Explosive remnants of war

A global survey

landmine action

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Abandoned ordnance: explosive ordnance that has not been prepared for use or used and which is not under the control of a party or parties to a conflict, but which remains in any area in which combat between armed forces has taken place, and which can cause loss of civilian life, injury to civilians or damage to civilian objects.

AFV: Armoured fighting vehicle.

Amended Protocol II: Amended Protocol II to the Convention on Certain Conventional Weapons 'prohibits the use of all undetectable anti-personnel mines and regulates the use of wider categories of mines, booby-traps and other devices. For the purposes of the IMAS, Article V lays down requirements for the marking and monitoring of mined areas. Article 9 provides for the recording and use of information on minefields and mined areas. The technical annex provides guidelines on, inter alia, the recording of information and international signs for minefields and mined areas.'[1]

Ammunition: see munition.

APM: anti-personnel mine. A mine designed to be exploded by the presence, proximity or contact of a person and that will incapacitate, injure or kill one or more persons.

AVM: anti-vehicle mine. AT (anti-tank) mines are included within this term.

BL755: Cluster bomb manufactured in the UK by Insys (formerly Hunting Engineering Ltd); each bomb contains 147 submunitions.

BLU 97: Combined Effects Munition: cluster submunition manufactured in the US by Olin Ordnance (formerly Aerojet) and Alliant Techsystems Inc.

Blind: a munition or component containing explosives, which fails to function as intended after projection or release. A blind is normally treated as being in a potentially dangerous condition.

Booby-trap: an explosive or non-explosive device, or other material, deliberately placed to cause casualties when an apparently harmless object is disturbed or a normally safe act is performed.

CBU: cluster bomb unit. A bomb containing and dispensing submunitions. These submunitions may be mines (anti-personnel or anti-tank), penetration (runway cratering), bomblets, fragmentation bomblets etc.

CCW: Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects (1980), often known as the Convention on Certain Conventional Weapons for short.

Demining: for the purposes of this survey, 'demining' applies to activities designed to alleviate or remove the impacts of all UXO, not only mines. 'Mine action' is also used as an alternate term, as it apparently conveys more clearly that UXO-risk education and awareness are important components of demining, and not only physical clearance.

DPICM: Dual-Purpose Improved Conventional Munition. A type of cluster munition produced by the United Kingdom, United States and Former Republic of Yugoslavia/Serbia.

Explosives: a substance or mixture of substances that, under external influences, is capable of rapidly releasing energy in the form of gases and heat.

EOD: explosive ordnance disposal. The detection, identification, evaluation, render safe, recovery and disposal of UXO. EOD may be undertaken:

– As a routine part of mine clearance operations upon discovery of UXO.

– To dispose of UXO discovered outside mined areas
(this may be a single UXO, or a larger number inside a specific area.

– To dispose of explosive ordnance which has become hazardous by damage or attempted destruction.

ERW: explosive remnants of war. For the purposes of this study, ERW is defined as unexploded ordnance of all types except anti-personnel and anti-vehicle mines. It also includes abandoned stockpiles of munitions.

GICHD: Geneva International Centre for Humanitarian Demining. It supports humanitarian mine action through research, operational assistance and contributions to the implementation of the Ottawa Treaty. It is an independent foundation supported by 18 governments.

HALO Trust (The): UK based non-governmental organisation specialising in landmine clearance and explosive ordnance disposal.

ICRC: the International Committee of the Red Cross is an impartial, neutral and independent organisation whose exclusively humanitarian mission is to protect the lives and dignity of victims of war and internal violence and to provide them with assistance. It directs and coordinates the international relief activities conducted by the Red Cross Movement in situations of conflict. It also endeavours to prevent suffering by promoting and strengthening humanitarian law and universal humanitarian principles.

IMAS: International Mine Action Standards. Documents developed by the UN on behalf of the international community that aim to improve safety and efficiency in mine action by providing guidance, by establishing principles and, in some cases, by defining international requirements and specifications.

IMSMA: Information Management System for Mine Action.

Landmine Monitor: Landmine Monitor is an initiative of the International Campaign to Ban Landmines (ICBL). It aims to assess the international community's response to the humanitarian crisis caused by anti-personnel mines. Data is gathered on an annual basis by a civil society global reporting network. Although this reporting network is focused principally on APMs, it also generates some information on other types of explosive remnants of war.[2]

Mine: a munition designed to be placed under, on or near the ground or other surface area and to be exploded by the presence, proximity or contact of a person or a vehicle (Ottawa Treaty definition).

Mine action: A sector of international aid addressing landmine and UXO contamination through ERW and mine clearance, awareness education and accident survivor assistance.

Munition: a complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in military operations, including demolitions.

NGO: Non-governmental organisation.

NPA: Norwegian People's Aid, a non-governmental organisation that conducts landmine clearance and explosive ordnance disposal projects as well as undertaking other relief and development work.

Ottawa Treaty: the 1997 Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction. Referred to in this Survey as the Ottawa Treaty.

SALW: Small Arms and Light Weapons.

Self-destruction: action generated by means of a device integral to the munition, which results in the complete destruction of the munition after a predetermined period of time.

Self-neutralisation: action generated by means of a device integral to the munition, which renders the munition inoperative, but not necessarily safe to handle. In landmines this process may be reversible.

Submunition: any munition that, to perform its task, separates from a parent munition.

UNIDIR: United Nations Institute for Disarmament Research.

UNMAS: United Nations Mine Action Service.

UXO: The (evolving) IMAS definition, although not universal, is used here: explosive ordnance that has been primed, fuzed, armed, or otherwise prepared for use or used. It may have been fired, dropped, launched or projected yet remains unexploded either through malfunction or design or for any other reason. Mines are not included.

Introduction 1

International humanitarian law seeks to minimise civilian casualties in armed conflict by, among other things, requiring that weapons be used in the most discriminating manner possible. Weapons that are indiscriminate by their very nature are prohibited, and only military objectives can be targeted legally.

Even when properly targeted, however, many explosive weapons fail to function as designed and become explosive remnants of war (ERW). These remnants may threaten civilians for decades after they have ceased to serve any useful military purpose.

Awareness is growing of the devastating impact that explosive remnants of war have on the lives and livelihoods of post-conflict communities. To further understanding of these humanitarian problems, Landmine Action carried out research in 2001-02 in Cambodia, Eritrea, Kosovo and Sri Lanka.[3] Others have also made available information concerning the humanitarian impact of explosive remnants of war on specific countries or territories, or certain aspects of the ERW threat.[4] But there has not, to date, been any contribution describing the scope of the ERW problem worldwide.

An accurate global profile of the ERW problem remains an elusive target. A myriad of factors including the types of weapon systems used and how they are used, munition failure rates and variations in terrain all have a bearing on whether and how much ERW is generated in any conflict situation. Post-conflict, a host of other factors also come into play. These factors include the movements of civilians (some of whom may be displaced people returning to their homes), community patterns of land use, local population density, and economic need. In view of this, ERW remains a dynamic rather than static data set to collate and analyse.

Recently, calls have been made for better qualitative information on the scope and nature of ERW's global impacts. Last year the Geneva International Centre for Humanitarian Demining (GICHD) recommended the development of a system to allow a global overview of casualties caused by specific types of ERW.[5] Some States party to the Convention on Certain Conventional Weapons (CCW) made similar calls during their discussions on ERW in Geneva, Switzerland in 2002. There appears to be recognition that increasing understanding of the scale and nature of the ERW problem globally could assist in the identification and development of international measures to deal with explosive remnants of war.

In October 2002 Landmine Action, funded by the UK's Department for International Development and with the support of Landmine Monitor and Landmine Monitor donors, undertook to carry out an initial study of the global impact of explosive remnants of war.[6] That paper contained a summary of preliminary findings based on analysis of data provided by Landmine Monitor and other secondary sources.[7] Following on from these, a more detailed data compilation and analysis of the problem of explosive remnants of war is presented here.

This survey should be seen as one early stage of an ongoing process to profile the global ERW problem. As such, it is a 'snapshot' focusing on 2001 as the base year where possible, and not a thorough analysis. It is possible, nonetheless, to develop some tentative conclusions on the basis of the evidence available. The hope is that this study contributes to the development of an effective CCW Protocol dealing with explosive remnants of war.

2 Background

Framing the Problem

Research published by Landmine Action[10], ICRC and the GICHD[11] show that all explosive munitions can cause post-conflict humanitarian problems. In practice, the socio-economic effects of the presence of mines, unexploded munitions and abandoned ordnance all deny safe access to land and other important community resources, and can cause casualties among civilian populations.

Mines and other forms of unexploded munition can each constitute serious threats to the safety of civilian populations. In theory, however, they function differently.

- Mines are munitions designed to be placed under, on or near the ground or other surface area and to be exploded by the presence, proximity or contact of a person or vehicle.[8] Mines become a socio-economic problem because they can remain active long after the end of military hostilities.
- Munitions that have failed to function as intended become a post-conflict problem usually as the unplanned consequence of the use of weapons systems (with the exception of munitions planted or dropped with an anti-disturbance element deliberately incorporated with the express intention of hampering clearance operations) that due to factors such as terrain, incorrect firing or deployment, poor design or interaction with other items of ordnance, have not detonated.
- Abandoned ordnance, which can be difficult to distinguish from munitions that have failed to function as intended, also poses a risk to civilians post-conflict. For example, ammunition depots hit by air or artillery strikes may scatter munitions widely, and mix with unexploded munitions that have been dropped or fired. Moreover, their clearance processes will not be significantly different. The most likely difference is that stockpiled abandoned munitions may not have their fuzes fitted, which would generally make them safer to move to bulk demolition sites.[9]

Defining 'Explosive Remnants of War'

There are no universal or formally agreed definitions of 'explosive remnants of war' or 'unexploded ordnance' (UXO). In addition, although often used interchangeably, they are not identical. One of the various drafts of the United Nations International Mine Action Standard (IMAS), for instance, defines UXO as:

> Explosive ordnance that has been primed, fuzed, armed or otherwise prepared for use or used. It may have been fired, dropped, launched or projected yet remains unexploded either through malfunction or design or for any other reason.[12]

However, even this definition is not necessarily self-evident, as landmines are excluded in the general understanding of its scope.[13]

Clarifying terms of reference became pertinent in the course of discussions on 'explosive remnants of war' leading up to the Second Review Conference of the Convention on Certain Conventional Weapons (CCW), which was held in Geneva in December 2001. The general view of delegates was that anti-personnel mines were dealt with adequately elsewhere, and thus did not need to be part of the CCW Group of Governmental Experts' work. Anti-vehicle mines (AVM), euphemistically described in the CCW context as 'mines other than anti-personnel mines', were also viewed as distinct from work on ERW and to be considered under a different mandate.

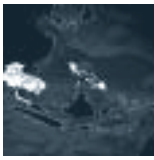
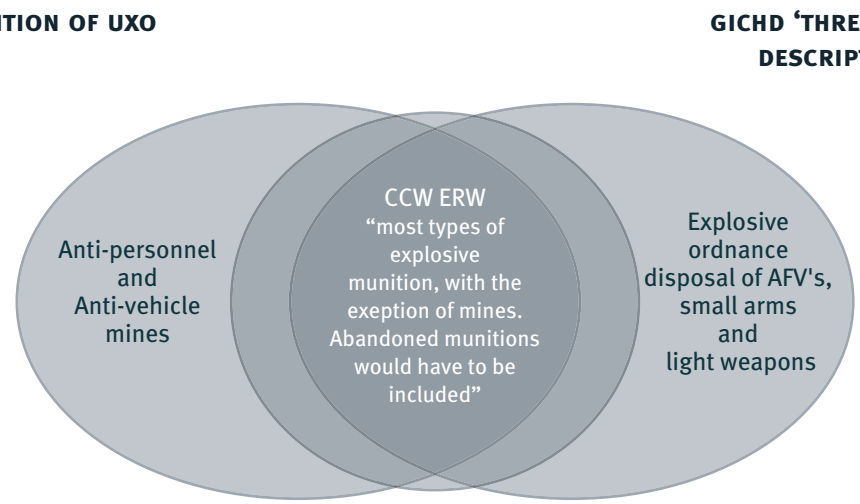


Figure 1: Venn diagram of UXO/ERW terms



In mid-December 2002, CCW States Parties agreed, on the basis of recommendations by the Governmental Group of Experts, for negotiations to begin on a new instrument to tackle ERW within the rubric of the Convention, with the following mandate:

'a)

i) To negotiate an instrument on post-conflict remedial measures of a generic nature, which would reduce the risks of ERW. These measures would be based on a broad definition covering most types of explosive munition, with the exception of mines. Abandoned munitions would have to be included. In these negotiations, questions need to be considered regarding, inter alia, responsibility for clearance, existing ERW, the provision of information to facilitate clearance and risk education, warnings to civilian populations, assistance and cooperation, and a framework for regular consultations of High Contracting Parties. These negotiations would have to establish the scope of this instrument consistent with Article I of the Convention as amended at its Second Review Conference.

ii) To explore and determine whether these negotiations could successfully address preventive generic measures for improving the reliability of munitions that fall within the agreed broad definition, through voluntary best practices concerning the management of manufacturing, quality control, handling and storage of munitions. Exchange of information, assistance and cooperation would be important elements of such best practices.

iii) Separate from the negotiations under (a) to continue to consider the implementation of existing principles of International Humanitarian Law and to further study, on an open ended basis, possible preventive measures aimed at improving the design of certain specific types of munitions, including submunitions, with a view to minimize the humanitarian risk of these munitions becoming ERW. Exchange of information, assistance and cooperation would be part of this work.'[14]

Thus, a working term for 'Explosive Remnants of War' in the context of the CCW appears to have evolved. The CCW's mandate to tackle ERW excludes anti-personnel mines and anti-vehicle mines left in operation after a conflict. And, it excludes 'booby traps' and 'other devices' (such as Improvised Explosive Devices (IED)) as defined by CCW Amended Protocol II and dealt with already by that instrument.[15] However, it includes all other 'unexploded ordnance', as well as abandoned ordnance.

From a research perspective, the problem is how to square this working understanding with data collected on UXO in the past – information that forms the basis for the findings of this Survey. The CCW's working term for ERW is not particularly helpful for researchers because it is a diplomatic term that does not necessarily resemble the way information is collected in the field. The reality is that for an area to be made safe, deminers have to clear all munitions present. Records detailing specific categories of munitions cleared are not always kept. Moreover, because there is no universally agreed term for unexploded ordnance, we have found that different data sources can use the same term to describe different sets of munitions. Others do not specify which munitions they are describing as UXO.

For that reason, this Survey adopts the following approach to

describing explosive remnants of war and unexploded ordnance:

- When it is possible to differentiate between ERW and mines in our sources we have done so. If further differentiation between munition types is possible (for instance, mortar shells and grenades), we have also done so.
- With some data it is not possible to disaggregate this information, and so in these cases we have simply described data as 'ERW and mines'.
- ERW includes abandoned ordnance in this Survey. Sometimes abandoned ordnance is further identified, however, when it can shed additional light on the ERW profile of a country or territory.
- Unexploded ordnance (UXO) is a term used in the following Survey when a research source deploys it but does not make an explicit differentiation between mines, abandoned ordnance and ERW, and this cannot be reliably inferred from its context.

Methodology and Sources

Research for this study included a wide range of sources on many countries and territories. A team of researchers collected and collated information into a standard form as the basis for the short 'thumbnail' country reports and regional and global analysis included here, working mainly on the basis of publicly available secondary sources.

Data on Explosive Remnants of War

Explosive remnants of war are often found in and around mined areas, sometimes in far greater numbers than mines, and are commonly addressed by mine clearance and mine risk education programmes. But, open-source data on the nature and impact of the ERW problem is far less available than for mines.

Quite detailed information on explosive remnants of war does appear to exist in a minority of the countries and territories we studied. Data is collected, for instance, in Information Management System for Mine Action (IMSMA)[16] modules operating in at least two-dozen countries, Landmine Impact Surveys, and national records and databases accumulated by many mine action organisations, including NGO and commercial clearance outfits. But there is no common repository for this data, nor has some of it been made publicly available. Consequently, the quantity and quality of data openly available is more limited than it could be otherwise.

In addition, differentiating between and separating ERW and mine data sets is sometimes not possible because:

- Most existing data for ERW derives from research into

Box 1: Landmine Impact Surveys

The **primary purpose** of impact surveys is to assess the mine situation in each community and develop an understanding of how this threat affects it. A mine impact survey may generate a lot of useful data about ERW, if ERW are present. The **secondary goal** is to support later steps in the mine action process.

The survey begins at the national level, where survey teams meet with national experts and get information about what areas of the country are known, or thought to be contaminated. After getting this general picture, survey teams gather more detailed information at the local level. Data collected at the local level is analysed and presented in the impact survey. **Community interviews** are at the heart of the survey process. Hand-drawn maps of contaminated areas are made with the assistance of local leaders of known or suspected areas affected. In this way it is possible to point out clearly the relationship between the affected area and key local landmarks, and valuable assets such as fields, water sources or roads. It is then possible to identify what threats and blockages are created by mine and ERW contamination. Information about ERW and mine incidents is also collected. Upon completion of the community interview stage, the **data collected is analysed to determine the level of community impact**.

There are shortfalls with this system, however systematic. The major limitation is that the survey reports on areas that are affected, or believed to be affected. The survey assesses perceived risk, and at this stage of the process areas reported are not verified and mapped. Therefore, **the area reported as affected may be larger than the actual area** so the survey inevitably presents a snapshot of the problem.

This can provide a great deal of information and bring previously unknown or under-appreciated problems (like the presence of ERW) to light. But, **the survey cannot track a fluid situation**. Changes brought about by clearance activities, a resumption of conflict, the discovery of previously unsuspected affected areas, or natural causes (floods and earthquakes can displace ERW and mines) will not be reflected.

the anti-personnel mine (APM) problem.

- It is sometimes not known what types of unexploded munition have caused injury or death, or it is assumed that mines are the cause. Consequently, ERW injuries and fatalities may be under-reported, or assessed as due to mines in areas where mines are thought to be present.
- Survivors of ERW incidents will often not know the type of munition responsible.
- It appears that a significant proportion of ERW injuries are fatal.

In this way, concentrating on the collection of socio-economic and other data for one weapon system like APMs may only show part of the picture when ERW are present. There seems to be broad implicit recognition of this situation, especially by international agencies and NGOs involved in humanitarian demining at the practical level. But APMs remain the focus of socio-economic research (as opposed to ERW) for at least two reasons:

- APMs are often laid in a manner intended to maximise socio-economic disruption. This weapon-system is designed to incur harm through inadvertent contact and, when activated, functions as intended most of the time. As such, the presence of APMs poses a clearly defined problem for affected communities, donors and researchers.
- International humanitarian law on APMs is more highly developed than for ERW. The 1997 Ottawa Treaty and associated publications such as Landmine Monitor have been highly successful in focusing the attention and resources of donors, international organisations and trans-national civil society onto APMs, with a view to its complete prohibition and eradication.

At present, Landmine Monitor provides one of the widest initial samples of ERW data amongst publicly available secondary sources. Although focused on issues associated with implementing the ban on APMs, this annual publication also provides some data on ERW in mine-affected countries. We have had to be careful, however: while 'unexploded ordnance' is a commonly used term in the Landmine Monitor, it is not used uniformly. In some cases it has not been possible to ascertain whether UXO is used to describe:

- a) All types of explosive remnant of war except APMs;
- b) All types of explosive remnants of war except APMs and mines other than anti-personnel mines; or
- c) In certain cases (concerning, for instance, an area cleared or casualty data) all types of unexploded munition including APMs and other mines.

Therefore it is sometimes unclear in Landmine Monitor which munition categories are being described. Such variations in terminology create troubling implications for the evaluation and comparison of quantitative clearance or casualty data for APM compared with ERW.

The same shortcoming applies to most other open sources of data, including the United Nation's online database of country profiles, documents and other information about mine action (the so-called 'emine' system).[17] This even occurs at the level of detail of technical assessment mission reports to individual territories. Where possible, figures and munition types quoted in country or territory reports in this study have been corroborated with other accessible sources.

While some data we possess is spread over some time, generally we have pursued a snapshot approach focusing on 2001 as the preferred base year. In addition, certain comparisons between individual countries, territories and regions have been made in graphs and case studies in the following survey. This has been done circumspectly though, as there are huge variations in the severity and characteristics of ERW even within national or territorial borders.

