Broken Harvests: How Explosive Weapons Devastate Farmland and Livelihoods

The Use of Explosive Weapons in Populated Areas and Their Impact on Food Security

November 2025

Insecurity Insight

Executive summary /report synopsis

Agricultural land is the foundation of global food security: it feeds populations, sustains livelihoods and drives economies. When explosive weapons hit farmland, they do not just destroy crops: they contaminate water sources, degrade soil quality and break down food supply chains. These impacts are often compounded by concurrent damage to critical food infrastructure such as **irrigation systems** and **marketplaces**, which disrupts food security. Understanding the effects of the use of explosive weapons on farmland is essential for understanding the broader implications of armed conflict for food security, economic resilience and communities' well-being.

This report draws on Insecurity Insight's dataset of reports of 1,034 incidents gathered from open sources in which the use of explosive weapons affected agricultural land. These incidents occurred in 29 countries and territories between 2018 and 2024; i.e. in the six years since the adoption of UN Security Council Resolution (UNSCR) 2417 (2018) on the protection of civilians during armed conflict, conflict-induced food insecurity, and the threat of famine. Incidents are documented using Insecurity Insight's incident-based methodology, which records reported incidents at the time and place they occur, capturing information dynamically rather than according to a predetermined case study focus. These records are then complemented with first-hand accounts and information from other on-the-ground sources to provide a unique and contextualised understanding of how conflict impacts food supply systems, civilian well-being, and humanitarian access.

The recorded incidents show that explosive weapons damaged, made unusable, and contaminated arable land, destroying crops and harvests and killing or maiming agricultural labourers. These destructive consequences of explosive weapons use occurred through blast impacts, fires that burned fields and olive groves, and unexploded ordnance (UXO) that continues to pollute soil and water long after the initial attack. These incidents occurred both through direct strikes on agricultural land and through incidental harm during active fighting between opposing conflict parties. The incidents examined illustrate a wide range of consequences, from scorched fields and destroyed irrigation systems to contaminated soil and abandoned land that once sustained entire communities. In countries where attacks of this kind occur, agricultural infrastructure such as silos, greenhouses, animal shelters and irrigation systems were also affected by explosive weapons, which, although not covered in this report, causes further problems to the agricultural sector.

Conflict affects agricultural production in complex ways by disrupting the agricultural cycle. This report focuses on the impact of explosive weapons use on agricultural land, because the characteristics of these weapons systems, particularly their wide-area effects and chemical composition, have direct foreseeable consequences for food supply systems and food sovereignty.[1] These impacts are relevant to the processes under the Political Declaration on Strengthening the Protection of Civilians from the Humanitarian Consequences Arising from the Use of Explosive Weapons in Populated Areas (EWIPA Political Declaration) and to discussions on the application of international humanitarian law (IHL) during conflict.

Current diplomatic and humanitarian discourse on the impact of explosive weapons in populated areas has largely focused on the use of explosive weapons in populated areas and on the immediate civilian deaths and injuries caused by their use. Agricultural land is an area where civilians are less densely concentrated and is often found on the outskirts of villages.[2] These areas are locally, regionally and globally essential to communities, due to their primary function in food production. To understand the full impact of the use of explosive weapons on communities, it is essential to also examine damage to vital civilian infrastructure, including that required to produce food, such as agricultural land. When fields are cratered, contaminated, or made inaccessible, the destruction reverberates over time, eroding food security, livelihoods, and community resilience; making communities more dependent on humanitarian aid; and negatively impacting post-conflict reconstruction. Broadening the focus beyond immediate casualties reveals the true, far-reaching impact of explosive weapons use, which always extends beyond the initial explosion.

While the overall impact of conflict on agricultural land and farming communities is complex, this report specifically examines how the use of explosive weapons systems affects these areas. The importance of focusing on explosive weapons is underlined by a reported sharp increase in their use since 2023. This increase will leave more explosive remnants of war (ERW) in agricultural land, creating long-term risks for communities – particularly once conflicts end and people return to their land.

This report forms part of a four-part series examining how individual conflict incidents collectively contribute to the complex relationship between conflict and hunger. It highlights that agricultural land, as a core component of food supply systems, is essential for food production and civilian survival. The damaging and destruction of such land disrupts livelihoods and heightens the risk of food insecurity in affected communities. Recognised as civilian in character, agricultural land is protected under IHL as a civilian object. The findings presented here aim to inform discussions on the implementation of the EWIPA Political Declaration and contribute to broader debates on the “conflict and hunger” agenda, in which protecting livelihoods during armed conflict is essential to preventing hunger and aid dependency by ensuring that food supply systems can continue to function. It is hoped that the report will contribute to a discussion of how the rules of war are applied in practice, how information on their application in practice is collected and analysed, and to whom conflict parties are accountable.

Key findings

- Between 2022 and 2024, the reported use of explosive weapons impacting agricultural land markedly increased. In 2018, the impact of the use of explosive weapons on agriculture was reported in five countries. But by 2024, it was reported in 21 countries, making it much more widespread and posing a serious threat to food security and livelihoods.
- Explosive weapons cause immediate and long-term damage to farmland and communities. They destroy harvests, cause fires, and injure or kill farmers, resulting in the abandonment of arable land, the disruption of planting cycles, and reduced agricultural productivity, which in turn leads to less food being produced and heightened food insecurity. These effects hinder post-conflict recovery and undermine the resilience of affected populations.
- ERW and the contamination of soil and water supplies by released toxic chemicals create lasting environmental and health hazards that persist for years after a conflict has ended.
- The destruction of food crops disrupts local food supplies and displaces farming communities, undermining food sovereignty. Repeated attacks on agricultural land erode local food production, increase dependence on external aid, and weaken community control over food supply systems and agricultural practices.

Agricultural land: vital to food supply systems and needing to be protected during conflict to prevent conflict-induced hunger

- Due to its essential role in food production, agricultural land is vital to food supply systems and constitutes an *"object indispensable to the survival of the civilian population"* under IHL.[3] Its destruction, damaging or contamination undermines civilian livelihoods and community resilience.
- There is an urgent need for states to recognise not only the immediate impact of the use of explosives on agricultural land, but also the foreseeable reverberating effects of such use for affected communities, such as soil degradation and contamination, and the long-term impact on food production.
- Monitoring incidents involving the use of explosive weapons on agricultural land can serve as an early indicator of long-term impacts on food security. Integrating this information systematically into early warning systems for conflict-related food insecurity could help trigger timely action to mitigate future consequences.
- More coordinated international action and protection are required to mitigate the impacts of these attacks and their effects on food systems.

This report is part of a series covering the impact of explosive weapons use on **water supply systems**, agriculture and **markets** during conflict. The data cited in it can be downloaded **here**. In the sources for boxes, figures, and maps and in footnotes, this data is referred to as "2018-2024 EPIWA and Agricultural Land Data".

DOWNLOAD THE EXECUTIVE SUMMARY

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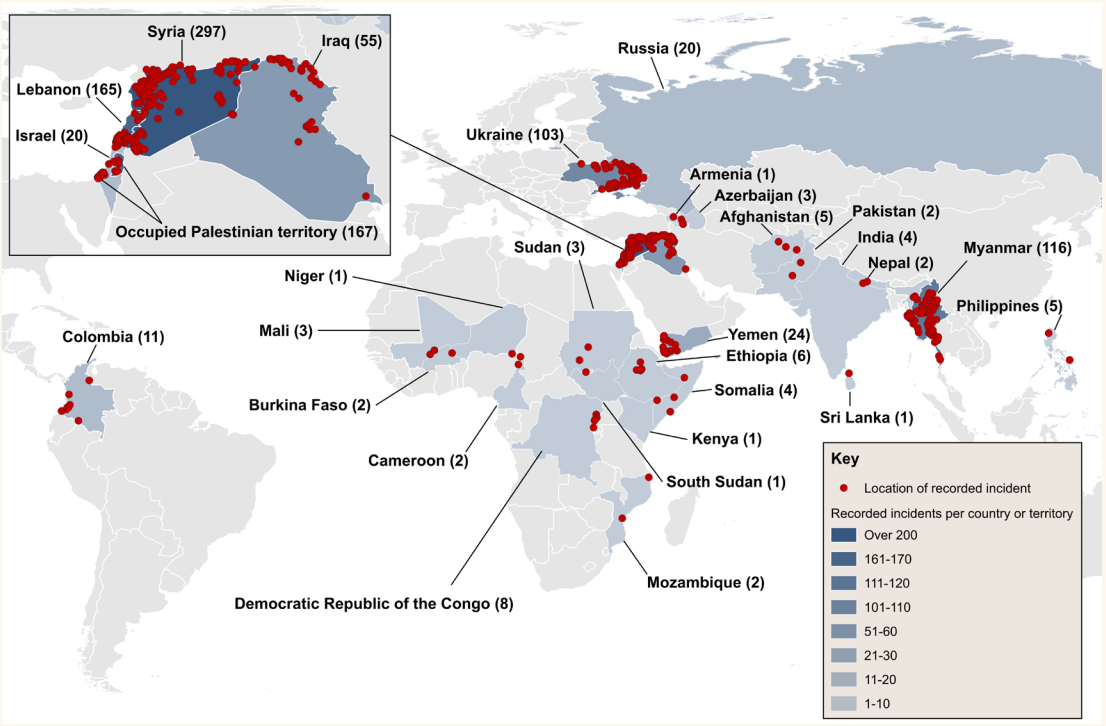
Introduction

According to available data, agricultural land was damaged or destroyed (i.e. made unusable) by explosive weapons in 1,034 reported incidents across 29 countries or territories between January 2018 and December 2024. The data was compiled from open sources and is neither comprehensive nor complete, but provides insight into changing trends of explosive weapons use affecting agricultural land and the impact of these trends on food supply systems during conflict.

Five countries – Syria, the occupied Palestinian territory (oPt), Lebanon, Myanmar and Ukraine – accounted for over 80% of all 1,034 reported incidents of explosive weapons use adversely affecting agricultural land. While these conflicts show the highest concentration of harm, attacks were also recorded in 24 other contexts, but were often less visible to the public. Olive groves in northern Israel, Lebanon, Syria, and the oPt and beehives, orchards, and vineyards in Iraq were all damaged or destroyed by explosive weapons. In Ukraine, wheat and barley fields were hit by air strikes and shelling, resulting in the burning of hectares of land, the destruction of crops and agricultural equipment, and the killing or severe injuring of agricultural workers. In Myanmar, farmers – including children helping on family-run farms.

Map 1: Known locations of reported incidents involving explosive weapons use impacting agricultural land, 2018-2024[4]

Between 2018 and 2024, 1,034 incidents were reported across 29 countries and territories. The Middle East was particularly affected, with 80% of reported incidents occurring in this region. A high number of incidents were also reported in Ukraine and Myanmar.



Source: 2018-2024 EWIPA and Agricultural Land Data

Agricultural land forms the foundation of broader food supply systems through its central role in food production, and its damaging or destruction has cascading effects that extend from household food insecurity to global market disruptions. In regions such as the Middle East, where countries are increasingly reliant on grain imports to meet domestic demand, this vulnerability is magnified.[5] Dependence on external food supplies means that conflict-related disruptions to local production or international trade can rapidly translate into shortages, price volatility and heightened food insecurity. Over the long term, the loss and degradation of agricultural land erode food production capacity and threaten the sustainability of food security at both the national and regional levels.

This report addresses a largely under-recognised issue, using available evidence to examine not only the direct impact of explosive weapons use on harvests and agricultural workers, but also how the destruction and contamination of agricultural land contribute to the disruption of broader food supply systems and, over time, to conflict-induced food insecurity. The long-term environmental contamination caused by ERW further compounds these impacts by degrading soil and water quality, and slowing recovery and agricultural rehabilitation. Over time, such effects weaken local control over food production, undermining food sovereignty and the resilience of affected communities.

Definitions

Agricultural land

In this report, the term “agricultural land” refers to land actively used for the cultivation of crops for food, livestock feed, or other agricultural purposes, including fields, orchards, olive groves, vineyards, rice paddy fields, cultivated pastures, and grazing land. Agricultural land may be under active planting, in a preparatory stage (e.g. ploughed or irrigated before sowing), or in a managed fallow period as part of planned crop rotation.

Explosive weapons and their delivery systems

The term “explosive weapons” encompasses a broad spectrum of weapons systems, from small hand grenades and suicide vests to large artillery shells, rockets, and aerial bombs (see Annex 2). Their size, yield, and method of delivery produce different effects on people and infrastructure. To assess their impact and changes over time, this report classifies explosive munitions into three categories based on delivery method. This approach works well for non-military readers, because it relies on observable characteristics: directly emplaced weapons (e.g. car bombs, improvised explosive devices, or IEDs), ground-launched weapons (e.g. artillery shells fired from the ground), and air-delivered weapons (e.g. munitions dropped by aircraft or drones), while also providing the basis for further analysis.

State and non-state actors

The report also classifies the reported users of explosive weapons in terms of state forces and non-state actors (see Annex 3). This distinction is important from a policy perspective. When state forces use explosive weapons to attack civilian structures, including agricultural land, questions of state responsibility and violations of IHL arise. Harm caused by non-state actors is often addressed through counterterrorism frameworks, even though these actors are equally bound by customary IHL despite not being parties to relevant treaties. There are also direct links between the categorisation in terms of state and non-state actors and delivery methods, because non-state actors generally rely on improvised or limited systems to deliver explosive weapons, whereas state forces typically have access to more advanced explosive weaponry, including delivery systems that launch explosive weapons from the air or over long distances. Using both classification systems in the analysis allows the examination of patterns and trends from more than one perspective, which helps to understand nuances (see Annex 2).

However, these distinctions and categorisations are not always clearcut. The distinction between state and non-state forces may not be universally accepted. For example, after regime changes, governments may not be universally recognised, and competing claims can blur who legally represents a state. In some situations, de facto authorities that control part of a state's territory function much like state forces.

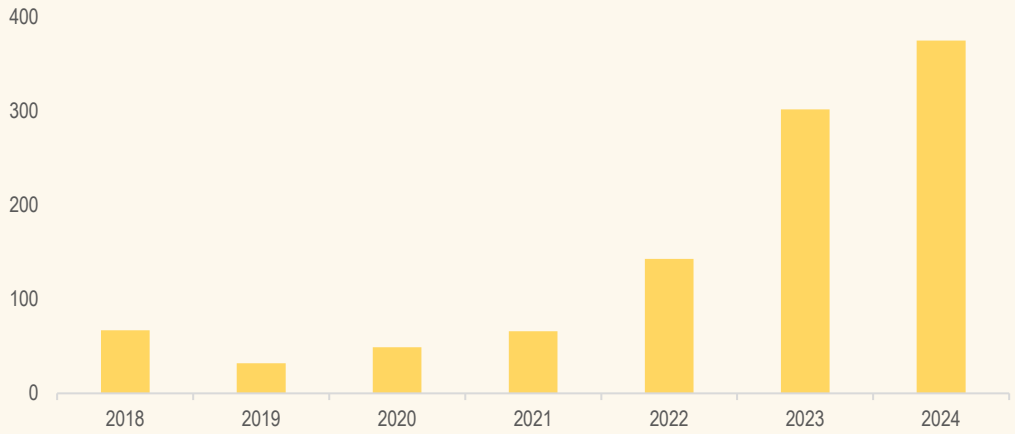
Increasing number of reports of explosive weapons use affecting agriculture

In 2024, 375 incidents in which explosive weapons use impacted agricultural land were reported, compared to 67 incidents in 2018. This reflects both a rise in the number of incidents in the most heavily affected countries (from 62 incidents in 2018 to 307 in 2024) and the spread of reported practice from five countries where such incidents were identified in 2018 (Iraq, Kenya, Myanmar, Syria, and Ukraine) to 21 countries and territories in 2024, including Burkina Faso, Israel, Mozambique, and Russia, highlighting a concerning and serious threat to agricultural land and the communities that rely on it.

