



FRAGMENTS

EXPLOSIVE WEAPONS MONITOR QUARTERLY

VOL. 1, ISSUE 2. DECEMBER 2023

Explosive Weapons and the 2030 Agenda

How the use of explosive weapons in populated areas undermines sustainable development

Barbara Morais Figueiredo, Associate Researcher, United Nations Institute for Disarmament Research (UNIDIR)

Strengthening Data Collection on Civilian Harm from the Use of Explosive Weapons

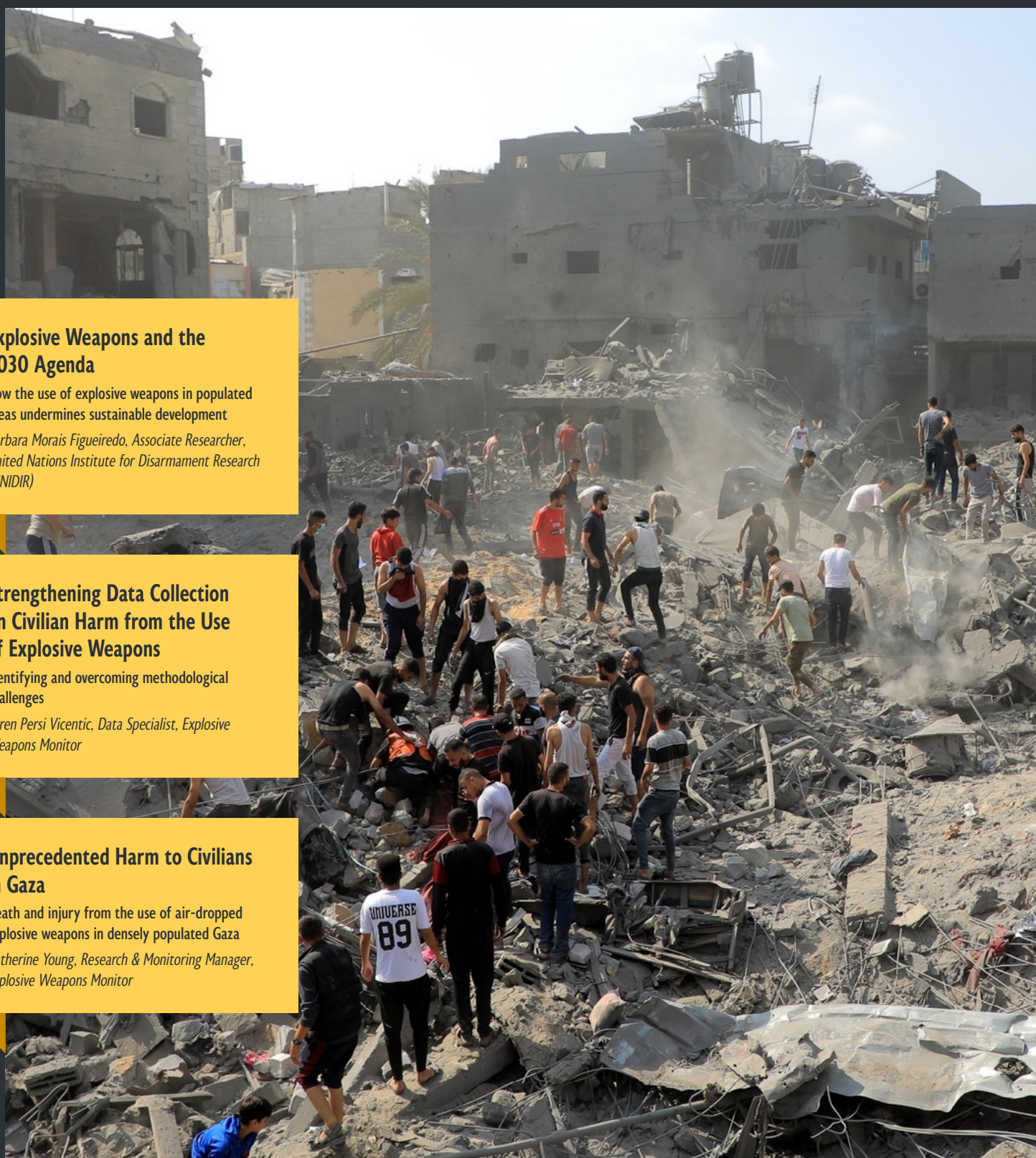
Identifying and overcoming methodological challenges

Loren Persi Vicentic, Data Specialist, Explosive Weapons Monitor

Unprecedented Harm to Civilians in Gaza

Death and injury from the use of air-dropped explosive weapons in densely populated Gaza

Katherine Young, Research & Monitoring Manager, Explosive Weapons Monitor



A NOTE FROM THE EXPLOSIVE WEAPONS MONITOR



Since the beginning of Israel's military response to attacks by Hamas on 7 October 2023, the world's attention has been focused on the relentless bombing of densely populated Gaza. The impacts of the use of explosive weapons on civilians in this context have been catastrophic. Palestinians have been killed at a rate for which there are few precedents in the last century. Much of the civilian infrastructure within Gaza has been leveled. This damage and destruction will have reverberating impacts on civilians for many years to come.

This issue of *Fragments* shows just a proportion of the harm to civilians caused by explosive weapons use in Gaza, focusing on the scale of direct death and injury caused by the Israel Defense Force's use of air-dropped explosive weapons, including unguided munitions with heavy explosive payloads, in densely populated areas. The scale of both use and impact of explosive weapons in this context is nearly unprecedented.