Comparing threats posed by explosive remnants of war in different locations is very complex. ERW in any given situation may comprise many different munition types scattered about, for instance. All are unpredictable by the very fact that they are ERW in the first place, since they have not functioned as intended, a characteristic outlined in more detail in the next section.

The information presented here indicates a number of general trends. But in view of the difficulties inherent in comparisons of widely varying ERW profiles, and the shortcomings of available quantitative data, care has been taken to avoid interpolating too much from the data. The reality is that every community affected by ERW will have an individual threat profile.[18] Until data collection and collation systems for ERW improve substantially, definitive conclusions about the socio-economic impacts of explosive remnants of war must remain inevitably, tentative.

3 How ERW can affect communities

Socio-economic effects

Explosive remnants of war and mines affect communities in many ways. They pose serious risks to the health and safety of civilian populations in affected countries around the world. But they also pose significant economic risks to these same populations. By ERW 'impact' we refer to all the ways in which it affects people's lives, not just the more obvious risks posed to health and physical safety.

An ERW-affected community is not just one that has experienced incidents resulting in injury or death. It is also one in which the known or suspected presence of ERW interferes with activities necessary for the social and economic health of the community, such as access to water sources, housing or other infrastructures including schools, hospitals and roads.

It is important to keep in mind that ERW numbers alone do not tell the story of their impact. High numbers of ERW do not necessarily represent a severe impact if, for example, they are in an uninhabited area. Going beyond the numbers and considering the range of ways in which it affects human lives is the only true way to assess the full impact of ERW. Each community's particular economic, cultural and topographical characteristics, for instance, have some bearing on its ERW profile. After a full assessment taking these characteristics into account, demining resources can be targeted more effectively to achieve maximum benefit.

The wounding effects of ERW

The wounding effects of munitions that have failed to function as intended and abandoned ordnance can be more severe than those of anti-personnel mines in post-conflict communities where the former are present.

Anti-personnel mines usually consist of 50 to 80 grams or so of explosive material in a plastic, metal or wooden box, and are buried below the surface of the soil. An APM inflicts damage when detonated, usually on one victim, primarily through 'point detonation' against specific parts of the human body. Additionally (unless it is a bounding or jumping design, or another type designed to use fragments to cause injury) the APM dissipates part of its explosive force into the soil around it. Traumatic amputation of a limb or limbs as the result of APMs can be fatal, but it is often survivable, especially if no serious internal injuries have been inflicted. Consequently, a major proportion of victims survive these incidents, commonly as amputees.[19]

By contrast, munitions that have not functioned as intended and abandoned ordnance are to be found lying on the surface of the ground, buried or partially covered. ERW are to be found in many shapes and sizes, from small fuze detonators to large free-fall bombs, or missiles, weighing up to hundreds of kilograms. They are devices that usually come in metal casings designed to fragment into many tiny pieces and embed themselves at high velocity into surrounding people or objects when detonated. The explosive concussion effects from ERW can also cause massive trauma and death to human beings in a wide radius, this distance depending on weapon yield and intervening obstacles.

Because they are devices that have failed to function as intended, individual items of unexploded ordnance are unpredictable in terms of whether they will explode on human contact. 'A landmine will typically detonate when a very specific action has taken place such as pressure being

Box 2: The Red Cross Wound Classification System

The International Committee of the Red Cross has developed a basic system of wound classification. Its applications include injury assessment in ICRC hospitals, establishing a scientific approach to war surgery, surgical audit and improving wound information collection from the field. The Red Cross classification system has limitations but it permits consideration of wounds as surgical lesions rather than weaponry phenomena; it refines the heterogeneity of wounds according to their clinical significance, and is applicable in very basic field conditions.

Very broadly, this system rates wounds according to factors such as entry and exit point, wound size, cavity size, whether there is fracture, injury to a vital structure and whether embedded metallic bodies are visible or detectable by X-ray. Based on these scores, wounds can be graded according to the amount of tissue damage – 1 (low energy transfer), 2 (high energy transfer), and 3 (massive wounds) – combined with information about fracture damage or structures injured, to assess injuries from small simple wounds through to large wounds threatening life or limb.

On the basis of data collected using this system, the ICRC has been able to show that during war, mines and fragmenting munitions (mortars, bombs and shells) are more likely to injure civilians than bullets. Furthermore, the inherent nature of a weapon is shown to be a factor in determining whether civilians are killed or injured, and helps to demonstrate that the injuries inflicted by different types of mines and ERW vary. We take these points up further in our Survey conclusions. (See Robin Coupland, *The Red Cross Wound Classification*, (Geneva, ICRC, 1991)).

applied to a pressure plate, or a trip wire being pulled. In contrast, UXO has the potential to detonate from a range of stimuli including changes in temperature and the smallest degree of disturbance. An item such as a mortar round could be picked up and even dropped with no consequence. An identical item could detonate simply by being rolled through a few degrees.'[20]

Over time, the condition of an item of ERW becomes even more unpredictable because physical degradation from humidity, temperature change and a host of other variables the individual munition is not designed to withstand, occur. (Mines may also suffer physical degradation, but they are usually designed to remain able to function over a long period with this in mind.) Degradation may occur at differing rates for the same munition depending on whether it is in moist, humid jungle, or desert, or tundra or snow, for instance. An ERW item may be lying on the surface and exposed to the weather and UV radiation, or it may have penetrated the ground and lie buried or partially covered. It may have lain where it is since it was used or have been displaced by flood, slip or earthquake. As mentioned above, it may even have been tampered with previously without detonating.

Incidents involving ERW appear to cause multiple casualties, and result in fatalities, a much higher proportion of the time than APM. Although it is difficult to generalise about ERW, the explosive force of these munitions and their fragments tend to be directed toward the abdomen, torso and head regions of victims' bodies.[21] Such injuries are usually complex to treat, and often require modern surgical care for the victims to stand a chance of survival, let alone make a full recovery. This type of care is beyond the range and means of a great majority of local communities in the developing world.

4 Global Overview

The global impact of explosive remnants of war

Explosive remnants of war are a global humanitarian concern. Our estimate, based on positive reports or other strong indications of problems caused by the presence of ERW, is that at least 82 countries and 10 territories in most regions of the world appear to be affected.

There are also a number of countries that have a residual ERW problem, usually as a result of the First and Second World Wars, in which it is not uncommon for unexploded ordnance to be discovered and subsequently dealt with by specialist emergency civilian or military services. These countries have not been included in this analysis as the presence of ERW does not appear to have had detrimental social or economic effects in our time frame, and civilian casualties have not been reported for some years.

Examples of such countries include **Belgium, Germany, Greece, Latvia, Lithuania, the Netherlands, Slovakia, Slovenia** and the **United Kingdom**. However, even in cases of residual ERW contamination, there clearly remains a degree of potential risk to civilians.

Research undertaken as part of this study indicates that the effects of ERW contamination in the Pacific, specifically in **Kiribati, the Marshall Islands, Papua New Guinea, the Solomon Islands** and **Tuvalu**, may only be residual. These countries have been included in the Asia-Pacific section of the Survey because definitive evidence is not yet available to verify this.

This Survey divides the countries and territories surveyed within it into the five broad geographical regions used by the *2002 Landmine Monitor*. They are as follows:

a) The Americas, b) Asia and the Pacific, c) Europe, the Caucasus and Central Asia, d) The Middle East and North Africa and e) sub-Saharan Africa. The set of countries and territories listed in Table 1 differs from the set assessed as 'UXO affected' in *2002 Landmine Monitor*. Our set of ERW affected countries also differs from Landmine Action's preliminary global findings presented in December 2002.[22] It is important to note that this does not mean that explosive remnants of war have no socio-economic impact in other countries not included in this Survey. Rather, it means that we have not yet found current data in other countries and territories to determine that effects there from ERW are more than residual. This Survey excludes mines, which may be a documented socio-economic threat in these places, even if other forms of unexploded munition are not.

Between January 2001 and June 2002 ERW casualties occurred in many populated regions of the world. Casualties were reported in 15 countries and territories in Sub-Saharan Africa, 19 in Europe and Central Asia, 12 in the Middle East and North Africa, eight in Asia, and five in the Americas (see Table 2). There were, however, no ERW casualties reported in the Pacific.

While conflict continues in several of the countries and territories listed in Table 2, a majority had not experienced any active armed conflict between the beginning of 2001 and mid-2002. In many cases, conflict resulting in the generation of ERW occurred a decade or more ago.

There are 38 countries or territories included in Table 1 that did not report casualties between the beginning of 2001 and the end of June 2002 (Table 2). It is probable that there were new ERW casualties in at least some of these places during this time period, for reasons set out in the previous section on Sources & Methodology. However, without firm evidence, we have excluded such countries and territories.

This Survey does not contain any estimate of the global total of casualties of explosive remnants of war, as there is not sufficient information to attempt this. However, even if it is impossible at present to reach reliable consolidated estimates of casualties, comparisons between the general characteristics of casualty profiles in different places can provide some useful indications of the broad socio-economic effects of ERW.

Deep or comprehensive analysis of the socio-economic impacts of ERW is not the intention here. Such approaches have been pursued elsewhere, for instance in Landmine Action's 2002 study *Explosive Remnants of War: Unexploded Ordnance and Post-Conflict Communities*.

Instead, an attempt has been made to set out in one document what current secondary literature tells us about the range of socio-economic impacts of explosive remnants of war. From this rudimentary basis it has been possible to identify some broad prevailing trends or common themes. Discussion of these begins below.

The overviews at the beginning of each of the Survey's five regional sections outline some of these socio-economic effects. Individual profiles for each affected country or territory provide more detailed information. At the end of the report are some conclusions about the global ERW threat, as well as recommendations to better tackle it.

Table 1: Countries affected by socio-economic effects of explosive remnants of war (ERW)

Africa (sub-Saharan)	The Americas	The Asia-Pacific	Europe, Caucasus and Central Asia	Middle East and North Africa
Angola	Colombia	Afghanistan	Albania	Algeria
Burundi	Ecuador	Cambodia	Azerbaijan	Egypt
Chad	El Salvador	China	Belarus	Iran
Republic of Congo	Guatemala	India	Bosnia & Herzegovina	Iraq
DR Congo	Honduras	East Timor	Croatia	Israel
Cote D'Ivoire	Nicaragua	Kiribati*	Czech Republic	Jordan
Djibouti	Panama	Laos	Estonia	Kuwait
Eritrea	Peru	Marshall Islands*	Georgia	Lebanon
Ethiopia		Mongolia	Hungary	Libya
Guinea	*(8)*	Nepal	Kyrgyzstan	Morocco
Guinea-Bissau		Pakistan	Latvia	Oman
Kenya	Falklands/Malvinas	Papua New Guinea*	Lithuania	Syria
Liberia		Philippines	Macedonia	Tunisia
Mauritania	*(9)*	Solomon Islands*	Moldova	Yemen
Mozambique		Sri Lanka	Poland	
Namibia		Thailand	Russia	*(14)*
Nigeria		Tuvalu*	Serbia & Montenegro	
Rwanda		Vietnam	Tajikistan	Northern Iraq
Sierra Leone			Ukraine	Palestine
Somalia		*(18)*		Western Sahara
Sudan			*(19)*	
Uganda		Taiwan		*(17)*
Zambia			Abkhazia	
		(19)	Chechnya	
(23)			Kosovo	
			Nagorno-Karabakh	
Somaliland				
			(23)	
(24)				

* Socio-economic impacts of ERW are suspected, but not confirmed.

Box 3: Standard Indices used in territorial profiles in this Survey

Data for the table of standard indices used in country and territory profiles were, unless specifically noted, obtained from the following sources:

- Land area, overall GDP (US$) and population were based on 2000 World Bank figures (available at http://www.worldbank.org/data).
- Arable land (as a percentage of land area) and rural population density as they stood at the end of 1999 were obtained from the World Bank's 2002 World Development Indicators.
- Finally, GDP per capita (or Purchasing Power Parity (PPP), in US$) for 2000 was taken from the Human Development Index published by UNDP at: http://www.undp.org/hdr2002/indicator. PPP means a rate of exchange that accounts for price differences across countries, allowing international comparisons of real output and incomes. At the PPP US$ rate (as used in the UNDP HDI), PPP US$1 has the same purchasing power in the domestic economy of the country referred to as $1 has in the United States.

Table 2: Countries with new ERW casualties reported between January 2001 and June 2002

Africa (sub-Saharan)	The Americas	The Asia-Pacific	Europe, Caucasus and Central Asia	Middle East and North Africa
Angola	Colombia	Afghanistan	Albania	Egypt
Chad	Ecuador	Cambodia	Azerbaijan	Iran
DR Congo	El Salvador	Laos	Belarus*	Iraq
Eritrea	Guatemala	Pakistan	Bosnia & Herzegovina	Jordan
Ethiopia	Nicaragua	Philippines	Croatia	Kuwait
Guinea		Sri Lanka	Czech Republic	Lebanon
Guinea-Bissau	*(5)*	Thailand	Estonia	Oman
Kenya		Vietnam	Georgia	Syria
Mozambique			Hungary	Tunisia
Namibia		*(8)*	Kyrgyzstan	Yemen
Nigeria			Macedonia	
Sierra Leone			Poland	*(10)*
Somalia			Russia*	
Sudan			Ukraine	Northern Iraq
			Serbia & Montenegro	Palestine
(14)				
			(15)	*(12)*
Somaliland				
			Abkhazia	
(15)			Chechnya	
			Kosovo	
			Nagorno-Karabakh	
			(19)	

*Asterisk denotes countries or territories in which ERW casualties are strongly suspected, but not confirmed.

Who are the victims of ERW?

- It would appear that males aged between 18 and 40, followed by children, are most at risk from death or injury in ERW incidents, although casualties come from all demographic groups.
- ERW incidents are fatal more often than anti-personnel mine incidents; and
- ERW tends to kill and/or injure multiple people per incident.

All members of ERW-affected communities are potentially vulnerable to its socio-economic effects, especially if community functions such as the production of food or cash crops, access to clean water supplies, or infrastructure such as roads, schools and markets are affected. In Laos, for example, many families have learned to accept malnutrition rather than work land that poses a high risk of incident from explosive remnants of war. Inadequate diet or malnutrition in the long-term has a whole range of medical, economic and social effects, including increasing the vulnerability of those affected to infectious disease and other illnesses, as well as impeding child development.

Explosive remnants of war, like mines, can have a host of more subtle negative effects on communities too. Fear of death or injury from ERW, or the difficulties in maintaining a viable existence in the face of their presence, can effect changes in community behaviours and even lead to community relocation or abandonment. At the very least, it affects the confidence with which individuals or groups based in a community work, travel, live and play. Casualties from explosive remnants of war are only one indicator of its socio-economic impact on communities, and are used here in the absence of comprehensive data on other socio-economic aspects.

A remarkably common factor in the incidence of casualties is that males between the ages of 18 and 40 appear most at risk from ERW. Several explanations have been put forward to explain this:

- Participation of young men in pastoral activities such as herding and grazing of livestock exposes them to ERW and mines;
- Boredom or curiosity results in tampering with ERW;
- Men are preponderant in the more intrusive forms of agricultural work such as ploughing and digging;
- Men are more likely than other groups to have had military experience. This leads to a higher degree of confidence around munitions, which means these males are more likely to approach explosive items;
- Social displays of contact with ERW are sometimes linked to the expression of masculine identity.

While these theories may help to explain the reasons for individual incidents, they do not comprise an adequate explanation for the overall trend of male casualties, in our view. More useful work could be done to examine these patterns of injury and fatality in order to improve general responses to reduce ERW risk.

The second group that appears most at risk is that of children, particularly boys. We would stress the word 'appears', because the spread and level of data available regionally or globally is very fragmented. It might be, for instance, that injuries or deaths to children are reported more often than injuries to adults. The definition of a child also varies among the sources we have used: in some, for instance, it refers to those younger than 15, in others the term 'child' refers to someone younger than 18 years of age. In some cases it is left unspecified. This means there is some degree of overlap between children and older demographic groups ERW and mine data. Until better evidence is available, it is difficult to test explanations of why children or young men appear to be especially at risk from ERW.

Current ideas put forward to account for why children seem to be victims must be treated with care. For example, linking the apparent vulnerability of children to accidents with unexploded cluster submunitions to brightly coloured devices with drogue parachutes, that give these devices a curious and inviting appearance, might explain specific incidents in which children have tampered with submunitions, but broad applicability does not necessarily follow. Not all cluster submunitions have a distinctive appearance. Children in every region of the world seem just as likely to pick up unremarkable-looking khaki-coloured devices such as grenades, in view of the wide range of reported incidents with these weapons.

It is clear that contact with explosive remnants of war is not stigmatised in some societies, despite awareness of its dangers. In fact, in economies such as Laos, Cambodia, Vietnam and in the Horn of Africa quite the reverse may be true: ERW items have perceived economic value as scrap, in the fashioning of everyday objects, or for their explosive content. Children learn from the people around them, and an environment in which contact with unexploded munitions or their components are familiar or routine may increase the risk to youngsters.

It would be useful to have data across countries or regions on how often children are bystanders in ERW incidents. There are reports, for instance in Kosovo, of a number of children being killed or seriously injured by cluster bomblets while watching adult Albanian males (some former Kosovo Liberation Army members) deliberately move or tamper with these ERW.[23] Because of ERW's general characteristics, inadvertent or deliberate bystanders are at more risk from it than from the directed explosive force of mines. Plausibly, this could be especially so for children as their bodies are

smaller and less robust than adults when it comes to surviving multiple trauma and fragmentation injuries.

Do certain activities or occupations appear to be more dangerous than others?

- Tampering with unexploded munitions, or being a bystander in any area where explosive remnants of war may be interfered with, are common reasons for injury or death.
- Beyond this, the individual activities or occupations resulting in ERW incidents depend to a large extent on the individual characteristics of communities.

The 'bystander hypothesis' has more general applicability than children. Anyone is at risk when unexploded munitions are in the vicinity. (This point is also relevant with regard to undesired explosive events in ammunition storage areas.) However, data collected about incidents makes no distinction in most instances between bystanders and those who have initiated an ERW detonation. This is a fact acknowledged by the Cambodian Mine Incident Database Project, for example.[24]

The most risky activity seems to be to tamper with explosive remnants of war. That tampering is risky might seem obvious. However, reasons for ERW tampering are complex, and may be driven by compelling economic need or other imperatives. The direct economic value of ERW to a community has already been discussed, but ERW may also need to be moved or cleared in order for the resumption of important activities such as agriculture, the movement of livestock, vehicles or people, to remove a danger to the community (for instance, to prevent others – such as children – possibly tampering with it), or for other reasons. In Kosovo in 2001, for instance, touching or deliberate tampering caused all of the 12 incidents involving ERW, resulting in seven deaths and 12 injuries. The implication here is that awareness programmes operating in specific ERW-affected communities need to consider the reasons for tampering and move to address these, rather than simply issuing generic warnings to leave ERW and mines alone, as such warnings may not be sufficient.

Beyond tampering, general patterns in the causes of incidents begin to break down. Unlike mines, ERW embedded or buried in the ground may not necessarily detonate if the surface is travelled over. Forceful contact, for instance in the course of agricultural activities such as ploughing, may or may not detonate ERW. It appears clear, however, that the pattern of deaths and injuries from ERW is linked to the nature and location of economic activities that occupy different groups within the many different types of community around the globe.

Are certain types of ERW more of a threat than others?

- Grenades and mortar shells appear to be especially common across a wide range of post-conflict situations.
- There are many exceptions, but as a general rule-of-thumb the more common a munition is unexploded in a post-conflict situation then the more likely it is to cause incidents, all other factors being equal.
- Cluster munitions pose an especially high risk in the limited set of conflicts where they have been used.
- ERW threat profiles tend to evolve over time.

Arguing that certain types of unexploded munitions are uniformly more or less dangerous simply on the basis of numbers of total casualties linked to them is of limited value in understanding and reducing their future threat. We would stress again that the types of munitions and the ways in which they are used vary within, and between, conflicts. Moreover, many different factors affect the ways in which civilian populations interact with ERW, as well as its composition and level of presence. Such factors modify how vulnerable a civilian population may be to ERW.

While we have insufficient data yet to reach any categorical conclusions, we have identified the following general tendencies:

- **The more a munition type is present in a civilian post-conflict environment, the more dangerous it is generally in numbers of incidents and casualties.**

Infantry-level explosive munitions have been used in most of the conflicts we have surveyed. These appear to make up the greatest proportions of incidents involving ERW in the widest group of affected post-conflict communities. It is also likely that some incidents attributed to APM are in fact other infantry-level munition types encountered post-conflict.

