobilising multisectoral teams to provide evaluation, care, equipment and training for the treatment of patients.⁶² Perhaps the most concerning thing is that HIHFAD have reported that, on follow-up, 25% of those injured that they have assisted had been further injured in ongoing fighting. Such continued violence also displaced 13% of all respondents and killed one patient.

Amongst the refugees and NGO organisations interviewed by AOA, many Syrian refugees struggled to access services, particularly those lacking appropriate documents. They also faced language barriers, economic concerns, fear and stigma, which all could further prevent them from seeking treatment from both

physical and psychological health conditions. In Turkey, for example, if you don't possess a right-to-remain document, then you risk being reported to the police on visiting a hospital or other healthcare facilities.⁶³

The level of need amongst Syrian refugees, as well as cuts in donor funding and political uncertainty regarding refugees in some host countries, has also meant that humanitarian agencies are struggling to cope. At the International Pitying Hearts Society (IPHS) a lack of funding has forced them to close their clinics in Syria and in some Turkish border areas. Their clinic in Gaziantep has a waiting list for prosthetics for more than 2,000 people.⁶⁴

In Lebanon and Jordan, one survey found that almost a quarter of refugees interviewed had a disability (22.9% in Jordan and 22.6% in Lebanon). Of these, a quarter in Jordan and over half (57.5%) in Lebanon needed specialised services, but had been unable to access them.⁶⁵



Imam who lost a leg due to an airstrike in Aleppo, Syria.

Such a lack of treatment has meant Syrians are often faced with incorrect treatment or self-treatment. Whilst self-treatment can be useful if the patient is informed, as organisations like HIHFAD have tried to ensure, patients and carers all too often make ill-informed treatment choices. For example, many Syrians are said to be purchasing over-the-counter antibiotics, self-prescribing and overusing antibiotics. This, in turn, has increased antimicrobial resistance (AMR) in Syria.⁶⁶

In this regard, the injuries caused by explosive weapons pose a particular concern. As one review of antimicrobial resistance concluded: 'the war trauma produced by the heavy weaponry used in this conflict has led to an exponential increase in the number of infection-prone high-risk injuries such as contaminated open wounds and fractures.'⁶⁷ Many of those self-prescribing antibiotics often do so incorrectly, such as failing to finish the course, while the constant movement of refugees raises the risk that certain strains of AMR may spread.⁶⁸ When compared to local populations, the rates of AMR are notably higher, and the strains different, among refugee populations.⁶⁹ One German study, for instance, found an increased prevalence of antibiotic resistant genes (ARGs) in refugees from Syria, Iraq and Afghanistan compared to local Germans.⁷⁰

PHYSICAL

According to the World Health Organisation (WHO), more than 11.3 million people are in need of health assistance in Syria, including three million living with injuries or disabilities.⁷¹ In 2016, the Syrian Center for Policy Research (SCPR), estimated that 11.5% of the country's population have been killed or injured since the crisis erupted in March 2011.⁷² And, as explosive weapons injure more people than they kill, along with medical advances in traumatic injury care, it is a truth that more Syrians will have survived bomb blasts, albeit often with complex injuries. In most modern conflicts, the number of wounded is more than double those killed – though this is, of course, dependent on the availability of healthcare.⁷³

There are numerous physical health consequences caused by explosive weapons. Blast injuries, for instance, greatly increase the risk of developing chronic health conditions such as hypertension, diabetes, coronary artery disease and chronic kidney disease.⁷⁴

Among the 25,000 Syrian refugees with injuries examined in a 2016 report from *Humanity and Inclusion* (formerly 'Handicap International'), 53% had been harmed by explosive weapons.⁷⁵ Of these, 89% had permanent or temporary physical impairment. 47% had fractures or complex fractures, including open fractures of the lower and/or upper limbs. 15% had undergone amputation.

In some areas, the rate of injury and disability to Syrian civilians was even higher. In a survey across Idlib, Aleppo and Raqqa, between 40-50% were estimated to be living with a disability.⁷⁶ The main cause of injuries across these areas were airstrikes (54%), followed by other explosions (28%). Impairments associated with mobility and self-care were by far the most prevalent.

Such blast injuries require long-term healthcare, particularly when it comes to the issue of prostheses. Another survey conducted with patients in north-west Syria estimated that almost half of those injured by the conflict were expected to have a permanent impairment.⁷⁷ Amputations are, sadly, commonplace – one doctor commented that Syria will be left with 'a generation of amputees'.⁷⁸ While the NGO Humanity and Inclusion reports that of approximately one million injured people in Syria, around 8% required an orthopaedic fitting.⁷⁹

Clearly, such amputees have life-long healthcare needs: from rehabilitation and tissue management to further associated conditions, such as ectopic bone formations and osteoarthritis. Such conditions are difficult to manage in a developed healthcare system, let alone in a post-conflict environment with a dilapidated and destroyed healthcare infrastructure. Moreover, as many injuries are borne by children, there is an even greater demand on healthcare to address their needs.

PSYCHOLOGICAL

The psychological harm caused by the Syrian conflict is one area where considerable study has been undertaken in recent years. A *Save the Children* study found that, among Syrian refugees interviewed, almost all children and 84% of adults said bombing and shelling was the primary cause of psychological stress.⁸⁰ 71% of interviewees said children were increasingly suffering from symptoms of toxic stress and PTSD.⁸¹



A patient attending the IPHS clinic in Gaziantep, Turkey, who lost a leg due to airstrikes in Aleppo, Syria.

These psychological conditions are expected to have lasting consequences. As the report concluded, 'daily exposure to the kind of traumatic events that Syria's children endure... will likely lead to a rise in long-term mental health disorders'.⁸² In children, the psychological stress of bombardment manifests itself in a variety of ways, often with significant behavioural changes and psychosomatic symptoms.⁸³ In some cases, the impact is so great that children turn to substance abuse, self-harm, or even suicide attempts.⁸⁴

Overall, according to the World Health Organisation, about 'one in 30 people in Syria is suffering from a severe mental health condition and at least one is suffering from a mild to moderate mental health condition as a result of prolonged exposure to violence'.⁸⁵

Syria is clearly unable to treat such numbers effectively. In 2009, prior to the war, it was reported there were just 85 psychiatrists in the whole country.⁸⁶ If we assume a similar decrease in psychiatrists as with physicians there would be less than 30 psychiatrists for the entire country - though some interviewed reported far less.⁸⁷

In response to this, humanitarian agencies have begun training medical personnel to manage some psychological conditions, but with many patients needing long-term specialist care, such ad hoc responses fail to offer a comprehensive solution.

In refugee communities, challenges in accessing psychological support were similar to those reported for accessing physical health support. In addition, there existed added societal stigma relating to mental health disorders, and disquiet at a 'western approach' offered towards psychological care.⁸⁸

It is also of note that refugees often face further trauma in their countries of refuge, which can exacerbate existing psychological conditions. Citizen's Assembly, an NGO in Istanbul, reported that of the refugees using their services, 90% have PTSD or depression.

Additionally, the insecurities that many refugees face, including issues over registration, difficulties in finding suitable shelter, insecure job prospects and xenophobia, create further stress and anxiety that can exacerbate pre-existing mental health problems.⁸⁹

CONCLUSION

Extensive damage to the Syrian health service has placed a serious strain upon the population, with children and victims of explosive violence at most risk. Health system infrastructure may take years to be rebuilt, while the loss of key medical personnel could take a generation to remedy. Whilst this is the case, those living with illness and injury will continue to suffer - many of the injured will have complex needs and will require a lifetime of care, particularly the young people who have been injured in the conflict. It is also likely that casualties will continue due to the level of explosive contamination, discussed further below.