This issue also explores the longer-term impacts of the use of explosive weapons in populated areas across the world, as the reverberating effects from the use of these weapons present significant challenges to the attainment of the 2030 Agenda for Sustainable Development and undermines development efforts. In Yemen, for example, the destruction of civilian infrastructure and essential services resulting from the widespread use of explosive weapons significantly reduced the pace of development, setting back human development goals by more than two decades.

Lastly, this issue reflects on the challenges of documenting and measuring the reverberating effects of explosive weapons use on civilians – which are more difficult to quantify as they often occur over space and time – and identifies ways in which this reflection might contribute to the development of good practices in tracking both the direct and indirect impacts on civilians from the use of explosive weapons.

This issue of *Fragments* underscores the importance of understanding the many ways in which civilians are impacted by the use of explosive weapons in populated areas. Documenting and collecting data on this harm provides a more comprehensive understanding of the full impact of explosive weapons use on civilians and provides an evidential basis for harm reduction that can inform changes to military policies and practices that better protect civilians.

Katherine Young
Research & Monitoring Manager, Explosive Weapons Monitor

FRAGMENTS: EXPLOSIVE WEAPONS MONITOR QUARTERLY SERIES

Fragments – the Explosive Weapons Monitor Quarterly Series – is a collection of articles that address topics related to the use of explosive weapons in populated areas and contribute research to or report on developments and news relevant to this issue area. *Fragments* aims to reach a combination of specialised audiences familiar with the issue of explosive weapons in populated areas, including those affected by explosive weapons use, as well as the community of practice working to address the impacts of explosive weapons through the Political Declaration on the Use of Explosive Weapons in Populated Areas.

The Explosive Weapons Monitor is a research initiative of the International Network on Explosive Weapons (INEW). It conducts research and analysis on harms from and practices of explosive weapons use in populated areas and monitors universalisation and implementation of the Political Declaration on the Use of Explosive Weapons in Populated Areas.

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On the cover:

Palestinians conduct a search and rescue operation after the second bombardment of Israeli armed forces at Jabalia refugee camp in Gaza City, Gaza on 1 November 2023.

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This issue was produced and edited by Katherine Young of the Explosive Weapons Monitor. Reviews of articles were conducted by the Explosive Weapons Monitor Editorial Board. Art direction and graphic design was provided by Collected Pros Ltd. Images were provided by Getty Images.

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December 2023

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EXPLOSIVE WEAPONS AND THE 2030 AGENDA

HOW THE USE OF EXPLOSIVE WEAPONS IN POPULATED AREAS UNDERMINES SUSTAINABLE DEVELOPMENT

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The use of explosive weapons in today's increasingly urban conflicts gives rise to a distinct pattern of harm that affects civilians long after the hostilities end. The reverberating effects from the use of these weapons presents significant challenges to the attainment of the 2030 Agenda for Sustainable Development and undermines development efforts in affected regions and beyond. Halfway to the 2030 deadline to achieve the global goals, avoiding the use of explosive weapons in populated areas and committing to take armed conflicts "out of urban areas altogether" should be an integral part of efforts to help put the world "back on track" towards sustainable development.

Introduction

*"The massive destruction caused by armed conflicts in cities can set development indexes back by years and even decades... This is a major setback to the achievement of many of the Sustainable Development Goals. Progress gained over decades can be quickly reversed as once lively and prospering population centres turn into ghost towns."*¹
– UN Secretary-General Antonio Guterres and ICRC President Peter Maurer, September 2019

2023 marked the midway point to the deadline set by the international community for achieving the ambitious set of goals for people, planet, and prosperity agreed with the adoption of the 2030 Agenda for Sustainable Development (2030 Agenda) in 2015. Global leaders met to consider the progress achieved on the 2030 Agenda at the high-level Sustainable Development Goals Summit in New York in September 2023. That meeting reflected broad consensus that a fundamental shift is required to accelerate progress towards the Sustainable Development Goals (SDGs) and ensure that they do not disappear "in the rear-view mirror".²

The United Nations (UN) Secretary-General's A New Agenda for Peace, launched earlier this year, presents a vision for how the international community should more effectively act to prevent armed conflicts and sustain peace in the face of multiple and interlocking crises.³ Crucially, it proposes several key recommendations for action to address the complex global challenges confronting humanity and boost progress towards the SDGs.

Noting the dramatic adverse effects that armed conflicts have on the attainment of these goals, A New Agenda for Peace underlines that the implementation pace of the 2030 Agenda is particularly concerning in conflict-affected environments. With one quarter of humanity living in conflict-affected areas, it warns that "without a dramatic reduction in conflict, violence and the spread of weapons, the 2030 Agenda will remain out of reach for a large percentage of humanity."

A local fruit and vegetable market
near the Old Town of Benghazi,
Libya on 2 February 2019.

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Against this backdrop, the increasing number of armed conflicts and their shift to urban and other populated areas presents enormous obstacles to the attainment of the 2030 Agenda.⁴ Given current urbanisation trends, these challenges are only likely to grow more acute in the coming years and decades.

Over half of the global population currently resides in urban areas, a rate projected to reach almost 70 percent by 2050.⁵ While urban growth can be an important accelerator of human and socio-economic development, when cities become the battlegrounds of conflicts, the humanitarian and developmental impacts are immense.