This increase in reported incidents is reflected by cases in which state forces reportedly used explosive weapons that struck agricultural areas, with over half of incidents affecting agricultural land linked to state forces (619 of 1,034), reflecting a worrying increase in state forces striking agricultural lands during conflict. Just five state forces (the Israel Defense Forces, Myanmar Armed Forces, Syrian Arab Armed Forces, Russian Armed Forces and Turkish Armed Forces) accounted for most of these reported incidents (564 of 619).

Incidents of this kind attributed to non-state armed groups also increased, but at a slower rate (from 87 in 2023 to 148 in 2024). This increase was primarily due to a surge in incidents in 2024 linked to Hezbollah (110 reported incidents of explosives use affecting agricultural land), which fired missiles and rockets at Israeli forces occupying agricultural land in Lebanon and Syria and into northern Israel.

Figure 1: Reported incidents of explosive weapons use on agricultural land, 2018-2024
Since 2022, reports of the use of explosive weapons affecting agricultural land dramatically increased, with the number of incidents in 2023-2024 being over five times higher than pre-2022 levels.



Source: 2018-2024 EWIPA and Agricultural Land Data

Direct effects of explosive weapons use and reverberating impacts on food supply systems

When explosive weapons detonate on agricultural land, they set in motion cascading effects that may injure or kill individuals, destroy farm infrastructure and equipment, and damage crops and harvests, while also contaminating soil and water sources. The consequences often include severely disrupted agricultural cycles and abandoned farmland. These disruptions affect households, communities, and regional, national, and even international food supply systems. This devastation frequently forces the displacement of affected communities and increases dependency on food aid. Yet the long-term indirect effects on economic survival, food security, and public health remain underdocumented and underanalysed.

Purpose, method and structure of the report

This report focuses on how explosive weapons affect agricultural lands, highlighting their impact on civilians and food supply systems in conflict settings. The report forms part of the implementation of two ECHO-funded projects designed to strengthen the protection of civilians from explosive weapons and examine the relationship between conflict and hunger in terms of an IHL framework.[6] The report covers issues directly relevant to international discussions under the EWIPA Political Declaration[7] and UNSCR 2417 (2018),[8] as well as the application of IHL.

Box 1: International instruments protecting agricultural land from explosive weapons use

UNSCR 2417 (2018) recognises how armed conflict impacts food supply systems both directly through displacement from land, livestock grazing areas, and fishing grounds and the destruction of food stocks and agricultural assets, or indirectly through the disruption of food supply systems. In addition, it also specifically highlights the humanitarian threat posed to civilians by landmines, ERW, and improvised explosive devices (IEDs), which have serious and lasting social and economic consequences for communities and their agricultural activities.

UNSCR 2417 calls on all parties to armed conflict, including non-state actors, to comply with their obligations under IHL and to refrain from using starvation as a method of warfare. This includes ensuring the unimpeded delivery of humanitarian assistance to civilians in need. While UNSCR 2417 primarily addresses state actors, its call on all parties to armed conflict to adhere to IHL and refrain from using starvation as a weapon extends to non-state actors. Through international pressure, accountability measures, and the promotion of humanitarian access, the resolution aims to mitigate the impact of armed conflict on civilians and uphold the principles of IHL.

UNSCR 2573 (2021)[9] builds on the protections outlined in UNSCR 2417 and has a wider scope by strongly condemning attacks on critical civilian infrastructure that is indispensable to the survival of civilian populations and highlighting that depriving people of the use of such infrastructure, including for agricultural purposes, threatens their survival and should be halted.

The **EWIPA Political Declaration**, which was adopted in November 2022, addresses the responsibilities of both states and non-state actors regarding the use of explosive weapons in populated areas. State parties to the declaration commit to implementing the policies outlined in it, training their armed forces to implement these policies, and promoting IHL. While non-state actors cannot endorse the declaration, they are still bound by the rules of IHL. The declaration strongly encourages non-state armed groups to adopt policy commitments to avoid the use of explosive weapons with wide-area effects in populated areas and to strengthen the protection of civilians.

Attacks on agricultural land with explosive weapons highlight the civilian harm the EWIPA Political Declaration aims to prevent. As noted previously, this use of explosive weapons causes severe civilian harm and damages essential infrastructure. Although the Declaration is focused on populated areas, many of its principles are still relevant to the use of explosive weapons on agricultural lands, primarily because these lands are often close to civilian populations, are used for food production and therefore considered critical for post-conflict recovery and civilian livelihoods, and are frequently struck during conflict, while ERW cause long-term environmental damage and significantly impact people's livelihoods.

Ottawa Convention

The Ottawa Convention or Mine Ban Treaty, which was adopted in 1997, prohibits the use, stockpiling, production and transfer of anti-personnel landmines.[10] It also requires the destruction of existing stockpiles, the clearance of mined areas, and the provision of assistance to landmine victims. As of August 2025, 166 countries had ratified or acceded to the Ottawa Convention, making it one of the most widely supported disarmament agreements in history.

The focus on explosive weapons does not imply that other threats to agricultural land such as the use of chemicals or military bulldozers are irrelevant.[11] Nor does it exclude other significant factors, such as the looting of harvests or agricultural equipment; the occupation or repurposing of agricultural land for military use; threats to the safety of farmers and agricultural workers; shortages of manpower; disputes over land ownership; or shortages of and restricted access to seeds, equipment, and pesticides caused by supply-chain disruptions or blockades. The report fully recognises that the overall impact of conflict on agricultural systems is extremely complex. Nonetheless, it concentrates on understanding how explosive weapons use on agricultural land contributes to civilian harm. This focus is particularly relevant from an IHL perspective, since explosive weapons are inherently indiscriminate and have reverberating destructive effects on both civilians and agricultural systems. Their use in attacks on farming communities inevitably leads to the disruption of agricultural work, resulting in damaged crops, disruptions to harvest cycles, and the contamination of soil and water sources.

The purpose of this report is to provide evidence-based insights that inform practical policy and operational decisions within international frameworks. To this end, it applies the tested classifications of Insecurity Insight's Security in Numbers Database (SiND), which is designed to enable structured, incident-based analysis of the impact of conflict. These classifications support the generation of policy-relevant findings, while also accounting for the nuances and complexities of real-world conflicts (see Annex 1).

The data for this report has been generated using Insecurity Insight's open-source data-gathering methodology, which includes the use of web crawlers that continuously scrape open-source content and use AI-driven functions to classify information that human researchers then review and classify. This method, although not yielding a comprehensive or fully representative dataset, provides the basis for an analysis of shifts in reported incident patterns over time (see Annex 1).

Impact analysis

The report evaluates the impact of explosive weapons use on agricultural land using the three-level impact framework of the UN Institute for Disarmament Research (UNIDIR),[12] which provides a structured approach to understanding the effects of such weapons on people, infrastructure, and market functionality, and makes use of a review of a wide range of literature.

While limitations remain in the data and methodology, and important knowledge gaps persist, the collected data and applied categorisations enable the exploration of key connections. The identified information underscores the indiscriminate nature of explosive weapons use and the predictable risks it poses to civilians and civilian infrastructure. Satellite images can provide an important complementary tool for examining the impact of explosive weapons use on agricultural land by providing visual evidence of craters, scorched fields, damaged irrigation systems, or abandoned farmland. However, such analysis faces challenges, including restrictions on access to timely or high-resolution imagery, seasonal factors that obscure damage, and the difficulty of distinguishing explosive weapons' effects from other conflict-related or environmental factors. Despite these constraints, satellite-based assessments can help verify ground reports, track patterns of destruction over time, and provide critical insights when field access is restricted.

Assessing compliance with IHL, particularly the principles of *distinction, proportionality and precautions*, remains challenging due to the lack of public scrutiny of the strategies and tactics employed by conflict parties that target agricultural land.

Structure

The report is divided into an introduction followed three main sections, followed by conclusions, recommendations, and annexes. The first main section (Section II), which focuses on the impacts of explosive weapons use on civilians and food supply systems, demonstrates that the use of such weapons causes civilian casualties and entails broader repercussions for food supply systems in conflict-affected areas. The second main section (Section III), which discusses patterns and trends in the use of explosive weapons on agricultural land, provides a detailed analysis of available data, offering insights into the evolving ways in which state and non-state actors deploy a variety of explosive weapons systems in attacks on farmland. This section highlights a notable shift from directly emplaced explosives to air-delivered and ground-launched weapons. The third main section (Section IV) underscores the significance of this issue in terms of IHL frameworks and points out the existing limitations of efforts to ensure legal accountability.

This report is part of a four-part series examining how explosive weapons affect key elements of food supply systems, including water supply systems, agricultural production and markets. Collectively, the series illustrates how the use of explosive weapons is a central factor in the destruction of food supply systems and, when aid operations are targeted, exacerbates food insecurity and can ultimately lead to starvation.

The report is also connected to broader research examining the impact of explosive weapons on health care systems[13] (see **2023** and **2024** reports) and the link between conflict and food insecurity (see reports on the **DRC**, **Ethiopia**, **Gaza**, **Lebanon**, **Mali**, **Niger**, **Somalia** and **Sudan**, **Syria** **Ukraine** and the **West Bank**). Additionally, it relates to assessments of how the introduction of new drone weapons-delivery technologies has affected the risks associated with delivering aid and **health care**, as well as the development of associated **guidance materials**.

Impacts of the use of explosive weapons on agricultural land

Explosive weapons that detonate on or near agricultural lands harm civilians and communities not only through immediate injuries and death, but also by destroying the essential systems required to produce, deliver, and sustain access to food and water. These impacts unfold in both the short and long term. Short-term effects occur at the moment of detonation, causing direct and visible damage to land, crops, livestock, and infrastructure. Long-term or reverberating effects develop over weeks, months, and years, as the destruction of agricultural systems undermines livelihoods, food security, and the environment.

Understanding the impact of explosive weapons on agriculture

This report uses a four-level impact level analysis to understand the impact of the use of explosive weapons on agricultural land, ranging from the household to the community, local region, nation, wider region and international levels.

Figure 2: Impact levels of explosive weapons use on agriculture

Explosive weapons use on agricultural land can generate consequences that range from household food insecurity to global market disruptions, depending on the context and role of the affected land in wider food supply systems.

Such distinctions reflect the extent to which individual agricultural activities are embedded in wider systems. The significance of explosive weapons use on agricultural land cannot be measured only by the number of hectares damaged or destroyed, but by the role that land plays within broader food supply systems, which varies significantly depending on context. For example, damage to a small orchard or vineyard may primarily harm household income and food security. However, by contrast, the destruction of stable-crop fields in major producing areas can disrupt food supplies and livelihoods for millions of people both domestically and internationally. For example, in Myanmar, the shelling of rice paddies may devastate local households and villages dependent on subsistence farming.[14] In contrast, in other contexts, such as Ukraine, which is a major producer and exporter of grain and sunflower seeds, attacks on wheat, grain, and sunflower fields can reverberate through global food markets.[15] Thus, while individual incidents may appear similar in scale, their consequences range from local livelihood disruption to global food insecurity, particularly since agricultural land is the starting point of food supply systems. When agricultural land is destroyed, the consequences cascade down through supply chains, affecting markets, trade, and ultimately food access for individuals and households worldwide.

Immediate consequences of the use of explosives on agricultural land

Direct injuries to and deaths of farmers and agricultural workers

In individual incidents, explosive weapons cause severe and often fatal injuries to farmers and agricultural workers working in their fields. They can be injured or killed after being struck by shelling or air-launched explosives, or when their agricultural equipment strikes a landmine or ERW.

Box 2: Examples of civilian casualties and injuries from explosive weapons use during agricultural work

- **Afghanistan, September 2020**: One farmer was killed and another 15 injured while working in a potato field after being hit by grenades thrown by an unnamed armed group.[16]
- **Armenia, April 2021:** A farmer was severely injured after stepping on a landmine while harvesting crops in his field, resulting in the amputation of his foot.[17]
- Democratic Republic of the Congo (DRC), June 2023: One farmer was killed and another injured after an explosive device planted by the Allied Democratic Forces non-state group detonated. The device had been planted where crops were being stored.[18]

The high-pressure wave and fragments from the detonation of explosive weapons can cause life-threatening injuries by rupturing internal organs or causing severe burns. Directly emplaced explosives, such as landmines, can cause a variety of severe injuries, including shrapnel wounds, burns, blast injuries, and amputations, due to the explosive force and fragmentation that occurs when they detonate. Additionally, the constant threat and fear of being struck by an explosive weapon takes its psychological toll on farmers. Sowing and harvesting need to happen at specific times, so farmers have no choice but to work under shelling or under threat

Damage to agricultural buildings

Explosive weapons also damage the built infrastructure that underpins agricultural production, ranging from irrigation systems and greenhouses to silos, animal shelters, and crop and seed storage facilities. The destruction of irrigation systems and water channels can leave fields uncultivated for entire seasons, while damaged greenhouses reduce the yields of high-value crops and undermine farmers' ability to diversify production. Strikes on silos and storage sites not only destroy harvested grain, but also eliminate reserves needed to buffer the food supply system against shortages, driving up food prices. The loss of animal shelters exposes livestock to diseases, bad weather, and predation, reducing their survival rates and threatening pastoral livelihoods, while damage to seed storage facilities disrupts planting cycles and reduces access to quality seeds, prolonging the recovery period long after conflict has ended. These impacts interrupt production cycles, shrink future harvests, and weaken the resilience of entire agricultural industries, which illustrates how attacks on infrastructure magnify the long-term harm explosive weapons use can cause to food supply systems.

Figure 3: Satellite images showing vegetation degradation in Beit Hanoun, Gaza, 22 October and 11 December 2023
Satellite images of Gaza indicate that large areas of vegetation on agricultural land have been seriously degraded, while greenhouses have been destroyed.

Damage to agricultural land and the destruction of crops and harvest

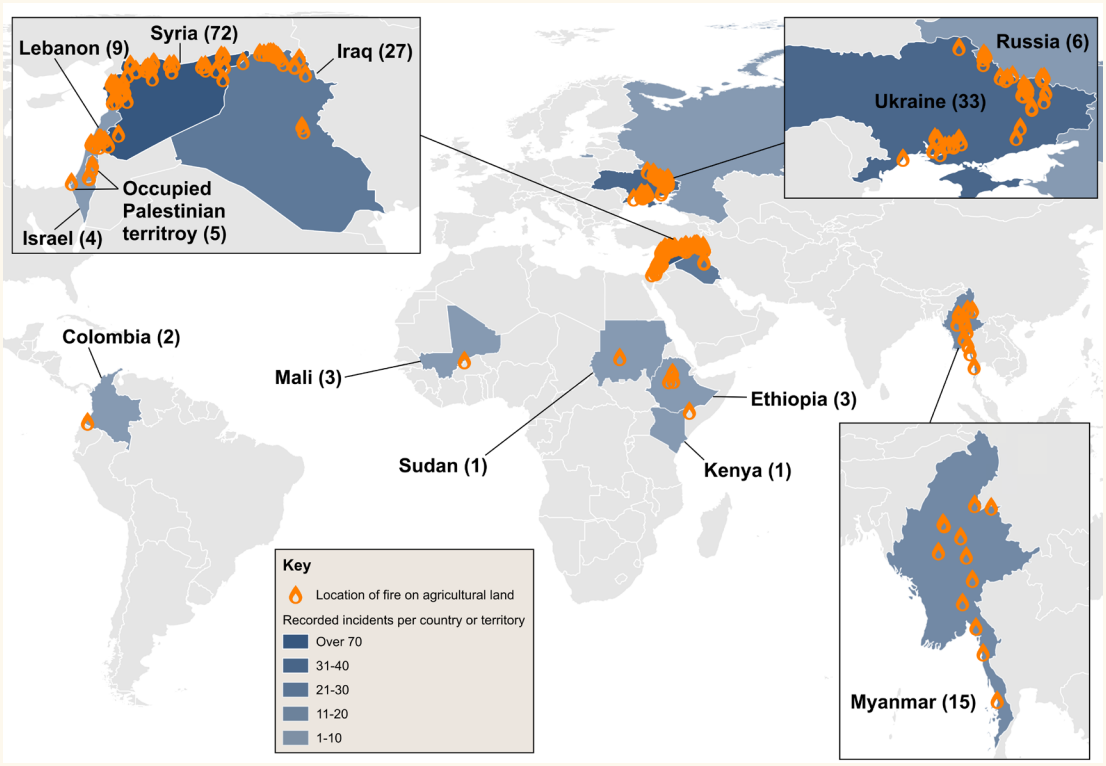
Explosive weapons have severely damaged farmland, destroyed crops, and cut communities off from vital food and income sources. Crops take months to grow, and when a harvest is destroyed, farmers lose their main source of livelihood, while communities must wait until the next season – or even years, in the case of crops like olive trees or grapevines – for food supplies and income to be restored.