Mortar shells, whether ERW or unfired, appear to be the greatest threat after mines. This is partly a consequence of the nature of the shell itself as well as the deployment and use pattern of mortars in combat situations. Mortars can achieve high rates of fire and are of high military utility to infantry combat forces for local indirect fire-support. Comparatively large stocks of mortar ammunition are often kept ready for use in forward combat areas. Although, as a rule, retreating forces try to destroy munition stocks they leave behind, such stocks are often abandoned.

Grenades are also a very common component of ERW, and appear to cause many post-conflict incidents. These small explosive fragmentation devices vary in size and effect, but are carried by many combatants. Usually grenade use entails pulling a pin and placing or throwing the explosive device. Problems with the pin mechanism, deployment technique or the detonator may cause the grenade to fail to function as

intended. Disturbing or tampering with an unexploded grenade, therefore, can be extremely hazardous.

- **In the limited set of conflicts where they have been used, cluster submunitions appear to pose a high level of ERW threat to civilians.**

Cluster munition use has been reported in Afghanistan, Albania, Bosnia and Herzegovina, Cambodia, Chad, Chechnya, Eritrea, Ethiopia, Iraq, Kosovo, Kuwait, Laos, Lebanon, Northern Iraq, Saudi Arabia, Sudan, Serbia and Vietnam.[25] They have also been used in Sierra Leone. This Survey shows that many of these places continue to suffer persistent contamination from cluster submunitions.

Because of the nature of their deployment and dispersal, submunitions are often found in high concentrations, both on the surface of the ground and in it.[26] They are also capable of causing multiple deaths and injuries if detonated. Certain types of cluster submunition, for instance the US-manufactured BLU-97, appear to be notorious for their high failure rates and instability when unexploded: this may be linked to the nature of their multi-directional fuzes, which can act like anti-disturbance devices if they fail to function during initial impact.[27] Our research supports the ICRC's view that 'recent conflicts generally indicate that submunitions do not deny the use of land to the local population in the same way mines do. While mines are universally feared and avoided where possible, civilians do not seem to draw any particular distinction between submunitions and other forms of UXO. Consequently, local people venture onto land known to be contaminated with bomblets where they would not venture into a minefield. This greatly increases the likelihood of accidents.'[28]

- **The threat of a munition as ERW in a post-conflict situation may evolve over time.**

A changing ERW threat profile to civilians appears to be the case for a number of reasons, not least the physical degradation of unexploded munitions left uncleared. Some types of explosive remnants of war may be more easily buried or missed in the course of clearance operations immediately post-conflict, or when military land is being decommissioned. Others, which are more easily visible (e.g. unexploded bombs) or that are detectable by widely available means (like some types of APM) may decline in threat as numbers are reduced by clearance. This might help to explain why incidents from grenades, for instance, still occur many years or decades after ERW and mine clearance efforts have been carried out in countries like Belarus, Kyrgyztan, the Russian Federation and Ukraine.

In addition, post-conflict communities may encounter different 'layers' of contamination if more than one conflict has generated ERW in the same area in the past. This is the case in many countries surveyed. Places in Europe, North Africa and the Middle East, for instance, have contamination dating as far back to World War I, as well as from more recent conflicts. As economic development and population changes affect land use patterns, for instance in Egypt or Nicaragua, this may increase ERW and mine incident risk. In Nicaragua, increasing rural population density has led to the clearing of hitherto marginal land for cultivation. In Egypt, industrial and urban development are encroaching increasingly on ERW contaminated areas from World War II and more recently.

Self-neutralisation/self-destruction features incorporated into some munitions may also change the nature of an area's ERW threat (as opposed to ERW presence) over time if, for instance, remotely-delivered mines deactivate while unexploded submunitions do not. This, in effect, increases the *proportional* chance of incident from submunitions as opposed to a remotely-delivered mine, even if the overall chance of an ERW incident occurring decreases. This has implications for the best types of measures to tackle ERW and mine threats after a conflict. The implications of the current global range of ERW threat are a subject discussed further in this Survey's sections containing conclusions and recommendations.

5 Sub-Saharan Africa

Regional overview

At least 24 countries and territories in sub-Saharan Africa appear to suffer negative socio-economic effects from the presence of explosive remnants of war. As better information becomes available about other countries in this region it is likely that this number will grow.

Africa presents severe problems for ERW data collection and analysis. It is clear though that explosive remnants of war and other forms of unexploded ordnance are among the factors that weaken the ability of local communities to withstand a variety of other socio-economic stresses in Africa, whether malnutrition, endemic disease or environmental damage. Although their precise effects vary hugely, some of the types of socio-economic impacts of post-conflict ERW threat identified by this research include:

- ERW has, in some communities, forced changes in land use and reduced access to water supplies;
- As in other regions in this survey, ERW poses a particular problem in communities dependent on pastoral agriculture, such as Chad and in the Horn of Africa.
- ERW, and particularly cluster submunitions (where they have been used, for instance in Eritrea, Sudan and Ethiopia), pose serious threats to the safety of refugees and internally displaced persons (IDPs), and may affect their ability or willingness to return to their communities of origin.
- In places like Zambia, ERW presence in sparsely populated regions of the country has nevertheless had a socio-economic impact because of its negative effects on quality of life for Zambians, their livestock and the accessibility of certain areas for livestock grazing, hunting and tourist activities. There is also evidence ERW has been an obstacle to economic and infrastructure development.
- Ammunition stockpiling and storage have a bearing on the profile of ERW threats, for instance in Nigeria, Guinea and Guinea-Bissau, which have experienced undesired explosive incidents resulting in ERW contamination.
- The presence of ERW, often combined with the threat of mines, endangers United Nations peacekeepers and international humanitarian assistance personnel. ERW and mines prevent them from undertaking some activities to help ensure the well-being of local populations in conflict and post-conflict situations, and may cut off areas (for instance in southern Sudan) from relief assistance.
- Men and boys are consistently involved in more ERW-related incidents than women, and are a considerably greater proportion of recorded injuries and fatalities in Africa.

West Africa

Explosive remnants of war have socio-economic impacts on communities in Guinea, Guinea-Bissau, Liberia, Mauritania, Nigeria and Sierra Leone. In addition, recent conflict in Cote D'Ivoire may have generated unexploded ordnance, but confirmation is not yet available. Little is known about the effects of ERW and mines in Liberia, Mauritania and Sierra Leone, although cluster submunitions appear to be a component of ERW in the latter's case. ERW disposal data for Sierra Leone also shows that high explosive and fragmentation grenades may be a major part of the ERW threat there.

Ammunition stockpile explosions have occurred in at least three West African countries – in Guinea, Guinea-Bissau and, most seriously, in Lagos in Nigeria, in 2001. As well as killing or injuring large numbers of people, large numbers of unstable and unexploded ordnance were thrown into surrounding, populated areas by these incidents. This was a situation worsened by the location of some of these ammunition depots within urban zones, as was the case in Lagos.[29]

Overall, the information with which to profile West Africa's ERW problems is scant. Guinea-Bissau may be typical of other West African countries: many more explosive remnants of war were cleared there in 2001 than mines. No comprehensive records have been kept on ERW and mine casualties in the sub-region, but there is anecdotal evidence to suggest that ERW casualties are occurring at a steady trickle of two or three per month in Guinea-Bissau. Economic pressures have seen the continued agricultural cultivation of ERW and mine-infested areas, and led to attempts to disassemble unexploded munitions for scrap. Children would appear to feature prominently in incident reports as victims of handling grenades and other unknown devices, although whether this is proportionate to the actual numbers present of these munitions is not known.

Central and Southern Africa

Angola, Burundi, Democratic Republic of Congo (DRC), Mozambique, Namibia, Republic of Congo, Rwanda, Uganda and Zambia, to varying degrees, suffer post-conflict effects of unexploded ordnance of which ERW contamination are components. The DRC has been the geographical fulcrum of Central African conflict since civil war broke out there in 1997, with the involvement of many other actors in the region. Areas of this country have seen heavy fighting and generation of ERW with commonly available infantry weapons such as mortars and grenades, which have been a feature of conflicts throughout Africa.

Older independence struggles in Angola, Mozambique, Namibia and Zimbabwe have also generated ERW contamination. With frequent movements across borders of armies and armed non-state actors a feature of these wars, even countries not involved in conflict, such as Zambia, have experienced ERW contamination and its negative socio-economic effects. (Zambia's strategic position and its relatively low rural population density, especially in border regions, means that foreign forces have used it as a safe haven and arms cache for decades, also laying mines in the process.) The Republic of Congo's ERW problem appears to date back to earlier in the 20th century, perhaps exacerbated in some areas bordering Angola by the operations of certain Angolan armed non-state actors.

In Mozambique the highest profile problem is anti-personnel mines. But recent studies indicate that ERW is, in fact, as significant a threat in terms of incidents – although these numbers are declining over time. Most ERW and mine incidents, according to a *Landmine Impact Survey* conducted in Mozambique, occur in the course of normal community activities, particularly in rural areas, such as food and water collection, farming, herding or household work. The high rate of fatalities (in one third of incidents) appears to support the contention that ERW, as well as APM, are a significant threat.

Mines have been a more significant immediate post-conflict threat in Angola than explosive remnants of war. However, there is evidence that significantly higher numbers of ERW are also being cleared than mines in some areas.

North-east Africa

Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Somaliland and Sudan are impacted by explosive remnants of war. The socio-economic impacts of ERW appear to be relatively slight in Djibouti and Kenya. However, the situation is slightly altered if Kenya's military training grounds are factored in. There appear to have been ERW-related incidents involving grenades and 'bomblets' in three provinces of Kenya, and more probably go unreported, especially amongst nomadic tribespeople.

Aside from their possible use in military training exercises in Kenya, cluster submunitions are a feature of the ERW problem in Eritrea, Ethiopia and Sudan. These weapons have been used against civilian targets in all three countries, a situation that has exacerbated humanitarian relief problems as well as risks involved in livestock grazing and other forms of agriculture due to high submunition failure rates.[30] They are a particular threat in Eritrea and, to at least some extent, in the Temporary Security Zone on Ethiopia's side of the border. The Korokon refugee camp in Eritrea was attacked with British manufactured BL-755 cluster munitions in May 2000, for instance: more than 400 unexploded BL-755 bomblets were subsequently cleared by The HALO Trust in January 2001. Other submunition types, such as the PTAB and AO-1, were also cleared from areas nearby, in addition to mortars and grenades.[31] It has not been possible to confirm whether submunitions are a component of ERW threats in Somalia and Somaliland. However, abandoned ordnance constitutes a problem in both places, and ERW being cleared at Hargesia airport in Somaliland may result from an ammunition dump explosion.

Chad does not easily fall into any of the geographic sub-categories above. In some respects, the types of post-conflict socio-economic impacts observed in Chad link it most closely with North Africa and the Middle East. With little arable land, and a relatively low rural population, pastoral agriculture predominates. Unfortunately, as has been observed in other pastoral cultures, this tends to exacerbate the threat of ERW contamination and casualties, particularly among males aged between five and 29. Many of the injuries reported from tampering were to the upper body, a feature of injury more consistent with explosive remnants of war than mines. The desire to gain value from scrap or simple curiosity may be factors in these incidents. Detrimental effects of ERW on livestock to do not appear to be limited to accidental detonation – this is reported relatively infrequently – but also due to poisoning from licking unexploded munitions for moisture. One problem with analysing information on Chad is that the most useful sources, such as the *Landmine Impact Survey* for that country, do not make much distinction between mines and other forms of unexploded munition.

Sub-Saharan Africa: country profiles

Angola

Land Area:	1,246,700 sq km
Arable land (% of land area):	2.4
Population:	13.1 million
Rural population density (people per sq km of arable land):	283
GDP:	US$8.9 billion
GDP per capita:	US$2,187

Wars in Angola from 1961 to 2002 have left many ERW and mines scattered throughout the country, with serious socio-economic consequences. In the mid-1990s civil conflict expanded from the countryside into the cities, which were besieged, bombarded and ringed with mines to cut off movement of people and supplies.[32] A cease-fire agreement was signed on 4 April 2002 between the government and UNITA forces. Relative stability appears to be returning to Angola.

ERW and mine assessment efforts have focused on mines. The latter appear to have been a more immediate humanitarian threat, including for the delivery of humanitarian food aid and medicines, and essential infrastructure. Data on explosive remnants of war is mainly derived from specific clearance operations by NGOs such as The HALO Trust and the Mines Advisory Group (MAG). Clearance figures for 2000-2001 show that significant numbers of explosive remnants of war are being cleared in the course of demining operations. MAG operations, for instance, have included the safe disposal of abandoned ammunition dumps as well as clearance tasks in Moxico and Cunene provinces in which the quantity of ERW encountered dwarfs that of mines.[33] Overall, the relative proportion of mines to explosive remnants of war varies according to area, with ERW generally present in equal to much greater numbers.

With overall mine action coordination capacity still weak at the national level, complete casualty impact data for ERW and mines is not available. In 2001, 660 new casualties were reported from ERW and mines: 160 killed, 362 injured and 128 unknown. However, of the casualties reported in 2001, almost 10 per cent were from explosive remnants of war. It is possible that this proportion is higher, as these types of incidents have a tendency to be fatal, and thus go unreported.[34]

Burundi

Land Area:	27,800 sq km
Arable land (% of land area):	30
Population:	6.8 million
Rural population density:	
(people per sq km of arable land)	792
GDP:	US$678.5 million
GDP per capita:	US$591

In recent years Burundi has suffered from a devastating civil war (claiming more than 250,000 lives), a deteriorating social infrastructure, as well as severe drought. Burundi has also become involved in the conflict in the Democratic Republic of Congo. UN sources have reported that continuing fighting as part of Burundi's civil conflict has left an increasing amount of unexploded ordnance.[35] No nationwide data collection programme for explosive remnants of war or mines appears to be operating in Burundi, although since 1995 791 deaths from ERW and mines have been reported. 'The absence of victim and incidence data makes it impossible to produce an accurate assessment of the social and economic impact of mines and UXO.'[36] Fighting in Kinama in February 2001 appears to have led to unspecified ERW and mine contamination.[37] A report posted on the UN Integrated Regional Information Network in 2001 reported that explosive remnants of war in Kinama are a particular danger for children there.[38]

Chad

Land Area:	1,284,000 sq km
Arable land (% of land area):	2.8
Population:	7.7 million
Rural population density: (people per sq km of arable land)	163
GDP:	US$1.4 billion
GDP per capita:	US$871

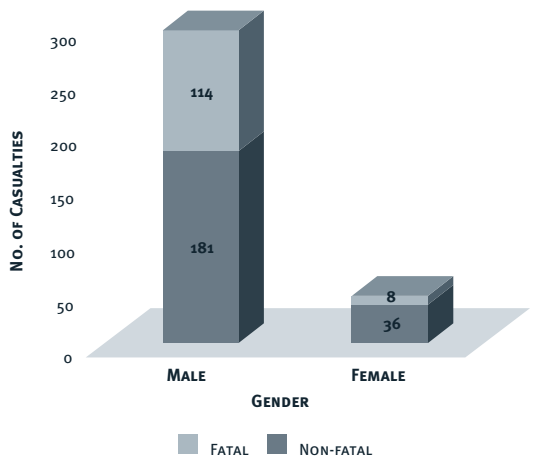
In addition to war with Libya (1984-1987), the Republic of Chad has experienced ongoing internal conflict over the last three decades. As a result, Chad has extensive contamination from ERW and mines. The *Landmine Impact Survey* conducted in the Republic of Chad from December 1999 to May 2001 conclusively identified 249 communities affected by unexploded munitions. These communities contained a total of 417 ERW and mine contaminated areas covering 1,081 square kilometres of land. The Survey assessed that this contamination 'directly interferes with the livelihood and safety of at least 284,435 persons.'[39] Explosive remnants of war and mines in Chad mostly affect rural villages, with the majority of the impacted communities small.[40] Although the ERW and mine problems are present to some degree throughout all areas of Chad, in northern Chad the

departments of Borkou and Ennedi contain more than one third of all impacted communities and more than one quarter of the nation's affected population. By contrast, southern Chad has only 20 impacted communities, even though the majority of Chad's population lives there.[41]

The *Landmine Impact Survey* data collected on the socio-economic impacts of ERW and mines revealed that a greater proportion of communities in Chad were severely impacted than had previously been thought, with an unexpectedly wide geographic distribution. Military firing ranges and abandoned munitions depots were discovered to be very significant sources of danger for civilian populations living in surrounding areas. 'These populations suffer a considerable number of casualties when they interact with abandoned munitions or UXO left on the ranges either in the course of their normal herding and farming activities, or through tampering with the devices collected from the ranges.'[42] Livestock are rarely lost to ERW explosion, but may be poisoned by toxins that leach from unexploded ordnance into the soil, or by licking it in an effort to increase salt intake. In addition, ERW and mines inhibit access to resources such as ponds or wadis, and basic agricultural land may be rendered unusable. ERW are moved and sometimes used to fetter animals. One cause of incidents reported was the use of munition components as a source of light and heat.

Current estimates of total numbers of explosive remnants of war and mines remaining a threat in Chad do not appear to be available. However, clearance information for the period from 26 September 2000 to 1 June 2002 in Chad indicate that ERW are being disposed of in far greater quantities than anti-personnel or anti-vehicle mines.[43] It is perhaps not surprising that 'informal' mine clearance activities by affected communities themselves are common in Chad. These initiatives include the removal or caching, at risk of injury or death, of dangerous explosive devices found in areas that communities want to use, or in locations such as schoolyards. Unfortunately this type of activity in itself is a source of casualties.

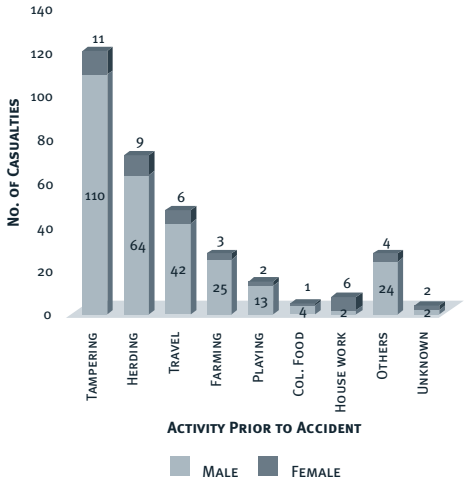
Figure 2: ERW and mine victims by gender in Chad from September 1999 to May 2001[44]



Among the 249 impacted communities surveyed, 180 had a history of incidents in which UXO injured or killed one or more people. Among 339 'recent' victims in Chad 87 per cent were men: 122 were killed and 217 injured. The five to 29 year old age group was the most common demographic group amongst both male and female victims.

Children and young men in affected regions are at high risk because they may be tempted to tamper with ERW out of curiosity or for material gain. Data also showed that many victims sustained upper body injuries caused by tampering, mostly with explosive remnants of war. In 2001, comprehensive data on new ERW and mine casualties in Chad was not available.[45]

Figure 3: Causes of ERW and mine casualties in Chad from September 1999 to May 2001[46]



Cote D'Ivoire

Land Area:	322,500 sq km
Arable land (% of land area):	9.3
Population:	16 million
Rural population density: (people per sq km of arable land)	286
GDP:	US$10.6 billion
GDP per capita:	US$1,630

Once hailed as a model of stability in West Africa, Cote D'Ivoire has been embroiled in civil conflict since September 2002 with the country divided into government and rebel-held areas. Fighting between the two sides, as well as the intervention of French military forces, is likely to have generated unexploded munitions. No assessments of the scale and impact of this threat have yet been carried out.