ECONOMY

- Syria's GDP stands at half of its pre-conflict level
- The Syrian Pound has depreciated by 400%
- Jobs have been destroyed at an estimated average rate of 538,000 per year
- More than three in four Syrians of working age are not earning an income
- More than 80% of Syrians live below the poverty line; seven in ten Syrians live in *extreme* poverty

Explosive violence and economic insecurity go hand-in-hand, particularly when civilian infrastructure is widely damaged. Syria proves no exception to this rule. Widespread bomb damage has left millions needing aid to survive. In the section below, AOAV examines the economic harm in Syria from the use of explosive weapons.

GDP

The GDP of a country experiencing conflict typically falls by an average of two percentage points.⁹⁰ Syria's GDP fell by over five times this after the start of the conflict in 2011. By 2015, total GDP stood at half its pre-conflict levels.⁹¹ The estimated foregone output (the expected output if there was no conflict) amounts to four times the size of Syria's GDP in 2010; a cumulative loss of some \$226 billion.⁹²

The most severely affected sector is that of mining (including oil and gas). Oil and gas production, prior to the Syrian conflict, was the main source of government revenue, but by 2016, daily oil production had dropped from a peak of 368,000 barrels of oil per day to less than 40,000.⁹³ Much of this was down to the instability created by the conflict, alongside damage to facilities and pipelines.

Non-oil GDP also declined by an annual rate of 15.5% between 2011 and 2014, and was estimated to decline

a further 4.9% and 4.3% in 2015 and 2016 respectively.⁹⁴ Government oil production has come to a virtual halt over the course of the war. In 2010, Syria produced 386,000 barrels of oil per day. Having reduced drastically throughout the conflict, in 2017 16,700 barrels per day were produced - just 4% of that produced pre-crisis.⁹⁵

The extent of explosive damage to pipelines and facilities remains unclear but is said to be extensive; much of Syria's oil fields fell under opposition or ISIS control, becoming the target of various bombing campaigns.⁹⁶ A major oil pipeline in Homs was hit by an explosion in 2012 - Syrian activists said the damage was down to regime airstrikes, while state media blamed 'terrorist groups'.⁹⁷ Other pipelines and extractive infrastructure have also been damaged by explosive weapons.⁹⁸ Many of the ISIS-controlled oil fields came under heavy bombardment from US-led coalition forces in their attempt to curtail oil revenues to ISIS (discussed in more detail under the environment section of this report).⁹⁹

Overall, every sector of Syria's economy has been severely affected by the war. Manufacturing, domestic trade and construction have declined, on average, by more than 70%. The contribution of agriculture and government services has risen as a proportion of GDP from about 30% in 2010 to 46% in 2014, despite these sectors having contracted in real terms by more than 40%.¹⁰⁰

CURRENCY AND DEBT

Due to the large military expenses associated with waging conflict, capital expenditures have fallen rapidly, to about 0.5% of GDP in 2016, compared to 9% of GDP in 2010, while current expenditure has increased by 6% of GDP in 2016 compared to 2010.¹⁰¹

The Syrian Pound had depreciated by 400% by March 2017 when it was trading at 514.43,¹⁰² a fall exacerbated by a sharp decline in tourism and oil exports. In January 2018, it was trading at 515.¹⁰³ Lines of credit from Iran and assistance from Russia have helped government finances, but the already high public debt has taken a battering, doubling between 2011 and 2014.¹⁰⁴ It was estimated that public debt stood at 94.8% of GDP in 2017.¹⁰⁵ In terms of GDP growth rate, Syria currently stands in last place in the CIA's World Factbook,¹⁰⁶ and 194th in GDP per capita.¹⁰⁷

For consumers, prices rose by more than 300% between March 2011 and May 2015.¹⁰⁸ This rise reflects a combination of supply shortages of basic goods such as food, medicine, and fuel, along with cuts in government subsidies (water, food, electricity, and fuel) and the depreciating currency, but it also reflects the impact of war – and explosive violence – on supply chains and purchasing power.

As a result of food price inflation, the 2015 FAO/WFP report found that households were having to spend a disproportionate amount on food – well over 50% of income in many areas.¹⁰⁹ Such levels of spending were confirmed by interviews conducted in 2018 – with such prices, many are having to choose between buying water or food.

EMPLOYMENT

Rapidly-shrinking job opportunities and scaled-down social security programmes have further aggravated Syria's humanitarian crisis.¹¹⁰ Jobs were being destroyed at an estimated rate of approximately 538,000 per year between 2010 and 2015, adding 482,000 people to the unemployment pool every year.¹¹¹ More than three in four Syrians of working age are not involved in any economic value generation. Unemployment among youth reached 78% in 2015.¹¹²

The loss of electrical power across many areas of Syria, widespread damage to infrastructure and the high cost of fuel have also contributed significantly to the loss of employment, as the war has forced many employers out of business. Such a downturn has been exacerbated by the loss and the displacement of skilled workers such as engineers and doctors. These same skilled labourers, however, also struggle to find employment in host countries, where their qualifications are either not valued or their language skills are deemed insufficient. One former engineer that AOA V interviewed in Gaziantep, for example, was happy to find employment, though instead of the petroleum industry he used to work in, he now worked in a bakery. His qualifications in engineering from Syria were unrecognised in Turkey.¹¹³

In north Syria, 70% of the populace are said to work in agriculture and livestock.¹¹⁴ However, extensive damage to agricultural infrastructure, and the systems that power it, through both explosive violence and neglect, has also meant that the amount of work in this area has been seriously impacted. Small-scale farmers have lost yields through displacement, pushing them into poverty; others have been forced to shift to cultivating less labour- and resource-intensive crops, such as coriander and other herbs.¹¹⁵



Syrian refugees often live amongst the poorest areas and neighbourhoods in Turkish cities.

Such shifts have had consequences. The amount of paid work available has shrunk and there has been a concentration of wealth among larger businesses.¹¹⁶ This area, like many others, has also suffered due to the loss of skilled workers, who are relied upon for expertise and repairs. The loss of skilled-workers, particularly engineers, has led to a loss of business and infrastructural operation in many areas, as many have fled to find refuge elsewhere.¹¹⁷

Post-conflict it is likely that Syria will hold a weak labour market. The disruption to education, and the numbers of IDPs and refugees, will leave a shortage of skilled workers, teachers, professionals, and physicians for example – similar to what AOA V recorded in post-war Sri Lanka. Many refugees may choose to stay in host countries rather than face the insecurity and instability in post-conflict Syria.

POVERTY

Approximately seven in ten Syrians live in *extreme* poverty today, unable to meet basic food and non-food needs.¹¹⁸

So widespread is this economic deprivation that many Syrians, including children, have had to find jobs in the informal sector to survive. The main reasons for such endemic poverty are the loss of property, jobs, and access to public services, including power, health and clean water, as well as rising food prices.¹¹⁹ Many items are no longer available on the market and, where they are, the prices are as much as triple that of previous years.¹²⁰

The cost of living, and of accessing vital resources, has become significantly higher. Prices for fuel oil increased 10-fold between 2011 and 2015. Rice and sugar prices rose by 230% in the same period.¹²¹ 6.5 million people in Syria face large food consumption gaps and extreme loss of livelihood assets, contributing to food consumption gaps, with a further 4 million people are at risk of becoming food insecure.¹²²

So bad are the levels of poverty that some Syrians have begun to rely on their children to help feed the family. Typically, boys have to undertake such work, because cultural values often prevent adult women from finding employment.¹²³ Girls, on the other hand, are often married off and Syria reportedly has seen an

increase in child marriage – freeing up the family from an extra mouth to feed.¹²⁴ (This is discussed in more detail under the section on Society and Culture.)