Across the world, the use of explosive weapons in populated areas is a recurring feature of many of today's armed conflicts and constitutes a major cause of civilian harm. In Afghanistan, Ethiopia, Iraq, Myanmar, the Occupied Palestinian Territories, Sudan, Syria, Ukraine, Yemen and elsewhere, such use claims countless lives and results in widespread destruction of infrastructure and essential services upon which civilians depend for their survival and well-being. Beyond the immense human suffering caused, the use of these weapons also entails severe development costs.

This article examines some of these developmental impacts, highlighting various ways that the use of explosive weapons in populated areas hampers progress towards several SDGs and derails efforts to achieve the 2030 Agenda.

The implications of the use of explosive weapons in populated areas for the achievement of the 2030 Agenda

According to the 2023 Global Sustainable Development Report, conflict-related civilian deaths from the world's twelve deadliest conflicts increased by 53 percent over the last year, marking the first increase since 2015, when the 2030 Agenda was adopted.⁶ As alarming as this figure is, it still fails to convey the full extent of human suffering and the profound societal and economic impacts borne by people and communities when cities and towns become the battlegrounds of armed conflicts.

The use of explosive weapons has humanitarian consequences for civilians both during armed conflicts and in their aftermath. In addition to their immediate and devastating effects, the damage and destruction wrought by the use of these weapons on critical infrastructure can disrupt or deprive civilians of access to services essential to their survival and well-being, causing widespread and long-lasting harm. These indirect, or reverberating, effects are not only responsible for a large part of civilian suffering, but also impose severe socio-economic costs – holding back or even reversing development processes in affected communities and beyond.⁷

In Yemen, according to a study by the UN Development Programme (UNDP), the large-scale destruction of civilian infrastructure and essential services resulting from the widespread use of explosive weapons significantly reduced the pace of development in the country, setting back human development goals by more than two decades.⁸ The study also noted that most civilian casualties did not result from direct conflict-related violence, but rather from the indirect effects of the conflict, such as food insecurity and the spread of diseases.

Indeed, between 2015 and 2017, Yemen recorded the world's worst cholera outbreak of the twenty-first century with over two million identified cases. The outbreak was linked to the use of explosive weapons in the conflict in at least two ways: first, the country's already burdened water and sanitation system disintegrated following years of conflict; second, the outbreak was further aggravated by the lack of effective public health responses due to conflict-related disruptions to health infrastructure and services.⁹

Given the complex interdependence of infrastructure and essential services in urban ecosystems and other populated areas, these impacts are often cumulative and spread out in space and time in ways that critically jeopardise progress towards various SDGs.

For instance, the damage or destruction caused by the bombing and shelling of transportation systems and networks in urban areas affects the movement of populations, compromising the achievement of several targets under SDG 11. Damaged transportation systems and networks can disrupt food supply lines and distribution networks – which has negative implications for achieving food security under SDG 2 – and can prevent the delivery of essential medical supplies to hospitals, clinics, and other health facilities, undermining the provision of health care to affected communities under SDG 3. Disruptions to supply chains in turn affect businesses and have adverse impacts on economic activities under SDG 8.

The impacts of the use of explosive weapons during armed conflicts also imply distinct challenges as societies seek to restore essential services and, ultimately, rebuild. While the negative effects on infrastructure and systems can be magnified or diminished depending on pre-existing conditions and levels of resilience in the affected areas, they can only be addressed through rehabilitation and reconstruction. However, repairing or rebuilding electricity stations, water plants, housing, bridges or roads is a time-consuming and very costly endeavour which inevitably diverts resources – both human and financial – away from other development efforts.

In protracted armed conflicts, the need to restore the capacity of essential services for relief operations often implies financing temporary solutions that can provide emergency relief, instead of investing in more sustainable and cost-effective systems and infrastructure. For instance, when water treatment plants are degraded or rendered inoperable by bombing or shelling, water trucking is typically implemented to cover interruptions in service and water access. Nevertheless, these operations are not only expensive but can also create dependencies on such alternative service provision and compromise efforts to establish more durable solutions.¹⁰

Beyond the evident opportunity costs reflected in these considerations, some of the harms inflicted on individuals and the social fabric of communities by the use of explosive weapons in towns and cities cannot be as easily quantified or measured, and they are likely to span generations. The destruction of cultural property, for example, can have a profound and enduring impact on the identity, memory and dignity of entire populations.¹¹

In Mosul, Iraq, where 80 percent of the Old City was destroyed during the campaign against ISIL in 2017, the recovery costs were estimated above US\$ 83 billion. Despite the immense investments to rehabilitate cultural and religious sites, however, much of the damage to century-old monuments and landmarks remains irreparable.¹²

The use of explosive weapons in populated areas can also result in social and security challenges. The competition for scarce financial resources, when combined with the lack of access to essential services wrought by the use of these weapons, can aggravate social tensions, provoke community unrest, or even trigger further conflicts. This creates an additional negative feedback loop that amplifies the harmful effects of the use of explosive weapons on development.

Overall, these cumulative impacts also contribute to the further marginalization of affected regions and communities, perpetuating or deepening existing inequalities and vulnerabilities. As is all too often the case in conflict-affected regions, the extensive humanitarian and developmental impacts manifest not only in death and physical destruction, but also in patterns of socioeco-nomic exclusion and inequality.