Democratic Republic of Congo

Land Area:	2,344,900 sq km
Arable land (% of land area):	3
Population:	50.9 million
Rural population density: (people per sq km of arable land)	518
GDP:	Not Available
GDP per capita:	US$765

ERW and mines are scattered around the Democratic Republic of Congo (DRC) in many areas where fighting has occurred since the outbreak of civil war in 1997.[47] Widespread mining of populated areas has compounded matters. Protagonists in this conflict include Rwanda, Uganda, Zimbabwe, Namibia, Angola and Burundi, which have all sent military forces across their borders into DRC, not to mention armed non-state actors originating from within the country's borders. Broad swathes of the DRC are, especially in the east of the country, probably ERW and mine contaminated because of fighting there.[48]

Information on specific contamination, casualties and other impacts of ERW is sketchy and unreliable. But it is a certainty that accidents occur and victims exist. In 2001, 135 new ERW and mine casualties were reported, including 92 military casualties: 18 of these casualties were confirmed as specifically ERW-related by hospital records, and 14 of them died. As elsewhere, actual numbers of ERW casualties are almost certainly much higher since many victims of ERW die before reaching medical facilities.[49] The ERW and mine threat also creates risks for peacekeepers and humanitarian workers, hampering their operational and developmental activities, in addition to impacts on the local population. The United Nations has established a Mine Action Coordination Centre, and is attempting to develop a reliable ERW and mine information system based on IMSMA that may, in time, yield more comprehensive and reliable information on socio-economic effects.[50]

Djibouti

Land Area:	23,200 sq km
Arable land (% of land area):	Not Available
Population:	632 thousand
Rural population density: (people per sq km of arable land)	Not Available
GDP:	US$552.9 million
GDP per capita:	US$2,377

A small ERW problem exists in Djibouti as a consequence of its civil war between 1991 and 1994. Djibouti's northern plateau was the most heavily contested during this conflict,[51] and it is here where unexploded ordnance is likely to pose a threat. To date, Djiboutian deminers have cleared 80 pieces of ERW in the Tadjourah district.[52]

Eritrea

Land Area:	117,600 sq km
Arable land (% of land area):	4.9
Population:	4.1 million
Rural population density: (people per sq km of arable land)	654
GDP:	US$622.6 million
GDP per capita:	US$837

The legacy of World War II, thirty years of independence struggle from 1961 to 1991 and border conflict with Ethiopia from 1998 to 2000 have left Eritrea with a severe ERW problem. Widespread use of mines has also been a problem. Cluster munitions were deployed by the Ethiopian air force against targets in Eritrea between 1998 and 2000, including Asmara airport and the ports of Massawa and Assab on the Red Sea coast.[53] Cluster munitions were also targeted at the Korokon refugee camp in Western Eritrea in May 2000, which contained roughly 7000 families, and this resulted in ERW.[54] 'Child cattle herders at the camp walked through heavily-affected areas at the camp, and were 'taking the copper charges from the bomblets and using them as cow bells.'[55] According to the ICRC, most of the UXO contaminated areas in Eritrea are situated in the north, northwest and southern provinces of the country.[56]

The Eritrean Mine Action Programme (UNMEE) believes that as many as two million ERW and mines remained uncleared at the beginning of 2002.[57] Between November 2000 and mid-2002 more than 10 million square metres of land were cleared, and 989 kilometres of road. Available evidence suggests that explosive remnants of war on the whole far outnumber mines: more than 18,900 ERW cleared compared with 1,865 mines in this period.[58] A *Landmine Impact Survey* of the socio-economic impacts of UXO began in May 2002.[59]

UNMEE estimates that, overall, more than 70 per cent of injuries and deaths caused by incidents in Eritrea are attributable to explosive remnants of war rather than mines.[60] (*Landmine Monitor* figures are lower: of 154 new ERW and mine casualties reported in 2001 (the actual figure is probably higher), explosive remnants of war accounted for 39 per cent of casualties, in its view, compared with 30 per cent attributed to APM and 22 per cent unknown.[61]) United Nations data also indicates that the majority of ERW and mine victims in Eritrea are children and young people under 20 years old, especially males. Between January and July 2002, 42 ERW and mine injuries and 11 fatalities were reported to the UNMEE Mine Action Coordination Centre (UNMEE-UNMACC).[62]

There are numerous reports of incidents involving explosive remnants of war. In February 2002, for instance, one boy was killed and another seriously injured when an RPG rocket they were playing with in the village of Adalio (Shihalio area) exploded.[63] In the ICRC's assessment, many people in Eritrea, an arid country dependent on pastoral agriculture, take risks with ERW and mines 'not necessarily because of lack of knowledge, but often because they are forced to do so for economic reasons.'[64]

Ethiopia

Land Area:	1,104,300 sq km
Arable land (% of land area):	10
Population:	64.3 million
Rural population density: (people per sq km of arable land)	520
GDP:	US$6.4 billion
GDP per capita:	US$668

Ethiopia's unexploded ordnance problem is largely the result of war with Eritrea between 1998 and 2000, as well as border disputes with Somalia and Sudan. Explosive remnants of war and mines can be found in Ethiopian territory along the Somali, Sudanese and Eritrean borders, in the latter's case especially in the Temporary Security Zone.[65] According to UNMAS, significant numbers of ERW and mine incidents have been reported in these areas, particularly in the Tigray region. 'Contamination poses a threat to the resident population, Internally Displaced Persons (IDP), as well as to associated humanitarian relief efforts.'[66]

Both Ethiopia and Eritrea used cluster munitions in their recent border war. Eritrea, for its part, raided towns in Ethiopian territory such as Mekele in which a primary school was attacked and 48 people were killed, including 10 children of less than 15 years of age.[67] Thus, although Ethiopia has had problems with ERW and mines since the 1930s, it would appear that the use of cluster munitions has added a new dimension to this threat. However, most explosive remnants of war found are mortar shells and unexploded anti-tank rockets.[68]

In 2001 there were at least 71 new casualties in Ethiopia from ERW and mines. It is not clear what proportion of these were caused by ERW. However, overall this represented a decrease on 2000, when 202 ERW and mine casualties were reported in Tigray, Afar, Somali National Region and Dabu Kebele alone. A *Landmine Impact Survey* to profile the socio-economic effects of Ethiopia's ERW and mine problems, which is underway, should provide a much clearer picture of the effects of ERW and mines when it is completed later this year in conjunction with Norwegian People's Aid and the Ethiopian Mine Action Office (EMAO).[69]

Guinea

Land Area:	245,900 sq km
Arable land (% of land area):	3.6
Population:	7.4 million
Rural population density: (people per sq km of arable land)	556
GDP:	US$3 billion
GDP per capita:	US$1,982

Guinean government military forces were engaged in combat with various armed non-state actors in the country until May 2001.[70] *Landmine Monitor* has reported some contamination in Guinea from explosive remnants of war in certain border areas and in the towns of Guéckédou and Pamelap, which were heavily shelled (and destroyed) by the Guinean army to dislodge Sierra Leonean Revolutionary United Front (RUF) forces. The Simbaya area of the capital Canakry is also believed to be ERW affected. This was due to a terrible explosion on 2 March 2001 at the Alpha Yaya Diallo Camp, which killed about 100 people and scattered ammunition into the surrounding community.[71] Assessments of the humanitarian impact of explosive remnants in Guinea are not available.

Guinea-Bissau

Land Area:	36,100 sq km
Arable land (% of land area):	10.7
Population:	1.2 million
Rural population density: (people per sq km of arable land)	300
GDP:	US$215.5 million
GDP per capita:	US$755

Guinea-Bissau fought a war of independence between 1962 and 1974 that resulted in an ERW problem. Much of this ERW remains scattered throughout populated and agricultural areas. Exposure to the weather has apparently accelerated the physical deterioration of these unexploded munitions, which is apt to make them more unpredictable and dangerous. ERW and minefields can also be found in the capital, Bissau and its immediate surroundings. Moreover, a Handicap International demining technical coordination team that visited the exploded army arsenal at Brá in April 2002 reported various types of munitions scattered in a radius of up to 5 kilometres, which posed an ERW threat. Locals continue to cultivate ERW and mine infested fields, and attempt to extract copper from munition remnants for scrap, which has caused at least four incidents.[73] In the view of UNMAS, the situation in Guinea-Bissau 'represents a persistent danger to the civilian population and a hindrance to the resumption of normal economic activities.'[74]

Explosive remnants of war appear to be a greater problem in Guinea-Bissau than mines. Between November 2000 and April 2002 Guinea-Bissau's National Mine Action Centre (CAAMI) cleared 175,000 square metres containing 5,000 ERW and 2,500 mines. The country's sole ERW and mine clearance NGO until July 2002, HUMAID, cleared a further 136,477 square metres of land of 6,277 explosive remnants, 976 APM and 30 AVM between 1 June 2001 and 31 May 2002.[75]

No comprehensive records are kept of explosive remnants of war or mine-related incidents in Guinea-Bissau. *Landmine Monitor* reports several ERW related incidents in 2001 and 2002, however. At least three children have been injured in incidents involving grenades and shrapnel from unknown devices, and at least one man was killed. Official estimates are that there is a 'regular victim rate' of two to three casualties per month from various forms of ERW and mines.[76]

Kenya

Land Area:	580,400 sq km
Arable land (% of land area):	7
Population:	30.1 million
Rural population density: (people per sq km of arable land)	499
GDP:	US$10.4 billion
GDP per capita:	US$1,022

Certain areas of Kenya have suffered contamination from explosive remnants of war, especially in the pastoral north where the Mau Mau rebellion was most intense. Complaints by the Masai and Samburu people factored into a British Army decision to step-up UXO clearance activities at the Archers' Post Training Range in April 2001. This is an area that United Kingdom armed forces have used for live fire training over several decades.[77]

Landmine Monitor reported that in 2001 seven people were injured in reported ERW-related incidents in Kenya. Of the seven, four of the incidents were reported in the expansive Rift Valley province and two in the Eastern province. The seventh occurred in August 2001 when a male herdsman lost a limb after he picked up a bomblet in Sambura district, northern Kenya. More casualties may go unreported, especially in remoter parts of the country.[78]

Liberia

Land Area:	111,400 sq km
Arable land (% of land area):	2
Population:	3.1 million
Rural population density: (people per sq km of arable land)	892
GDP:	Not Available
GDP per capita:	Not Available

Liberia has been in turmoil since civil war broke out in 1989, with only brief interludes of stability since then. Very little is known about the impact of ERW, although there is certainly some degree of contamination in view of the length and intensity of fighting. Efforts by the local, informal Buchanan Group to develop some understanding of the extent of ERW and mine contamination has resulted in the following information:

- Buchanan: Sikobili Town, LAMCO Loop 5, Doequoph Town, Wleh Town, Nekreen Township, Little Bassa, Doesquah Town, Woezehn Town, Gbayar Town, Blagbe, Glah-U-Way Town, Floe Town, Zangar Town, Kpazohn Town roads (no differentiation made between ERW and mines).
- Elsewhere in Liberia: Lofa County, Monrovia (especially the Paynesville area and an area known as Mount Barclay), Capemount, Bong Mines, the road between Bomi Hills and Kakata and the Kakata-Monrovia highway (no differentiation made between ERW and mines).
- Greater Monrovia has an ERW problem.[79]

There are no ERW and mine clearance activities currently being carried out in Liberia and as such no information is available on ERW casualties. There is also no data available on the other socio-economic impacts of ERW (or mines).[80]

Mauritania

Land Area:	1,025,500 sq km
Arable land (% of land area):	0.5
Population:	2.7 million
Rural population density: (people per sq km of arable land)	230
GDP:	US$983.4 million
GDP per capita:	US$1,677

Between 1975 and 1978 Mauritania occupied the southern third of Western Sahara and with Moroccan forces fought the Western Saharan independence movement, the Polisario. The exact scope of the ERW and mine threat remains largely undefined in Mauritania. No records exist, and only limited information gathering has taken place.[81] All parties in the Western Sahara conflict used mines extensively, which appear to constitute the bulk of the humanitarian problem from unexploded munitions now, especially as Mauritania used them to protect economic assets in the north. *Landmine Monitor* has reported that, to a lesser extent, explosive devices left over from the colonial period have been found in other parts of the country.[82]

Mozambique

Land Area:	801,600 sq km
Arable land (% of land area):	4
Population:	17.7 million
Rural population density: (people per sq km of arable land)	339
GDP:	US$3.8 billion
GDP per capita:	US$854

Mozambique suffers from widespread contamination from unexploded munitions as a result of bitter and protracted internal conflict from the mid-1970s to the 1990s. Overall, 'there are approximately 240 remaining sites that are suspected to contain ERW. Common munitions encountered in this country include hand grenades, rocket-propelled grenades (some with booby-traps) and booby-trapped anti-vehicle mines.'[83]

A *Landmine Impact Survey* carried out in Mozambique from January 1999 to September 2001 reported that about nine per cent of the country's population is affected by ERW or mines of some description. Twelve per cent of the total suspected affected area of the country consists of explosive remnants of war only, while 4.9 per cent is a mixture of ERW and mine-affected territory. Mines, by contrast, affected 82.8 per cent of suspected mined area in Mozambique.[84]

Clearance activities have been underway in Mozambique since the early 1990s. Nevertheless, the humanitarian effects of ERW and mines remain severe. It affects all 10 provinces of the country, and 123 of 128 districts. 768 rural communities were affected by ERW and mines the *Landmine Impact Survey* reported, as well as 23 urban communities with populations greater than 30,000 people. The presence of unexploded munitions has restricted use of agricultural land, access to roads and to non-agricultural land used for hunting, gathering firewood and other economic and cultural purposes. It has also sometimes restricted access to sources of safe drinking water.[85] Widespread flooding in the country in recent years may have displaced mines and ERW from their original locations.

A decade after hostilities have ended, incidents involving ERW and mines still occur. In 2001, 80 incidents were recorded, of which 60 were men and 20 were women. The proportions of killed and injured however were not recorded, nor how much of the total was attributable to explosive remnants of war as opposed to mines. However, these figures represent a significant increase over those of the previous year.[86] Details of 108 incidents collated by the *Landmine Impact Survey* indicate that male victims outnumbered women by a factor of almost three to one. The most frequently represented age groups were from 30 to 59 years among women (62 per cent of female victims) and from 15 to 44 years among men (57 per cent of male victims). 71 per cent of the incidents in the field of study occurred in the course of routine economic activities such as collecting food/water, farming, livestock herding or household work. Nearly one-third of the 'recent' accidents were fatal.[87]

It should be noted that while accident statistics are one useful indicator with respect to Mozambique's post-conflict reconstruction, they should not be taken in isolation from other measurements of development, or the evolving ERW and mine profile. A recent UNDP/GICHD study found that in terms of numbers of mine victims, 'the most recent estimates show a continued decline, with around half of all accidents caused by unexploded ordnance [ERW], not mines.'[88]

Namibia

Land Area:	824,300 sq km
Arable land (% of land area):	1
Population:	1.8 million
Rural population density: (people per sq km of arable land)	146
GDP:	US$3.5 billion
GDP per capita:	US$6,431

Explosive remnants of war are present in Namibia as a consequence of the country's independence struggle against South Africa until 1980. Contamination from ERW jeopardises inhabitants and livestock in three provinces in the northern region of the country. Large numbers of ERW and mines are located around former South African Defence Force bases as a result of conflict in these areas. The problem of ERW, especially abandoned munitions, are estimated to pose a 'far greater' threat to Namibians than mines.[89]

Records kept by the Namibian government indicate that 86.9 per cent of all 362 ERW and mine incidents from 1989 to March 2000 were attributable to explosive remnants of war. These incidents disproportionately affected young males aged five to 15 and males older than 22. UNMAS believes this is because the younger victims tamper with unexploded munitions, while adult males try to collect it to sell for scrap. Stock herders are at particular risk from ERW and mines, and many livestock are killed.[90] Between May 2001 and March 2002, one person was killed and 25 injured in 4 ERW and 10 mine incidents, a decrease on 2000 casualties.[91]

Nigeria

Land Area:	923,800 sq km
Arable land (% of land area):	31
Population:	126.9 million
Rural population density: (people per sq km of arable land)	250
GDP:	US$41.1 billion
GDP per capita:	US$896

On 27 January 2002 the Ammunition Transit Depot, in Ikeja Cantonment, Lagos, caught fire. A large number of explosive

munitions detonated, causing massive destruction of property and loss of lives. In the course of this fire, unexploded munitions were hurled over a wide area by explosions. At least 300 people were killed in the direct blast area and another 800 perished in the subsequent panic caused outside the cantonment.[92] Many different types of munition were scattered, including mines.[93]

Undesired events in ammunition storage areas are not the consequence of active conflict. However, in terms of effect 'this ammunition will have been subjected to forces very similar to the design forces required for arming: it will become 'live'. In effect it is now UXO, potentially unstable, and will require a planned EOD clearance operation.'[94] The Ikeja incident demonstrated that the projection of large quantities of ammunition from an 'undesired event' into surrounding populated areas has major socio-economic impacts, including large-scale casualties. Beside deaths, one estimate is that some 20,000 people were directly affected by this incident to varying degrees of severity. Many families for example became separated in the confusion.[95] ERW also posed hazards for emergency services trying to reach the accident scene.

Republic of Congo

Land Area:	342,000 sq km
Arable land (% of land area):	0.5
Population:	3 million
Rural population density: (people per sq km of arable land)	642
GDP:	US$3.2 billion
GDP per capita:	US$825

The Republic of Congo occasionally reports casualties caused by unexploded munitions. In 2001 a man and boy were killed and a woman injured when an unidentified munition exploded in a blacksmith's workshop after mistakenly being thrown into a furnace. In 2000, 11 children were killed when playing with a German-made shell in a school playground. There are concerns that in some areas of the southwest bordering Angola, non-state actors such as the 'Front de Libération de L'enclave du Cabinda' (FLEC) may have been deploying mines, but threat from ERW is unknown.[96] No nationwide assessments appear to be available on the socio-economic impact of explosive remnants of war.

Rwanda

Land Area:	26,300 sq km
Arable land (% of land area):	35.1
Population:	8.5 million
Rural population density: (people per sq km of arable land)	901
GDP:	US$1.8 billion
GDP per capita:	US$943

Incomplete statistics prevent a reliable assessment of the effects of ERW in Rwanda. Estimates of the total quantity of uncleared ERW and mines vary, with estimates of mine numbers 50,000 or more.[97] *Landmine Monitor* has reported official estimates of up to 200,000 ERW and mines in total.[98] If these very tentative figures are combined, it suggests that the number of ERW remaining in the country significantly outstrips the quantity of un-cleared mines. Rwanda's National Demining Office intended to begin a Level One survey in mid-2002.

Rwanda appears to have no central repository for data about ERW or mine victims. The only available data comes from casualty records in registered medical centres. To be included in these numbers, a victim would have to be fortunate enough to make it alive to such a centre, and then be correctly categorised. This means that official figures (which appear to record mine incidents only, as opposed to ERW) probably under-estimate numbers of ERW victims.[99] Since 1990, 617 'mine' casualties have been recorded, of which 446 were male.[100] One reported danger to the Rwandan population from ERW is that they are being utilised to fashion household implements.

Sierra Leone

Land Area:	71,700 sq km
Arable land (% of land area):	6.8
Population:	5 million
Rural population density: (people per sq km of arable land)	653
GDP:	US$635.9 million
GDP per capita:	US$490

Explosive remnants of war appear to constitute a significant threat to civilians in Sierra Leone, which between 1991 and 2002 experienced internal conflict between the government and armed non-state actors, chiefly the Revolutionary United Front (RUF). Explosive remnants encountered include French-manufactured scatterable high explosive and fragmentation (GR-66-EG) grenades.[101] Unexploded British-made BL-755 cluster submunitions dropped by the Nigerian-led ECOMOG intervention force have been reported near Freetown.[102] Although mines have also been occasionally encountered, Sierra Leone is not considered mine-affected and there were no reports of casualties from these weapons in 2001. However, there have been reports of casualties as a result of explosive remnants of war (and improvised explosive devices (IED) though numbers are not available.[103]

The UN Mine Action Office in Sierra Leone undertook bomb disposal/EOD destruction of 24 scatterable munitions, 1,020 weapons and 28,289 ammunitions and other explosive devices before its activities were frozen from May to December 2000.[104] More recent ERW destruction or clearance figures are not available.

The United Nations Mine Action Service sent a Technical

Assessment Mission to Sierra Leone in January 2000. It assessed that the ERW and mine threat was 'limited', but that several districts of the country appear to contain ERW. This was considered a threat to the mission area of the United Nations operations in Sierra Leone (UNAMSIL) and therefore warranted the creation of a mine and ERW disposal component.[105] Specific areas of Sierra Leone suspected of contamination were as follows:

- Ocara Hills (including French scatterable munitions, nuisance mining); Kono district; Kailahum district; The northern part of Moyamba district from Moyamba town; The southern part of Tonkolili district from Marburaka town; Koinadugu district; The southern part of Port Loko district from Port Loko town.