Levels of poverty and hardship are further exacerbated by explosive violence damage to infrastructure. Many in Syria live without electricity or access to clean water. Some rely on power generators, if they can afford it, and – for water – many are forced to turn to unsafe sources. A refugee living in Turkey explained that two of her sisters, still living in Aleppo, tried to filter the water themselves using cloth. It was the only water they could access, and was clearly contaminated. The sisters also had no electricity, so had to pay a neighbour to access power from a generator – but as this was also recorded on their electricity meter, they ended up having to pay two bills each month. It was said that they relied entirely upon their family abroad to pay their bills, as they had been long forced into unemployment.

Omar Sobeh, the WASH sub-cluster coordinator for Syria, told AOA V that many Syrians were spending up to 25% of whatever small income they had to access safe water, with their monthly earnings ranging from between \$50 to \$100.¹²⁵

Refugee communities

Refugee communities often face similar levels of unemployment and poverty. In Turkey, child labour amongst refugees was not uncommon, while many families found themselves living in cramped and unsanitary conditions. Syrian refugees were often on low wages, particularly children and those without a work permit – groups that could be more easily exploited.¹²⁶

The housing some refugees are forced to live in reflects this. Many were sharing a home with three other families, with up to fifteen in a room. Some organisations even reported that refugees, unable to afford a room in shared accommodation, would rent a shared bed with an allotted time slot, such as eight hours, in which they could sleep on a rotational basis.¹²⁷

INTERNATIONAL AID

In 2017, the US contributed \$169.6 million to mine action projects in Iraq and Syria.¹²⁸ In addition, the US contributed \$63 million to support clearance in areas liberated from Islamic State in northeast Syria, as well



This Syrian refugee has set-up his own business in Gaziantep, Turkey, after fleeing Syria two years ago.

as risk education activities. This is six-times higher than US funding provided in 2016. Syria also received substantial funds from Germany, with \$13.9 million provided for mine-related activities.¹²⁹ In June 2018, Australia announced new funding to cover mine action activities conducted by UNMAS in Syria (A\$8 million/US\$6 million) over 2018 to 2019.¹³⁰

In total, Syria received \$89.4 million of international support for mine-related activities in 2017.¹³¹ And, since 2012, international contributions to mine action in Syria have jumped from just \$1 million in 2012 to almost \$90 million in 2017.¹³²

Yet, whilst some areas have seen a rise in aid, others have increasingly struggled as the conflict unfolded. In 2018, a joint UN-EU pledging conference in Brussels raised \$4 billion, but this was less than half of the \$9 billion needed to help those in Syria and living as refugees.¹³³ And whilst funding has increased year on year in response to humanitarian aid requirements, the amounts needed have not been met, according to OCHA's Financial Tracking Service.¹³⁴

In a sense, the vast need for humanitarian aid has created its own economy in Syria, with millions reliant upon assistance – with certain donated goods traded

in a refugee grey economy.¹³⁵ And yet, in 2018, aid was said to be reaching less than 20% of those in desperate need in Syria, particularly those in hard to reach areas.¹³⁶

WIDER-ECONOMIC IMPACT

Explosive violence in Syria has also had wider economic impacts, particularly on countries hosting large numbers of refugees. Lebanon, for instance, has been particularly impacted. With 1.5 million Syrian refugees living there – more than a quarter of the population of Lebanon¹³⁷ – such an influx has, in some areas, caused the population to double. It has even meant that in some towns and villages, the host community has been rendered a minority.¹³⁸ Such an influx has also led to a doubling of levels of unemployment¹³⁹ and placed considerable strain upon Lebanon's economy – humanitarian aid being insufficient to support all the needs of refugees.¹⁴⁰ Overall, it is estimated that the Syrian crisis, by 2017, had cost Lebanon some \$20 billion.¹⁴¹

Since the beginning of the Syrian war, GDP growth in Lebanon has also declined drastically. According to Talal F Salman, Economic Advisor to the Minister Project Director in Beirut, 'by the end of 2017 the GDP stood at \$53 billion when, if it had continued at

a normal rate, it should have been \$80 billion.' This doesn't stem from the refugee crisis alone; Syria is Lebanon's only overland connection with the rest of the world, and more than 20% of total exports and about 6% of total imports transit by land through Syria.¹⁴² Since the war, both overland imports and exports have been severely disrupted. Tourism and other areas of the services sector, which make up 70% of Lebanon's GDP, have also been harmed by the Syrian war.¹⁴³ It is believed that the influx of refugees, fear of conflict spill-over, as well as the possibility of conflict with Israel, have all curtailed tourism to Lebanon.¹⁴⁴

CONCLUSION

The economic situation in Syria is critical and – predictably – the poorest there have been impacted the most. Whilst it is likely the economy will recover as the levels of violence in Syria declines, such a recovery will certainly be uneven and will have adverse impact in environmental terms, too.¹⁴⁵ Overall, poverty in Syria is likely to be long-lasting, particularly for those displaced by the explosive violence, and it will require the international community to continue supplying redevelopment aid, as well as for mine-clearance and victim assistance, for years, even decades, to come.



Syrian refugee children play outside their home in Gaziantep, Turkey.

ENVIRONMENT

- In 2017, there were at least 1,906 casualties reported from landmines and ERW
- Clearance of landmines and ERW could take approximately 50 years
- The destruction to civilian infrastructure across Syria amounts to over \$75 billion
- 50% of basic infrastructure in Syria is thought to be either destroyed or rendered non-operational
- Coalition bombing has damaged over 250 targets related to oil installations
- Agriculture production contracted by 41 percent between 2011 and 2015

The heavy use of explosive weapons leaves a considerable environmental impact, particularly deployed over populated areas such as towns and cities. It is not just the weapons themselves that contaminate, but also the destruction and disruption they cause that can have unexpected and often-times devastating impact on both the environment and on environmental health. Such consequences can present a severe hindrance to post-conflict recovery.

Despite the levels of potential harm, the environmental impacts of conflict are often understudied, and can be ignored by those considering redevelopment issues, with often a greater focus placed on quick solutions than sustainable ones. Below, AOA V examines some of the key environmental concerns arising from the use of explosive weapons in Syria, and seeks to highlight areas of concern that those seeking to help rebuild Syria might consider.