In Marawi, the largest urban centre of one of the poorest provinces in the Philippines, the use of explosive weapons during the 2017 conflict resulted in the large-scale destruction of public infrastructure and services.¹³ Given the magnitude of the destruction, as well as the high number of families who were already in vulnerable situations before the conflict, it was estimated that the number of people below the poverty line in the Lanao del Sur province could increase by approximately 150,000.¹⁴

In the context of the current conflict in Gaza, the UNDP and the Economic and Social Commission for Western Asia (ESCWA) estimate that from November 2023, poverty rates are set to soar if hostilities continue, with multidimensional poverty threatening 96 percent of the population of Gaza.¹⁵

Given the increasingly connected global economy, these harmful effects are seldom confined to national borders and typically spill over across countries and regions. The destruction of food production facilities and distribution networks, coupled with the extensive contamination of agricultural lands, can exacerbate local food insecurity, while also generating disastrous effects on global food supply chains and sparking global crises. Developing countries, in particular, can find these challenges magnified, “putting further strains on the lowest rungs of the economic ladder”.¹⁶

The widespread damage and destruction of infrastructure resulting from the extensive use of explosive weapons in the current conflict in Ukraine has significantly affected domestic food production and availability. This not only exacerbated food insecurity in the country – where the World Food Programme estimated that 11 million people faced food insecurity in early 2023 – but also sparked a global food and economic crisis reverberating around the world, with particularly harmful impacts to countries in Africa and the Middle East.¹⁷

From words to action: leveraging the implementation of the Political Declaration to support progress towards the 2030 Agenda

At the midpoint of the implementation of the 2030 Agenda, it is long past time to sound the alarm: it is now time to act. The recent SDG's Summit, which renewed commitments to implement the global goals by 2030, reflects this sense of urgency and recognises that profound changes are needed. Avoiding the use of explosive weapons in populated areas and taking armed conflicts “out of urban areas altogether” would put into practice the vision presented by the UN Secretary-General in *A New Agenda for Peace* and should be an integral part of such efforts.¹⁸

An important step in this direction was the adoption of the *Political Declaration on Strengthening the Protection of Civilians from the Humanitarian Consequences Arising from the Use of Explosive Weapons in Populated Areas* by 83 states in November 2022.¹⁹ Critically, the Declaration promotes a shared recognition by endorsing states of the devastating direct and indirect effects on civilians of the use of explosive weapons in populated areas, as well as of the need to take action to prevent and mitigate these effects. In its preamble, the Declaration explicitly recognises the severe impacts that the use of explosive weapons has on progress towards the SDGs and describes how their reverberating effects continue to affect individuals and communities long after hostilities end.²⁰

In addition to this important acknowledgement, the Declaration stipulates several operational commitments that endorser states are required to implement to fulfil these goals. These include “restricting or refraining” from the use of explosive weapons in populated areas, taking

into account the foreseeable direct and indirect effects of their use on civilians and civilian objects, as well as collecting and sharing data on their impacts. Other key commitments include the provision of assistance to victims, the facilitation of humanitarian access and the further promotion of the Declaration.

While each and all of these commitments are pivotal, the collection and sharing of data on the impacts of the use of explosive weapons on civilians is crucial to increasing the understanding of their humanitarian and developmental implications, as well as to planning effective and appropriate responses. The systematic collection and sharing of data on direct and indirect effects can shed light on the multiple ways that the use of explosive weapons adversely affects civilian well-being and reverses hard-won development gains.²¹ Using the lens of sustainable development to understand and document these impacts can also demonstrate key obstacles to achieving the 2030 Agenda and help identify critical actions needed to “get back on track” on its implementation.

Crucially, the implementation of the Declaration also requires addressing the cumulative and long-term impacts that result from the damage and destruction to civilian infrastructure and disruption of essential services. As such, it can be a critical tool for galvanising efforts towards the global goals and offers a unique opportunity for the international community to act upon the humanitarian, peace and development nexus. In implementing these commitments, states should also be guided by the defining principle of the 2030 Agenda and deliver on their promise: to leave no one – and no place – behind.





Disarmed unexploded ordnance fired by Russia onto the city of Kharkiv are seen at a collection point in Kharkiv, Ukraine on 30 March 2023.

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STRENGTHENING DATA COLLECTION ON CIVILIAN HARM FROM THE USE OF EXPLOSIVE WEAPONS

IDENTIFYING AND OVERCOMING METHODOLOGICAL CHALLENGES

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The Political Declaration makes clear that data collection is not just about recording the number of civilians killed and injured by explosive weapons, but also on the reverberating and longer-term impacts. Data collection methodologies, which are largely orientated towards monitoring the direct impacts of explosive weapon use, must be considered alongside this broadened understanding of harm to civilians. This article provides insight into current data collection efforts, reflects on questions raised by the Explosive Weapons Monitor as it works to strengthen its reporting of civilian harm, and identifies ways in which this reflection might contribute to the development of norms and good practices in tracking the full scope of harm to civilians from the use of explosive weapons.

Introduction

The *Political Declaration on Strengthening the Protection of Civilians from the Humanitarian Consequences Arising from the Use of Explosive Weapons in Populated Areas* represents a broadened understanding of the scope of harm to civilians from the use of explosive weapons and signifies that data should be collected on both the direct and indirect, or reverberating, effects of the use of explosive weapons.

In doing so, the Declaration makes clear that data collection is not just about recording the number of civilians killed and injured by explosive weapons, but on the reverberating and longer-term impacts as well, such as damage to schools and hospitals and other civilian infrastructure, the disruption of education and healthcare and other essential services, and psychological trauma.