Figure 4: Satellite images showing craters on agricultural land in Beit Lahia, north Gaza, 14 February 2024

Explosive weapons detonations can also spark crop fires and wildfires, damage land, and make it unusable for the next six to 12 months. In 14% of analysed incidents, farmland caught fire, especially during the dry summer months across the Middle East and North Africa region (May-October), when dry conditions make the land more vulnerable to fire.

Map 2: Reported locations of conflict-induced fires on agricultural land, 2018-2024

The use of explosives on agricultural land particularly during the summer months – when land is drier and more prone to wildfires – has resulted in many acres of agricultural land being made unusable by conflict-induced fires in at least 13 countries.



Source: 2018-2024 EWIPA and Agricultural Land Data

Abandoned agricultural land

Active fighting and the risk of ERW make farming unsafe, resulting in the abandonment of arable land. This disrupts production cycles, because missed planting or harvest seasons reduce yields not only in the current year, but also in subsequent ones, when soil preparation and crop rotation are also disrupted. For example, following Russia's February 2022 invasion, 7% of Ukraine's cropland was abandoned, leading to production losses,[19] while conflict in South Sudan resulted in a 16% drop in cultivated land between 2016 and 2018, which could have supported at least a quarter of the population in the country's southern states.[20]

The long-term consequences of explosive weapons use on agricultural land

The consequences of explosive weapons use on agricultural land extend far beyond individual tragedies. When farmers are seriously injured or killed, their ability to work the land is lost, resulting in abandoned fields and disrupted planting and harvesting schedules. This reduces agricultural productivity, leading to lower crop yields and potential food shortages. Fear of future attacks can drive entire communities to avoid farming certain areas, making the arable land in these areas unusable. Over time, these disruptions compromise local food security, inflate food prices, and destabilise rural economies that depend heavily on agriculture to provide local people with income and sustenance. The cumulative effect is a serious threat to both immediate livelihoods and long-term food production in affected regions.

Land accessibility and use

ERW, including mines, are often forgotten and continue to harm farmers and livestock returning to their land. For example, it is estimated that it may take 15 years to clear eastern Ukraine of ERW contamination and at least 30 years in Syria.[21] The damage from the use of explosives creates hazardous debris that takes years to clear and requires specialised equipment to prevent further health risks and the release of more toxic chemicals.

Long-term environmental impact

Explosive weapons use causes lasting ecological damage that hinders land recovery and sustainable farming, requiring extensive demining and soil cleanup activity, while also harming local biodiversity.

Soil contamination and degradation

ERW contaminate soil with heavy metals and toxins, degrading soil fertility and harming crop production. These chemicals are absorbed into the soil, water, and air, and have a detrimental effect on the health, well-being, and survival of communities in these areas.

Water resource disruption

Explosives weapons use also damages water supplies, treatment plants and irrigation systems that are vital for agriculture. Water is essential for growing food and keeping livestock. Explosive weapons can damage and destroyed **water infrastructure** used to irrigate crops, having a direct impact on food production when

crops cannot be irrigated or livestock cannot be provided with sufficient water. These impacts can be felt within days unless water supplies can be trucked in to make up the shortage until water systems are repaired. Over the long term, toxic chemicals released from explosive weapons can also leach into groundwater, poisoning water sources and reducing water availability.

Economic and food supply system impacts

The use of explosive weapons on agricultural areas has cascading effects across local, regional and global food supply systems. At the household level, families lose crops, livestock, and access to farmland, which in turn drives food insecurity, displacement, and income loss, which are often worsened by the long-term contamination of agricultural land or the presence of ERW. Regionally, damage to commercial farms and infrastructures disrupts supply chains and inflates food prices, limiting access to affordable food – particularly for already vulnerable populations. In addition, conflict in major food-producing regions can destabilise global markets. The war in Ukraine, for example, caused sharp declines in grain exports[22] and global price spikes.[23] Similarly, the Myanmar agricultural sector is considered to be the country's economic backbone,[24] contributing 32% of GDP and employing more than half of its workforce, while the country is the second largest global exporter of beans and pulses.[25] The undermining of Myanmar's agricultural activity resulting from the ongoing civil war may therefore have disastrous consequences for the country's and, ultimately, the global food supply system.

Figure 5: Economic and food supply system impacts
The use of explosive weapons on agricultural land has a reverberating effect across local, regional and global food supply systems.

Food sovereignty and local autonomy

Attacks on agricultural land undermine food sovereignty by depriving communities of control over their own food supply systems and means of production. The destruction of farmland, crops, and livestock forces reliance on external aid and imported goods, weakening local and national autonomy over agricultural practices and food supply policies. Over time, land contamination, displacement, and the loss of traditional farming knowledge further erode communities' resilience and capacity to sustain themselves, compromising their right to define and manage their own food supply systems.

Displacement and food aid dependency

The devastation of agricultural land triggers a cascade of consequences that can fundamentally alter a community's survival strategies and increase its dependence on food aid. As described in this report, when agricultural land is bombed, cratered, burned, or contaminated with ERW, rural populations, whose primary source of food and income is farming, lose their ability to sustain their livelihoods and feed their families. This loss often forces displacement, disrupts long-standing agricultural systems, disrupts food production and distribution, and drives a community into cycles of food aid dependency.[26]

There is also a clear correlation between displacement, hunger and malnutrition. Large-scale displacement not only signals a risk of famine – given the heightened food insecurity of displaced populations – but also reflects the consequences of attacks that restrict access to productive land and disrupt local food supply systems.[27] In Gaza, for example, the repeated mass displacement of people since 7 October 2023 driven by widespread Israeli evacuation orders has led to the abandonment of cultivated land and other means of food production, depriving communities of the ability to grow and harvest food and increasing their dependence on humanitarian aid.[28]

Active fighting and unusable land often force farming families to flee, leading to internal displacement or cross-border movement. Displacement severs access to arable land, seed banks and traditional coping mechanisms, compounding vulnerability. When displacement occurs during key agricultural seasons, this further undermines future harvest and recovery potential. With agricultural production disrupted, displaced families are increasingly dependent on humanitarian food assistance or cash-based transfers. This dependency often becomes prolonged when return to their land is impossible due to insecurity, land contamination or unresolved land disputes. Large-scale reliance on aid can overwhelm humanitarian systems, leading to ration cuts and/or prioritisation that deepen vulnerability. Even after active fighting subsides, barriers such as mine contamination, degraded soils, destroyed irrigation systems or contested land rights prevent displaced families from returning to their homes. These barriers prolong aid dependency and undermine resilience, locking communities into cycles of poverty and dependence on humanitarian aid.

Resilience

These cascading impacts can be prevented if the correct mitigation measures are put in place and if individuals and communities develop strong resilience. Usually, such resilience is only possible with outside support. The worst consequences of devastated and abandoned agricultural land can be avoided at the household level through direct assistance such as disability payments and support for those unable to work, financial aid to rebuild destroyed infrastructure and equipment, compensation to replace lost harvests, and funding to ensure that seeds for the next season can be purchased. Landmine and ERW clearance is also essential so that agricultural land remains usable and is not abandoned, while appropriate environmental measures can reverse damage. Together, these measures can help prevent displacement.

In other words, the damage and destruction caused by conflict is foreseeable, and an anticipatory mindset by local and national governments and aid agencies can stop cascading consequences from leading to full-scale food insecurity. With committed authorities and sufficiently resourced aid agencies, the worst impacts can be prevented. Without such measures, survival after devastating attacks depends entirely on the resilience of individuals, families or small communities.

READ *FRACTURED FLOW: THE CASCADING IMPACTS OF WAR ON ACCESS TO WATER*

Patterns and trends in the use of explosive weapons on agricultural land

Despite the adoption in 2018 of UNSCR 2417 and the EWIPA Political Declaration in 2022, the use of explosive weapons on or near agricultural land increased, causing not only visible physical destruction, but also profound disruptions to the social and economic fabric of affected communities. While these rising numbers capture immediate attention, they obscure deeper shifts in how conflict actors employ such weapons. These changes signal troubling trends in the conduct of hostilities, including a shrinking respect for IHL. Examining these patterns is crucial, not only to document the human and economic toll of the use of explosive weapons on or near agricultural land, but also to inform more effective protection strategies and interventions.

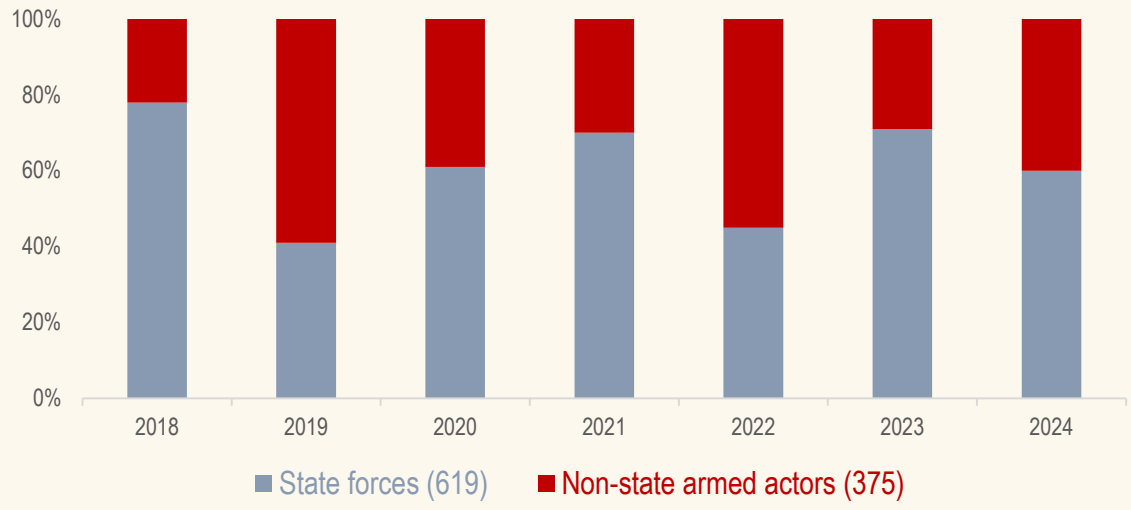
State actors' and non-state armed groups' use of explosive weapons impacting agricultural land

On average, state actors were more frequently linked to the use of explosive weapons on or near agricultural land than non-state armed actors, with generally nearly two-thirds of incidents being linked to state forces. For example, in 2024, state forces were linked to 60% of recorded incidents, compared to 40% linked to non-state armed actors.

This pattern had been the reverse in 2019 and 2022, when more incidents of explosive use affecting agricultural land were attributed to non-state armed actors. However, this shift was primarily the result of a decrease in incidents linked to state forces rather than an increase in the explosive weapons deployed by non-state armed groups.

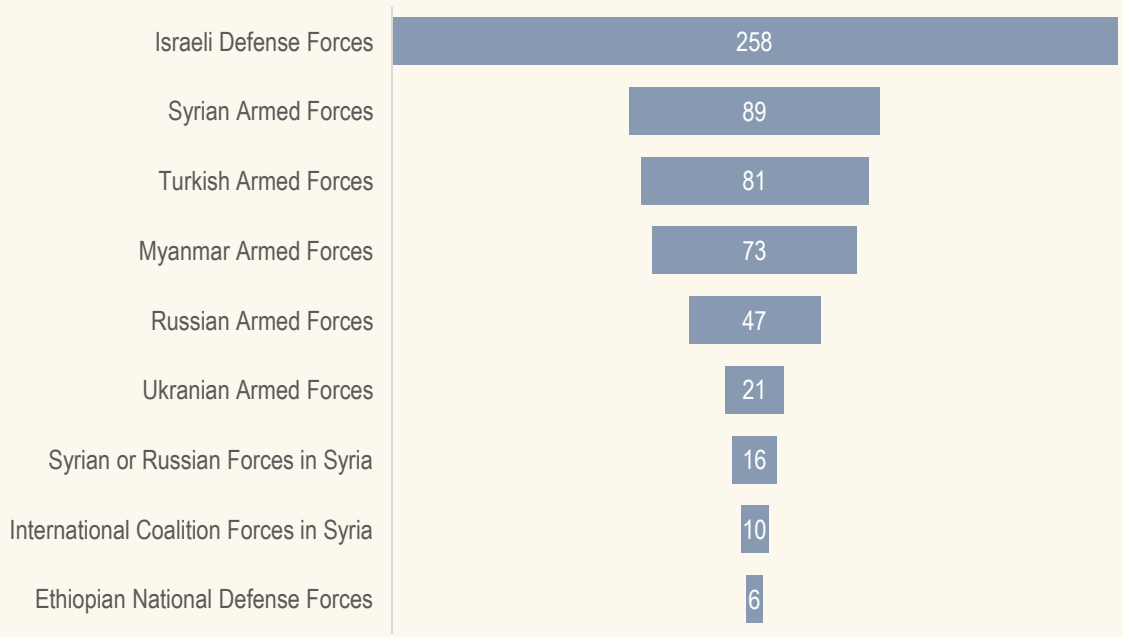
Figure 6: Reported incidents of explosive weapons use on agricultural land, by state actors and non-state armed actors, 2018-2024

State forces were more frequently linked to reported incidents of explosives use on agricultural land in the reporting period. A spike in incidents in 2022 mirrors a spike in incidents attributed to state forces because of increased conflict in Lebanon, Myanmar, the oPt and Ukraine.



Source: 2018-2024 EWIPA and Agricultural Land Data

Figure 7: Reported incidents of explosive weapons use on or near agricultural land, by named state forces, 2018-2024



Source: 2018-2024 EWIPA and Agricultural Land Data

Actors responsible for less than six incidents were not included in the above chart to ensure it was visually accessible. These include Armed Forces of the Philippines (5), African Union Mission in Somalia and Mali Armed Forces (two each), Armed Forces of Azerbaijan, Burkina Faso Armed Forces, Cameroon Armed Forces, Mozambique Defence Armed Forces, Sudanese Armed Forces, Saudi Forces, Myanmar Police Forces, Syrian Public Security Police, and Turkish Police Forces (one each).