UXO

In 2017, 1,906 casualties in Syria were recorded by the Landmine and Cluster Munition Monitor from landmines and ERW, though the true figure is thought to be significantly higher¹⁴⁶ 47% of these were caused

by improvised victim-activated devices or IEDs. The majority of those harmed were seen in Raqqa and Aleppo, with 880 (46%) and 550 (29%) landmine and ERW casualties recorded there respectively.¹⁴⁷ According to UNMAS, it is thought that men and boys are most at risk, due to cultural norms surrounding gender and employment.¹⁴⁸ Boys, for instance, are more likely to engage in unsafe behaviour, such as trying to move ERW or get scrap metal from items. Farmers are also more likely to be amongst the victims, as they are forced to work on the land where the contamination exists - a hard truth born from economic necessity.¹⁴⁹

There is little data available on levels of UXO contamination across Syria. UNMAS rely on estimates based on the number of explosive incidents, recorded by UNOCHA, alongside civilian perceptions of the level of contamination on the ground, established through Multi-Sectoral Needs Assessments (MSNAs). UNMAS also uses casualty data and, with the help of teams on the ground, carries out basic surveys to gain a better idea of levels of contamination. It is clear from such work that the levels of UXO contamination in Syria are extensive, and that clearance could take decades; some estimates are that it could take 50 years.¹⁵⁰

Matthew Williams, Head of the Programme and Coordination Unit at UNMAS Syria Response in Jordan told AOA V that there was, on average, one instance of explosive weapon use in Syria every ten minutes since January 2015¹⁵¹ (and one attack could include several bombs – particularly in the case of cluster munitions). When applying a 10% failure rate for modern weapons,¹⁵² it is clear that a considerable amount of contamination must exist.

Currently, there is precious little in terms of UXO clearance taking place across Syria, despite efforts by civilians and local organisations. Where work is being carried out, such teams often have little in terms of training and lack the necessary equipment. Their task, too, is daunting: one issue consistently noted by clearance organisations was the fact that the debris and rubble that littered Syria contained many layers of explosive contamination.

This layered contamination requires the use of armoured vehicles to reach the explosives – and organisations in Syria frequently find themselves unable to access

such equipment. The Rojova Mine Control Organisation (RMCO), an organisation committed to carrying out clearance in Northern Syria, for instance said that the lack of such armoured vehicles is one of the main barriers they face. Shortages such as these lead to the ad-hoc removal of rubble that has, in turn, resulted in a number of injuries amongst the civilian population.¹⁵³

The provision of clearance equipment has its own challenges. The Turkish government has placed strict restrictions on what can pass through its border to Syria, preventing the importing of much of the equipment needed for full surveys and clearance.¹⁵⁴ There are also other barriers to clearance in terms of funding and training. At the RMCO, for instance, they often find themselves unable to pay the salaries of those carrying out the work.¹⁵⁵

More aspects of UXO are discussed in other sections throughout this paper and below.



Damaged home of a Syrian refugee AOA V met in Turkey.

AGRICULTURE

The GDP from agricultural output in Syria contracted 41% between 2011 and 2015.¹⁵⁶ There have been significant shortages in equipment and difficulties in storing produce, as well as sustained damage to irrigation infrastructure that has severely curtailed production. According to the Food and Agriculture Organization (FAO), by 2014 wheat production had halved in Syria when compared to mid-2000.¹⁵⁷

It is a decline that has been exacerbated by a number of things. Irrigation systems have been damaged by bombardments, and such destruction has been compounded by the displacement of skilled workers – who would have repaired the harm – leading to years of neglect. Indeed, one of the most cited problems to the future of agriculture in Syria is the continued difficulty in finding qualified workers.¹⁵⁸

Sometimes such irrigation destruction has been purposeful; in Raqqa, for instance, ISIS bombed the irrigation control centre before their surrender and withdrawal.¹⁵⁹ Coalition airstrikes have also damaged irrigation infrastructure.¹⁶⁰ Such damage often leads to increased water pumping costs that has, in turn, led to many small-scale farmers being unable to survive.¹⁶¹ This harm has in many cases led to a loss of capital and debt.¹⁶²

Farmers have been reported by UNMAS to be amongst the most common casualties from ERW in northern Syria, particularly in the north-west.¹⁶³ This is, in large part, because of the nature of working the land and the economic need for such. Dr Omar Atik, at Shafak, for instance, told AOA V that many farmers work their land, even knowing it is contaminated.¹⁶⁴

Another impact of the conflict has been about the type of produce grown. Efforts taken to redevelop the agricultural sector have tended to focus on cash crops – those that are less cost-, resource- and work-intensive, such as herbs. This has meant a move away from the staple commodities. While this is good in the short term for the farmer, it is not beneficial for the wider community.¹⁶⁵

INFRASTRUCTURE

By 2017, over 50% of the basic infrastructure in Syria was thought to be either destroyed or damaged.¹⁶⁶

The Syrian Center for Policy Research (SCPR) further estimated in a 2016 report that the destruction to civilian infrastructure across Syria amounted to some \$75 billion.¹⁶⁷ Such wreckage has not only had a severe impact on the economy but has also devastated the lives of countless of civilians.

As of March 2016, an estimated 20% of the total housing of Aleppo, Dar'a, Hama, Homs and Idlib, lay in ruins. About 34% of housing units were said to be partially damaged, with Aleppo having the largest number of partially destroyed housing units – though this did not include the extreme damage to Aleppo caused during the bombardment of the final months of 2016.¹⁶⁸ In Raqqa, 80% of the buildings have been reported either partially or completely destroyed.¹⁶⁹ Damage to infrastructure has also caused disruption to industrial facilities (and production) and led to constant power outages.

Fuel shortages and conflict-driven constraints to the operation and maintenance of power stations have led to a sharp drop in supply. Power generation declined from 43,164 gigawatt-hours (GWh) in 2010 to 16,208 GWh in 2015 – a fall of 62.5%.¹⁷⁰ Much of this was down to fuel shortages, as available generation capacity declined by about 30% in the same period. This decline in electricity supply has caused major disruptions, especially with regard to access to clean water. By 2013, much of Syria's water supply system had become reliant on generators, and even then, only about 50% of capacity was able to be supplied. In the north, as much as 60% of the water systems there were said to be non-functional due to this lack of power.¹⁷¹

Across eight governorates – namely Aleppo, Raqqa, Daraa, Rif Dimashq, Deir Ezzor, Homs, Hama, and Idlib – one study found physical damage to 457 water supply and sanitation infrastructure assets. The report concluded that 'nearly two-thirds of the water treatment plants, half of the pumping stations, a third of the water towers, a quarter of the sewage treatment plants, and a sixth of the wells have been destroyed or partially damaged across Syria.' This survey did not include an assessment of damage to pipe networks.¹⁷² But it is clear that, even though some of those networks were damaged prior to the war, the war has greatly exacerbated such harm and further prevented repairs.¹⁷³

In addition, damage to wastewater treatment plants from airstrikes around Aleppo and Damascus is estimated to have affected 3.4 million people in 2015.¹⁷⁴ It is reported that, due to the proximity of water and waste-water pipes, alongside a predominantly rocky terrain which causes leaked wastewater to seep kilometres, clean water sources are often contaminated. This has, of course, furthered the spread of waterborne diseases with profound subsequent health consequences (for more, please see the section on health).

Overall, across Syria there has been a reported 50% reduction in access to safe water, due to infrastructural damage, a lack of maintenance and a loss of power supply.¹⁷⁵ The number of people who use the water network as their primary supply is even lower, a drop from 95% prior to the conflict, to 13% today. In 2018, it was reported that many Syrians spend as much as 25% of their income on water – a price that can prevent families from acquiring other necessities.¹⁷⁶

Many of the refugees that AOAV spoke to, particularly those from Aleppo, had seen their homes severely damaged or destroyed. They spoke of those they knew who had remained behind in Syria. How many had moved into the surviving homes of relatives, friends or displaced strangers. How others, if their houses were not damaged, had opened their doors to the blighted – sharing their roofs with neighbours and friends.¹⁷⁷

One Syrian architect spoke of how the poorest neighbourhoods in Aleppo had been the most bombed and how, as many professionals had fled from the middle class suburbs, those from the poorer areas had moved into the empty homes left behind.¹⁷⁸ She voiced a concern about such a trend – that it could cause tensions when people begin to return. Many displaced families may not wish to vacate the homes they had been occupying, especially as they may not have a home to return to.