This provides a more comprehensive understanding of the impact of explosive weapons use on civilians and provides an evidential basis for harm reduction that can inform operational changes and responses. It also provides important information about the progress made in fulfilling the humanitarian commitments of the Political Declaration and in avoiding the use of explosive weapons in populated areas.

Data collection methods and methodologies, which are largely orientated towards monitoring the direct impacts of explosive weapon use – impacts that result from an identified incident of explosive weapon use at a specific time and location – must be considered alongside this broadened understanding of harm to civilians. Indirect effects of explosive weapons use – impacts that occur as a result of incidents of explosive weapons use that cause civilian harm beyond the time and location of an attack – are generally more challenging to document as a result of this and other factors.

This article provides insight into the current landscape of data collection by research partners of the Explosive Weapons Monitor which provide a conceptual basis for understanding harm to civilians from the use of explosive weapons. It reflects on questions raised by the Explosive Weapons Monitor as it works to strengthen its reporting of civilian harm from explosive weapons use and addresses challenges in this documentation. Finally, it identifies ways in which this reflection might contribute to the development of norms and good practices in tracking the full scope of harm to civilians from the use of explosive weapons.

Decades of data collection on civilian harm from the use of explosive weapons

The Explosive weapons Monitor sources data from existing datasets managed by Action on Armed Violence (AOAV) and Insecurity Insight, both of which utilise methodologies derived from decades of efforts to monitor the impacts of weapons and contribute much-needed evidence to support advocacy on the need for action to address the issue of explosive weapons in populated areas.

Data that shows the need to prevent the harm caused by weapons was essential to the International Committee of the Red Cross (ICRC) Superfluous Injury or Unnecessary Suffering (SIrUS) project, initiated in 1996, which sought to determine how specific categories of weapons foreseeably cause military casualties.²² With this endeavour, the SIrUS team, including surgeon Robin Coupland, established a robust precedent for expressing evidence-based concerns by taking available data from recent conflicts into account.²³

Applying a methodology developed by Coupland and Nathan Taback, an academic statistician, Landmine Action generated a dataset on casualties caused by explosive weapons use worldwide that included data recorded from media reports in English-language newswire sources. Landmine Action is now AOA and since 2010 has provided continuous monitoring of explosive violence on that basis. This includes data disaggregated according to casualty type (deaths or injuries), civilian status (civilian or armed-actor), and location (populated or unpopulated), amongst other indicators.

In the early 2000s, Coupland, Taback, and Christina Wille, developed a methodology for 'documenting, presenting and using data on violence', which developed into Insecurity Insight. It supported healthcare in danger research before expanding thematically to other areas of concern over humanitarian access in conflict.²⁴ This method, which identifies the potency of harm, as well as the vulnerability to such harm, underlines the data collection undertaken and shared with the Explosive Weapons Monitor on access to aid, education and health care.²⁵

Challenges to obtaining consistent, representative data

Persistent efforts by civil society and international organizations continue to improve data collection and analysis on the humanitarian consequences of the use of explosive weapons in populated areas. Yet, challenges from earlier identified methodologies persist, along with new and added challenges for monitoring the indirect or reverberating effects of explosive weapon use.

Under-reporting

Landmine Action succinctly summarised key limitations of data in 2009, based on the experience of its initial monitoring of incidents of explosive weapons use:

“The data are not comprehensive and are subject to limitations and qualifications – these are primarily general under-reporting and geographical biases; the data are also likely to under-report combatant casualties and civilian casualties from major military engagements.”²⁶

Examples of challenges then, and now, that contribute to under-reporting include:

- Lack of access to information during peak conflict periods
- Uneven and shifting media attention on specific conflicts
- Constraints in language capacities for interpretation of local media and social media
- Conflict reporting sources which have a limited focus on fatalities (for example, sources reporting within the frame of Sustainable Development Goal 16.1.2)
- Data sources that record information on survivors that are able to reach medical care (for example, data gathered from emergency surgery wards and hospitals)
- Inconsistencies in the ways in which data is reported (for example, some sources regularly gather and disseminate immediate incident or casualty reports and others collect and release aggregate casualty or incident numbers for a fixed period)

Documenting reverberating effects

Reverberating, or indirect, effects of explosive weapons use – impacts that occur as a result of incidents of explosive weapons use that cause civilian harm beyond the time and location of an attack – are generally more challenging to document.

The damage that explosive weapons cause to civilian infrastructure are known to have long-lasting consequences, displacement, disruption or disintegration of essential services, and lack of access to medical care. These impacts, combined in any which way, may result in further disease outbreaks and other public health emergencies, food insecurity and economic crises.

The harm and deprivation of reverberating effects on civilians are broadly apparent in retrospect. Yet the direct evidence of these effects stemming from an incident of explosive weapon use can be difficult to glean while they are occurring. This is due in part to a lack of baseline information, as well as the very interconnected nature of the process and systems.

Overcoming challenges and identifying good practice

Much has been done to overcome these challenges and to work towards strengthened research and analysis on the full scope of harm to civilians from the use of explosive weapons. In its own efforts to strengthen its reporting of civilian harm from explosive weapons use and address challenges in this documentation, the Explosive Weapons Monitor has considered various means and methods for increasing the scope of its reporting.