State actors damaging or destroying agricultural land in foreign countries and occupied territories

In 42% of all reported incidents, state actors used explosive weapons to attacks foreign countries and territories. The Israel Defense Forces (91), Turkish Armed Forces (81) and Russian Armed Forces (47) were linked to most incidents involving explosive weapons use that impacted agricultural land in foreign territory. Israeli forces deployed artillery shelling, missiles, and aerial bombings to attack farmland, olive groves, and crops in Lebanon (75 incidents) and Syria (40 incidents), with incidents increasing significantly from 2023 in regions closest to Israel's borders. The Russian Armed Forces used explosive weapons in Ukraine (37 incidents) and Syria (10 incidents). All incidents in Syria took place in Idlib and Hama governorates, the majority of which occurred in 2018, when both territories fell outside the control of the Assad government, while in Ukraine, most incidents occurred in the eastern parts of the country. The Turkish Armed Forces were responsible for at least 81 incidents of explosive weapons use in Syria and Iraq during a military campaign against Kurdish-affiliated forces in northern Syria (40 incidents) and Iraq (41 incidents). Turkish forces used artillery shelling and air strikes on agricultural land, which resulted in orchards, pastures, and vineyards being set on fire. In some incidents, Turkish forces were reportedly attacking Kurdistan Workers' Party militants in Iraq or Syrian Democratic Forces in Syria; however, in many incidents no information was available for the motive behind these attacks.

Additionally, almost two-thirds of incidents were attributed to the Israel Defense Forces in the oPt – the majority of which occurred in 2023 and 2024 following Israel's military assault on Gaza. By April 2025, it was estimated that 80% of Gaza's cropland had been damaged,[29] which has contributed to the collapse of the territory's agrifood system and, along with the destruction of other food infrastructure and severe restrictions on humanitarian aid, to famine being confirmed in Gaza in August 2025.[30]

State actors damaging or destroying agricultural land domestically

State actors often damaged agricultural land and made it unusable domestically, when state forces struck infrastructure in areas outside of their control in order to weaken de facto authorities and deny services and resources to civilians. Many incidents (89%) were attributed to both the Syrian Arab Armed Forces (73 incidents) and the Myanmar Armed Forces (89 incidents). The latter seized power in a 2021 coup, and subsequently damaged agricultural land or made it unusable in opposition-held areas. In Syria, the Syrian Arab Armed Forces employed artillery, rockets, mortars and shelling that struck farmland. Reported incidents peaked in 2018 and occurred across five governorates, before declining in 2019, when most were concentrated in Hama and Idlib governorates. From 2021 onwards, incidents began to rise in number again, indicating a renewed escalation of conflict.

In Myanmar, prior to the military coup in 2021, incidents attributed to the Myanmar Armed Forces were largely concentrated in Rakhine, Kayin and Shan states, where conflict between the Myanmar Armed Forces and various ethnic armed groups persisted. [31] However, following the military coup, the number of incidents increased from 2022 onward – both in frequency and in their geographic spread. By 2023, the Myanmar Armed Forces were striking agricultural land with artillery shelling and air strikes across nine regions and states, reflecting a sharp escalation in the scale and scope of attacks.

Non-state actors damaging or destroying agricultural land

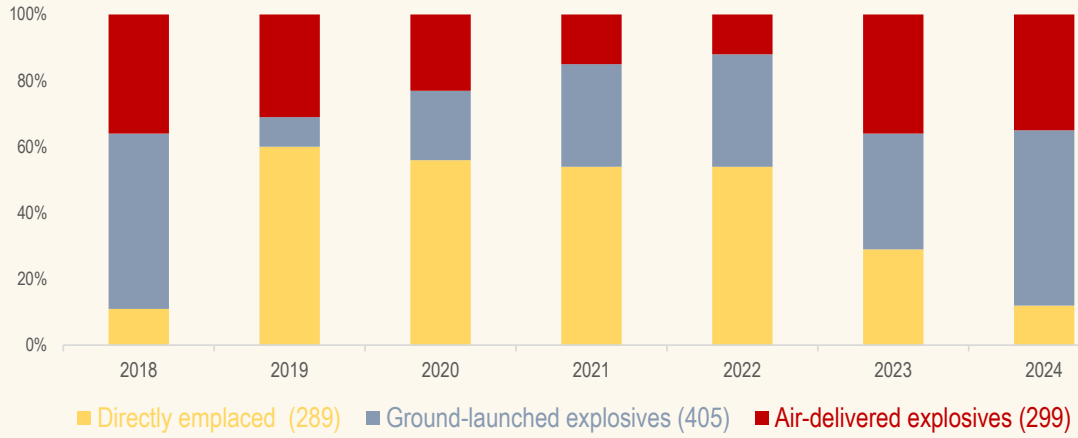
Just over a third of all incidents (36%) in which explosive weapons impacted agricultural land were attributed to non-state armed groups. These actors employed a range of explosives, including IEDs, rockets, missiles, mortars, and drones, that struck farmland, killing and injuring farmers and damaging fields and infrastructure essential for food production. In countries such as Afghanistan, Cameroon, the DRC, Mali, Myanmar and Sudan, hand grenades were thrown at farmers or accidentally detonated after being left in fields by armed groups, killing or maiming farmers. Nearly one-third of all incidents attributed to non-state actors involved Hezbollah (112 of 375 incidents), which used explosive weapons to strike Israeli forces operating on or near occupied farmland in Syria and Lebanon. In several cases, rockets and missiles attributed to Hezbollah were also launched into northern Israel, striking agricultural areas, destroying equipment, killing livestock, and causing further civilian casualties among agricultural workers.

Changes over time in delivery methods

The kinds of delivery methods used to launch explosive weapons change over time. State forces and non-state armed actors do not always have equal access to explosive weapons, influencing patterns of harm. Technological developments, budgets and weapons transfer regimes all influence which weapons systems are used. Depending on their budgets and access to weapons manufacturers, conflict actors can deploy a wide range of military-grade explosive weapons systems and munitions, and can maintain complex delivery and maintenance structures, including air forces. These disparities in access to explosive weapons were reflected in a shift in the types of devices used in attacks on agricultural land, moving from the frequent use of directly emplaced IEDs or hand grenades, to more ground-launched and air-delivered attacks. Different explosive weapons systems cause different patterns of harm. Trend analysis that combines information on users with information on the weapons systems used and the method of deployment provides insights into broader global trends in how agricultural areas are exposed to the effects of explosive weapons use.

Figure 8: Reported incidents of explosive weapons use on agricultural land, by launch type, 2018-2024[32]

Between 2019 and 2022, landmines, IEDs and UXO were the most frequently reported explosives affecting agricultural lands. Since 2023, the use of air-delivered and ground-launched explosives has increased sharply.



Source: 2018-2024 EWIPA and Agricultural Land Data

Armed actors employ different explosive weapons categories for both strategic and tactical purposes, depending on their objectives and resources. Landmines are often used to deny access to territory, channel the movement of opposing forces, or create long-lasting insecurity for civilians, making them both a tactical tool in battle and a strategic method of control. Artillery, with its capacity to deliver sustained fire over great distances, serves tactical purposes such as suppressing enemy positions or disrupting supply routes, while strategically it can weaken morale and destroy infrastructure. Air strikes, by contrast, are typically chosen for their ability to project power rapidly across large areas, allowing forces to target high-value objectives, command structures or logistical hubs far from front lines. While each type of weapon differs in precision, reach, and persistence, their common effect is to shape the battlefield environment and influence the behaviour of both enemy forces and civilian populations.

Between 2019 and 2022, landmines, IEDs, and other directly emplaced explosive devices were the most frequently reported explosives affecting agricultural land. While their use continued at the same level between 2021 and 2022, it fell in 2023, and by 2024 had reached a level slightly higher than that of 2018 (see Figure 8).

Since then, the use of ground-launched and air-delivered weapons on agricultural land has increased noticeably. Reported impacts from UXO were relatively low in 2018, reflecting the predominance of smaller, directly emplaced devices that leave fewer pieces of UXO scattered across fields. The heavy use of ground-launched and air-delivered systems in 2023 and 2024 suggests that the presence and impact of UXO on agricultural land is likely to rise in the coming years when the expected long-term impacts become apparent.

Directly emplaced explosive weapons in agricultural lands: landmines, IEDs and ERW affecting agricultural lands

Directly emplaced explosive weapons include landmines, which are factory-made explosive devices that are hidden in the ground to block movement or protect areas, and IEDs, which are homemade explosives assembled from available materials and planted to surprise, injure or kill. ERW are bombs, shells, or grenades that were fired or dropped but failed to detonate as intended, remaining hazardous and unpredictable long after conflict has ended. All these explosives can lie concealed in the soil, detonating when moved or stepped on, and may stay in place for years, posing a serious long-term threat to agricultural workers. Together, they accounted for almost a third of all reported incidents affecting farmland. In 2019, landmines and IEDs were the most frequently reported explosive weapons types used against agricultural land, but by 2024 their use had reached a level slightly above that of 2018.

A quarter of these incidents were attributed to non-state armed groups, who deliberately planted devices on farms, killing and injuring agricultural workers and children engaged in farming activities. Landmines, IEDs, and ERW affecting agricultural land were reported in at least 26 countries and territories, with the highest number of cases recorded in Syria (85 incidents), Ukraine (63 incidents), and Myanmar (40 incidents). Landmines affecting agricultural lands are associated with at least four states[33] that are not signatories to the Ottawa Convention, which prohibits the use, stockpiling, production and transfer of anti-personnel landmines. For example, it is estimated that Russian forces have used at least 13 types of anti-personnel mines in Ukraine since February 2022, extensively contaminating the country, while the Myanmar Armed Forces have also repeatedly used anti-personnel mines since seizing power in a coup in February 2021.[34] Incidents have also been attributed to Syrian and Israeli forces.

Box 3: Examples of suspected landmines affecting the farming population

- **Ukraine, May 2023:** A farmer was injured when his tractor accidently ran over an unknown explosive device as he was working in his field.[35]
- **Mozambique, June 2024:** A ten-year-old girl activated a landmine as she walked with her mother to their agricultural land. The landmine was likely planted by Islamist militia after they tried to attack a nearby village. The girl died from her injuries.[36]
- **Syria, September 2024:** A 15-year-old child was killed and another injured while they were harvesting olives after stepping on a landmine planted by an unidentified armed group.[37]

Landmines, IEDs, and UXO remain among the most severe and long-term threats to agricultural land. They are often buried or hidden in soil, making them difficult to detect during routine farming activities. Ploughing, digging, or operating machinery can easily trigger these devices, causing injuries or death. Many remain active for decades, contaminating fields long after the conflict has ended. As a result, they not only endanger lives, but also reduce access to productive land, disrupt economies and undermine food security for entire communities.

This report may not fully capture the risks faced by farmers from landmines or ERW, because the incidents included here only record cases that were publicly reported, often when a device detonates. Many more ERW and landmines remain buried beneath the surface of agricultural land, posing an ongoing and unrecorded threat.

Accurately attributing responsibility for the placement of landmines or ERW is challenging. Based on available reporting, slightly more than three-quarters of recorded incidents involving directly emplaced explosives on agricultural land were attributed to non-state armed actors; however, in most cases the actor responsible was not identified. These devices maimed or killed farmers and agricultural workers when they were stepped on during agricultural work or detonated after being struck by agricultural machinery. Additionally, because it is often difficult to determine the origin of an explosion on farmland, reports from affected communities or other witnesses rarely specify whether the device was an IED, landmine, or ERW. Distinguishing between these categories requires technical expertise, and without it, such classifications remain uncertain.

Ground-launched explosives impacting agricultural land

Box 4: Examples of the long-term impact on agriculture of landmines and UXO

After 30 years of war, Cambodia has been one of the most mine-affected countries in the world, with estimates suggesting 4-6 million landmines were scattered across the country.[38] As of 2024, it is estimated that around 1,856 km2 of land remains contaminated.[39] Landmines and ERW have caused over 64,000 casualties, giving the country one of the highest per-capita rates of amputees. As a result, large swathes of agricultural land remain dangerous, blocking food production and threatening rural livelihoods.

"I can't do anything with the land, can't even plant vegetables. It is far too stressful, and I don't want to risk my life for some vegetables."

Cambodian farmer, 2022[40]

Ground-launched explosive weapons, including mortar bombs, rockets, artillery shells, missiles, tank shells and rocket-propelled grenades (RPGs), are fired from the ground to hit targets at a distance. Often inaccurate, they can cause extensive damage when used near towns, fields and markets. These weapons frequently impact agricultural land, accounting for more than a third of all reported incidents. Their effects were particularly pronounced in 2018 and 2024, when they made up half of all explosive weapons incidents affecting farmland. Since 2021, roughly one-third of all explosive weapons incidents on agricultural land have been attributed to ground-launched systems.

Almost two-thirds of incidents involving ground-launched explosives impacting agricultural land were attributed to state actors, with the number of such incidents highest in 2023, because of an increase in incidents attributed to the Israel Defense Forces in Lebanon, Syria, and the oPt, and the Myanmar Armed Forces in Myanmar. Eleven state armed forces reportedly used ground-launched explosive weapons that affected agricultural land, including the Israel Defense Forces in Lebanon, oPt, and Syria (74 incidents), Myanmar Armed Forces in Myanmar (58 incidents), Syrian Arab Armed Forces in Syria (65), Turkish Armed Forces in Syria (31 incidents), and Russian Armed Forces in Syria and Ukraine (23).

In 2024, incidents of ground-launched explosive weapons impacting agricultural land attributed to non-state armed actors was markedly high. While IEDs and other directly emplaced devices had previously been the weapons most associated with non-state forces, by 2024, ground-launched explosives accounted for 81% of all reported incidents involving explosives affecting agricultural land attributed to non-state actors. This spike reflects an increase in attacks by Hezbollah (107 incidents), which fired missiles and rockets at Israeli forces in Lebanon (Nabatiyeh governorate) and Syria (Quneitra governorate), as well as into northern Israel, where rockets struck agricultural land, hitting olive groves, killing livestock, and killing and injuring agricultural workers.

Since 2021, roughly one-third of all explosive weapons incidents on agricultural land have been attributed to ground-launched systems. In 2018 and 2024, ground-launched explosives made up half of all explosive weapons incidents affecting farmland.

In the entire reporting period, incidents in which ground-launched explosives impacted agricultural land were reported in 12 countries, with almost two-thirds of incidents reported in Lebanon (125) and Syria (123). In Lebanon, Israeli forces fired artillery shells and missiles that struck agricultural land, setting olive groves and fields on fire, while Hezbollah fired missiles at Israeli forces occupying agricultural land in southern Lebanon. In Syria, various conflict parties, both state forces, including Turkish, Israeli, Syrian and Russian forces, and non-state armed actors, including Hezbollah and Islamic State, fired artillery shells, mortar bombs, rockets, and RPG rounds that set grain fields and olive groves on fire and destroyed crops.