Somalia

Land Area:	637,700 sq km
Arable land (% of land area):	1.7
Population:	8.8. million
Rural population density: (people per sq km of arable land)	592
GDP:	Not Available
GDP per capita:	Not Available

Somalia has a significant problem resulting from unexploded munitions. This problem has its origins in border conflicts with Ethiopia in the 1960s and the rise of resistance movements and civil conflicts within the country from the 1980s. As well as mines, items of ERW include Soviet missiles, explosives and bunkers filled with a variety of bombs, missiles and warheads in former military bases, battle areas and most urban areas. The towns mostly affected are those where the heaviest fighting has taken place, namely Berbera, Hargeisa and Burao in the northwest; Bossaso and Galkayo in the northeast; Belet Weyne and Huddur in Central Somalia; and Mogadishu and Kismayo in the south.[106]

Somalia's Transitional National Government (TNG) formed in July 2000 – although yet to be recognised internationally – is re-imposing central control over central and southern parts of the country only gradually. In view of this, comprehensive and accurate national data on the threat posed by ERW is difficult to obtain. 'A limited mine action information system currently exists (in north-west Somalia), and although some Level One and Level Two surveys and clearance have been conducted by several international non-governmental organisations and the UNDP, the results of these actions are inadequate for use as a basis for future mine action planning.'[107]

Consequently, although the ERW and mine threat in Somalia is regarded as significant, it is difficult to quantify currently. Their negative socio-economic effects 'can be seen in almost every aspect of Somali society: reduced land available for livestock and cultivation, increased transportation costs, obstacles to repatriation and re-integration of communities, poor performance of rehabilitation efforts, loss of lives, disability, psychological problems and general lack of security of communities.'[108] *Landmine Monitor* has reported 4,357 UXO casualties for the period from 1995 to 2000, including 2,626 killed and 1,731 injured.[109] It is uncertain whether any systematic demining operations are underway in Somalia at present.[110]

Somaliland

Territory Indices:	Not Available

Significant amounts of explosive remnants of war remain a threat in the self-declared Republic of Somaliland, to the northwest of Somalia. In 2001, for instance, The HALO Trust cleared and destroyed 3,003 items of ERW, as well as 24,509 pieces of small arms ammunition, 76 APMs and 248 AVMs in the territory.[111] The Danish Demining Group (DDG) has conducted ERW clearance to open up infrastructure for community use, which includes the Hargesia and Berbera airports and the Berbera naval base in 2002 (which is no longer military). ERW clearance at Hargesia airport was initiated in response to an ammunition dump explosion that contaminated roughly 180,000 square metres of land with ERW. A number of initiatives have also been undertaken by NGOs such as the Mines Advisory Group, and international agencies, to provide Somaliland with an indigenous capability to deal with persistent ERW and mine problems.[112]

A *Landmine Impact Survey* for Somalia and Somaliland is currently underway and should yield more comprehensive socio-economic data about the nature and severity of the ERW and mine threats when it is completed.[113]

Sudan

Land Area:	2,505,800 sq km
Arable land (% of land area):	7
Population:	31.1 million
Rural population density: (people per sq km of arable land)	119
GDP:	US$11.2 billion
GDP per capita:	US$1,797

Sudan has been torn apart for many years by civil war, but a peaceful resolution now appears within reach. Unexploded remnants of war pose a significant threat in Sudan, as do mines, especially in the Nuba Mountains and southern Sudan regions. According to a US State Department report, both ERW and mines continue to hinder the movement of cease-fire monitors, humanitarian goods and civilian populations.[114] There are numerous reports that the Sudanese air force deployed CB-130, CB-500 and CB-250-K cluster munitions of Chilean manufacture in the 1990s

against areas of southern Sudan occupied by opposition forces. These weapons have become notorious because of the threat their submunitions pose to civilians when unexploded, especially since it appears they were targeted deliberately at hospitals, concentrations of internally displaced people and other targets of a non-military nature.[115]

There does not appear to be a comprehensive survey yet of Sudan's ERW problem, or assessment of its socio-economic impacts. However, the Sudan Landmine Information and Response Initiative (SLIRI), advised by Landmine Action, is gathering information from all conflict-affected parts of the country. The only entirely Sudanese cross-conflict mine action organisation, SLIRI and its network of civil society partners aims to establish an accurate overview of the impact of landmines and other explosive remnants of war throughout the current and former combat zones of Sudan. The project is funded by the European Union and facilitated by Landmine Action coalition member Oxfam GB. UNMAS has also established Mine Action Coordination Offices in Khartoum, the Nuba Mountains and in south Sudan.[116]

In the meantime, clearance data from NGOs operating in Sudan such as Operation Save Innocent Lives (OSIL) indicates that ERW are present in large numbers.[117] Casualties continue to be reported from both explosive remnants of war and mines, though total figures are not available. The Sudanese Red Crescent, for example, reported 3 people killed and 24 injured in unspecified ERW-related incidents in the Kassala area alone between March 2001 and March 2002.[118]

Uganda

Land Area:	241,000 sq km
Arable land (% of land area):	25.7
Population:	22.2 million
Rural population density: (people per sq km of arable land)	368
GDP:	US$6.2 billion
GDP per capita:	US$1,208

There may be explosive remnants of war in Uganda as a result of government operations against the Lord's Resistance Army, an armed non-state actor that operates in areas in the north of the country. However, information about the nature or scope of the ERW threat is difficult to obtain. Uganda does have a better quantified mine threat; 602 mine casualties between 1991 and March 2001. No casualties attributed to explosive remnants of war or mines were reported by Ugandan hospitals in the first three months of 2002.[119]

Zambia

Land Area:	752,600 sq km
Arable land (% of land area):	7.1
Population:	10.1 million
Rural population density: (people per sq km of arable land)	105
GDP:	US$3.2 billion
GDP per capita:	US$780

Zambia's ERW problem is largely of an imported nature, like its mine problem. While it has been relatively stable since independence in 1964, civil conflicts in neighbouring Angola, Mozambique, Namibia and Zimbabwe tended to spill over into Zambia. Various irregular forces crossed Zambian territory, or attempted to use it as a safe haven area from which to launch their activities.[120]

As a consequence, ERW and mines in Zambia are described as mainly residual in nature and tend to be concentrated in sparsely populated border areas. UNMAS concluded that 'the problem in Zambia is primarily the threat posed by unexploded ordnance, followed by anti-tank mines and anti-personnel mines.'[121] Abandoned munitions have been found in Zambia in various conditions, either stocked in caches left by different foreign factions or as ERW on past battlefields. Mortar and artillery shells are especially common.

Zambia has announced its intention to conduct an impact study of ERW and mines when funds are available.[122] In the meantime, little specific information exists on where ERW and mines are located in the country, and no comprehensive assessment has been developed on their socio-economic impacts.

There were no casualties reported from ERW and mines in 2001.[123] The number of casualties overall appears to be relatively low – from one to two hundred victims among Zambians since the early 1970s, according to UNMAS. But the situation along the Angolan border is more fluid given refugee movements from that country, and there may have been unrecorded injuries or fatalities amongst Angolans from unexploded munitions on the Zambian side of the border. Overall, the main socio-economic effects of explosive remnants of war, along with mines, include lost quality-of-life for local Zambian peoples; negative effects on livestock and accessibility of certain areas for livestock grazing; hunting and tourist activities and the obstacles ERW and mines create to effective development.[124]

The Americas 6

Regional Overview

That anti-personnel mines pose a socio-economic threat to some communities in Central and South America is well known, and a meeting of the States Parties to the Ottawa Treaty in Managua, Nicaragua further raised the profile of this issue in 2001. What is less well known is that explosive remnants of war are also significant problems in several countries in the Americas, including Nicaragua.

Overall, however, the breadth and depth of specifically ERW-related data on the affected parts of the Americas is generally extremely limited. For other places, such as Cuba, it is practically non-existent. (It appears from available evidence that the Caribbean does not have an ERW problem.) Until more information is available about the nature and extent of the unexploded munition threat in the countries and territories listed in this section, it is difficult to identify what the specific socio-economic impacts on their civilian populations may be – beyond inference on the basis of the general types of effects on post-conflict communities reported in other parts of the Survey.

Central America

Several countries in Central America faced internal armed conflict in the last quarter of the 20th century, including El Salvador, Guatemala and Nicaragua. As in the majority of countries globally, little or no distinction has been made in official figures (which in any case may be incomplete), about the types of unexploded munitions responsible for casualties in these countries since the late 1990s. But, ERW casualties have occurred, judging from data in a few specific incidents; caused by infantry level munitions including grenades and mortar shells. In Guatemala and El Salvador, for instance, casualties occurred in 2001 when children found and mishandled grenades.

In Nicaragua, much larger numbers of explosive remnants of war than anti-personnel mines are being cleared in many locations around the country: two-and-a-half times as many, according to 2000 figures (see its country profile in this section). Beside the munitions mentioned above, ERW disposed of in Nicaragua also comprise rocket and artillery shells.

The large numbers of ERW being discovered in Nicaragua may be significant, in our view. Nicaragua, like other countries in the region, is experiencing heavy land pressure due to population increase. Walking over ERW buried in soft ground such as mortar shells or grenades may not necessarily detonate them (unlike an anti-personnel mine), but a glancing blow from an axe, spade or machete may well do so – a characteristic that has impeded community use of land elsewhere, for instance in ERW-affected areas of South East Asia. As 'marginal' land and vegetation such as bush or jungle are cleared to make way for agricultural or other economic activities in former combat areas, casualties could conceivably increase from ERW many years after conflict ended.

Honduras and Panama did not experience internal conflict, and neither is considered to have a humanitarian problem either from ERW or mines. Honduras, however, was involved in border conflict with Nicaragua in the 1980s. It is possible that ERW may have been encountered in addition to significant quantities of anti-personnel mines cleared in these regions between 1995 and 2001. In the Honduran government's estimation, 'mines' from 1995 to 2001 killed 200 civilians: whether this figure also refers to other unexploded munitions is unclear. In Panama there is a moderate problem with ERW because of US military exercises in the Panama Canal Zone in the three decades until 1967.

But there were no ERW casualties reported in 2001 or the first half of 2002. In view of its proximity to other conflicts, it might be assumed that Costa Rica has some measure of ERW contamination. However, we have found no evidence to test this assumption, and therefore have not included this country in our Survey.

South America

Unlike other regions considered in this Survey, the Americas were fortunate not to experience ERW contamination as a result of World War II. Colombia has experienced internal conflict for more than four decades, however, including military action between heavily armed non-state actors and government forces. Unless clearance operations have been especially effective it would be surprising if some degree of ERW contamination did not exist in areas of Colombia. A breakdown of Colombian explosive incidents between January and October 2001 found that anti-personnel mines were the largest component (87 per cent), with abandoned grenades (4 per cent) and other explosives (1 per cent) minor elements of the total.[125] (Colombian armed non-state actors have made extensive use of improvised explosive devices (IED), not only in conventional bombs but also to produce mines; presumably the latter are included within the anti-personnel mine category.)[126] It may be that ERW contamination, if it does exist in Colombia, either goes largely unreported or has occurred in areas that:

(a) Are remote or economically marginal enough that socio-economic flow-on effects are negligible (jungle or mountainous terrain, for instance); or

(b) Fall outside areas of official government control, thus preventing the collection of data.

Peru and Ecuador fought border wars in 1981 and 1995 and, although information is very sketchy, Ecuador appears to have experienced ERW contamination including grenades, mortar shells, artillery rounds and air delivered bombs in certain areas bordering Peru. (No information on ERW appears to be available for Peru.) ERW casualty figures in both countries are hazy and there is an absence of reporting on any other socio-economic effects. It is believed, however, that the presence of ERW and mines impacts socio-economically on indigenous peoples living in that part of the Amazon basin.

The Falklands/Malvinas

Many of the conflicts in Central and South America were long running and resulted in many casualties. Most, however, were of relatively low-intensity and limited in scale, with only a certain range of weapon systems generally used. (The possible exception is Colombia, in which conflict continues.) Large-scale combined arms operations were usually the exception rather than the norm. In the sparsely populated South Atlantic islands of the Falklands/Malvinas, by contrast, Argentina and the United Kingdom fought a relatively short, sharp war in 1982 in which strike air power, naval support and a wide range of land service ordnance were deployed.

While explosive remnants of war have had little socio-economic impact on these sparsely populated islands, the 1982 conflict is instructive in demonstrating the long-term consequences of even a short military campaign in which cluster submunitions are used. Fifteen to 20 per cent of bomblets of the cluster munition type deployed by the British, the BL-755 (deployed by British Harrier jump-jets operating from naval carriers), failed to detonate on the soft peaty ground of some target areas. Unexploded BL-755 submunitions were originally supposed to be cleared after the war. However, after a number of casualties among deminers in the course of clearance operations, this policy changed: 'submunitions effectively became treated as mines in the Falklands [sic]. They are actually afforded considerable respect by EOD troops, who regard them as highly dangerous and never attempt to move them. After early accidents, a mythology has grown up around the BL-755, and British EOD procedures instruct operators to avoid casting a shadow across an unexploded bomblet. From a technical perspective this is quite absurd, but it illustrates the level of distrust with which theses, and other unexploded submunitions, are sometimes regarded.'[127] It is uncertain when, if ever, the remaining BL-755 will be cleared.

The Americas: country profiles

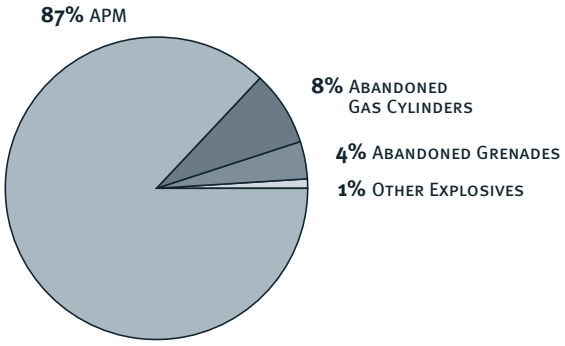
Colombia

Land Area:	1,038,700 sq km
Arable land (% of land area):	2
Population:	41,008,227
Rural population density: (people per sq km of arable land)	508
GDP:	US$83.2 billion
GDP per capita:	US$6,248

Colombia is in the midst of an internal armed conflict that began more than 40 years ago. Anti-personnel mines continue to be laid on a regular basis by non-state actors, and it would appear that Colombia also has a significant ERW problem, although few details are available about its precise nature. December 2001 estimates were that as much as one-third of the country remained affected by unexploded munitions, with 180 municipalities (in 30 of 32 departments) contaminated. While conflict continues this number will most likely increase. Accordingly, the number of new ERW and mine victims continues to grow, with 129 victims reported between January and June 2002, a figure representing an increase of more than 100 per cent over the same period in 2001. Major areas of productivity in the country appear to have suffered.[128] The

Colombian Vice-President's Office reported in January 2002 that in the first ten months of 2001 there were at least 118 combat situations in the country involving the use of 'abandoned explosive artefacts' rigged to function as mines.[129] This may indicate deliberate tampering with ERW by armed non-state actors to make IED and booby traps.

Figure 4: Breakdown of 243 explosive incidents in Colombia from January to October 2001[130]



Cuba

Land Area:	110,860 sq km
Arable land (% of land area):	33.1
Population:	11,224,321
Rural population density: (people per sq km of arable land)	76
GDP:	Not known
GDP per capita:	Not known

Little is known about whether Cuba has a problem with explosive remnants of war. However the area surrounding the American military base at Guantanamo Bay is heavily mined, with indigenously produced Cuban mines probably based on Soviet designs. Injuries from explosive remnants of war have not been reported.

Ecuador

Land Area:	276,840 sq km
Arable land (% of land area):	5.7
Population:	13,447,494
Rural population density: (people per sq km of arable land)	302
GDP:	US$13.6 billion
GDP per capita:	US$3,203

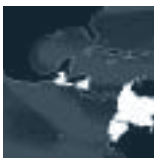
In 1981 and 1995 Ecuador fought border wars with its neighbour, Peru. Consequently it has a problem with anti-personnel mines and ERW including small arms ammunition, grenades, mortar, artillery rounds and air-delivered bombs. Although the main threat is from anti-personnel mines, an 'unquantified threat'[131] from ERW also exists in the Cordillera del Condor, an extremely bio-diverse area in the Amazonian basin and, to a lesser extent, in the southern provinces of Loja and El Oro, which border on Peru. The Cordillera del Condor is sparsely populated and has, so far, undergone little socio-economic development. This has limited the number of ERW and mine casualties but has, nevertheless, affected the traditional way of life of the indigenous Shuar and Achuar peoples. A 1999 UN Inter-Agency Assessment Mission Report to Ecuador reported that the country's current information management systems for ERW and mines remain rudimentary and do not present a complete picture.[132] On 29 May 2001 two children were killed and a third seriously injured by a grenade they found that exploded. The incident occurred in Parroquia Montalvo in Pastaza, while US Army Rangers and the Ecuadorian Jungle Battalion no. 49 were conducting a training exercise.[133]

El Salvador

Land Area:	21,040 sq km
Arable land (% of land area):	27
Population:	6,353,681
Rural population density: (people per sq km of arable land)	590
GDP:	US$13.2 billion
GDP per capita:	US$4,497

Between 1980 and 1992 El Salvador endured civil war between government forces and armed non-state actors. Both sides made extensive use of mines, and the conflict also generated ERW. In addition, the guerrillas of the Farabundo Martí National Liberation Front (FMLN) made significant numbers of homemade APM and Improvised Explosive Devices (IED).[134]

Some demining activities, both military and commercial, have been carried out since 1992. In 2000, 575 'UXO' were destroyed – it is not clear whether these were mines or ERW.[135] The government of El Salvador says that the country is 97 per cent mine free, and that the remaining three per cent are in areas of low risk. But reports persist within local communities that significant areas remain infested with mines and ERW that would appear to belie such claims. (In addition, it is unclear whether 'mine free' also applies to ERW.) At any rate, it is difficult to pinpoint the categories of unexploded munition causing incidents, because little distinction is made in El Salvador's casualty incident figures even between mines and other munitions. However, at least five people were killed in 2001 from ERW: three children died fishing when they disturbed and inadvertently detonated an unidentified device, and in two separate incidents grenades caused one death and severe injuries to another person.[136]



Falklands/Malvinas

Land Area:	12,173 sq km
Arable land (% of land area):	Not known
Population:	2,697
Rural population density: (people per sq km of arable land)	Not known
GDP:	US$52 million
GDP per capita:	US$19,000[137]

In 1982 Argentina landed troops on the quiet and isolated islands of the Falklands/Malvinas. The ensuing military conflict with the UK, although over quickly, included the use of anti-personnel and anti-vehicle mines (including those remotely-delivered) as well as the generation of significant amounts of ERW such as unexploded mortar rounds, free-fall bombs, grenades and small arms ammunition. British armed forces also deployed BL-755 cluster munitions, which suffered high failure rates, especially on soft ground.

Although there was some military clearance activity during and immediately after the conflict, several areas on the islands remain marked and fenced and are 'no go' areas. Apart from the loss of territory for agriculture and recreation this has had minimal socio-economic impact. An Argentine-UK mine clearance feasibility study is currently underway for the islands, in line with the obligations of both countries for mine clearance under the Ottawa Treaty. Presumably this will also apply to any ERW remaining. There were no mine or ERW-related casualties reported between 2001 and the middle of 2002.[138]

Guatemala

Land Area:	108,890 sq km
Arable land (% of land area):	12.5
Population:	11.9 million
Rural population density: (people per sq km of arable land)	488
GDP:	US$19.1 billion
GDP per capita:	US$3,821

Guatemala has a significant ERW problem. Between 1980 and 1996, armed conflict between the Government and the Unidad Revolucionaria Nacional Guatemaleca (UNRG) killed more than 200,000 civilians and left a large number of Guatemalans permanently disabled. A 1997 Government estimate puts total numbers of ERW between 5,000 and 8,000, compared with estimates of a maximum of 1,500 mines.[139] It is estimated further that since these ranges were calculated, about 25 per cent of ERW and mines in the most affected areas have been destroyed. Rough terrain and difficult weather conditions often make clearance difficult. Thirteen departments of Guatemala were considered by the government (as late as 2002) to be at high risk from unexploded munitions.[140] In 2001, Guatemala's volunteer fire fighters located 26 'UXO' (compared to 80 in the year 2000) and the Army cleared an area covering 7,749 square metres.[141]

Casualty numbers due to mines and other forms of unexploded munition vary. ERW or mines have injured approximately fifteen people since 1994 (before that time no official records were kept) according to *Landmine Monitor*.[142] Yet a UNICEF-supported programme in 2001 identified more than 140 victims in the most affected parts of Guatemala.[143] The majority of these were injured as children, and have never received any form of victim assistance. In December 2001 four brothers were killed while handling a grenade.[144]

Honduras

Land Area:	112,090 sq km
Arable land (% of land area):	13.1
Population:	6,560,608
Rural population density: (people per sq km of arable land)	229
GDP:	US$5.9 billion
GDP per capita:	US$2,453

Although there was an ammunition dump explosion in the department of Cortes several years ago that scattered unexploded munitions widely and still requires clearance operations, Honduras does not appear to have a humanitarian ERW problem.