Another architect from Homs spoke of his concern that Syria has no experience of rebuilding after a disaster.¹⁷⁹ In particular, he said, many civilians may be trying to rebuild their broken homes, leading to unsafe construction practices and unstable constructions. He also spoke of the need to involve local communities in reconstruction decision-making – a failure to do so

could lead to rebuilds that were neither beneficial nor suitable for local communities, and doing so could hamper long-term community cohesion and a sense of belonging.¹⁸⁰

All the architects that AOAV spoke to, however, saw opportunities in the rebuilding process too – a chance to build better homes, particularly in poorer districts – and even a chance to build up cities where divisions could be healed, not exacerbated.

The damage to health and education infrastructure is discussed elsewhere in this report.

POLLUTION

The use of explosive weapons in populated areas and the destruction of civilian infrastructure causes a number of environmental concerns. The composition of the explosive weapons themselves means that such elements, including for example, heavy metals, fuels, lubricants, solvents and energetic materials such as RDX and TNT and propellants (such as perchlorate),¹⁸¹ can contaminate both soil and groundwater.¹⁸²



Homes destroyed in Aleppo, Syria.

Additionally, such metal contamination also makes the clearance of ERW all the harder.¹⁸³ Furthermore, the destruction of large numbers of oil refineries, textile, pharmaceutical and plastic factories, power stations and hospitals are all also likely to have released toxins and hazards into the environment.¹⁸⁴ Of all, though, it is perhaps the extensive damage to buildings in general across Syria that may cause the greatest environmental consequences there and, in so doing, exacerbate other forms of environmental fallout.

The use of explosive weapons in populated areas in Syria has caused the destruction of many urban areas. In doing so, civilians have been exposed to countless dangerous substances. Clouds of toxic dust, a mixture of pulverised cement, metals, Polychlorinated biphenyl, silica, asbestos, industrial or medical waste, explosive residues and other synthetic fibres, are thrown up by blast and linger over the cityscapes like a shroud.¹⁸⁵ Into this mix comes the fact that the intense heat caused by explosive weapons can also generate changes in the chemical composition of such materials, making the dust even more toxic.¹⁸⁶

Some of the impacts of such materials have been looked at in detail, especially in places such as Lebanon and Gaza, places where many residents were exposed to the carcinogen asbestos following the destruction of infrastructure there.¹⁸⁷ It is also clear that the toxic dust from the attack on the World Trade Centre in 2001 caused a wide variety of health issues among New Yorkers, particularly in terms of respiratory, neurological, and gastrological complaints.¹⁸⁸ About 30% of those exposed to dust inhalation following the 9/11 attacks required medical treatment, with new patients even now presenting with related illnesses, almost two decades later.¹⁸⁹ In total, some 43,000 people have been certified with a 9/11 related health condition, including almost 10,000 with a related cancer – and many more are likely to have been affected.¹⁹⁰ This, it should be noted, is in a developed nation where the health care systems were not harmed by the attack – something that is clearly not the case in Syria.

First-responders are amongst the most vulnerable, and many of those exposed to the toxic dust have developed 'chronic, disabling illnesses as a result of their horrific exposures'.¹⁹¹ Many school and college students are also amongst those most impacted,

some even developing cancers in their 20s and 30s, along with other life-altering health conditions.¹⁹² There are additional concerns related to this type of exposure in Syria, including the lack of safety measures, prolonged exposure due to their inability to clear the waste effectively, and the lack of health infrastructure to address the needs of those impacted, to name just a few. The truth is that the extent of such consequences may only come to light in another decade.

Informal waste dumps were already a pre-conflict problem in Syria, and it is likely that the destruction brought by the war will exacerbate the use of these dumping sites and increase the likelihood of ground-water contamination accordingly.¹⁹³ The random burning of waste across Syria has also reportedly increased.¹⁹⁴ The further health impacts from such rubble and waste are discussed under the health section.

ISIS' improvised oil refineries

After ISIS gained control of territories along the Euphrates River, they began exploiting Syria's oil supplies in order to finance their operations. It was certainly a cash cow for the terror group: almost 6,000 sites were recorded near Deir Ezzor in 2016.¹⁹⁵ These refineries, for the most-part, were makeshift and reliant on out-dated processing techniques. Leaks and fires, toxic fumes and gases were commonplace in these refineries, an environmental harm exacerbated by Russian and US-led coalition bombings, as well as by ISIS' own scorched-earth tactics when in retreat.

Coalition bombing has been estimated to have damaged over 250 ISIS targets related to oil installations, along with hundreds of fuel trucks.¹⁹⁶ Russian airstrikes may have targeted fewer facilities, but they were said to have destroyed over 1,000 fuel tankers.¹⁹⁷ Such bomb runs, beyond the immediate pollution the spill of oil must have caused, also forced ISIS to greater reliance on more hazardous and makeshift sites, with corresponding greater health and environmental risks.

The contamination from such rudimentary oil refineries, along with the bombing of such facilities, is likely to cause contamination to waterways near the sites, whilst the soot from burning oil along with spills can render the land barren and unworkable.¹⁹⁸ Such impact on Syria's agriculture has already seen reduced harvests.¹⁹⁹

Numerous health impacts from oil contaminants have also been documented amongst the local population, ranging from persistent coughs to chemical burns and the raised risk of tumours. AOA spoke with Dr Kinda Alhourani and Dr Tarek Al Mousa from the Syrian Expatriates Medical Association (SEMA), who both highlighted the fact that cancer cases had been associated with children's increased interaction with oil pollutants, as well seeing a general increase in the number of lung cancer diagnoses in those areas most impacted.²⁰⁰

NATURAL RESOURCES AND HABITATS

Little research has been conducted into the non-anthropocentric environmental impacts of explosive violence, despite the toll such harm is likely to have, and the long-term harm consequences of such, on local communities. Animal populations, for instance, are likely to be impacted by UXO, water, waste, and oil contamination caused by explosive weapons. Other impacts to wildlife and livestock are also likely to occur as a result of the disruption and destruction caused by widespread bombing.

IDP camps can create their own environmental concerns. In Syria, many IDPs rely on collecting firewood for an energy source. In Idlib, such collection is reported to be having an impact on the landscape.²⁰¹ In fact, between 2001 and 2017, Syria lost 18,600 hectares in tree cover, a 20% loss of cover since 2010.²⁰² Of this, at least 14,000 hectares (75%), was lost in the years following the start of the conflict in Syria, especially around Idlib.²⁰³

A particular concern is that of the coastal region, where mountainous areas are witnessing high levels of deforestation as a result of high numbers of displaced persons relying on firewood after fleeing the bombardment in Aleppo.²⁰⁴ The contamination of Syria's rivers, reservoirs and lakes, as mentioned earlier, also threatens the bird and animal species that rely on them.²⁰⁵ Understandably, biodiversity in Syria is said to be 'notably disrupted'.²⁰⁶

Since the Syrian war began, the last bald ibis in the wild appears to have perished in Palmyra, while a number of other species are also in danger, including long-legged wading birds, sociable lapwings, the Arabian ostrich, and the Syrian brown bear.²⁰⁷