Box 5: Examples of incidents in which ground-launched explosives impacted agricultural land

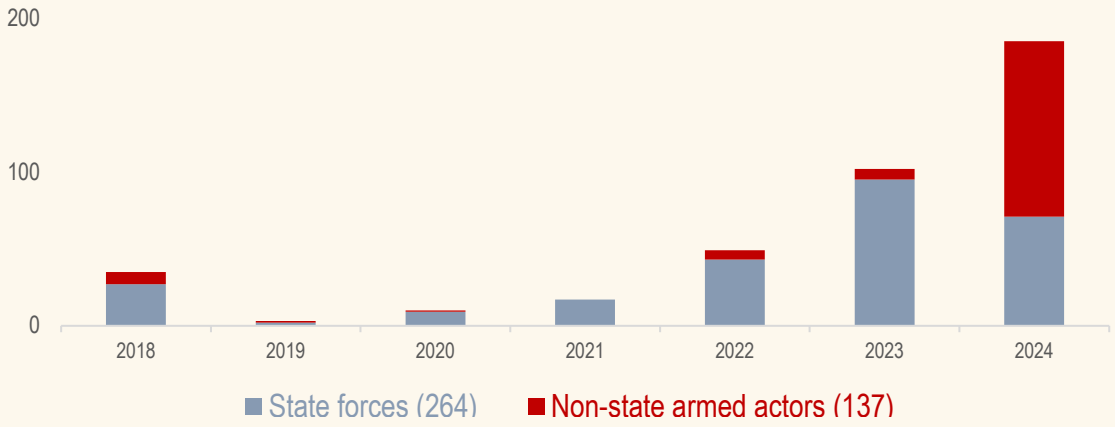
- **Israel, October 2024:** Hezbollah forces fired two rockets into northern Israel, striking an orchard. The strike killed five agricultural workers, four of whom were Thai nationals, and seriously injured another.[41]
- **Syria, May 2018:** A Russian Armed Forces ballistic missile launched from a naval vessel in the Mediterranean Sea caused a wildfire that destroyed crops and made fields unusable in Hama governorate.[42]
- **Lebanon, November 2024:** An Israeli shell fired from a Merkava tank exploded in an olive grove, damaging the grove and shattering the windows in neighbouring houses.[43]

Ground-launched weapons are sometimes used on agricultural land for clear tactical reasons, even when crop damage is incidental. Agricultural areas can lie close to roads, supply routes and enemy encampments, making them convenient firing zones to engage or suppress opposing forces. Open farmland offers little cover, so mortar bombs, rockets, and artillery shells are often fired into or across fields to slow or prevent enemy movement and deny safe routes. Farms and outbuildings may also be used to conceal weapons, munitions or supplies, so striking these locations can be a deliberate effort to interdict logistics. Artillery cratering and the presence of unexploded ordnance can create physical obstacles that temporarily block or channel movement, degrading an opponent's freedom of movement.

Tactically, these actions aim to degrade an adversary's operational capacity – by disrupting supply lines, destroying storage or making terrain hazardous – rather than to destroy crops as such. Nevertheless, shelling fields, damaging or destroying irrigation systems, and contaminating land with ERW predictably undermine agricultural production, livelihoods, and civilian safety, and so the incidental civilian harm of such tactics is a foreseeable consequence that should inform armed forces' targeting and precautionary assessments.

Figure 9: Recorded incidents involving the use of ground-launched explosive weapons systems on agricultural land attributed to named state forces or non-state armed actors, 2018-2024.

In 2022, the use of ground-launched explosives on agricultural land increased. This was mainly attributed to a rise in state forces deploying these explosives on agricultural land. In 2024, incidents involving ground-launched explosives impacting agricultural land linked to non-state armed groups peaked, reflecting a spike in incidents attributed to Hezbollah.



Source: 2018-2024 EWIPA and Agricultural Land Data

The impact of air-delivered explosives on farmers and agricultural land

Air-delivered explosives include munitions launched from aircraft, drones and helicopters. Their wide-area blast and fragmentation effects can devastate farmland and kill or severely injure farmers working in the fields. Aerial bombs and missiles also crater land, destroy irrigation systems, ignite fires, and leave behind ERW, creating long-term risks that prevent safe cultivation and undermine livelihoods. These weapons accounted for nearly a third of all reported incidents affecting agricultural land, and their use rose sharply from 17 incidents in 2022 to 106 in 2023.

This surge was primarily driven by Israeli air strikes on the oPt during military operations in Gaza. Overall, state actors were responsible for 98% of incidents involving air-delivered explosives, with the majority attributed to Israeli forces in Lebanon, the oPt and Syria (169 incidents).

An additional 11 state actors also used air-delivered explosive weapons that impacted agricultural lands, including the Russian Armed Forces in Syria and Ukraine (11 incidents), the Turkish Armed Forces in Iraq and Syria (45 incidents), the Ukraine Armed Forces in Russia and parts of Ukraine occupied by Russian forces (19 incidents), the Myanmar Armed Forces in Myanmar (10 incidents) and Syrian Arab Armed Forces in Syria (8 incidents). Incidents in which air-delivered explosives impacted agricultural land were reported in 13 countries, with almost half reported in the oPt (123 incidents).

Box 6: Examples of reported incidents involving air-delivered explosives impacting agricultural workers

- **Gaza, October 2023:** Israeli air strikes killed six Palestinian farmers while they were working their land.[44]
- **Cameroon, May 2024:** The Cameroon Armed Forces conducted air strikes on three villages in Far North region, injuring at least one pastoralist, killing livestock and destroying a field of off-season beans.[45]

Since 2022, the use of explosives delivered by drones has increased, and by 2024 explosives delivered by drones made up almost a third of all air-delivered explosives impacting agricultural land, with 91% attributed to state forces.[46] This increase in drone use poses a growing threat to farmers; for example, in Kharkiv and Sumy, two regions in Ukraine close to the front line, some large farms require security escorts equipped with drone jammers when they go into their fields with workers.[47] Whilst one farmer reported hiding his truck out of sight of drones. In north-west Syria, drone attacks occurred primarily in the Al-Ghab area, which is one of Syria's most fertile agricultural regions, particularly for cultivating grains that serve as a main food source for the Syrian population.[48]

The detonation of air-delivered explosives on agricultural land accounted for a third of all reported incidents, with numbers rising sharply in 2023.

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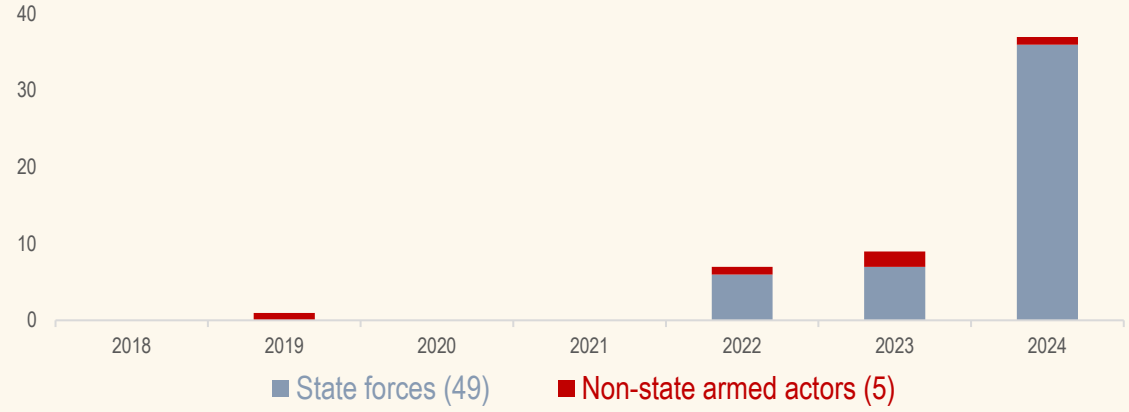
Figure 10: Recorded incidents on agricultural lands of drone-delivered use of explosive weapons attributed to named state forces or non-state armed actors, 2018-2024
Since 2022, the use of drone-delivered explosives has increased dramatically, posing a growing threat to farmers and agricultural workers, with 91% of these incidents linked to state forces.



Source: 2018-2024 EWIPA and Agricultural Land Data

Armed drones pose a serious, ongoing threat to agricultural workers and livestock because they can monitor activities, follow workers, or strike from the air with little warning. Even without direct attacks, their presence creates fear and stress, disrupting routine farming activities. Strikes can injure or kill workers, destroy crops, or kill or frighten livestock, while the persistent threat of attacks may force the abandonment of land. As a result, drones not only endanger lives and animals, but also reduce access to productive farmland, disrupt rural economies, and undermine food security for entire communities.

Aircraft and drones pose a growing threat to farmers working their lands.

Box 7: Examples of reported incidents involving drone-delivered explosives impacting agricultural workers

- **Ethiopia, November 2024:** Farmers harvesting grain were killed by an Ethiopian National Defence Force drone strike.[49]
- **Russia, October 2024:** An agricultural vehicle working in a field was hit by a Ukraine Armed Forces drone. The strike killed one farmer immediately and injured another.[50]

Manned aircraft strikes are typically used for both strategic and tactical purposes: to quickly engage high-value targets, shape battlefield conditions, and project power over wide areas. They can rapidly strike enemy positions, vehicles, or concentrations of fighters using precision-guided munitions, or employ unguided bombs and rockets for area suppression. Drone strikes, by contrast, are more intelligence-driven, combining continuous surveillance with precision engagement of mobile or time-sensitive targets, allowing repeated strikes with lower risk to personnel. They add persistence and flexibility, enabling continuous surveillance, loitering strikes, and stand-off attacks from beyond enemy air defences.

Air-delivered weapons generally produce larger blast and fragmentation effects than ground-launched systems, often causing secondary fires, collapsing storage facilities or destroying irrigation networks. While precision munitions can reduce collateral damage, limitations in sensors, targeting procedures and battle awareness mean civilian harm remains likely. The remote nature of many air strikes complicates the real-time assessment of civilian presence in target areas. Consequently, the foreseeable impact on food production, livelihoods, and humanitarian access should factor into targeting and precautionary assessments, because agricultural land destruction and contamination are predictable outcomes of employing air-delivered explosives.

READ *SHATTERED STALLS, SHATTERED LIVES: THE HUMAN COST OF BOMBING MARKETPLACES*

International law and other instruments, and the protection of agricultural land and food security during conflict

The protection of agricultural land under international law

Recognised by default as civilian in character, agricultural land is protected under IHL by both general and specific provisions.[51]

Under the general principle of IHL governing the protection of *"civilian objects"* in both international[52] and non-international armed conflict,[53] agricultural land should be protected against attack, and attacks should be limited *"strictly to military objectives"*, and if there is any doubt whether a structure is being used for military purposes, then it should be assumed that it is not. Building on this general protection, customary IHL rules specifically prohibit attacks on *"any part of the natural environment"*[54] and prohibit "the use of methods or means of warfare that are intendent, or may be expected, to cause widespread, long-term and severe damage to the natural environment".[55]

Agricultural land is also protected under IHL by specific provisions. Due to its essential function to produce food, agricultural areas are considered as *"objects indispensable to the survival of the civilian population"* and their destruction is therefore prohibited.[56] Agricultural land therefore enjoys special protection under IHL. These rules have also been considered as applicable to non-international armed conflicts under customary IHL[57] and are linked to the prohibition of the use of starvation as a method of warfare.[58] In its "Commentary of 1987",[59] the ICRC elaborated on these specific protections, explaining that the verbs *"attack"*, *"destroy"*, *"remove"*, and *"render useless"* were deliberately chosen to encompass all possible methods of harm, including pollution by chemicals.[60] The "Commentary of 1987" further clarifies that agricultural areas used for the production of food stuffs, drinking water installations, and supplies are regarded as *"especially protected"* objects,[61] meaning that parties to a conflict not only have a negative obligation to refrain from damaging or destroying them, but also a positive duty to actively safeguard and preserve this resource. Even where foodstuffs or water installations may incidentally benefit opposing forces, the ICRC notes that this does not justify depriving them of the protection afforded them under IHL.[62]

In situations of belligerent occupation, the occupying power, which is recognised as a temporary administrator, has an obligation to *"restore, and ensure, as far as possible, public order and civil life"*.[63] Accordingly, it must safeguard the resources of the occupied territory and has no legal authority to exploit them for its own benefit.[64] The ICRC adds that the occupying power *"may not destroy objects located in occupied territory which are indispensable to the survival of the civilian population"*.[65] Otherwise, the occupying power may use the natural wealth of the territory only to supply its armed forces during the occupation, as strictly required by security, military or administrative necessity and without exceeding ordinary use.

Human rights law remains applicable during armed conflict, and particularly in situations of occupation. Although human rights instruments do not explicitly address agricultural land, its protection is increasingly recognised as integral to the enjoyment of fundamental rights, including life, health, property, and privacy, all of which may be affected by the destruction of or deprivation of access to agricultural resources. Human rights law also directly protects the rights to food and an adequate standard of living, both of which are closely linked to secure access to land and the fulfilment of the fundamental right to freedom from hunger and malnutrition.[66]

The protection of agricultural land under other policy instruments or commitments

Recent policy initiatives have also focused on regulating the use of explosive weapons in armed conflict, particularly in terms of their impact on civilians and essential resources. Both the EWIPA Political Declaration and UNSCR 2417 (2018) are grounded in IHL as the key legal framework for achieving their objectives.

The preamble to the EWIPA Political Declaration reaffirms the applicability of International Humanitarian Law, including the principles of distinction, proportionality, and precaution, to the use of explosive weapons in populated area.[67] The operative section outlines specific commitments to the use of explosive weapons in populated areas and commits states to go beyond the foundations laid down by IHL and establish their own military policies and practices specific to the use of explosives. In section 3.3, states commit to *"restricting or refraining as appropriate from the use of explosive weapons in populated areas, when their use may be expected to cause harm to civilians or civilian objects*". In section 3.4, states commit to ensuring that their armed forces take into account the direct and indirect effects on civilians and civilian objects, which can reasonably be foreseen in the planning of military operations and the execution of attacks in populated areas, and conduct feasible damage assessments to identify lessons learned.[68] Other specific commitments commit states to develop new military policies and practices that both ensure compliance with IHL and go beyond it, which includes as a first step a review of national policies and training for the armed forces. As of September 2025, 88 states had endorsed the EWIPA Political Declaration.[69]

UNSCR 2417 calls on all parties to armed conflicts to comply with their obligations under IHL. This includes ensuring the protection of civilian infrastructure critical to the delivery of humanitarian aid and the proper functioning of food supply systems and markets. The resolution emphasises the importance of adhering to IHL principles to prevent and mitigate the impact of conflict-induced hunger. It reaffirms that states bear primary responsibility for protecting their populations throughout their entire territory. This responsibility should ensure that IHL is respected and that actions leading to food insecurity, such as the unlawful denial of humanitarian access, are prevented and addressed. The resolution strongly condemns the use of the starvation of civilians as a method of warfare and underscores that such actions may constitute a war crime under IHL, particularly under the Geneva Conventions and their Additional Protocols.

While these instruments apply to both states and non-state actors, the latter can also sign the Geneva Call's Deed of Commitment[70] for the Prevention of Starvation and Addressing Conflict-related Food Insecurity.[71] This instrument underscores the links between food insecurity, displacement, health, and environmental degradation; recalls IHL protections for displaced persons, health care, and the natural environment; and highlights the severe and lasting impacts of armed conflict on food security, health, education, sustainability, and peace. So far, only one non-state actor, Nduma pour la défense du Congo-Rénové/Guidon in the DRC, has signed the Deed of Commitment on the Prevention of Starvation, pledging to protect objects indispensable to the survival of the civilian population, such as foodstuffs, agricultural areas for the production of foodstuffs, crops, livestock, drinking water installations and supplies, and irrigation works, including when such objects are part of the natural environment.[72]

Finally, the Ottawa Convention (Mine Ban Treaty[73]), adopted in 1997, prohibits the use of anti-personnel landmines, including on agricultural land, and, as of August 2022, 165 states had ratified or acceded to the treaty. Additionally, 54 non-state armed groups from 12 countries had signed up to Geneva Call's "Deed of Commitment under Geneva Call for Adherence to a Total Pan on Anti-personnel Mines and Cooperation in Mine Action".[74]

Box 8: IHL principles protecting the agricultural sector during conflict

1. Principle of distinction

Parties to a conflict must always distinguish between military objectives and civilian objects.[75] Agricultural land is considered a civilian object and as such is protected against attack. Attacks that deliberately or indiscriminately target such objects are prohibited and may amount to war crimes.[76] As with any civilian object, agricultural land loses its protection if, and for such time as, it is used for military purposes, and may then be subject to attack in accordance with the principles of proportionality and precautions.[77] In situations where there is doubt as to whether farmland constitutes a legitimate military target, it must be treated as a civilian object, and conflict parties must protect it from attack.