Border conflict along the Nicaraguan border with Honduras in the 1980s created ERW, and both sides used anti-personnel mines, mainly in frontier regions. According to the Honduran government, 98 per cent of these mines have now been cleared as part of a clearance programme from 1995 to 2001. According to official figures, 380,385 square metres of land were cleared, as well as 2,165 mines and 56,009 ERW destroyed from the departments of El Paraíso, Olancho and Choluteca in this period.[145]

Total ERW casualty figures do not appear to be available for Honduras. In September 1995 Honduran officials estimated that more than 200 civilians had been killed in mine incidents since 1995: it is not clear whether this figure may have included explosive remnants of war as well.[146]

Nicaragua

Land Area:	129,494 sq km
Arable land (% of land area):	5.8
Population:	5,023,818
Rural population density: (people per sq km of arable land)	72
GDP:	Not known
GDP per capita:	Not known

Between 1979 and 1990 Nicaragua experienced prolonged internal conflict. In addition to large numbers of anti-personnel mines, 'limited' quantities of explosive remnants of war (rockets, artillery and mortar shells)[147] remain in combat areas and along the country's northern borders. ERW also exists in the interior departments of Jinotega, Madriz, Neuva Segovia and the Northern Atlantic Autonomous Region. In 2000, 16,172 explosive remnants of war, compared with 6,155 APMs, were cleared in Nicaragua.[148] *Landmine Monitor* 2002 estimated that a further 61,875 APMs remain in the ground, although 2.5 million square metres of land have been cleared.

Currently, there is a shortage of reliable data on the socio-economic impact of ERW and mines in Nicaragua. There is, however, enough information available to indicate that these problems prevent the productive use of many hectares of agricultural land in regions where demographic pressure on available land is a permanent problem.

Roughly 10 to 20 per cent of Nicaragua's population (about 20,000 families) are thought to live in the most affected areas.[149] Extreme weather activity in recent years (such as Hurricane Mitch) has created additional hazards: some APM and ERW in the ground have been displaced due to landslips, mudslides and other forms of subsidence, and some areas formerly considered ERW and mine free may now be infested.[150] Despite the government's efforts, UNICEF has reported that many people are forced to undertake ERW and mine clearance efforts themselves, although it is uncertain whether this extends to clearing ERW.[151] Figures from the Orthopaedic Centre of Managua and those of the Red Cross combine to give an assessment of roughly 1,500 victims of ERW and mines since the beginning of the 1980s, not counting fatalities.[152]

Panama

Land Area:	75,990 sq km
Arable land (% of land area):	6.7
Population:	2,882,329
Rural population density: (people per sq km of arable land)	240
GDP:	US$10 billion
GDP per capita:	US$6000

Panama has inherited a moderate problem with ERW due to US military exercises in the Panama Canal Zone in the three decades prior to 1997. The area of UXO-affected land in the Canal Zone is approximately 151 square kilometres in the Empire demolition range, the Balboa West range and the Piña and Sherman range, according to *Landmine Monitor*.[153]

There were no reports of ERW casualties in 2001 or the first half of 2002. Panama's government has reported that at least 21 people have been killed by ERW since 1940, while the US reports seven fatalities since 1984.[154] In 1997, Panama's Ministry of Health conducted a socio-economic study on the effects of ERW on populations residing near the affected areas. According to the United Nations, findings from this study indicated that 81 communities and more than 100,000 people were at risk. The study also presented a different casualty figure: that of five deaths and 'up to' 27 injuries caused by 'UXO'.[155]

Peru

Land Area:	1,028,000 sq km
Arable land (% of land area):	2.9
Population:	27,949,639
Rural population density: (people per sq km of arable land)	188
GDP:	US$53.5 billion
GDP per capita:	US$4,799

In 1981 and 1995 Peru fought border wars with its neighbour, Ecuador. In addition to considerable quantities of mines used by both sides in their mutual border regions, the conflicts also resulted in some ERW, particularly in the previously disputed Cordillera del Condor area. Since then Peru has undertaken demining projects along its border with Ecuador. On 14 June 2002, after working to clear an 18 kilometre strip alongside the Zarumilla Canal, Peru's Army declared that it had completed the operation, and said that 906 mines and 1,259 ERW had been found.[156] However unexploded munitions continue to constitute a hazard to some projects undertaken as outcomes of the 1998 peace agreement between Peru and Ecuador.[157]

Landmine Monitor collects mine casualty figures for Peru, but no figures appear to be available for casualties, if any, from explosive remnants of war.

7 Asia and the Pacific

Regional Overview

Ninteen countries and territories in Asia and the Pacific are contaminated by explosive remnants of war. The ERW-affected countries and territories in Asia and the Pacific coalesce into three basic sub-groups:

a) **Countries mainly contaminated by ERW in the course of the war between Japan and the Allies between 1941 and 1945**. This group includes, but is not limited to, Kiribati, the Marshall Islands, Papua New Guinea, the Philippines, the Solomon Islands and Tuvalu. China was contaminated by ERW from the 1930s, when Japan attacked, and it remained in turmoil until Mao Zedong's victory over the Nationalists in 1949. Mongolia and East Timor may also have been affected by contamination in the course of World War II, but we have been unable to verify this.

b) A second sub-group consists of **South East Asian countries contaminated by ERW since the Second World War, mostly between 1965 and 1975**. Although not actively engaged in the Viet Nam conflict (which has a very serious ERW threat as a result), Cambodia and Laos were heavily bombed by the United States, also resulting in negative socio-economic consequences from the presence of ERW. China and Thailand's problems with unexploded munitions mainly stem from mines they laid along their borders, rather than from ERW – although it is a component.

c) **A third sub-group of others** includes Nepal and Sri Lanka, which have been respectively engulfed in long-running conflicts within their borders resulting in at least some measure of contamination from explosive remnants of war. In Afghanistan, for example, 30 years of conflict have led to successive layers of ERW and mine contamination that pose a great threat to civilian post-conflict reconstruction, both in the countryside and in urban areas. Additionally, this group includes India, which has made extensive use of mines, and possibly has an ERW problem in border regions with Pakistan, especially in Jammu-Kashmir along the line-of-control. Lastly, Chinese mainland forces unsuccessfully attacked offshore islands under Taiwan's control in 1949, resulting in some explosive remnants of war there, with uncertain socio-economic impacts.

Socio-economic impacts in Asia

Of the sub-groups identified above, the most comprehensive socio-economic data is available for the South East Asians – Cambodia, Laos, Thailand and Viet Nam. Demining programmes are well established in these countries, as they are amongst the worst affected by explosive remnants of war, both in terms of numbers cleared and recorded casualties (except Thailand). In addition, other socio-economic impacts associated with the presence of ERW on community life have been thoroughly documented.

In Laos, only one per cent of the munitions cleared between 1996 and 2001 were mines, according to some estimates. Most of the rest consisted of submunitions (47 per cent) and other ERW (53 per cent). Between 1973 and 1996, submunitions were responsible for the most accidents (44 per cent), a trend that has probably continued given the high proportion of submunitions that continue to be found there.

Box 4: The Ho Chi Minh Trail and the spread of ERW in South East Asia

During the war between North and South Viet Nam, the North Vietnamese army had to find a way to supply its forces fighting toward the South with arms, ammunition and other supplies. As Viet Nam was bisected by the heavily militarised 17th Parallel and the US Navy dominated the sea routes, Hanoi rebuilt and refurbished a network of jungle trails, footpaths and secondary roads through Laos and Cambodia that had already seen use during the First Indochina War (1945-1954). This network became known as the Ho Chi Minh Trail.

American operations against the Ho Chi Minh Trail began as early as 1961. From 1964 to 1973, the US Army used saturation bombing to try to permanently disrupt it, but without lasting success. The bombardment of the Ho Chi Minh Trail was the most intense in history, reaching 900 sorties per day. Over two million tonnes of ordnance was dropped on Laos, through which the Trail partly ran, an amount equal to the combined total dropped by all combatants during the Second World War. It is estimated that between 10 and 30 per cent of this ordnance did not explode on impact.

The example of the Ho Chi Minh Trail underlines the fact that explosive remnants of war can easily spread beyond countries in conflict to their neighbours.

Figure 5: Types of unexploded munition responsible for accidents in Laos from 1973 to 1996[158]

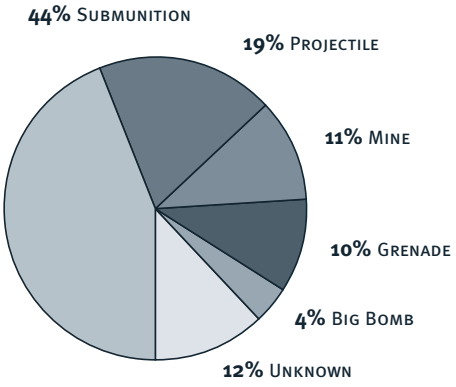
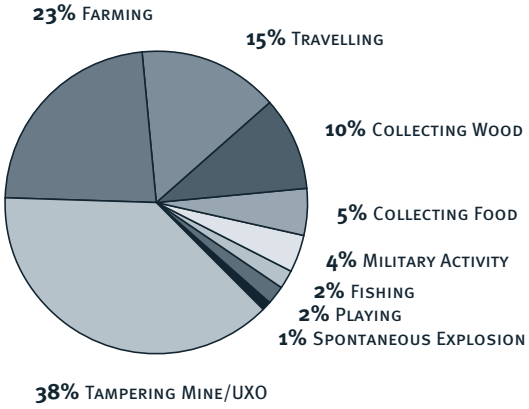


Figure 6: Activities causing ERW and mine incidents in Cambodia from October 2000 to September 2001[159]



Explosive remnants of war have become a ubiquitous feature of everyday life in Laos. It interferes with a wide range of activities, a situation exacerbated by the country's economic under-development. This has resulted in unexploded ordnance being sought for its scrap value, the extraction of explosive for activities such as fishing, or use in the fashioning of everyday items. People trying to clear land for economic activities like farming are sometimes compelled to move any items of ERW they find themselves. The highest proportion of casualties in Laos derives from handling unexploded munitions, followed by agricultural activity and the collection of forest products in the period from 1973 to 1996.

Although representing different time periods, it is interesting to compare the types of activity responsible for ERW incidents in Laos with Cambodia. Cambodia has a significant ERW problem, as well as a roughly equivalent mine threat in terms of casualties.[161] Here, tampering with unexploded munitions accounted for 30 per cent of total incidents in the period from October 2000 to September 2001. By contrast, incidents in the course of agricultural activities accounted for only 23 per cent.

Similar trends prevail in Viet Nam. Here the majority of incidents (totalling up to 2000 casualties each year) have occurred in the course of scrap metal collection, children tampering with explosive items, or accidental encounters. As in the case of Laos, the spread of explosive remnants of war appears to be wide: many regions appear to experience some infestation, rather than pockets of ERW infestation surrounded by larger clear areas. This is in contrast to Thailand, where mines, but also some ERW, appear to be a problem more prevalent in border regions than in the interior.

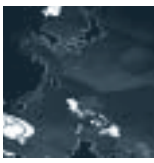
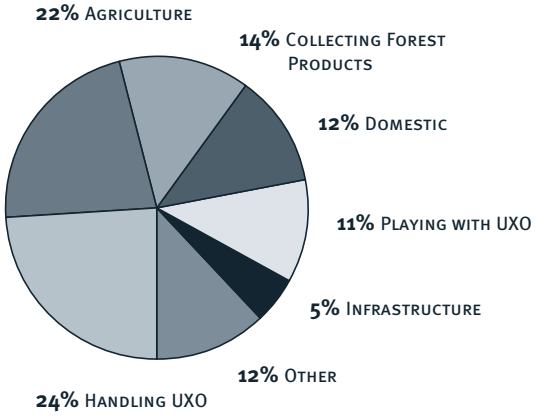


Figure 7: Activities resulting in ERW and mine accidents in Laos from 1973 – 1996[160]

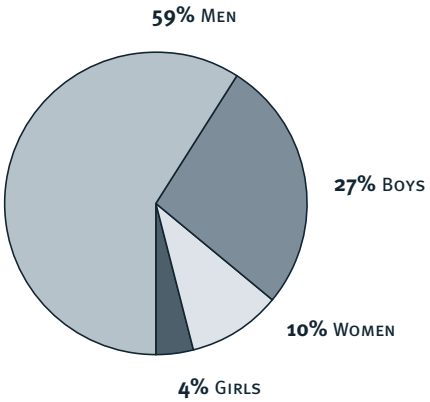


In Cambodia, recorded casualties have been highest amongst adult males between 18 and 40 years of age. In Laos, data collected between 1973 and 1996 by Handicap International indicated that 'men' were the largest group of casualties, followed by 'boys'. Although precise data is currently lacking, there is some evidence to suggest that a similar trend of predominantly male injury and death from ERW are prevalent in Viet Nam.

Why males? Death and injury from accidental contact with explosive remnants of war may be based on typical divisions of labour within communities – either in the type of location of work – and the likelihood of previous military experience that may lead to attempts at 'spontaneous demining'. 'It may be that men undertake more intrusive forms of agricultural work (such as ploughing and digging) perhaps in locations where UXO is more likely to be found. Those working in remote places away from villages may also be at greater risk, as communities are less likely to have moved or destroyed items that are not in their immediate vicinity.'[162]

Children are also considered to be at risk, although the level of data about their casualties is extremely variable in South East Asia. Of the 122 'UXO' casualties in 2001 in Laos, for example, 42 per cent of casualties were children[164] – the inference being that many were as a result of explosive remnants of war instead of mines because ERW is far more common. Other data indicates even higher rates of child casualties: one study examining 'UXO' injuries in the northern Xieng Khouang province of Laos reported that nearly half (46 per cent) of all UXO injuries involved children below the age of 15, based on comprehensive village surveys.[165] This prevalence has also been noted in Vietnam and Cambodia, as well as in other ERW-affected countries within and beyond the South East Asia region, for instance in Kosovo. It must be stressed that the reasons for this are still not clear – at least at a global level – and may have as much or more to do with other factors as with munitions design, for instance with respect to submunitions. 'Children learn from the people around them, and often discover that contact with UXO (at least military debris) is not stigmatised and may be central to the family economy. (Of course, this point is significant not just for children but for the whole post-conflict population.)'[166]

Figure 8: ERW and mine casualty breakdown by population group in Laos from 1973 to 1996[163]



However serious the direct impact of casualties on specific demographic groups are, community adaptations to ERW contamination involve difficult choices between curtailing economic activities and risking death or injury for everyone. In Laos, for example, 'many households could mobilise sufficient labour to expand their rice fields, but choose not to do so because clearing new land is too dangerous. Swidden farmers also reduce the land used because of fear of contamination. This implies a change in cropping patterns, returning to use lands after, say, five years fallow rather than ten, and thus reduced yields as the land would not have regained full fertility. In Lao PDR, such adaptations would mean that some households would accept seasonal or chronic malnutrition as the cost of reducing risk associated with UXO.'[167]

Moreover, in developing societies in South East Asia, resources to rehabilitate survivors of ERW incidents are limited. Injuries from ERW, such as multiple traumatic amputation of limbs, burns, puncture wounds, lacerations from fragmentation, ruptured eardrums, and blindness from fragmentation or blast further reduce family incomes already affected by forced adaptations of land use.

Less is known about the socio-economic impacts of explosive remnants of war in other Asian countries. Very little data is available, for instance, to profile the ERW problems of Mongolia or East Timor. The Philippines still has a residual ERW problem dating back to World War II, and unexploded munitions continue to be found on former American bases

such as Clark Field. Casualties stemming from these do occur from time to time, for instance in 2000. Whether ongoing government operations against armed non-state actors in the southern regions of the country are resulting in new pockets of ERW contamination is currently unknown.

Efforts to achieve peace in Sri Lanka after prolonged conflict on the island may lead to better information about the consequences of the considerable ERW problem there. The presence of ERW has significantly impacted the movement of Internally Displaced Persons (IDP),[168] and there is evidence that Sri Lankan communities suffer similar types of effects as those in the South East Asian sub-group, including tampering with ERW resulting in casualties, predominantly amongst boys and younger men. This ERW threat extends into urban areas.

The Pacific

In view of this rough breakdown it is obvious that although the two regions are often lumped together, the threat profile of the Pacific is quite different to that of Asia. While explosive remnants of war do persist in the five countries of the Pacific considered here – Kiribati, the Marshalls, Papua New Guinea, the Solomons and Tuvalu – we have not found contemporary data to indicate that the effects of contamination are any more than residual. No casualties were reported between the beginning of 2001 and the middle of 2002 in these countries, no systematic demining or awareness programmes appeared to be underway, and indications of detrimental effects on land use from heavy fighting in World War II seemed to be lacking.

The situation may be more complicated with respect to Papua New Guinea and the Solomon Islands, however. The emergence of armed non-state actors in both countries in the last decade has resulted in internal conflict. Small arms and light weapons proliferation constitute problems for both Honiara and Moresby. As part of peace and stabilisation efforts and with international assistance, weapons collection programmes have been set up to try to alleviate the threats to internal stability in these countries. As well as more modern weapons, some arms are of World War II vintage, and may not be restricted to rifles and light automatic weapons. It is conceivable that other types of weapons, such as fragmentation grenades and mortars, may have been unearthed or removed from hidden caches. Without further research, it is not possible to determine whether an ERW threat exists in either country.

Asia & The Pacific: country profiles

Afghanistan

Land Area:	652,090 sq km
Arable land (% of land area):	12.1
Population:	26.6 million
Rural population density: (people per sq km of arable land)	257
GDP:	Not available
GDP per capita:	Not available

A lot of data is available on Afghanistan's explosive remnant of war and mine problems compared with other countries in its region. Moreover, a *Landmine Impact Survey* designed to produce a comprehensive survey of the socio-economic impact of mines on the country's population is underway.[169] The country's clearance programmes are well established and largely indigenously run, albeit with UN and international assistance.

Afghanistan is heavily affected by unexploded munitions, including cluster submunitions, from 25 years of conflict. The Soviet Union invaded in 1979, but was forced to withdraw from Afghanistan 10 years later by anti-Communist mujahadin forces supplied and trained with foreign backing. Fighting subsequently continued amongst the mujahadin factions resulting in a state of warlordism that enabled the

Table 3: Status of US BLU-97 strikes in Afghanistan since October 2001[172]

Region	Centre	South	East	North	West
Total No. of Strikes	31	57	29	64	47
Cleared tasks	30	31	13	54	13
Ongoing tasks	1	4	15	4	2
Suspended	0	1	1	3	15
Not cleared	0	21	0	3	17
Total BLU-97 destroyed	2,430	1,533	1,279	3,596	3,966
Civilian incidents	2	26	42	12	28
Mine Action incidents	0	0	0	2	0

Taliban to rise to power over much of the country in the 1990s. The fall of the Taliban came in late 2001 when the United States joined with beleaguered Afghan Northern Alliance forces in military operations against it. Massive American airpower was instrumental in this campaign, and involved large-scale use of cluster munitions[170] and other air-delivered high explosive weapons. Ammunition depots in some major towns, when hit scattered unexploded munitions over as much as a five square kilometre radius.[171]

Afghanistan is extremely poor, landlocked and dependent on subsistence and pastoral agriculture. This has exacerbated the socio-economic impacts of millions of ERW and mines that pose a threat in most parts of the country. Urban areas are also affected: Kabul is regarded as the most heavily ERW and mine affected city in the world. Approximately 850 square kilometres of land in Afghanistan is severely affected by ERW and mines, some of it battlefield but the majority in areas where it poses a direct threat to social and economic activity. From 1990 until 2001, over 239.6 million square metres of mined areas (all classified as high priority clearance) and approximately 401 million square metres of former battle areas were cleared of mines and ERW. During these operations 1,571,260 items of ERW were cleared. In 2001 (mainly before 11 of September terrorist attacks on the US after which demining operations were temporarily halted) 328,398 explosive remnants of war were cleared.[173] The final figure for 2002 is likely to be significantly higher. Unfortunately, some demined areas have had to be cleared again because of the effects of the 2001-02 military campaign.