Identifying new sources of data

New and/or under-explored sources of relevant data can help increase our understanding of the impacts and humanitarian consequences on civilians from the use of explosive weapons. A number of emerging, diverse sources are now increasingly available. These include:

- Geospatial digital data
- Open-source intelligence (OSINT) investigative groups
- ‘Before and after’ satellite imagery and satellite measurements of airborne substances and pollutants
- Social media content analysis
- Qualitative reporting, such as field investigations, first-person interviews and surveys

Each source offers unique opportunities for measuring harm from explosive weapons, though may employ differing methodologies in order to do so.

Incorporating key concepts into data collection systems

A small number of sources on civilian harm have been specifically designed to record the impact of explosive weapons in populated areas. Several other sources also record data disaggregated by categories and subcategories of explosive weapons.

For example, some sources indicate if harm to civilians occurred specifically in populated areas. Other sources may not make this distinction outright, but other relevant information can be used to determine independently whether or not recorded incidents occurred in populated areas. This might include determining whether there is a presence of civilians and civilian infrastructure by looking at population density and level of urbanisation, for example, or the presence of civilian infrastructure such as homes, schools, and hospitals.

The way that data systems define 'explosive weapons' similarly contributes to the ways their impacts on civilians will be interpreted, understood and reported. As such, collectively agreed understandings and definitions, and the promotion of substantial correlations in the use of terminology, can improve data effectiveness.

Definitions for these terms can be derived from technical and legalistic categorizations, definitions agreed among engaged communities of practice including civil society actors, or a combination of both.

Utilising technologies with the capacity to process large quantities of information

New opportunities to utilize the automation of data collection and processing through the application of artificial intelligence systems offers potential to speed up some elements of data collection and reduce the burden on human resources. Machine learning and natural language processing can offer the ability to scan and parse millions of online sources that include references to the impacts of explosive weapons.²⁷

For example, the private technology company Dataminr, through its newly-launched AI for Good program, will work with Insecurity Insight, the UN Development Programme (UN) and other partners to provide AI technology to data collection efforts. For Insecurity Insight, this support will automate tasks and identify trends and patterns in data related to attacks targeting food systems, thus complementing Insecurity Insight's existing work on aid security, health, and education.²⁸

Finding broader contexts for harms defined in data systems

Standardized codes and methodologies for data collection allow for meaningful comparisons of data that help researchers, policymakers, and humanitarian organizations understand the scale of use of explosive weapons and severity of damage and harm in a consistent manner.

Impacts on civilians from explosive weapons use that are coded within data systems will nonetheless each remain context dependent. Many factors precede, and thus influence or determine, the outcome of the use of explosive weapons. The resulting civilian harm can be magnified by the concentration of population, for example, including as a result of displacement or 'besieged' or 'encircled' areas, by the age and deterioration of buildings and infrastructure, by the inability to find shelter, or the decrepit state of hospitals, services, or utilities.

A closer diagnosis of harms could better show the interaction between the direct impacts of explosive weapons, their longer-term effects and the preexisting contexts and conditions that contributed to those effects, to the extent possible. To that end, the United Nations Institute for Disarmament Research (UNIDIR) has developed menus of indicators that can be used and adapted to demonstrate quantifiable reverberating impacts of the use of explosive weapons.²⁹

Sharing responsibility for proof with the users of explosive weapons

Prior to the Political Declaration, data collection was largely understood in the context of the work of civil society, the United Nations (UN) and the International Committee of the Red Cross (ICRC). Its purpose was to raise awareness of the humanitarian impact of explosive weapons use and to push for more effective protection of civilians.

The notion of data collection under the Declaration is expanded and makes clear the need for states and their armed forces to also understand the causes of civilian harm. This understanding can then be used to inform tactical changes and the development of policy to mitigate harm and to support accountability by identifying civilian harm incidents that require investigation.

Conclusion

Understanding both the challenges and possibilities of data collection on the direct and reverberating effects of explosive weapons use can support the efforts of a growing community of practice to collectively advance the understanding of the full scope of these impacts.

The Political Declaration provides a framework for this community of practice – including civil society, international organisations, and states – to work together towards this increased understanding, as its data collection provisions serve to set norms and establish good practice in recording not only deaths and injuries from explosive weapons use, but also the broader economic and social impacts.



Palestinians conduct a search and rescue operation after the second bombardment of Israeli armed forces at Jabalia refugee camp in Gaza City, Gaza on 1 November 2023.

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UNPRECEDENTED HARM TO CIVILIANS IN GAZA

DEATH AND INJURY FROM THE USE OF
AIR-DROPPED EXPLOSIVE WEAPONS IN
DENSELY POPULATED GAZA

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The use of air-dropped explosive weapons by the Israel Defense Forces, as well as the intensity and frequency with which they are used in densely populated areas in Gaza, have had catastrophic impacts on Palestinian civilians. Since the beginning of Israel's military response to attacks by Hamas fighters on 7 October 2023, Palestinians have been killed at a nearly unprecedented rate, with families and children particularly impacted. To end the suffering of Palestinian civilians, Israel Defense Forces – and all parties to the conflict – must stop the use of heavy explosive weapons in populated areas.

Introduction

On 7 October 2023, Hamas and other armed Palestinian groups launched rockets and deployed fighters into southern Israel, killing 1,200 people and taking more than 200 hostages, according to Israeli authorities. In return, Israel initiated one of the heaviest aerial bombardments in recent history, followed by a ground-invasion in which nearly 40,000 combat troops invaded northern Gaza.³⁰

The direct impacts of Israel's military response have been catastrophic for civilians, resulting in death and injury on a nearly unprecedented scale. While not explored here, the Israel Defense Force's (IDF) use of explosive weapons in populated areas also has longer-term effects on communities and infrastructure that extend their impact, in different forms, to a wider population over a longer period of time. This is already evident from the damage and destruction of civilian infrastructure, including residential buildings, hospitals, schools and camps for internally displaced persons (IDPs), and the humanitarian catastrophe that is unfolding as a result.