Embedded in the principle of distinction is the prohibition on indiscriminate attacks.[78] Parties to conflicts are prohibited from launching attacks that fail to distinguish between military targets and civilian objects, or that employ weapons that cannot be directed at specific military objectives, or the effects of which cannot be limited as prescribed by IHL.[79] For instance, the use of inherently indiscriminate weapons, such as landmines, violates this principle. More broadly, the use of explosive weapons with wide-area effects on or near agricultural land often causes damage well beyond the intended target, destroying crops, contaminating soil, and leaving explosive remnants, raising serious concerns regarding compliance with the prohibition on indiscriminate attacks.

2. Principle of proportionality

The principle of proportionality imposes the obligation on all parties to a conflict to assess the potential collateral harm to civilians and civilian objects, such as agricultural land, of a specific attack against a legitimate military target in relation to the anticipated military advantage that could be gained.[80] This principle prohibits attacks that would result in disproportionate harm to civilians and civilian infrastructure. In determining the weight to be given in the proportionality assessment to the damage that an attack may cause to objects essential for the production of

food, such as agricultural land, the short- and long-term impacts on the well-being of the civilian population must be taken into consideration. The use of explosive weapons with wide-area effects against, or in the vicinity of, agricultural land can cause long-term food insecurity, economic collapse in rural areas, and environmental degradation – consequences that must be carefully factored into the proportionality assessment.

3. Principle of precautions

The principle of precautions stipulates that in the conduct of military operations, constant care must be taken to spare the civilian population and civilian objects. All feasible precautions must be taken to avoid, and in any event to minimise, the incidental loss of civilian life, injury to civilians and damage to civilian objects.[81] These precautions include verifying targets[82] and choosing the type of weapon that is less likely to cause civilian harm or damage to civilian objects.[83] In the case of agricultural land, it could be argued that the use of explosive weapons that have an increased likelihood of directly or indirectly damaging surrounding lands should be avoided when launching attacks against military objectives in the vicinity of agricultural land. Another precautionary measure includes timing attacks when they are less likely to cause civilian harm or damage to civilian objects. For instance, parties to the conflict should consider cancelling an attack that occurs during critical planting or harvest seasons.[84]

4. Special protection for objects indispensable to civilian survival

Article 54(2) of Additional Protocol I to the Geneva Conventions prohibits attacks on objects indispensable to the survival of the civilian population, including farmland, irrigation systems and food storage facilities. Destroying such objects or rendering them unusable undermines food security, displaces populations, and can amount to the use of starvation as a method of warfare, which is prohibited under both IHL and the Rome Statute of the International Criminal Court.

The protection of agricultural land and the pattern of explosive weapons use impacting agriculture

A review of patterns in the use of explosive weapons and their impact on agricultural land and food supply systems highlights several key concerns related to compliance with IHL. The available information seems to suggest that, in a high number of cases, the principles of IHL requiring combatants to distinguish at all times between military objectives and civilian objects and to refrain from launching attacks against military objects that would cause excessive harm (direct or indirect) to civilian objects, including agricultural land, with respect to the military advantage sought, were not respected.

This conclusion rests on the indiscriminate nature of most explosive weapons, evidence of repeated harm to vital civilian infrastructure, and the lack of publicly available demonstrated proportionality assessments or adequate precautions to mitigate foreseeable impacts. While these findings are not definitive, they are intended to guide stakeholders in pursuing further analysis.

However, the lack of evidence about military intent, strategy, pursued military advantage and the consequences for complex food supply systems prevents definitive answers to two critical questions: whether agricultural land was intentionally targeted, and whether these actions contributed to food insecurity. Without access to critical information from conflict parties, it remains difficult to establish with certainty whether damage to crops and harvests, farmland, or irrigation systems resulted from "proportional" incidental harm, indiscriminate tactics, or deliberate targeting. Without detailed information on a conflict party's military strategy, it is difficult to assess whether an attack was proportionate to specific military objectives. Equally, without clearer knowledge of the role of specific food production systems within wider food supply systems, it is difficult to determine how these events contributed to food insecurity or starvation. This review therefore also underscores how the continued absence of transparency stemming from states' decisions to withhold operational assessments or strategic information from public disclosure and the persistent lack of accountability for IHL violations remain a significant concern.

Challenges to respect for the principle of distinction when using explosive weapons with wide-area effects

Parties to a conflict must always distinguish between military objectives and civilian objects, yet the incidents of explosive weapons use on agricultural land analysed in this report suggest that this principle may not be systematically applied to protect agricultural land. The wide-area and often indiscriminate effects of many explosive weapons make it inherently difficult to uphold the principle of distinction, raising serious questions about compliance with IHL when such weapons damage agricultural land, crops and harvests.

Although the protection of civilian objects against direct attacks is absolute, these objects may risk losing their civilian status if, and only for a limited time, they are used for military purposes. If combatants or military assets were present on agricultural land at the time of an attack, the principles of distinction may have been respected. Of the 1,034 documented incidents of explosive weapon use affecting agricultural land referred to in this report, in only a handful of cases did the attacking party allege that soldiers or military installations were present on the land at the time of the attack. However, the number of incidents in which explosive weapons affected agricultural land without a readily identifiable military objective raises serious questions about the consistent application of the principle of distinction by parties to a conflict as required under IHL. Even if agricultural land had lost its civilian status in some cases, the principle of proportionality would nonetheless remain applicable. The extent of the destruction observed, the difficulty of identifying a clear military objective and the type of explosive weapon used all raise serious concerns regarding whether such attacks met the IHL proportionality requirement.

For the affected communities, however, the impact of and harm caused by an attack are experienced in the same way, regardless of intent. As a result, perceptions of affected communities can often blur the line between "incidental" and "intentional" targeting, because victims' experience is one of pain and a sense of powerlessness and injustice irrespective of the attacker's specific aims. For example, Ukrainian farmers reported feeling that their land was being deliberately attacked as part of a broader effort to destroy their livelihoods and culture. As one Ukrainian farmer

explained: *"The Russians aren't just hitting military objects. They're hitting farms as well. Farming is at the heart of Ukraine culture, and that's what they are trying to destroy"*.[85] This illustrates how affected communities in Ukraine interpreted attacks on their land as assaults not only on their livelihoods, but also on their cultural identity. Conclusive evidence of Russia's intention, however, would require access to internal strategic discussions and decision-making, which is not available.

Foreseeable excessive and long-term impacts on food supply systems during conflict

IHL protects food production systems, including agricultural land, which forms the foundation of food production, and damaging it or making it unusable has both immediate and long-term consequences for a community's ability to feed itself. The characteristics of explosive weapons not only cause immediate civilian harm, but also have foreseeable excessive impacts on food supply systems during conflict. In the short term, explosive weapons destroy crops and harvests, disrupt planning and harvesting cycles, and reduce the availability of essential food sources. In the long term, these weapons undermine livelihoods, weaken rural economies, and entrench food insecurity, forcing communities into displacement and increasing reliance on humanitarian food aid. Explosive weapons, whether artillery shells, bombs or landmines, can remain in the soil for several years, making it dangerous for farmers to return to their fields. Additionally, there is limited public information on plans or measures to manage ERW and reduce their impact on affected communities after the end of hostilities. Under IHL, parties to a conflict are required to take precautions and assess proportionality in their targeting decisions, yet little information is available on whether and how the foreseeable consequences for food production and access to food are considered.

Additionally, under customary IHL, agricultural land falls within the scope of the natural environment, since it forms the ecological foundation of food supply systems on which civilians' survival depends. ERW can remain embedded in soil and water systems for years, contaminating the land and water and making them unsafe for cultivation. This resulting contamination may cause long-term ecological damage, not only hindering land recovery and sustainable farming, but also harming local biodiversity.

The protection of agricultural land and food security during conflict: conclusion

While definitive conclusions remain impossible in the absence of information provided by conflict parties about their targeting decisions, the patterns described in this report raise significant questions about how the principles of distinction, proportionality, and precautions are applied in incidents involving explosive weapon use on agricultural land and what measures, if any, are taken to prevent food insecurity and environmental degradation. Even if individual incidents cannot be conclusively assessed, the cumulative characteristics of such attacks raise critical concerns about conflict parties' compliance with IHL, particularly regarding the protection of the natural environment as part of civilian life-support systems. While IHL does not require conflict parties to explain their decisions, diplomats, parliamentarians, civil society and other stakeholders should urgently demand explanations from conflict parties regarding how they apply these principles during their targeting procedures.

Although food production represents only one component of complex food supply systems, the repeated use of explosive weapons in attacks on agricultural land directly impacts these systems, contributes to depriving civilians of food, and undermines food sovereignty. This in turn increases the risk of conflict-induced starvation when insufficient precautions are taken to mitigate foreseeable humanitarian and environmental consequences of explosive weapons use. Further work is required to better measure the impact of strikes on agricultural lands and how this may contribute towards depriving civilians of sufficient food during a conflict.

Although the strategies and tactics behind such strikes remain opaque, the wide-area effects of explosive weapons and their repeated use in agricultural areas raise serious concerns about indiscriminate targeting and a diminishing respect for IHL protections. These practices not only destroy the material basis for civilian survival, but also damage the natural environment that sustains food supply systems, leaving land contaminated and unsafe long after hostilities end.

Conclusion

This report aims to broaden the understanding of civilian harm resulting from the use of explosive weapons by demonstrating that their impact poses not only a humanitarian and protection concern, but also a significant threat to food security and rural livelihoods, with impacts that can extend far beyond the immediate vicinity of the damaged agricultural area and can reverberate across regions and borders, disrupting food supply systems. Civilian harm cannot be measured in casualty figures alone. Damage to fields, irrigation systems, silos, livestock, and seed storage facilities strikes at the foundation of civilian survival. The report demonstrates that explosive weapons also significantly harm agricultural production and food security – dimensions that are under-represented in existing frameworks.

The EWIPA Political Declaration's preamble highlights that explosive weapons have a *"devastating impact"* not only through immediate casualties, but also through the destruction of essential infrastructure such as food, water, sanitation and energy systems. Damage to one service often disrupts others, undermining livelihoods, food supply chains, market access and health care. UNSCR 2417 similarly recognises the harm that conflict causes to food security, agricultural production and livestock, but without explicitly linking these effects to explosive weapons.

The evidence presented here from seven years of documented data across 29 countries demonstrates a clear pattern: explosive weapons use disrupts agricultural production, contaminates land and endangers those who work it, with consequences that reverberate far beyond the battlefield. Impacts can be highly localised, affecting individual households or small markets, or can cascade across regions, and even across international borders. These consequences are often shaped by the agricultural calendar (e.g. planting and harvest seasons are most critical); dependence on vulnerable water infrastructure, especially for irrigation; and the integration of affected land into broader food supply systems.

The cascading effects of explosive weapons use on food supply systems are both predictable and preventable. When harvests are destroyed, land is contaminated, or infrastructure is damaged or destroyed, households and communities are pushed into crisis. Without timely measures – such as financial support, seed replacement and landmine clearance – families face displacement, and entire regions risk spiralling into long-term food insecurity. While governments and aid agencies can mitigate these impacts with foresight and resources, the absence of such support leaves survival after devastating attacks dependent on the resilience of individuals, families, and small communities alone.

Agricultural land is indispensable to civilian survival due to its fundamental role in providing food. Yet the documented incidents show that both state and non-state actors continue to damage or render unusable this vital resource. While the available evidence does not always allow for a full legal assessment of intent or necessity, the recurring nature of such incidents raises serious concerns about how effectively the relevant IHL principles are being implemented in practice. These patterns point to an ongoing accountability gap and highlight the need for stronger monitoring, reporting, and preventative measures to uphold IHL protections.

Moving forward, the consequences for agriculture from explosive weapons use must be systematically integrated into civilian harm monitoring, humanitarian responses, and policy discussions under the EWIPA Political Declaration. The omission of this link in UNSCR 2417 leaves food systems vulnerable and underprotected in debates around the issue of conflict. Addressing this omission is not only a legal obligation, but also a humanitarian imperative.

Ultimately, safeguarding agriculture in conflict zones is about safeguarding civilian survival. Acknowledging the foreseeable and long-lasting consequences of explosive weapons use for rural life must drive stronger commitments, better monitoring, and more anticipatory action. Only then can the international community prevent the devastating chain reactions that turn armed violence into widespread hunger. The fact that it remains impossible to prove or disprove such perceptions with the available information contributes to the suffering and pain of affected communities who at the very least seek acknowledgement of their profound loss and pain.

Recommendations

The damaging or destruction of agricultural land and other food production systems, such as irrigation systems and markets, and the long-term, cumulative effects on communities and economies from their damaging or destruction should become central to monitoring systems, legal compliance assessments, strategic policymaking, and humanitarian and development planning. Implementing the following recommendations strengthens alignment with commitments in the EWIPA Political Declaration, IHL duties, and the goal of protecting civilians and their essential infrastructure.

1. States should support coordinated international mine-clearing efforts:

- Fully support the work of the UN and relevant stakeholders in identifying and implementing best practices for the assessment, clearance, and rehabilitation of agricultural land contaminated by ERW and other conflict-related debris.
- Collaborate with humanitarian mine action organisations, agricultural ministries, and local farming cooperatives to coordinate clearance and restoration priorities.

2. Stakeholders should integrate impact on agriculture into EWIPA frameworks:

- Align the EWIPA Political Declaration with the UN Environment Assembly's resolutions on conflict pollution and sustainable waste management, with explicit reference to the protection of agricultural ecosystems.
- Recognise agricultural land as civilian infrastructure and food supply systems as part of essential services, with specific reference to protecting the land, water supply systems, and biodiversity that underpin food production.

3. Stakeholders should strengthen systematic data collection and analysis:

- Develop and implement dedicated agricultural land indicators within the UNIDIR EWIPA Research Framework to measure direct, indirect and long-term harm in unpopulated or semi-populated areas.
- Systematically track and link event data with the presence of explosive remnants in agricultural areas to understand contamination patterns.
- Ensure that data is disaggregated by gender, age, livelihood type, and crop or livestock dependency to identify differential impacts on farming communities.

4. Conflict parties should adhere to environmental protection guidelines:

- Comply with the ICRC's Guidelines on the Protection on the Protection of the Natural Environment in Armed Conflict, with particular attention to land use for food production.[86]
- Include environmental risk assessments in operational planning to prevent the contamination of soil and water sources critical for farming.

5. Conflict parties should prevent the use of harmful explosive weapons in agricultural areas:

- Endorse and implement the EWIPA Political Declaration.
- End the use of wide-area-effect explosive weapons in populated and agricultural areas, recognising their capacity to cause disproportionate and long-term harm to food supply systems, livelihoods, and community well-being.
- Factor seasonal agricultural cycles into operational decision-making to avoid targeting agricultural land during planting or harvesting periods.

6. Stakeholders should prioritise agricultural recovery in post-conflict responses:

- Fund and implement rapid landmine and ERW clearance operations for agricultural land to restore safe access to farmlands.
- Support livelihood recovery programmes, including the provision of seeds, tools, livestock, microfinance, and training.
- Invest in soil and water rehabilitation to address contamination and restore productive capacity.

7. Stakeholders should institutionalise long-term impact monitoring:

- Monitor and assess the long-term effects of agricultural land degradation on food security, economic stability, and rural resilience.
- Share findings in public disaggregated reports to inform risk assessments, landmine and ERW clearance priorities, and humanitarian recovery strategies.

Annex 1: Insecurity Insight's incident identification methodology

Insecurity Insight works to mitigate violence against aid operations, strengthen the duty of care towards staff and local aid partners, and improve humanitarian access. It supports analysis on how vital civilian services – such as food supply, health care, education, protection and aid delivery – are affected by conflict. It also promotes strong data responsibility practices and ethical standards for data on conflict incidents, ensuring that information is handled with integrity. The methodology's adaptive, database-driven design is built to flexibly generate and tailor data that can inform and support humanitarian policies across the aid sector.