WIDER-ENVIRONMENTAL IMPACTS

Displacement has had a severe environmental impact on refugee host countries. In Jordan, one of the most water-scarce countries in the world, the influx of refugees has led to pronounced water scarcity and created tensions amongst host populations.²⁰⁸ Syrian refugees have also produced greater levels of human waste, which in turn risks contaminating the ground-water available. The health needs of refugees have also been associated with an 84% increase in medical waste, and a 150% increase in pharmaceutical waste.²⁰⁹

There also appears to have been a marked rise in wildlife violations by Syrian refugees. In 2014, for instance, Jordan recorded 'an unprecedented 1,483 court cases for wildlife violations': 572 for illegal wood cutting, 75 for illegal grazing, 84 related to illegal hunting, 25 regarding forest fires, and 727 cases for other wildlife violations.²¹⁰

Waste has also been an issue related to refugees in Lebanon. Research published in 2014 by the Ministry of Environment indicated that municipal spending on waste disposal, particularly in Akkar and Bekaa, had

increased by 40%, whilst 92% of untreated sewage was running directly into water sources, linked to the increased demand on land, electricity, and waste disposal. As a result, since 2011, waste water pollution has increased in Lebanon by some 33%.²¹¹ And whilst, in both Lebanon and Jordan, such issues related to waste management pre-date the Syrian war, the influx of refugees has certainly exacerbated this issue.

CONCLUSION

Explosive violence, and its consequences, has had a severe and long-term impact on both the urban and non-urban environment, both within and outside Syria. In the years prior to the conflict, Syria's environmental governance was notoriously poor, and has clearly deteriorated since. Such a failure has had profound effects. The harm to the environment is one of the leading causes of poor health and poverty in the region, and will continue to be so over coming years. Some impacts will not be fully understood for years, as has been seen with 9/11, but – for the present – the issue of explosive violence and environmental considerations must stand at the forefront of those humanitarian agencies' agendas when it comes to redevelopment.



Syrian girls walk past the rubble of destroyed buildings on their way home from school on March 7 in al-Shaar neighborhood, in the rebel-held side of Aleppo. By Jordi Bernabeu Farrús (IZEIN ALRIFAI/AFP/Glimages).

SOCIETY AND CULTURE

- 6.6 million people are displaced inside Syria
- The conflict has led to over 5.6 million Syrian refugees
- A quarter of Syrian schools are estimated to be unusable owing to violence
- Over 45% of the school-aged children in Syria no longer attend education
- All six of the UNESCO World Heritage sites in Syria have been severely damaged or destroyed
- Over 14,400 mosques have been destroyed across Syria since 2011

Explosive violence predictably causes displacement and, when civilian infrastructure is highly damaged, leaves civilians displaced for significantly long periods of time. Such levels of infrastructural damage, along with environmental contamination, prevents people from returning and rebuilding. And, as AOA V has seen in other countries, the longer people are displaced, the less likely they are to return.²¹² In short, explosive destruction, and the displacement that follows, can alter cities and the communities that inhabit them beyond recognition.

In this section, AOA V examines the impact of such explosive violence on Syria's society and culture.

DISPLACEMENT

Conflict is the main cause of displacement, and when explosive weapons are used, the need to flee is even greater and the length of displacement even longer.²¹³

Furthermore, in *Areas of Harm*, a report by the civil society organisations PAX and Article 36, it was found that when explosive weapons were used in populated areas entire populations were not only displaced once, but repeatedly so.²¹⁴

Whilst multiple factors influence levels of displacement, there is a strong correlation between the numbers of casualties from explosive violence in a country, and the numbers of displaced persons.²¹⁵ At least 6.6 million are displaced inside Syria.²¹⁶ As explosive violence continues even greater levels face displacement. Between January and April 2018, over 920,000 people were newly displaced – the highest displacement rate since the beginning of the conflict, primarily caused by air campaigns on Eastern Ghouta and Idlib.²¹⁷

Refugees

In *Escaping the Bombing*, Humanity and Inclusion found that, among Syrian refugees interviewed in Jordan, the threat of explosive weapons was the primary and overriding factor influencing their decision to flee the country.²¹⁸ AOA V's report *The Refugee Explosion* also found a high correlation between the rise in casualties from explosive violence and the numbers seeking refuge abroad.²¹⁹ In total, Syria has seen approximately 5.6 million refugees,²²⁰ with Turkey hosting the largest number, with over 3.5 million.²²¹

Such mass displacement will have reverberations for generations to come. In AOA V's report examining the long-term impacts of explosive violence in Sri Lanka we found that, more than eight years after the end of the conflict, many refugees had not returned. This left gaps in many areas of employment, particularly health-care and education, and also left an aging population without familial structures they would have typically relied on. Many Tamils also spoke of their desire to join family or find new opportunities abroad, which they believed would be better than struggling in a post-conflict setting.²²²

For many child refugees, their country of refuge will have been the only one they know, and there was a general consensus from organisations that AOA V met with that most refugees were likely to stay in their host countries.²²³ For those refugees that do wish to return, even when the Syrian war ends it may take decades for some areas to be made habitable again, because of both ERW and the sheer levels of civilian infrastructure that need to be rebuilt.

Returnees

One NGO told AOA V that, from their experience with Syrian refugees in Istanbul, they would expect about

80% to remain in their host country.²²⁴ Another said that 90% would.²²⁵ Such high levels of permanent residency means the temporary plans host countries have in place for refugees are deeply unsuitable, exerting considerable pressure on the infrastructure and economies of host countries.

It is likely, though, that Syrian refugees will face pressure to leave when their homeland is seen as 'safe' to return to, despite the challenges and dangers returning could present. In Turkey, AOA V were told that – since the Afrin Olive Branch operation in Syria – there had been increasing pressure on Syrians to return, from both media and local populations. At the moment return is on a voluntary basis but there are concerns it may one day be enforced. It was reported that some authorities with the highest refugee populations were sending SMS messages to Syrians saying that it was safe to return and that their transport had been arranged.²²⁶ However, this could not be confirmed by other organisations.



Children at the Rainbow centre in Gaziantep, Turkey.

CULTURAL SITES

The impact of explosive violence to the cultural life of Syria cannot be ignored. Unlike some other forms of damage to infrastructure, destruction of cultural and historical sites is not easily remedied and can have a significant impact on the communities in these areas.

By March 2016, all six of the UNESCO World Heritage sites in Syria had been severely damaged or destroyed.²²⁷ In Aleppo alone, more than 150 cultural heritage sites have been damaged or destroyed, as well as many traditional houses.²²⁸ In particular, mosques have seen significant levels of destruction. Almost 39% of Syria's mosques have been rendered unusable.²²⁹ In opposition-held towns and villages in Aleppo, Deir Ezzor, Hama, Damascus, Raqqa, Idlib and Homs, not a single mosque has reportedly escaped damage. Some of the most historical mosques have seen significant harm – with Ottoman-era Adliye Mosque in Aleppo's Old City and the Seljuq-era Qishla Mosque in Hanano district lying in rubble. In total, over 14,400 mosques have been destroyed across Syria since 2011; of these, over 90% were destroyed since 2013.²³⁰

For many communities though, it is not the loss of some of the main heritage sites across Syria that is the most pressing issue – many may not have even visited these places. For many Syrians, it is the loss of the buildings they saw every day as part of their normal routines – their markets and shops, businesses, homes and religious buildings – which can cause a profound scar in the cultural memory.²³¹

AOA V spoke to an architect who has been interviewing people across Homs to better understand the needs for the reconstruction process. He told AOA V that people reported feeling like strangers in their own city: 'they feel disorientated and have lost their sense of belonging, where they have lost not only the faces they used to see, but also the buildings, shops, and streets they used and visited.'²³² There was also said to be a lot of concern amongst local populations that rebuilding would happen without consultation, distancing them further from that sense of belonging. Clearly, explosive violence does more than just harm in a physical way – it has the ability to transform landscapes and cause deep cultural trauma – a trauma that could, in turn, lead to talk of the need for

vengeance, thereby perpetuating the cycle of violence. And so, while the preservation and restoration of art and architecture might not be at the forefront of donor's minds when confronted with the enormity of Syria's woes, it cannot be ignored if peace is ever to be fully realised.