The collection of comprehensive ERW and mine casualty data in Afghanistan remains problematic, in part because of transportation constraints and the time needed to centralize and process this information. Also, more than 1.6 million refugees returned from Pakistan and Iran alone in 2002. Displaced populations are looking to return to land that was previously abandoned because of the conflict, even when ERW and mine contamination in these areas has not been dealt with.[174] However, it is estimated that there are some 200,000 ERW and mine survivors in Afghanistan[175] with new casualties for 2001 probably totalling about 3,600.[176] Survivor assistance is improving, but is nevertheless extremely limited.

Figure 9: ERW and mine clearance breakdown in Afghanistan in 2001[177]

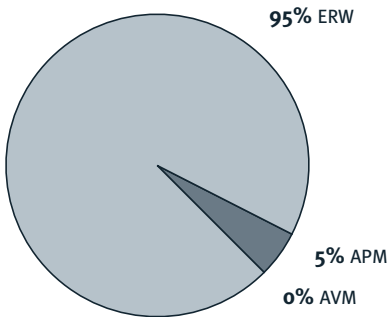
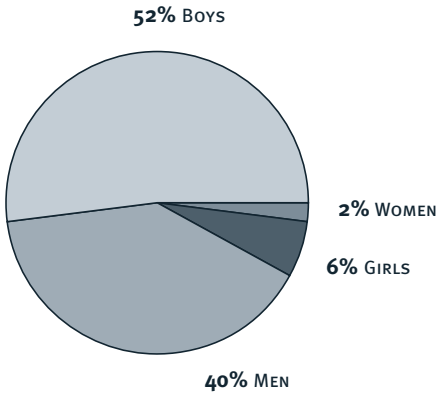


Figure 10: ERW and mine casualty breakdown by population group in Afghanistan in 2001[178]



Cambodia

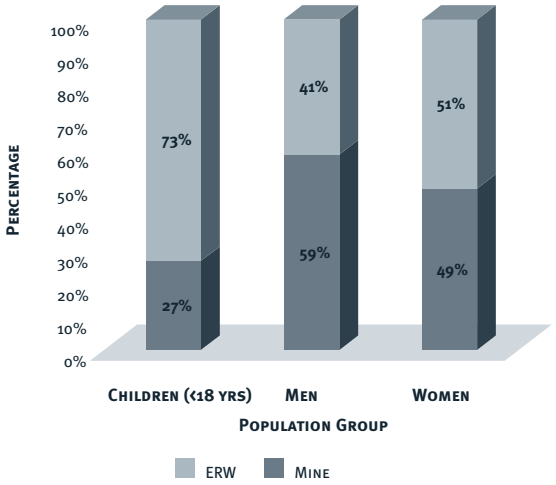
Land area:	181,000 sq km
Arable land (% of land area):	21
Population:	12 million
Rural population density (people per sq km of arable land):	268
GDP:	US$3.2 billion
GDP per capita:	US$1,446

Explosive remnants of war and mines left over from thirty years of conflict affect Cambodia.[179] ERW is present in numbers as great as mines. All 24 provinces of the country are afflicted to some degree, and 13 areas affected by cluster submunitions have been identified.[180] 6,422 villages (46 per cent of Cambodian villages) have 'UXO' infested areas.[181] A conservative estimate is that 2.5% of the total surface of the country is contaminated.[182] In the heavily

affected province of Battambang, for example, 6,543 explosive remnants of war were destroyed during the year 2000, compared with 2,657 mines.[183]

Unexploded munitions from the American bombing campaign against North Vietnamese supply lines were widely dispersed in Cambodia, 'while aerial-delivered UXO was concentrated in the eastern and central provinces.'[184] By contrast, many of the mines afflicting Cambodia are found along the Thai border, where a majority of fighting against the Khmer Rouge occurred since 1979. Since demining began in Cambodia about 155 square kilometres of land have been cleared, including 8,006 anti-personnel mines, 70 anti-vehicle mines and 91,131 ERW.[185]

Figure 11: ERW and mine casualty breakdown by category and population group in Cambodia from October 2000 to September 2001[188]



In 2001 there were 813 ERW and mine casualties recorded. An average of two people are injured or killed by ERW and mines each day, approximately half due to ERW incidents.[186] Recorded casualties are highest in adult males aged between 18 and 40. However, the casualty rate among children as a proportion of total casualties appears to have increased recently.[187]

Figure 12: Activities causing ERW incidents in Cambodia from October 2000 to September 2001[189]

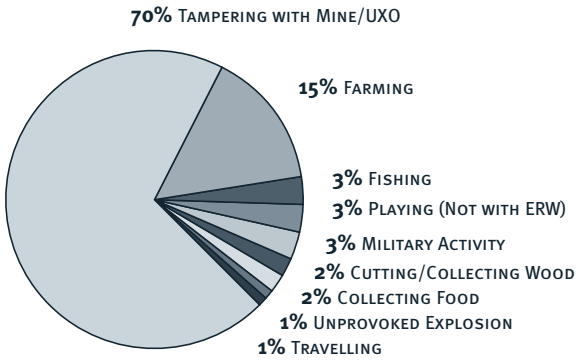
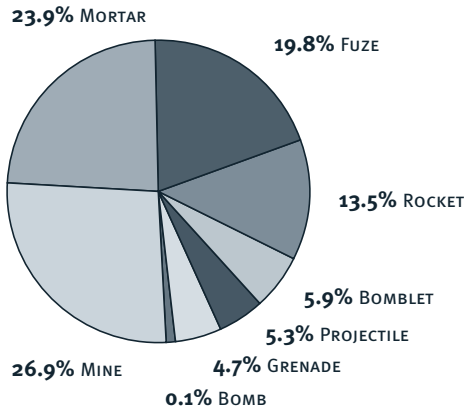


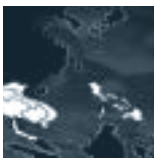
Figure 13: UXO clearance breakdown in Cambodia by ordnance category in 2000[190]



China

Land area:	9,598,100 sq km
Arable land (% of land area):	13.3
Population:	1,3 billion
Rural population density (people per sq km of arable land):	691
GDP:	US$1,079.9 billion
GDP per capita:	US$3,976

Unexploded munitions remain a problem in parts of China, stemming from the first half of the twentieth century that saw Japanese occupation (1937-1945) and prolonged civil war in which Mao Zedong's Communist party ultimately seized power. A small proportion of the unexploded munitions dating from the Japanese occupation may contain a chemical or bacteriological risk. Border conflicts



occurred throughout the next three decades, including the Sino-Indian War (1962-1963), border clashes with the Soviet Union (1969) and the Vietnam conflict in the 1960s and 1970s. In these border areas the mine threat is usually more dangerous to local populations. The Chinese government launched some major clearance operations between 1992-1999 along the Chinese side of the Sino-Vietnamese border (in Yunnan and Guanxi Provinces), which have, it reports, removed the mine threat there.[191] More than 2,000 People's Liberation Army (PLA) troops cleared 1.88 million mines and 32,000 ERW and destroyed more than 700 tonnes of discarded ammunition. A total of 300 to 306 square kilometres of territory was cleared during these operations, and 60,000 hectares of deserted farmland, pastures and mountain forest restored.[192] Casualty data and other information about the socio-economic impacts of ERW for China are not currently available.

East Timor

Land area:	Not Available
Arable land (% of land area):	Not known
Population (July 2002 est.):	952.6 thousand
Rural population density (people per sq. km of arable land):	Not known
GDP (2001 est.):	US$415 million
GDP per capita (2001 est.):	US$500[193]

In December 1975, East Timor was invaded by Indonesia after a long period of colonisation by Portugal. East Timor recovered its independence on 20 May 2002 after prolonged resistance to Indonesian rule and a brief period of UN administration from the late 1990s. During the UN administered transitional period an Australian-led peacekeeping force was responsible for securing the territory's borders against incursions by Indonesian militias from the west of the island. There were infantry firefights during this period along the border zone which may have resulted in a small quantity of ERW. There is no evidence of anti-personnel or anti-vehicle mine use during the fighting (from 1975 to 1999); but there is evidence of ERW. These ERW are in small numbers and are of unknown origin. Some may date from World War II.[194] In 2000, the United Nations Transitional Administration in East Timor (UNTAET) launched a public information campaign to increase people's awareness about ERW and mine dangers.[195]

India

Land area:	3,287,300 sq km
Arable land (% of land area):	54.4
Population:	1.0 billion
Rural population density (people per sq km of arable land):	2,973
GDP:	US$457.0 billion
GDP per capita:	US$2,358

It is probable that some unexploded ordnance remains from the wars fought between India and Pakistan (1947-48, 1965 and 1971), and against China (1962-63). However little data is available, in part because no comprehensive data collection mechanism on ERW and mines exists in India.

Despite claims by India that it is not a mine-affected country,[196] casualties from Indian-laid APMs have been reported.[197] *Landmine Monitor* reported 332 new mine casualties (133 people killed and 199 injured) in 2001.[198] It is likely that at least a small proportion of these casualties were caused by ERW. In addition, India acknowledges that Improvised Explosive Devices (IEDs) deployed by non-state actors (NSAs) are a problem, although these are not classified as UXO. Although information is not officially available, it is probably that some measure of ERW contamination has occurred in areas along the Jammu-Kashmir line of control, due to intermittent exchanges of fire with Pakistani army units as well as conflict with irregular forces operating on the Indian side.

Kiribati

Land Area:	730 sq km
Arable land (% of land area):	Not Available
Population:	90.7 thousand
Rural population density: (people per sq km of arable land)	Not Available
GDP:	US$43.2 million
GDP per capita:	Not Available

The islands now known as Kiribati were retaken from the Japanese by American forces in World War II, most famously on Tarawa, the capital of this island state. While there is unexploded ordnance left over from World War II, especially on Tarawa (which was taken by Allied amphibious invasion), there are not believed to be any mines remaining.[199] ERW does not appear to constitute a humanitarian problem in Kiribati. No other information is currently is available.

Laos

Land area:	236,800 sq km
Arable land (% of land area):	3.8
Population:	5.3 million
Rural population density (people per sq km of arable land):	454
GDP:	US$1.7 billion
GDP per capita:	US$1,575

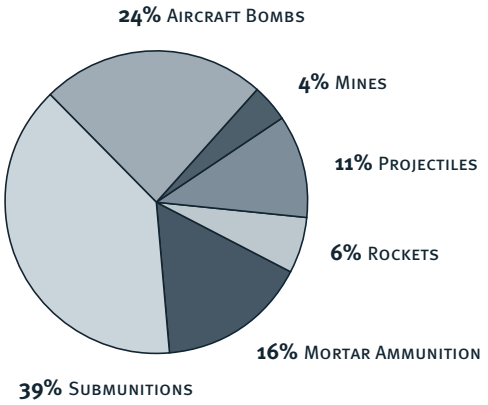
The Lao People's Democratic Republic (Laos) is heavily affected by ERW. Ten of Laos' 18 provinces are severely contaminated.[200] This problem dates back to 1965, when fighting started between the Royal Lao Army (sponsored by the USA) and Hmong irregulars supported by the Pathet Lao and North Vietnamese. The ground fighting between these forces, which continued until 1973, left a significant quantity of ERW. In addition, heavy aerial bombardment of the Ho Chi Minh Trail by the United States of America included operations targeting Laos' eastern border (the north and south eastern provinces of Laos are the most contaminated). During this period more than 500,000 bombing missions dropped in excess of two million tonnes of ordnance.[201] 'Most of the aerial bombardment consisted of anti-personnel cluster bombs filled with bomblet submunitions. These have a 'spin-to-arm' mechanism and were intended to explode on impact or shortly after impact. Each cluster bomb container was filled with up to 670 individual bomblets, about the size of a tennis ball. These are called 'bombies' in Lao language, and each one can kill and injure a number of people. Up to 30 per cent of bombies and other munitions did not explode. Precise details of the quantity of unexploded ordnance are unobtainable, but original estimates of 10 per cent of munitions failing to function as initially intended have been revised to 30 per cent.'[202]

As a result, Laos is one of the most heavily bombed countries on earth. A quarter of all villages in the country still have an ERW presence.[203] It is important to note that 'such is the scale of UXO contamination that, as communities have rebuilt their physical, social and economic structures in the wake of this war, military debris has become an integral part of everyday life. Ordnance has been transformed into lamps and forged into sickles and knives, other military debris is converted into chairs, boats and stilts for houses. But this resource also causes death, injury, fear and impoverishment, and stifles plans for social and economic development. Digging the land, making a fire and cutting through undergrowth are all dangerous tasks in many parts of Lao PDR. Land use for agriculture cannot be safely extended and construction projects cannot be undertaken without locating and destroying unexploded ordnance.'[204]

Consequently, ERW contamination would appear to be a significant impediment to Laos' development, exacerbating inefficient use of land and other resources, and creating casualties who will require medical treatment and rehabilitation amongst its effects.[205] Clearance is also an economic burden for the country: in 2001 the average cost was US$3,551 per hectare.[206]

The human cost of explosive remnants of war on the inhabitants of Laos has also been considerable. More than 11,000 'UXO' accidents have been reported since the end of the Indo-China War.[207] Of these, only 11 per cent were attributed to mines.[208] The average age of victims is 26.[209] In 2001, 122 new ERW casualties were reported (35 people killed and 87 injured). 42 per cent of these casualties were children.[210]

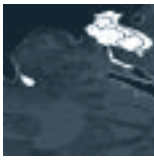
Figure 14: Breakdown of ERW and mine contamination in Laos by ordnance category in 1997[211]



Marshall Islands

Land Area:	Not Available
Arable land (% of land area):	Not Available
Population:	51.8 thousand
Rural population density (people per sq km of arable land):	Not Available
GDP:	US$93.6 million
GDP per capita:	Not Available

Like other modern island states in the Pacific region, the Marshall Islands have inherited a legacy of unexploded remnants of war from World War II. The Japanese occupied some of the islands and there was subsequent American bombing and amphibious counter-attacks. Although considerable quantities of unexploded munitions are known to have been generated in the Marshall Islands during this period, no data is available about the types or quantities, or whether this has any humanitarian impact today, almost 60 years later.



Mongolia

Land area:	1,566,500 sq km
Arable land (% of land area):	0.8
Population:	2.4 million
Rural population density (people per sq. km of arable land):	75
GDP:	US$969.5 million
GDP per capita:	US$1,783

Explosive remnants of war are present in Mongolia, although it is not mine-affected. Eighteen areas of the country contain unexploded munitions resulting from World War II or from the presence of Soviet military bases in the country between 1960 and 1992.[212] According to 2002 *Landmine Monitor*, no ERW casualties were reported in 2001.[213] Data on the other socio-economic impacts does not appear to be available.

Nepal

Land area:	147,200 sq km
Arable land (% of land area):	20.3
Population:	23.0 million
Rural population density (people per sq km of arable land):	686
GDP:	US$5.5 billion
GDP per capita (PPP US$):	US$1,327

Nepal faces an on-going low intensity conflict with Maoist guerrillas opposed to the country's constitutional monarchy. More than 3,500 people have died in clashes since the mid-1990s.[214] Maoist guerrillas make extensive use of home made anti-personnel mines and Improvised Explosive Devices (IED). Little data is available on the impact of explosive remnants of war. According to *Landmine Monitor*, mine incidents have been reported in 71 of the 75 districts since May 2001 (compared with 37 districts the previous year). In 2001, 214 people were killed and 210 injured in 148 mine and IED incidents.[215]

Pakistan

Land area:	796,100 sq km
Arable land (% of land area):	27.5
Population:	141.5 million
Rural population density (people per sq km of arable land):	403
GDP):	US$61.6 billion
GDP per capita (PPP US$):	1,928

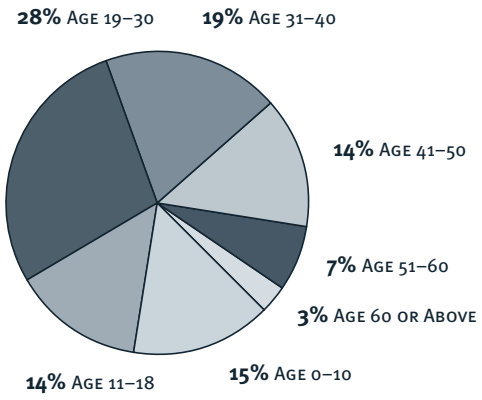
Pakistan fought three wars against India in 1947, 1965 and 1971. Pakistan also suffered in the course of the Soviet occupation of Afghanistan between 1979 and 1989. Thousands of mines were left in Federally Administrated Tribal Areas (FATA) because Soviet troops remotely-delivered mines and used other explosive munitions, on both the Afghan and Pakistani sides of the border (the Durrani Line). Consequently, Pakistan's areas bordering on India and especially Afghanistan are infested with ERW and mines. Of the seven tribal Agencies of the

FATA, Bajaur and Kurram were most affected. It is also likely that some level of ERW and mine contamination exists along the disputed Jammu-Kashmir line-of-control.

From September 1997 to December 2001 there were 842 mine and ERW casualties in Pakistan, of which 755 occurred in the FATA.[216] In Bajaur, about two ERW or mine related incidents occur weekly.[217] Children and women are among the most vulnerable groups, as well as agricultural workers and pastoralists. There have also been casualties amongst the Afghan refugee population. An ERW and mine awareness and risk education programme is underway.[218]

Problems resulting from the widespread presence of ERW and mines have major socio-economic impacts. 'While the FATA was socially underdeveloped previous to the war, it has regressed further as a result of mines. The region's inadequate health services must deal with a public health situation of tragic proportions. Agricultural land has been rendered unproductive. Once productive men responsible for earning livelihoods have not only been rendered unproductive, but have become liabilities. Children have been forced to perform hard labour and beg in the streets.'[219] The presence of explosive remnants of war and mines has further increased pressure on already limited farming land.[220]

Figure 15: ERW and mine incidents by age in Bajaur Pakistan from 1980 to 2000[221]



Papua New Guinea

Land Area:	462,800 sq km
Arable land (% of land area):	0.1
Population:	5.1 million
Rural population density: (people per sq km of arable land)	Not Available
GDP:	US$3.5 billion
GDP per capita:	US$2280

Papua New Guinea has been affected by two conflicts. In 1942 and 1943 New Guinea was the scene of fierce fighting between Japanese and Allied troops. Most of the fighting was concentrated in the highland regions of the Kokoda Trail, which offers one of the few routes over the mountainous central spine of the country between the north and south. As the Japanese were turned back, first at the Battle of the Coral Sea by American naval forces and eventually by land, there was fierce ground fighting north of the central mountain range. Jungle, extreme humidity and other weather conditions as well as very soft ground are all factors that led to the generation of unexploded munitions. However, no specific information either estimating the quantity of ERW remaining or humanitarian impacts appear to be available. Additionally, between 1988 and 1997 the government became involved in a secession conflict as the island of Bougainville sought to break away. Bougainville is not believed to have a problem with mines, but improvised weapons may have been manufactured there. Weapon collection activities for small arms and light weapons are underway today as part of the peace plan for Bougainville.

Philippines

Land area:	300,000 sq km
Arable land (% of land area):	18.6
Population:	75.6 million
Rural population density (people per sq km of arable land):	566
GDP:	US$74.7 billion
GDP per capita:	US$3,971

The government of Philippines is involved in military activity against several armed non-state actors including the New People's Army, Abu Sayyaf, the Moro National Liberation Front (MNLF) and the Moro Islamic Liberation Front (MILF). There is probably some ERW left from this fighting, but no specific data on quantities and location appears to be available. *Landmine Monitor* reports that in 2001 there was at least six 'UXO' incidents causing 22 casualties (2 people killed and 20 injured).[222]

A legacy of environmental damage from World War II and the post-war US military presence in the Philippines also remains. In 1997 at least 11, 81mm live mortar shells were found in Barangay Sapang Bato, a village near Clark Field. Similar mortar shells were found in an area very near the Royal Duty Free Shop, one of 14 duty-free stores inside Clark Field. At least 398 unexploded bombs (either Japanese or American made) were found between 1996 and 1997.[223] Deaths appear to occur from time to time from such incidents. Casualties were also reported for the year 2000.[224]

Solomon Islands

Land Area:	28,900 sq km
Arable land (% of land area):	Not Available
Population:	420.5 thousand
Rural population density: (people per sq km of arable land)	Not Available
GDP:	US$277 million
GDP per capita:	US$1,648

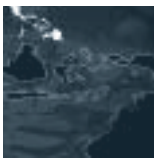
The Solomons' original problem with explosive remnants of war dates back to the Second World War and the Pacific campaign. Imperial Japan's advance and the establishment of Japanese forward bases at Rabaul and elsewhere in the region compelled the Allies to undertake amphibious operations in the Solomon Islands. The most famous of these was on Guadalcanal from 1942. Intense fighting on and around this island resulted in a 'significant' ERW problem, according to local sources.[225] Although specific data is not available from official sources in the Solomon Islands, it is likely that ERW has had some socio-economic impact. ERW has probably affected land use on Guadalcanal and nearby islands, in addition to activities such as traditional forms of agriculture, fishing and hunting. It is believed that mines are not a threat on the islands.[226]

In addition, some 'primitive' improvised explosive devices were used during internal conflict in recent years in the Solomon Islands. No humanitarian impact data is available for ERW.