Much of this damage has been caused by airstrikes conducted by the IDF with large, air-dropped munitions with heavy explosive payloads, including 2,000-pound unguided bombs that lack the accuracy needed to ensure that civilians and civilian infrastructure are not harmed and damaged when such munitions are used in populated areas.

These and other bombs have been dropped so frequently by the IDF, there are few precedents for it in recent history. The United Nations (UN) Secretary-General described the bombardment as "relentless" in its first month and continues to call for better protection of civilians in Gaza and a humanitarian ceasefire to prevent and address the harm caused to civilians.³¹

The conflict in Gaza is a stark example of the severity of these consequences. To end the suffering of Palestinian civilians, Israeli armed forces – and all parties to the conflict – must stop the use of heavy explosive weapons in populated areas.

Air-dropped explosive weapons with wide area effects used in populated areas

Gaza is one of the smallest and most densely populated territories in the region, with more than 2.2 million people living in an area only 40 kilometres long and 11 kilometres wide. Gaza's population density, which on average is similar to that of the city of London, is more concentrated in urban centres such as Gaza City and Khan Younis, where tens of thousands of people live in dense neighbourhoods.³²

Current bombardment by the IDF has further shifted places of high population density in the area. Since 3 December 2023, tens of thousands of internally displaced people fled to Rafah governorate and now live in overcrowded conditions both inside and outside shelters. In this area, the population density has increased fourfold, making it the most densely populated area in the Gaza Strip, according to UNOCHA.³³

As such, the use of air-dropped munitions by the IDF has been particularly devastating given the types of munitions dropped in densely populated Gaza, as well as the intensity and frequency of strikes. These factors increase the risk of harm to civilians, as recognised in the Political Declaration on Strengthening the Protection of Civilians from the Humanitarian Consequences arising from the use of Explosive Weapons in Populated Areas, which makes clear that the risk to civilians from the use of explosive weapons in populated areas increases depending on a range of factors, "including the weapon's explosive power, its level of accuracy, and the number of munitions used."³⁴

These factors are all in play in Israel's military operations in Gaza.

Munitions with large blast and fragmentation ranges

Israeli armed forces have dropped at least 29,000 explosive munitions in Gaza since the start of the conflict, according to US intelligence.³⁵ During the first two weeks of the conflict, about 90 percent of these were 1,000-pound and 2,000-pound satellite-guided bombs.³⁶ A 2,000-pound bomb, with an estimated crater size of 14 meters,³⁷ was used in the Jabalia refugee camp airstrike that killed at least 126 civilians, including 69 children, on 31 October 2023, according to Airwars.³⁸

Given the heavy explosive payload of these bombs, they are not often the weapon-of-choice by militaries conducting operations in urban areas, and military analysts have been surprised by their use in Gaza given their effects. For example, the largest bombs used by the US and allied forces in the battle for Mosul were 500-pounds.³⁹

The remaining 10 percent of munitions used by the IDF were smaller 250lb bombs. Due to their relatively smaller size, their blast and fragmentation radius is smaller. Used frequently, however, and in populated areas, their use may not reduce the risk of harm to civilians and damage and destruction of civilian infrastructure.

Inaccuracy of air-dropped munitions

Only a few days after the conflict began, an IDF spokesperson stated that "thousands of tonnes of munitions" had been dropped on Gaza in those days, and that "while balancing accuracy with the scope of damage, right now we're focused on what causes maximum damage."⁴⁰

US intelligence estimates that of the 29,000 air-dropped munitions used by the IDF since 7 October 2023, about 40-45 percent of them have been unguided, or 'dumb' bombs, as opposed to 'smart' or guided bombs that allow for more accurate targeting.⁴¹ However, even when large munitions are turned into 'smart bombs' through the addition of positioning systems that makes targeting more accurate, the force of the bombs stay the same, as does the destruction on the ground.

Air-dropped bombs used by the Israel Defense Forces

The IDF uses general-purpose Mark 80 bombs, often dropped by fighter jets. These United States-supplied, air-dropped bombs vary in size and amounts of explosives, including 2,000-pound, 1,000-pound and 500-pound variations. The IDF also uses the M117, another general purpose bomb, weighing 750-pounds.⁴²

These general-purpose bombs, or 'dumb' or unguided bombs, can be made to be more accurate. They can be employed by fighter jets that make a steep dive close to targets, called 'dive bombing'.⁴³ They can also be fitted with GPS/INS guidance kits, which in turn makes them 'smart', or precision-guided. For the Mark 80 series, this includes the Joint Direct Attack Munitions (JDAMs) guidance system. Mark 80 bombs fitted with this kit are then referred to as GBU-38, 32 and 31 bombs.⁴⁴

Other munitions used by the IDF include laser-guided "Hellfire" missiles and Spike missiles, which are often dropped by attack helicopters.⁴⁵ Spike missiles can also be fitted with GPS/INS kits, including the Spice Family Gliding Bomb Assemblies.⁴⁶