GENDER

The use of explosive violence in Syria has also, in many areas, altered gender roles and transformed women's sense of identity. Explosive weapons cause destruction and disruption that can further put women at a disadvantage, especially given the cultural context of the conflict where, in general, women are often faced with an inferior status to men. Overall, those at most risk are displaced women and girls, widows or divorcees, those in female-headed households, and the disabled.

Many women have been widowed, or forced to flee their homes, while others have had effectively to become heads of households. Amongst Syrian



Nishreen, a Syrian refugee AOA met in Istanbul, Turkey.

refugees in Lebanon, female-headed households were twice as likely to be in informal settlements, whilst more than half (56%) did not have any working members of the household. 50% faced food insecurity.²³³

Those that have had the advantage of education and employment are able to more successfully navigate this new Syria, or as life as a refugee. However, in some communities, there still exists a stigma around women working, and where women struggle to access work, poverty is intensified and families are exposed to exploitation - including sex work, child labour (typically for male children) and early marriage (for female children).

Though more women in the workforce in Syria has forced some societal change, there are still particular struggles in areas such as civil society, media and politics, which continue to be seen as unsuitable for women by many.²³⁴ Furthermore, women working outside the home has not necessarily been indicative of more freedom, for some it is just an additional responsibility, whilst their husbands or other male family members remain in control. In some cases, it is thought that alongside the stress of years of war and poverty, women being pushed into the workplace is linked to an increased incidence of domestic violence, with male household members interpreting this as a threat to their traditional balance of power.²³⁵

When AOA met, for instance, a Syrian journalist working in Istanbul, she described the difficulties of working in the media; she herself worked in an organisation where she was the only female reporter. In particular, despite having more experience and qualifications than most her colleagues, she was made to work longer hours and for a lower salary than her male colleagues.²³⁶ Her experience was not unique: it is common amongst Syrian refugee populations for working women to earn less than working men. In Lebanon, working women earn on average just 77% of what working men earn.²³⁷

Some organisations have focused on teaching skills and languages to refugee women to assist them in finding employment. At one NGO, Small Projects Istanbul, AOA were told that only approximately 10% of the women coming to their social enterprise workshop had previous work experience.²³⁸



Child waits to be picked up from the Rainbow centre in Gaziantep, Turkey.

Over the course of the conflict, reports from UN agencies have also continuously circulated about Syrian women being sexually exploited by those delivering aid. This was particularly the case for those in female-headed households.²³⁹ Much of this seems to be ignored.²⁴⁰ Refugee and camps are also locations of increased risk of sexual exploitation and violence.²⁴¹ In addition, the levels of displacement have put women and girls at increased risk of sex-trafficking.

The culture and stigma around rape and sexual harassment means women are often blamed and thought to bring shame upon the family when it occurs. As a result, women may not collect aid if there is a risk of sexual exploitation, or a risk that others may think this is how they accessed aid. Others accept they must resort to survival sex to access aid or earn money.²⁴² There has also been a rise in women forced to engage in serial 'temporary marriages', allowing men to have sex with them in exchange for payment or material support before the marriage is annulled – the 'marriage' can last as little as a few hours.²⁴³ The proliferation of arms and the breakdown

of support structures caused by the violence, has meant that honour killings have also risen in Syria.²⁴⁴

Women are also less likely to own a passport – just 2% of women, compared to 20% of men own a passport – as well as other documentation. This makes it difficult to cross borders and proves challenging in regard to housing, land and property rights, which the conflict has made more necessary.²⁴⁵ The loss of documents in bombardment or other violence, leaves women especially vulnerable.

EDUCATION

Before the conflict began in 2011, child enrolment in formal education in Syria stood at about 95%.²⁴⁶ However, the number of children accessing education has since dropped significantly, with children and teachers killed, schools destroyed, families displaced and increased levels of poverty all hampering children's ability to safely access education.

AOAV has recorded 2,432 casualties from the use of explosive violence on schools. Far more schools, though, have been impacted than AOA's data reveals. According to the Ministry of Education, more than 6,500 schools in Syria have been destroyed, damaged, used as shelters for the displaced, or taken over by armed groups since the war began in 2011.²⁴⁷ Save the Children estimates that the number of destroyed schools could be over 14,000.²⁴⁸ This means that over one in three schools there has been rendered unusable by violence.²⁴⁹ It is estimated that repairing Syria's education sector will cost over £2 billion.²⁵⁰

Impact

According to figures provided by the Syrian Center for Policy Research (SCPR), over 45% of the school-aged children in Syria were no longer attending school between 2015 and 2016.²⁵¹ Furthermore, by the end of 2015, lost years of schooling at all educational levels was said to represent 'a human capital debit of 24.5 million lost years, which represents a deficit of \$16.5 billion in human capital investment.'

And while this national outlook is poor, in some areas, the impact of the violence has been far worse. In Aleppo, for instance, where some of the highest levels of explosive violence have been seen, basic education enrolment has stood as low as 6%.²⁵²



Syrian refugee children play outside their home in Gaziantep, Turkey.

The outlook remains poor. Schools remain destroyed and lost years of education are accumulating. Experts and human rights officials have warned that this loss in education could lead to a lost generation;²⁵³ some children will have been out of school now for over seven years. It is a loss of education that leads to further strains on economies, employment and poverty.

Refugee children

Of the 4.8 million Syrian refugees registered in neighbouring states, around 35% are of school age. Those in education stands at under half that, with 900,000 Syrian school-aged refugee children not attending school.²⁵⁴ Access to education remains highly dependent on the location of the refugee child. Of school-aged children in Turkey, only 39% are enrolled in education. Similarly, in Lebanon, the number stands at 40%. In Jordan, though, the amount jumps to 70%.²⁵⁵

Even when education is made available, there are challenges. Tuition in refugee hosting countries may

be taught in another language, a reality that puts Syrian refugee children often one to three years behind in their education.²⁵⁶ Some children end up dropping out of education because of such barriers and differences.²⁵⁷ According to the head of the Rainbow centre in Gaziantep, which provides free education to children prior to them joining Turkish schools, almost all children that come to the centre have three kinds of problems: bed-wetting, speech impairments, and fear.²⁵⁸

With higher education, Syrians face similar issues. The barriers to such include fees, language barriers, access to materials and further economic difficulties. Of Syrians who graduated from one of the Arabic programmes in Gaziantep University in 2016, for instance, more than 70% could speak either no Turkish or just a few words.²⁵⁹ While some students – about 14% of students on the programme in 2015, as one example²⁶⁰ – had family members to care for. Some universities teaching Syrians reported that some students tried to bring family members and

young children with them to classes; the institutions had to put a stop to this but there remains no child care facilities available.²⁶¹