Insecurity Insight's six-step data-processing procedure

1. Incident identification

Insecurity Insight uses an event-based approach to document incidents affecting humanitarian operations, health care, education, food systems, and protection. Event-based information is documented from three primary sources: open sources (information publicly available on the internet, usually taken from edited media or from organisations identified through our AI-supported search functions), private sources (information on incidents provided by individuals) and aid agency data-sharing mechanisms. Documented incidents must provide sufficient information to ensure that events are verifiable, fostering trust in the data. Information is collected on when and where an incident occurred, what or who was affected, and how they were affected (including information on the conflict actor an incident was attributed to, the type of weapon used and how it was launched or delivered).

Figure A1: Insecurity Insight's six-step data-processing procedure

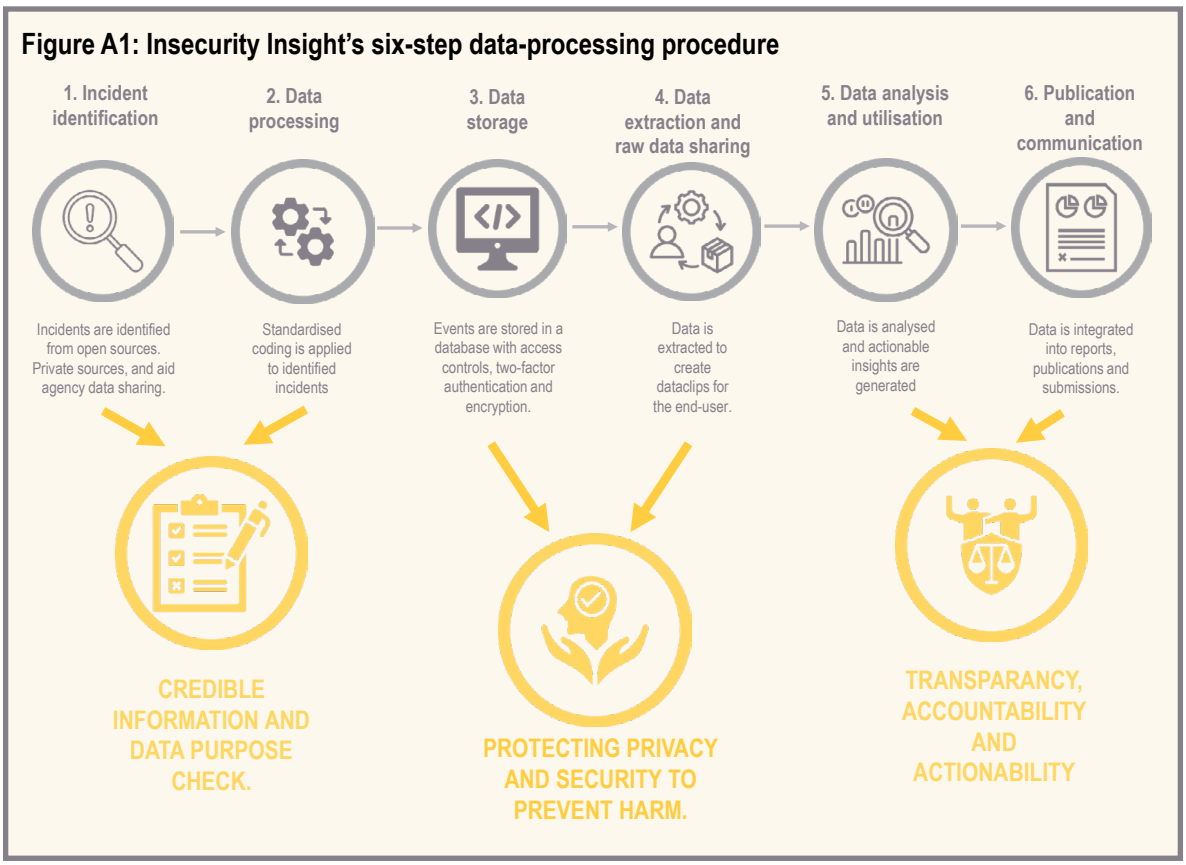
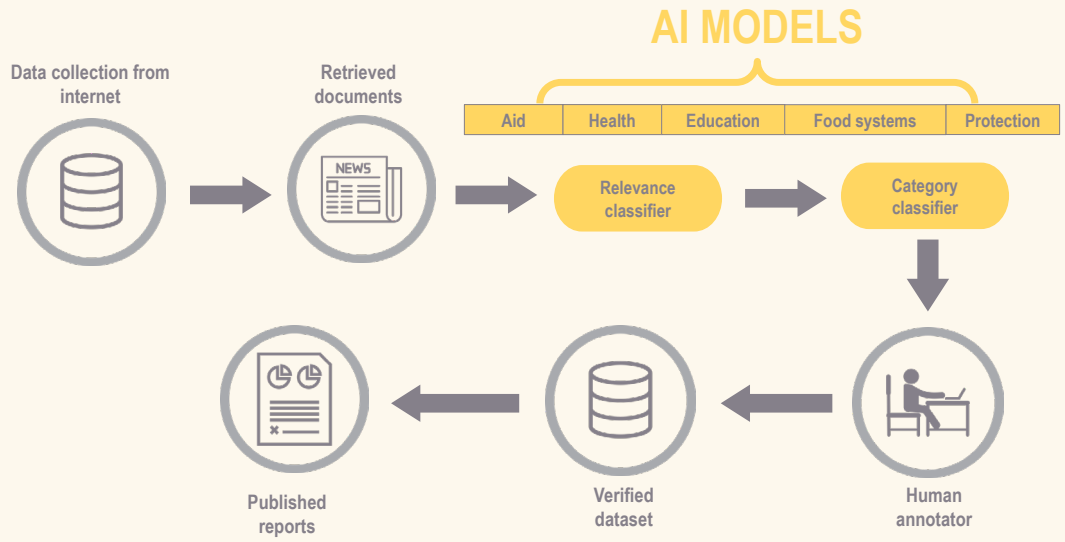


Figure A2: AI-supported open-source search functions

To identify relevant event descriptions in the vast amount of information available online, Insecurity Insight has developed a web crawler that continuously scrapes open-source content. This system uses AI-driven functions and advanced deep-learning techniques to retrieve information on potential events, which is then processed by a natural language-processing classifier and categorisation tools in English, French, and Arabic. These tools are trained on over 15 years of our experience collecting event data on incidents affecting aid access and vital civilian services in conflict zones. The retrieved data is automatically fed into a platform, and tagged with suggested relevance levels and thematic categories. Our team of human researchers then reviews the suggested content and determines which information meets our inclusion criteria and will become part of the event-based data analysed in reports. This system was short-listed for an award at the AI for Good Global Summit in 2025.



This event-based data can be combined with first-hand accounts and other on-the-ground sources to build a rich, contextualised understanding of how ongoing conflict affects civilian well-being and humanitarian aid access and delivery. It allows us to understand the context of a given situation and helps us analyse trends and patterns of attacks.

The report includes incidents where agricultural land was described as having been impacted by explosive weapons use. Information on these incidents was collected using Insecurity Insight's overall data collection system, making use of the best available sources. Incidents were included when there was credible reporting that explosive weapons impacted cultivated agricultural land, including cases where cratering, contamination, or the destruction of planted crops were documented. Incidents affecting farmers and agricultural equipment have only been included if they occurred on agricultural land. Incidents occurring on uncultivated natural grazing areas (e.g. forests, bushlands) were excluded unless these areas were subject to cultivation practices. Similarly, agricultural buildings, storage facilities and processing structures (such as barns, silos or greenhouses), although part of the wider agricultural sector, were also excluded for the purposes of this report. The focus of the report is specifically on agricultural land, because it is considered the primary resource underpinning food production.

2. Data preparation

Data preparation follows a standardised coding system inspired by the approach of the Taback-Coupland model for analysing armed violence[87], which is built around the six Ws (**W**ho did What to **W**hom, Where, **W**hen and with what **W**eapon). This method turns the elements that make up a violent event into independent and structured data points. Events are coded with their date, location, and perpetrator along with information on the affected civilian infrastructure and victim attributes, where relevant.

All data preparation follows defined quality control standards, including credibility checks to verify incidents wherever possible and cross-checking sources to prevent duplication, ensure consistency, and complete missing information. These steps support comparability and interoperability across datasets. Data is prepared according to internal protocols and codebooks, which define standards for collection, formatting, and consistency. All data is selected to enable data use for action, in accordance with Insecurity Insight's data responsibility policy.

3. Data storage

Events are stored and managed in the strictly confidential Security in Numbers Database (SiND), an event-based database built on the general principles of event recording.[88] All data is stored securely on encrypted servers with strict access controls to protect sensitive information. User access is limited to authorised personnel and safeguarded through multifactor authentication and regularly updated passwords. Routine security audits and system backups ensure data integrity and resilience against loss or unauthorised access. All of Insecurity Insight's staff are given cyber-security training. These measures collectively uphold high standards of data protection and confidentiality throughout the data management process.

4. Data extraction and raw data sharing

Insecurity Insight shares raw data through private partnerships, online platforms and application programming interfaces (APIs) with partners to allow them to use the data for their own analysis. Data sharing is based on memorandums of understanding or other specific agreements. Data included in the data-sharing process must comply with Insecurity Insight's data responsibility policy and allow end users to meaningfully use the data without exposing anyone to harm. In countries where information-sharing protocols to govern data and information sharing exist, usually with the host government or among UN and humanitarian actors, Insecurity Insight takes note of these protocols and will comply as far as they are compatible with its own data responsibility policy.

Data is extracted into data clips using query language to filter, organise, and classify information into relevant and usable categories based on different stakeholders' use cases. Each incident is assigned a unique event ID number to ensure traceability and consistency. The process is designed to make the data accessible and meaningful for end users, while excluding all confidential or personally identifiable information.

Datasets of all the data used in this report are made publicly available through Insecurity Insight's **HDX** (Humanitarian Data Exchange). Data collection on the topic of this report continues and datasets are updated beyond the content of the report and are automatically updated through APIs every Monday. The information is also available through the relevant **country pages**, where it is combined with other incident data documenting the impact of a particular incident on aid and vital civilian services. Curated datasets are also available on request.

Insecurity Insight also supports data collection and data analysis for the **Coalition Against Conflict and Hunger** and the **Explosive Weapons Monitor**.

5. Data analysis and utilisation

Insecurity Insight produces data tailored to enable it to be used for action. Data use is central to Insecurity Insight's data responsibility policy and focuses on support for aid sector decision-making, and for practices that uphold the rights and dignity of affected individuals and communities, in order to enable their empowerment and support humanitarian access and respect for IHL. Responsible data use is linked to aid agency operations, but also to policy and advocacy for aid policy.[89]

Insecurity Insight's data is used in a variety of ways. It forms the basis of the organisation's own reports. Insecurity Insight also generates data for NGO coalitions and their reports, such as the **Safeguarding Health in Conflict Coalition** report, the Conflict and Hunger Coalition, the **Explosive Weapons Monitor** yearly report and the annual **Protection of Civilians** report, among others. Various NGOs and organisations also use the data for confidential internal processes.

Finally, Insecurity Insight makes available selected datapoints for aid policy documents, such as submissions to UN Special Rapporteurs, responses to other groups' calls for information and data, and statements issued by various coalitions and NGOs, which may use the data for both public and internal processes.

6. Publication and communication

Insecurity Insight publishes information on conflict incidents affecting aid agencies and vital civilian infrastructure to strengthen trust in conflict-related incident data, amplify the voices of affected communities, and support policy processes by enabling stakeholders to integrate the data into their own policy processes. Insecurity Insight communicates sufficient detail to allow stakeholders to assess the credibility of information and to understand data limitations.

It publishes selected data from the SiND in its various thematic or commissioned reports. Data publication in such reports is subject to situational analysis, and context-specific editorial guidelines apply. Insecurity Insight communicates metadata and documentation outlining limitations, uncertainties, and data reliability, as well as copyright information.

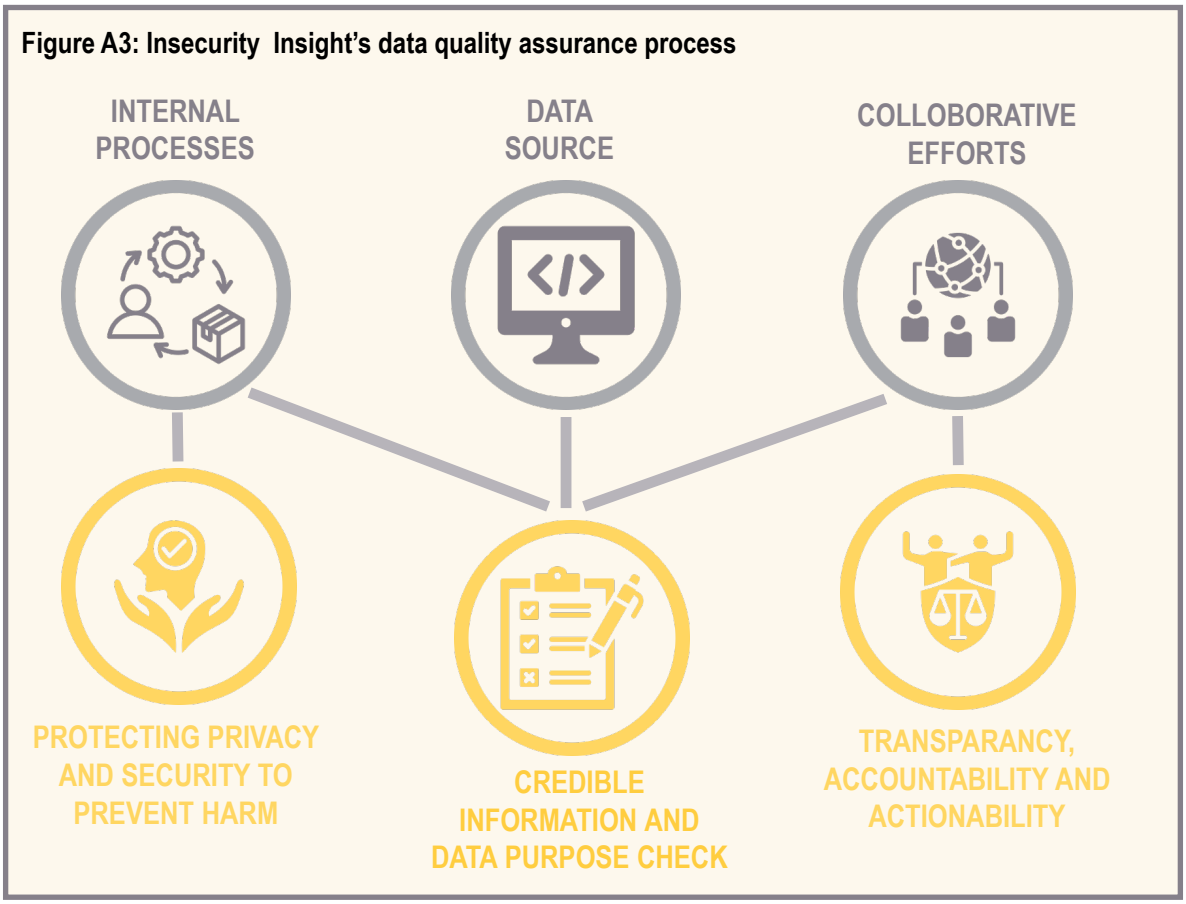
Insecurity Insight's data quality assurance process

Insecurity Insight's data responsibility policy is designed to ensure safe, ethical and effective data management. To achieve this, Insecurity Insight applies a comprehensive data quality assurance process to maintain the accuracy, credibility, reliability and ethical integrity of its datasets. Quality assurance is embedded throughout all stages of the six-step data processing procedure, with additional checks conducted whenever information on incidents is updated or backdated. The process covers three steps of credibility and data purpose checks designed to protect privacy and security in order to prevent harm, and ensure transparency, accountability and understandability. These steps are applied through three interconnected components: internal mechanisms, collaboration efforts and source verification.