High frequency of airstrikes

The scope of harm to civilians in Gaza can be attributed in part to the number of airstrikes conducted by the IDF in the short amount of time since the conflict began. The number of munitions dropped in Gaza amounts to just under 500 bombs per day (though it is estimated that in the first two weeks of Israeli military operations, the IDF deployed at least 1,000 air-dropped munitions daily), with the blast and fragmentation effects of these bombs felt in much of the territory that constitutes Gaza and is home to millions of Palestinians.⁴⁷ The Jabalia refugee camp alone was hit by airstrikes nearly every day in October.⁴⁸

To allow for this high frequency of airstrikes, the IDF is said to have shortened its "kill chains" to require less than 10 minutes for ground forces to collect intelligence to identify a target and to strike it.⁴⁹

Catastrophic impacts on civilians – death and injury

As a result, IDF airstrikes are killing civilians at a rate for which there are few precedents in the last century. As of 30 December 2023, more than 21,000 Palestinians were killed in Gaza since the start of hostilities, including more than 5,100 women and 7,700 children who, when combined, account for about 70 percent of all those killed, according to the Ministry of Health (MoH) in Gaza (which does not distinguish between civilian and armed-actor casualties).⁵⁰ Israeli authorities estimate that at least 5,000 Hamas fighters are among those killed.⁵¹

More than 56,000 Palestinians were also reportedly injured, while even more people remained missing and presumed buried under rubble. The numbers of those killed and injured increase on a daily basis.

The Israeli military's use of large, air-dropped bombs, deployed frequently in densely populated neighbourhoods in the Gaza Strip, have killed so many people, so quickly, that there are few military operations with comparable casualty rates. The number of women and children reportedly killed in Gaza since the start of hostilities is already higher than the estimated 9,000 to 11,000 civilians that were killed in the battle of Mosul, Iraq, by all parties to the conflict, which lasted nine months and served as another stark example of the destruction caused by the use of explosive weapons in populated areas.

Amongst the dead in Gaza are entire family units – an indication of the degree to which civilians, not armed-actors, have disproportionately suffered as a result of bombardment by the IDF. In just one airstrike on the Jabalia refugee camp on 31 October 2023, three families were killed in their entirety, according to Airwars.⁵²

Other families suffered tremendous losses of extended relatives. An IDF airstrike on 22 October 2023 levelled two buildings in Deir al Balah, killing 68 members of the Joudeh family as they slept, after some had fled from northern Gaza as Israel had ordered residents to do. The Joudeh family was buried side-by-side in a long grave, while other families spent days searching through rubble looking for missing children and other family members.⁵³

Survivors of airstrikes shared with Amnesty International the horror they faced in the aftermath of the attacks. Family members were buried in rubble. In most cases, only pieces of their loved ones could be recovered. Only a "small number of relatives were recovered more or less whole, otherwise bodies were reduced to shreds."⁵⁴

The UN Secretary-General was the first to describe Gaza as a graveyard for children. UNICEF has also made this clear:

“Gaza has become a graveyard for thousands of children. It’s a living hell for everyone else.”⁵⁵

More than 7,700 Palestinian children had been killed as of 30 December 2023 when the MoH stopped reporting disaggregated fatality figures. This accounted for 40 percent of all Palestinian deaths reported by the MoH.⁵⁶ In mid-November 2023, UN officials believed at least 1,500 missing children were believed buried under rubble.

Parents of children in Gaza have struggled to keep them safe. As families are forced to flee, they risk being separated, and UN workers have observed unaccompanied children amongst the internally displaced.⁵⁷ Parents, as they did in previous escalations of violence in Gaza, sometimes put their children to sleep in different parts of their homes, putting greater distances between them to increase the chances of them surviving attacks.⁵⁸

Thousands of children have also been orphaned by the conflict, arriving at hospitals without any surviving family members, prompting medical staff in Gaza to introduce a new acronym by which they are referred – WCNSF or ‘wounded child no surviving family’.⁵⁹

The death and injury from the IDF’s use of air-dropped explosive weapons extends to all ends of the Palestinian community. Health workers, aid workers, journalists and others have also been killed while working to

provide support to civilians impacted by the conflict. As of 30 December 2023, the MoH reported that 144 United Nations staff, 312 health workers and 106 journalists had been killed since the start of hostilities.⁶⁰

Conclusion

The foreseeable impacts on civilians of blast and fragmentation from explosive weapons – where civilians are killed and damage and destruction of civilian infrastructure leads to long-term consequences for entire communities – are well-documented. The current conflict in Gaza is a stark example of the severity of these consequences. As civilians are killed at a nearly unprecedented rate, airstrikes and the use of other explosive weapons by the IDF continue.

As the UN, the International Committee of the Red Cross (ICRC) and others call for better protection of civilians and an end to the suffering of civilians, the international community can look to the Political Declaration as a framework for action to prevent and address the harm to civilians from the use of these weapons.

In line with the Declaration’s commitments, actions should be taken by the Israeli armed forces – and all parties to the conflict – to take into account both the direct and long-term effects on civilians from the use of explosive weapons in populated areas, to facilitate rapid, safe and unhindered humanitarian access to those in need, and to stop the use of heavy explosive weapons in populated areas in Gaza.



A plume of smoke rises in the sky of Gaza City, Gaza during an Israeli airstrike on 9 October 2023.

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The Explosive Weapons Monitor is a research initiative of the International Network on Explosive Weapons (INEW). It conducts research and analysis on harms from and practices of explosive weapons use in populated areas and monitors universalisation and implementation of the Political Declaration on the Use of Explosive Weapons in Populated Areas.

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December 2023