CHILDREN

Children are among one of the most vulnerable segments of any population and in Syria have suffered a wide variety of impacts from explosive violence that are specific to them and their future. The barriers to education, as mentioned, are particularly devastating. Such a lack of education prevents them from accessing sanctuaries of learning and play, and harms future prospects. The impact of explosive weapons also impacts them psychologically – many are unable to rationalise and process what is happening in the same way adults might. In Syria, 44% of children are said to show signs of distress.²⁶²

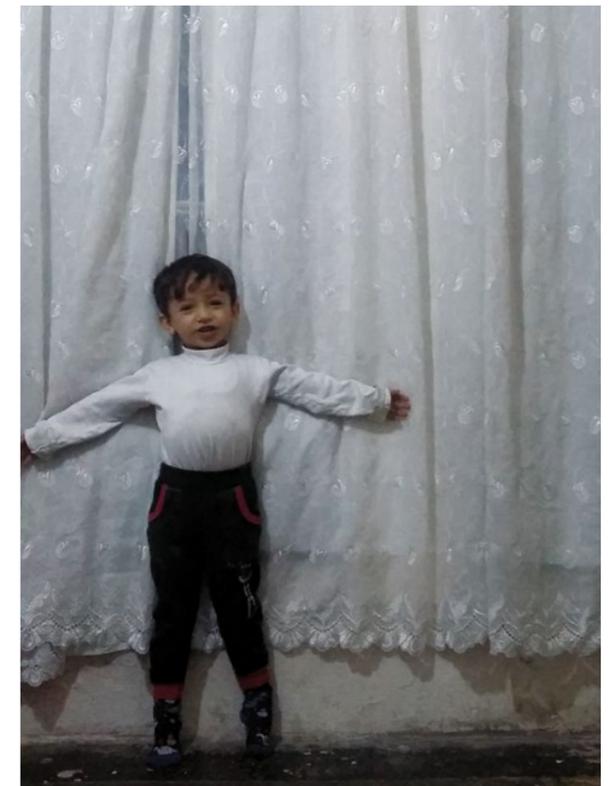
Displacement and violence have also led families to realities that can prove harmful to children. The most common of these appear to be forcing their children into early marriage, taking their children out of school, becoming reliant on humanitarian assistance, and begging, according to a survey conducted by the Protection Monitoring Task Force.²⁶³ Prior to the war, such behaviours were rarely socially accepted, but the poverty that the war has ushered in has meant these ways of coping have become increasingly common.²⁶⁴

The same survey, conducted across the north of Syria, found that 92% of respondents said that some or most of the children were working, with similar responses both in and out of camps.²⁶⁵ 33% of respondents then stated that either some or most of their working children were being mistreated. Such mistreatment included work greatly disproportionate to their physical build or capacity, having to carry extremely heavy materials, and being forced to work very long hours. Their parents also described how their children received low and incommensurate wages. Children were also exposed to systemic verbal and sometimes physical abuse and bullying at workplaces, which negatively impacts their psychological state. Those children that are working are often doing so in jobs that adults refuse to take, often for poor wages in unsafe environments. Typical examples include factory work, work in crude oil facilities, and garbage collection.

Children also make up the majority of blast victims in post-conflict situations.²⁶⁶ This has many a long-term impact on those young lives, especially as paediatric blast injury is not well understood and affects children vastly differently to adults. It often results in illiteracy as it creates barriers for education, as well as isolation, and further physical and psychological harm.²⁶⁷ In Syria today, 25% of those injured in the violence are estimated to be under 18 – most injured as a result of airstrikes and other explosive weapons.²⁶⁸ Additionally, when it is a parent that is injured, children are also likely to see negative impacts, including child labour and poverty.

CONCLUSION

The destruction and damage from explosive weapons leave deep scars upon communities. Homes become unrecognisable, and people can lose their sense of identity as societies shift to survive. Children consistently appear to be amongst the worst impacted from such changes. Many are forced to give up education and, with that, the futures they might have had – all the time coping with further traumas that erupt around them.



Syrian child in room he shares with his family in Gaziantep, Turkey.

CONCLUSION

The only way to prevent this harm is to stop bombing populated areas. As a member of the International Network on Explosive Weapons (INEW), AOAV and its colleagues urge states and all users of explosive weapons to:

- Acknowledge that the use of explosive weapons in populated areas tends to cause severe harm to individuals and communities and furthers suffering by damaging vital infrastructure;
- Strive to avoid such harm and suffering in any situation, review and strengthen national policies and practices on use of explosive weapons and gather and make available relevant data;
- Work for the full realisation of the rights of victims and survivors;
- Develop stronger international standards, including certain prohibitions and restrictions on the use of explosive weapons in populated areas.
- In developing these standards, states, and other actors should make a commitment that explosive weapons with wide areas effects will not be used in populated areas.

The impacts of explosive violence last generations. Civilians must continue to live with injuries, forced displacement and poverty for decades, whilst explosive remnants of war continue to wreak havoc with bodies and livelihoods.

For many, it will be years before they may return home. Many never will, having to rebuild their lives elsewhere; away from the violence and memories.

The level of destruction that explosive weapons have wrought in Syria is beyond that witnessed anywhere else in recent years. Clearing the rubble and ERW alone may take decades; rebuilding Syrian society even longer. The nature of the war, marked by an unrelenting bombardment by the regime and other states, as well as armed groups using suicide strikes and car bombs on a monumental scale, has left a nation-wide sense of distrust and anger. Every family that AOAV met on its field research had lost relatives. Many had also lost homes, and their sense of belonging. Such losses are not easy to forgive and harder still to forget.

With this loss, as well as the fear that explosive violence brings, psychological consequences must be addressed and support provided. Given the number of psychologists in Syria, even prior to the war, efforts will be required to provide services and to train Syrians to manage this need.

Assistance will also be essential to manage the lasting physical health issues, especially considering the damage to health infrastructure.

When explosive weapons are used in populated areas there will be civilian casualties and damage to the infrastructure on which they depend. This is a predictable impact and one that must be addressed. But it is the unpredictable, or often unaddressed, realities of explosive violence that also must be addressed.

Nuance in funding programmes, and a deeper understanding of the multifactorial reverberations of explosive violence must be had. As the war shifts from emergency need to reconstruction, there must be a pause for thought as to what this will entail, and how so much needs to be rebuilt.

RECOMMENDATIONS

- AOAV calls on States and other actors to politically commit to stop using explosive weapons with wide area effects in populated areas. Syria should be a warning to us all.
- States and users of explosive weapons should work towards the full realisation of the rights of victims, including those killed and injured, their families, and affected communities. They should strive to ensure the timely and adequate provision of needed services for the recovery, rehabilitation, and inclusion of victims of explosive violence, without discrimination.
- States should be cognisant of the fact the even when civilians are not killed, destruction to civilian infrastructure and land can have wide-spread and long-term harm for communities.
- More research is needed to better understand the long-term harm from the use of explosive violence; particularly in regard to public health and the environment.
- Efforts should be made to reduce the stigma associated with psychological support. Such efforts should be constructed in dialogue with the impacted communities and victims therein.
- Greater efforts should be made to recognise and address the psychological distress that such violence can cause.
- Communities should be consulted in regard to the redevelopment process and efforts should be made to reduce the impact of rebuilding, on health, livelihoods and the environment.



Destruction in Homs. Al-Khalidieh, Freedom House, November 23, 2012 via Flickr.

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CONTACT

Action on Armed Violence

405 Mile End Road,
London
E3 4PB

T +44 (0)7984 645 145

E info@aoav.org.uk

www.aoav.org.uk