1. Internal processes

Internal quality assurance relies on strong standardisation, continuous training, and the ongoing development of our research and coding systems. This includes the consistent application of definitions, terminology, and coding practices, as well as ongoing training for data coders and regular updates to guidance materials. The process integrates thematic classification systems such as explosive weapons launch systems, water-related categories, and food-system classifications to ensure coherence across datasets. These measures strengthen the link between methodological purpose and assurance practices, ensuring that outputs remain consistent, transparent, and comparable across projects.

Figure A3: Insecurity Insight's data quality assurance process



2. Data sources

Rigorous source verification underpins the final layer of quality assurance. Analysts consult multiple types of evidence, including other verified databases such as the Armed Conflict Location & Event Data (ACLED) database, Aid Worker Security Database (AWSD) and the Surveillance System for Attacks on Health Care (SSA); contextual reporting; and satellite imagery to cross-check and triangulate incidents. Specific thematic standards, such as those used in incidents affecting children in armed conflict, EWIPA, food supply systems, and conflict-related sexual violence frameworks, are also applied to ensure consistency with broader humanitarian and protection classifications.

The widespread use of internet-based communication – through mobile phones, apps and social media – has broadened the range of conflict reporters. While the risks of misinformation and disinformation are well documented, this technological shift has also democratised and diversified the production of publicly available narratives. It has brought greater visibility to the lived experiences of affected populations, reshaping perceptions. Direct and self-initiated information sharing by affected communities is one way in which local actors are actively working to influence and reshape humanitarian action.

Across all components, Insecurity Insight continuously refines its internal guidance documents, integrates evolving standards, and adapts to new data challenges, focusing on accuracy, understanding of data gaps, and consistency. This cyclical and collaborative approach ensures that the Security in Numbers Database remains a robust, transparent, ethically managed repository of conflict-related event data.

3. Collaborative efforts

Quality control is further enhanced through collaboration with partners and experts. Insecurity Insight maintains two-way communication with field-based and external partners to validate incidents, identify gaps, and ensure that data reflects grounded and trustworthy information rather than unverified reports. Collaboration is conducted sensitively to avoid causing reputational or operational harm to aid agencies, particularly in contexts where findings may be politically sensitive or controversial.

Methodological challenges

Incidents involving explosive weapons impacting agricultural land often occur some time after the explosive device was released. While such reports may document immediate physical damage (e.g. burned crops), they rarely capture the longer-term hazards, such as mines and UXO embedded in the soil, that can render land unsafe or unusable for months or years. Additionally, agricultural impacts are frequently underdocumented compared to more visible civilian infrastructure (e.g. buildings, roads), which means that many incidents may go unrecorded. Where incidents were identified, source material often lacked precise details on the amount of land affected, the type of crops destroyed or the estimated economic loss, limiting the ability to fully quantify the impact.

Annex 2: Explosive weapons in populated areas (EWIPA)

Explosive weapons are weapons that are activated by the *"detonation of a high-explosive substance that produces thermal energy and a blast and fragmentation zone"*.[90] They have the capacity to affect wide areas and to kill or injure any person or damage or destroy objects within their blast radius. There are many different types of explosive weapons, including bombs, missiles, artillery shells, and IEDs, and they can be delivered in various ways such as air-delivered (e.g. by aircraft or drones), ground-launched or directly emplaced.

The term "explosive weapons in populated areas (EWIPA)" refers to explosive weapons used in areas containing a large number of people such as towns, cities, refugee camps or markets. Many types of explosives are designed to be used in open battlefields and not urban settings, such as artillery shells, large mortar bombs, unguided rockets or tank gun shells. These weapons have large blast radiuses or wide-area effects, and their inaccuracy means that in populated areas their effects extend far beyond the intended military target. They can not only kill or injure civilians, but also damage or destroy civilian infrastructure, including homes, hospitals, schools, markets, water supply systems, power grids and roads, which leads to cascading effects on essential services.

However, in recent years, precision-guided munitions, smaller shaped charges or carefully applied close-support munitions are designed to be used in urban areas, but the same provisions to prevent civilian harm apply.

Delivery systems for explosive weapons

Explosive weapons range from small hand grenades or suicide vests to larger artillery shells, rockets, and aerial bombs. Their size, yield, and method of delivery produce different effects on people and infrastructure. To help with analysis, they can be grouped into three categories:

- Directly emplaced weapons (IEDs, grenades, suicide vests) are placed in position manually and are often used by non-state actors inside markets or near market stalls or water infrastructure, causing concentrated but lethal harm.
- Ground-launched systems (artillery shells, mortar bombs, rockets) are deployed by both state and non-state actors, are fired from fixed or mobile platforms, and can carry moderate to large explosive charges, often damaging large areas of open markets, surrounding shops, and wider infrastructure, including water supply system components.
- Air-delivered systems (bombs, missiles, rockets) are deployed from aircraft or drones and can involve very large payloads able to create extensive blast and fragmentation effects over a wide radius. These explosives are primarily used by state forces, because they are more likely to afford to maintain an air force capable of delivering such explosives. However, drone use has increased among both state forces and non-state actors, but varies in terms of systems, with states having access to military-grade armed drones, while many non-state actors have been known to use civilian and commercial drone systems and modify them to carry explosive loads.

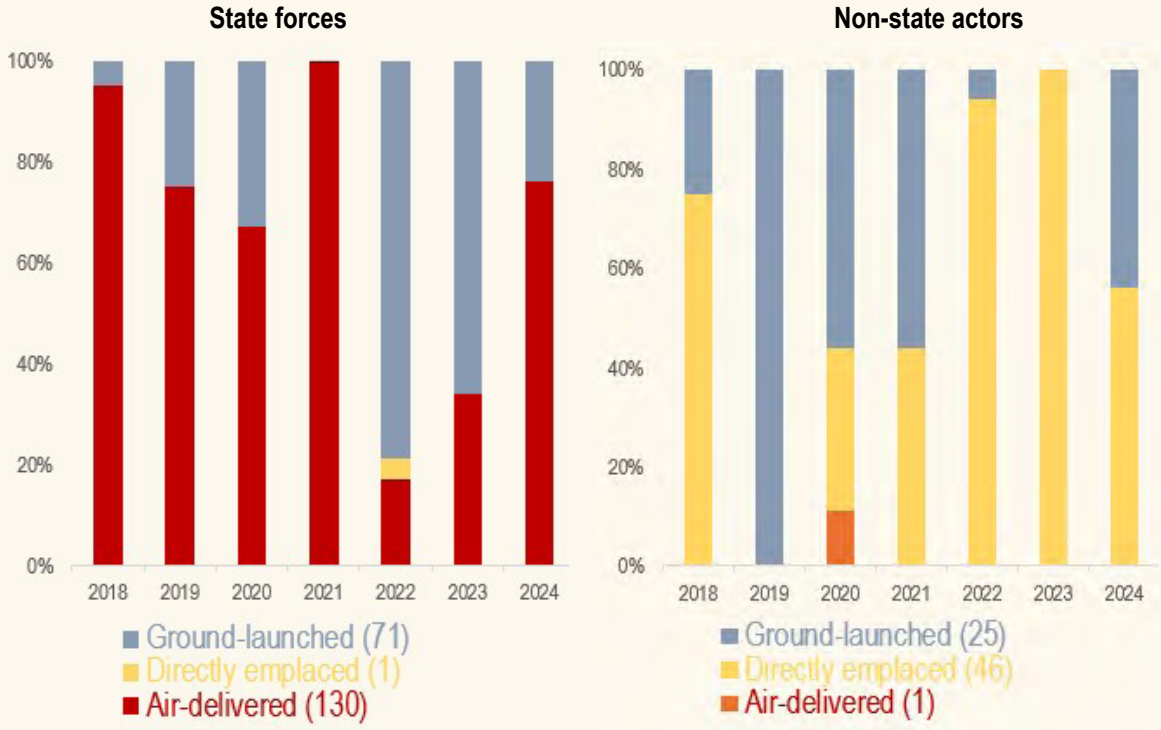
Insights based on weapon delivery classification

Information on the reported use of explosive weapons needs to be accurate, yet most civilian observers documenting the effects of explosive weapons use are not weapons experts. As a result, most available information does not contain technical information, such as the precise types or manufacturers of explosive weapons. However, most non-expert observers can reliably identify how a weapon arrived at its place of impact – whether it was planted, fired from the ground or dropped from the air – making this classification a useful tool for systematically analysing incidents and their humanitarian impacts.

For the analyst, information on the weapon delivery method provides important added information. Firstly, it helps to confirm or raise questions about the conflict party the incident has been attributed to, and helps to apply impact frameworks. Different conflict actors tend to have different access to weapons systems, thus allowing for the cross-checking of incident reports. State forces are more likely to deploy manufactured systems from licensed defence industries, including precision and heavy-payload weapons for air strikes, while non-state actors use more IEDs or may have access to certain ground-launched or drone-delivered explosives, depending on their external supporters or supply networks. As Figure A4 shows, clear patterns can be observed of different conflict parties using different types of

Figure A4: Reported incidents of explosive weapon use and their delivery method attributed to state forces and non-state actors, 2018-2024

In the reporting period, non-state armed groups were more likely to deploy directly emplaced explosives, such as hand grenades, car bombs and IEDs, while state actors were more likely to use air-delivered explosives.



Source: 2018-2024 EWIPA and Agricultural Land Data

Annex 3: State forces and non-state actors

Clear distinctions between state and non-state actors are vital for policymaking and for ensuring accountability under international law. However, classification becomes complex when state authority is disputed and governments or their armed forces are not universally recognised. From an analytical standpoint, it is equally important to define these categories conceptually and to establish consistent criteria for assigning classifications in contested political settings.

State forces

The terms “state actors” and “state forces” are used to refer to state armed forces that are the official military forces of a country, controlled by its government and recognised as such under national and international law. They usually include the army (land forces), air force (air and outer space operations), and navy (maritime forces), and may also have other branches such as marines, special forces or intelligence units. Their main role is to defend the country and carry out military operations authorised by the state.

In some contexts, the attribution of responsibility for a specific action is complex. Some authorities may lack effective control over the armed forces or may not be internationally recognised as a government, or a country may have competing or parallel authorities.

For the purposes of this report, the following categories have been applied to address such complexities. They are employed exclusively for coding purposes and do not imply endorsement or recognition of any authority, government or territorial claim.

State actor: This refers to a legally recognised government directing its armed forces.

State armed forces: This refers to national armed forces under government control.

Acting state armed forces: This refers to de facto forces controlling a country’s capital that are not internationally recognised.

Non-state actors

Non-state actors are organised armed actors that are not part of a country’s official military or police forces and are not controlled by a government. They can include militias, insurgent groups, rebel movements, or other organised forces that use weapons and military-style tactics. Their aims and activities vary widely – from controlling territory to challenging governments – but they operate outside the formal command of state armed forces.

- forces seeking to attack or gain territory that are opposing a recognised or de facto state military force; and
- military branches of de facto territorial authorities that are not internationally recognised and that do not control the capital of a recognised state.

This report used a binary state v. non-state classification for armed actors, while recognising that in many conflicts the distinction between state forces and non-state armed actors is not clear-cut. Some forces, such as paramilitaries or government-aligned militias, may operate with state support or coordination, but without being fully integrated into the official state chain of command. In other cases, breakaway factions may originate within the state security apparatus, but later act independently or in opposition to the government. Situations can be further complicated when a government is not internationally recognised after a coup or contested government transition, raising questions about whether its armed forces are representing the state and should be considered "state" armed forces under international law. Foreign involvement can blur the lines even more: troops from other states may be deployed under formal agreements, while private military companies such as the Wagner Group/Africa Corp operate in support of a government's objectives, but remain outside the official armed forces. These grey-area actors challenge straightforward classification and complicate the application of legal frameworks and monitoring and accountability mechanisms.

Endnotes

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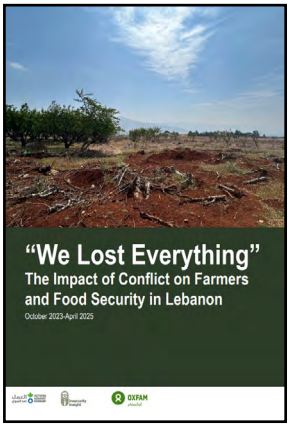
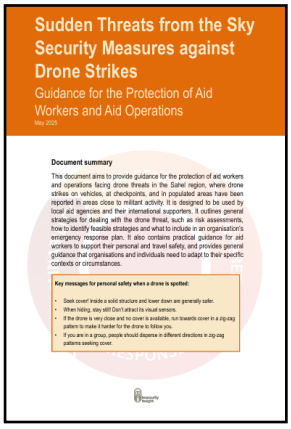
Other resources by Insecurity Insight



Almost a year since a ceasefire was agreed, many farmers in Southern Lebanon are still denied access to their land due to displacement, ongoing Israeli attacks, and soil contamination, a joint report by Action Against Hunger, Oxfam and Insecurity Insight found. The impacts of the war coupled with almost daily Israeli attacks and occupation have wiped out farmland and destroyed crops and essential food infrastructure.The report details the immediate and long-term impacts of repeated and ongoing attacks on Lebanese agricultural land and food production. It found the destruction of key centres of food production and distribution has deepened the economic challenges faced by communities, resulting in lasting disruption to the agricultural sector and rural economy.

Armed drones are an escalating threat in humanitarian settings, with their use expected to grow. Once rare, they are now a defining feature in modern conflicts. Adapting to the growing threat of drones means rethinking security risk measures in high-risk contexts. This practical guide by Insecurity Insight brings together current best practice and is available in **Burmese**, **English** and **French**. Individual resources:



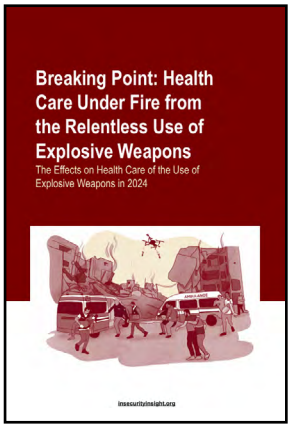
Outside When a Drone is Spotted: **Arabic**; **Burmese**; **English**; **French**

Inside a Building During a Drone Attack: **Arabic**; **Burmese**; **English**; **French**

Responding to Drone Attacks on Aid Work: **Burmese**; **English**; **French**

Traveling in High-Risk Areas: **Burmese**; **English**; **French**

Adapted for the protection of health services based on case studies on Myanmar in **English** and **Burmese**.



Violence impacting health care reached unprecedented levels in 2024, with the use of explosive weapons in populated areas emerging as a dominant and devastating trend. Health care is directly impacted when explosive weapons damage or destroy hospitals, health centres, and ambulances, or when they kill or seriously injure health workers and patients. These weapons cause indirect harm through their cumulative and reverberating effects on civilian infrastructure. This **second edition** of Insecurity Insight's *The Effects on Health Care of the Use of Explosive Weapons* discusses new trends in and impacts on global health care systems in 2024. The data cited in this report can be downloaded **here**.

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As an H2H (humanitarian-to-humanitarian) association, Insecurity Insight supports the work of aid agencies; the providers of health care, education, and protection services; and other civil society organisations by providing publicly available information that humanitarian organisations can use to design evidence-based policies to guide their activities and operations. We collect and analyse data about violence against civilians and the damaging and destruction of vital civilian infrastructure in order to strengthen civilian protection and the delivery of aid in contexts affected by armed conflict.

Insecurity Insight. 2025. Broken Harvests: How Explosive Weapons Devastate Farmland and Livelihoods (November 2025). Switzerland: Insecurity Insight. https://bit.ly/EWIPALand2025

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