Sri Lanka

Land area:	65,600 sq km
Arable land (% of land area):	13.6
Population:	19.4 million
Rural population density (people per sq km of arable land):	1,660
GDP:	16.3 billion
GDP per capita (PPP US$):	3,530

A ceasefire between Colombo's government and the Liberation Tigers of Tamil Eelam (LTTE) was formally signed in February 2002 after 19 years of conflict. Fighting occurred in



the north and east of the country, especially on the Jaffna peninsula. Sri Lanka has a substantial explosive remnant of war and mine problem stemming from this conflict.

Casualty figures compiled by UNDP and ICRC total at least 170 victims of unexploded munitions in 2000 alone. These 170 victims are drawn from the 2,500,000 people living in Sri Lanka's conflict-affected areas.[227] For this segment of the population, UNMAS estimates the ERW and mine problem to be roughly equivalent to that of casualties in Angola.[228] In 2000, at least 223 new mine casualties were reported for Sri Lanka as a whole. In 2001 there were more than 300 new ERW and mine casualties reported in the whole of the country, although this is probably lower than the real figure because no national agency is collecting the data centrally.[229]

Death resulting from contact with explosive remnants of war in Sri Lanka is more likely than from mines. There are also many incidents with multiple casualties. A broad range of unexploded munitions is present, although cluster munitions have not been used. The main munitions posing a risk to civilians and military personnel are 60mm, 81mm and 120mm mortar shells, artillery shells and grenades including illuminating mortars, such as white phosphorous. Of particular concern in the LTTE-controlled Vanni region are 40mm grenades, as they are highly unstable and difficult to clear. Boys and young men are particularly at risk when collecting firewood and coconuts, or deliberately tampering with ERW out of curiosity. The majority of victims are from low-income households and communities.[230] There is also significant contamination in Sri Lanka from abandoned ordnance as frontlines have shifted and army camps have been deserted. These unexploded munitions caches can be found in rural and urban areas.

More than 65,000 people have been killed and nearly 2.5 million people in Sri Lanka have been adversely affected during the years of conflict.[231] ERW contamination and 'the delay it causes to the return and resettlement of significant segments of Sri Lanka 800,000+ population of internally displaced persons (IDPs)'[232] means that many displaced people are only now beginning to return to their homes.[233] Unexploded munitions also represent a serious threat to the agencies working to provide emergency relief and rehabilitation.[234] Raising public awareness about ERW in order to promote behavioural change and risk avoidance are of primary importance in this country.[235]

Chinese Taipei/Taiwan

Land area (include the Pescadores, Matsu and Quemoy):	36,000 sq km
Arable land (% of land area):	24
Population:	22.5 million
Rural population density (people per sq km of arable land):	Not known
GDP:	US$386 billion
GDP per capita (2001 est.):	US$17,200[236]

In 1949 Mao Zedong's Communist regime forced the Chinese Nationalists troops to retreat offshore to Taiwan and surrounding islands. The same year Communist mainland heavily bombarded the two islands of Kinmen (Quemoy) and Matsu. Mines and explosive remnants of war still remain a threat on these two islands. Insufficient data is available on either clearance or other measures to deal with these unexploded munitions or their socio-economic impacts.[237] Kinmen, which is no longer a military zone and has been opened to the public, is currently designated as a national park. Nevertheless, the presence of ERW poses a serious threat to civilians on this island.[238] Matsu remains a military zone. The main island of Taiwan was never bombarded and does not appear to have an ERW problem.

Thailand

Land area:	513,100 sq km
Arable land (% of land area):	28.8
Population:	60.7 million
Rural population density (people per sq km of arable land):	323
GDP:	US$122.3 billion
GDP per capita:	US$6,402

A *Landmine Impact Survey* has been carried out for Thailand.[239] Twenty seven of a total of 76 provinces are ERW or mine affected. A total of 530 communities were identified as ERW or mine-affected, 297 of them on Thailand's border with Cambodia, which is the most seriously affected region in the country. 90 other affected communities are located on the border with Laos.[240] Two provinces are affected by the presence of ERW or mines on Thailand's border with Malaysia. Four communities with a total population of 2,200 suffer adverse socio-economic impacts.[241] On the Thai-Myanmar border 139 communities of a total of 874, in 9 provinces, are also affected.[242] A total of 134,320 people live in 69 ERW and mine 'highly impacted' communities, 162,114 live in 233 'medium-impacted' communities and 207,248 in 228 'low' impacted communities.[243]

Major infrastructure is rarely affected. Most of the contaminated areas are situated in forested areas, the most

frequently reported blocked resource type: 61 per cent of all communities indicate some loss in this regard.[244] Hunting and the collection of forest products are the most frequently reported activities at the time of ERW and mine incidents. 'This creates a severe dilemma in that low density or poorly defined contamination in such areas poses severe and costly technical challenges to clearance activities. One possible solution would be to selectively target for clearance only a portion of high-value areas within the forest confines, and to rely on risk-reduction and mine-awareness efforts to reduce impacts in other areas.'[245]

Figure 16: Community impact of mines and ERW along Thai borders from May 1999 – May 2001[247]

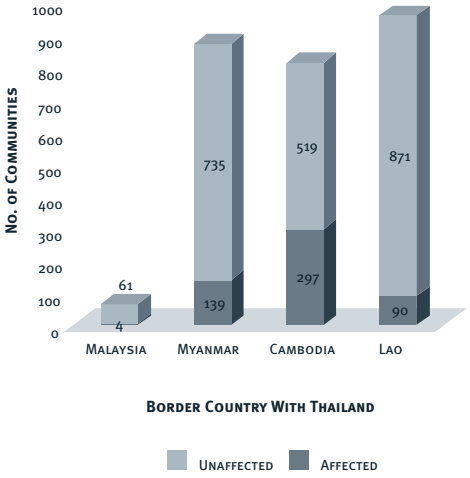
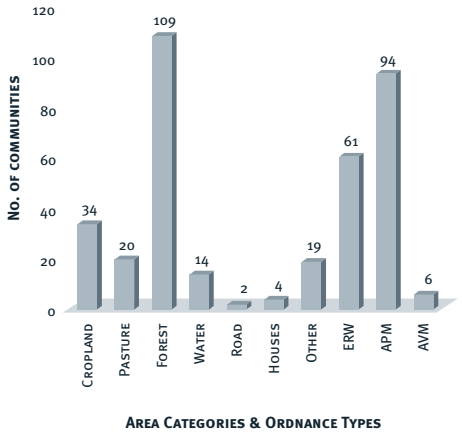
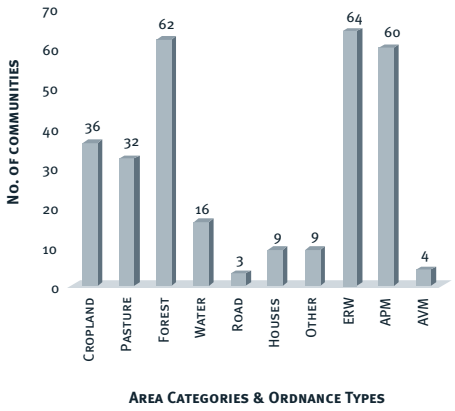


Figure 17: ERW and mine contamination and areas blocked to communities on Thai-Myanmar border in 2001[248]



The profile of the average ERW or mine incident victim in Thailand 'is a working-age' male engaged in some form of income-generating activity. The data indicates that very few victims are children and that very few victims are engaged in either tampering or informal demining at the time of injury'.[246]

Figure 18: Mine and ERW contamination and areas blocked to communities along the Thai-Lao border in 2001[249]



Tuvalu

Land Area:	Not Available
Arable land (% of land area):	Not Available
Population:	Not Available
Rural population density: (people per sq km of arable land)	Not Available
GDP:	Not Available
GDP per capita:	Not Available

Tuvalu was the scene of fighting between Japan and US forces in World War II. Government sources in Tuvalu have confirmed the presence of 'UXO' remaining from this conflict, but have reported no injuries or deaths in Tuvalu due to the presence of ERW or mines. No studies on the humanitarian effects of ERW appear to have been carried out.[250]

Vietnam

Land area:	331,700 sq km
Arable land (% of land area):	17.7
Population:	78.5 million
Rural population density (people per sq. km of arable land):	1,031
GDP:	US$31.3 billion
GDP per capita:	US$1,996

Explosive remnants of war accumulated over a long period of conflict in Vietnam. This was especially so during the war between North Vietnam and the United States which ended in 1975. This has had an enormous impact on daily life in the country up until the present day. Vietnamese territory was heavily bombarded and the Vietnamese government estimates that 'there still are 300,000 tonnes of unexploded ordnance around, two per cent of the bombs, landmines and artillery shells fired by U.S. forces during the war'.[251] Approximately 16,478 million square metres of land remain contaminated by explosive remnants of war and mines. This equates to about five per cent of Vietnam's total landmass.[252]

Little data is currently available indicating exactly the number of casualties. The Ministry of Labour, Invalids and Social Affairs (MOLISA) estimated in a 1999 report that ERW and mines had killed at least 38,248 people since 1975, with at least another 64,064 additional people injured. Both the Vietnamese and American governments estimate that about 2,000 new ERW and mine casualties occur each year.[253] The United Nations Mine Action Service has made the following general observations about the nature of the ERW and mine threat in Vietnam:

1. most accidents involve ERW as opposed to mines;
2. the vast majority of accidents arise from scrap metal collection, children tampering with ERW and mines, and accidental encounters;
3. children are killed and injured in disproportionately high numbers in ERW and mine accidents; and
4. these accidents occur in many different areas of Vietnam.[254]

As a consequence, several organisations including UNICEF have made ERW and mine awareness programmes in Vietnam a high priority.[255]

Europe, Caucasus and Central Asia 8

Regional Overview

Explosive remnants of war resulting in socio-economic effects are present in 13 countries and territories in Europe, and at least seven in Central Asia. ERW contamination as a result of the First and Second World Wars affected most mainland continental countries in Europe, as well as the United Kingdom. However, ERW's effects in most of Europe are considered residual, and with few, if any, remaining socio-economic impacts on local populations. No casualties, for instance, were recorded in Greece, Latvia or Lithuania in 2001.

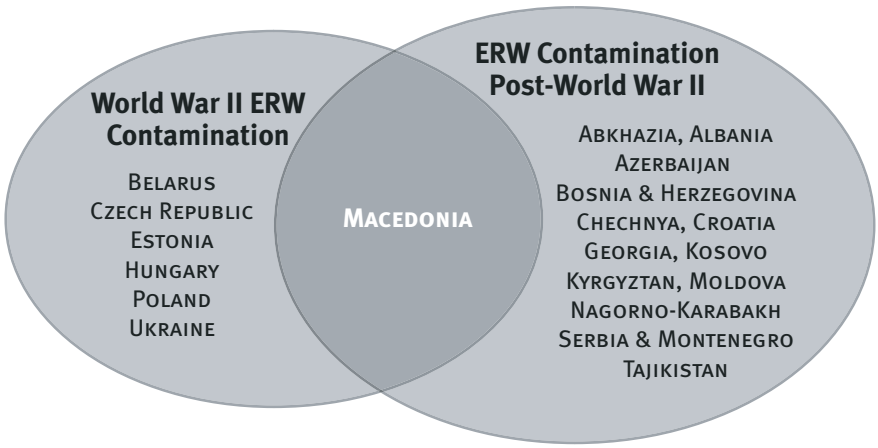
It is worth noting that, while the effects of ERW in Europe are considered residual today, some countries like the present-day Russian Federation had to undertake large-scale clearance operations on their territories for decades after World War II. In Belarus, where officials assess that up to 10 per cent of munitions used in World War II failed to function as intended, ERW casualties continue to occur at the rate of several per year, and significant areas remain to be cleared. While this includes mine casualties, clearance data indicates that 95 per cent or more of the remaining munitions to be dealt with are ERW.[256] It is probable, then, that at least a sizable proportion of casualties in Belarus are ERW-related.

Another cause of contamination was the stationing and exercising of Warsaw Pact military forces during the Cold War in countries and territories of both Europe and Central Asia. The Czech Republic, Hungary and Poland remain affected, and ERW clearance operations in these countries continue. In Poland, 92 per cent of munitions cleared in 2001 consisted of explosive remnants of war, as opposed to mines.[257] It should be noted that some of this contamination dates from the Second World War. Kyrgystan appears to face the same problem, with ERW casualties reported in 2001 and 2002.

The Balkan conflicts of the 1990s also resulted in ERW contamination in southeast Europe. Bosnia & Herzegovina, Croatia and Serbia were involved in heavy and prolonged fighting in the wake of the break-up of Yugoslavia. This incorporated the use of a wide-range of weapons systems from infantry squad level explosive devices to heavy weapons systems. The former included grenades, mines and rocket-propelled grenades and the latter included heavy artillery, rocket batteries, as well as air-deployed weapons including cluster munitions. Civilian populations were often caught in the crossfire or deliberately targeted, especially in the course of 'ethnic cleansing' campaigns. Such indiscriminate targeting has possibly exacerbated the spread of ERW.

A 78-day air operation by NATO air forces in Kosovo in 1999 created an ERW problem. The situation highlighted what could be a general trend in ERW-affected areas in the Balkans: local people, returning to their homes after being forced from their communities by security forces have little first-hand knowledge of where munitions had fallen in their absence. Not only is this risky in terms of their safety, it means they are not in a position to inform clearance agencies of where ERW are to be found after conflict, or how to avoid these explosive items (as well as mines). ERW and mine awareness campaigns in Kosovo after the conflict were important in bringing casualty rates down. But they do not alleviate other socio-economic consequences of the presence of ERW.

Figure 19: Venn diagram Europe.



The Balkan conflicts, followed by the Kosovo air campaign, demonstrated that these local consequences of ERW contamination have regional implications. Destruction of bridges, combined with ERW contamination, in the former Federal Republic of Yugoslavia affected the communication and transport system of the entire Danube river basin. Debris and ERW blocked navigation on the river and caused severe economic disruption.[258] Moreover, conflict in Kosovo has had spill-over ERW consequences for Albania in areas along their common border as well as in Macedonia (which already has an ERW threat left over from the First World War) when conflict between armed Albanian groups and the government broke out in 2001.

Finally, ERW contamination has been a feature of armed struggles for self-determination in areas of the former Soviet Union after its break up in 1991, especially in the Caucasus. Georgia, Abkhazia, Nagorno-Karabakh and Azerbaijan are examples. Conflict continues in Chechyna, even after Russian military occupation of the heavily damaged city of Grozny and it will be some time, even if fighting ceases, before an accurate picture of Chechyna's extensive ERW threat can be developed.

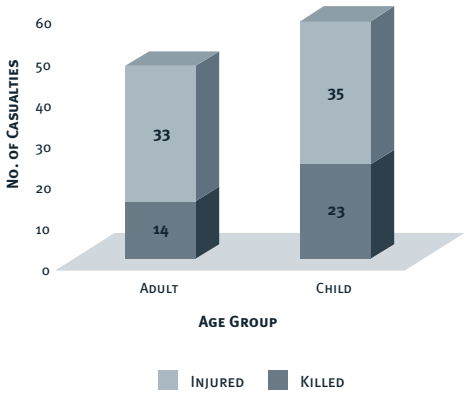
Accident hazard and other socio-economic consequences

As in all regions considered in this survey, uniform quantitative data profiling the victims of explosive remnants of war is unavailable yet. However, national data from some countries and territories in both Europe and Central Asia provide indications of some general trends in ERW incidents.

Who are the victims of ERW?

Civilian males between the ages of 15 and 59 would appear to be the group involved in the most ERW incidents, for instance in Azerbaijan. The limited quantitative data available combined with anecdotal evidence in other countries and territories in Europe and Central Asia tend to support this assertion. Children also appear to be a group at some risk, as shown by breakdown of figures over an eleven-year period in Belarus, a country mainly affected by

Figure 20: ERW and mine casualty breakdown in Belarus from 1990 to 2001[259]



ERW as opposed to mines. In Bosnia and Herzegovina between 1996 and 2002, 22 per cent of recorded UXO victims were 18 years of age or less, and this rose to 26 per cent in 2002. However, it has to be stressed that until comprehensive data is available with which to compare different countries or territories within the sub-regions, it is very difficult to make meaningful comparisons. In addition, as data in many instances is for UXO in general, it is currently not possible to identify what proportions of incidents or casualties are ERW, and not mines.

Are certain types of activity or occupation more dangerous than others?

From the evidence available, it is difficult to generalise about accident hazard. Tampering with ERW or mines, however, stands out as a probable cause of at least some incidents. Since 2000, incidents of tampering with ERW or mines have been reported in Estonia, Hungary, Kosovo, Kyrgyztan, Poland and Tajikistan. Reported casualties suggest curiosity (especially in children), economic need or informal efforts at clearance are among causes.

Data collected in Bosnia and Herzegovina provides some useful indications. Accidents involving ERW or mines between 1996 and 2002 rose sharply each March and April, and gradually fell away over the course of the year to lows in November and December. This may be because the arrival of spring (and warmer weather) means that people are outside more, and engaging in activities that may uncover or disturb unexploded munitions. Agricultural activities such as ploughing and sowing, which disturb the ground, may also be significant causes.

ICRC data from 2002 provides an interesting picture of casualty origin in Bosnia and Herzegovina. Without figures on the total numbers of returnees to given communities it is uncertain what the proportions of internally displaced persons (7 per cent) and returnees (18 per cent) as casualties really signify. But further research may be able to test the notion that, as occurred in Kosovo, people not present during active hostilities may be additionally vulnerable because they lack eyewitness knowledge of the locations of explosive remnants of war, mines and booby traps.

Assessing the other socio-economic effects of explosive remnants of war on post-conflict communities can be just as problematic. Even in Kosovo, 'data collection, reliability, suitability and completeness are major constraints.'[260] However it is likely that the loss of use of land for agricultural, wood foraging, hunting or recreational purposes has had some impact on affected communities in the province. This is a trend likely to be applicable in other ERW-affected countries and territories of Europe and Central Asia, to varying degrees.

Figure 21: ERW and mine accidents per month in Bosnia & Herzegovina from 1996 to 2002[261]

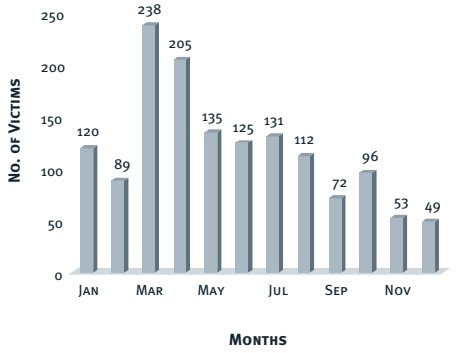
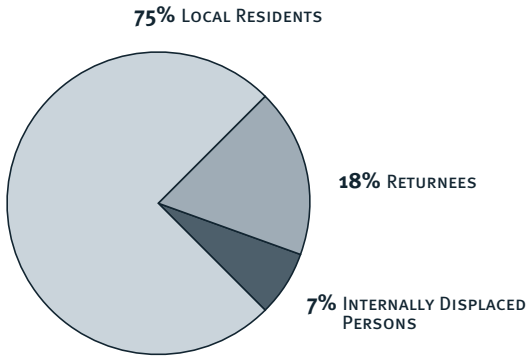


Figure 22: ERW and mine casualties by origin in Bosnia & Herzegovina in 2002[262]



Do certain types of ERW stand out as particularly high risk?

One of the major factors to bear in mind when considering which munitions pose a higher relative ERW risk to a given community are the numbers in which they have been used. Where failed munitions reside is also important. On the whole, however, our impression of different threat profiles in Europe and Central Asia supports the analysis put forward in the GICHD's 'Threat Analysis'.[263] In many of the affected countries and territories, grenades, mortar ammunition and other 'medium threat' projectiles have been used in great numbers, for instance in Belarus, Poland, Russia and Chechnya, and appear to be causes of casualties. Without disaggregated clearance or casualty data for ERW it is not possible to rank reliably their relative threat at this stage, even in individual post-conflict situations.

Cluster munitions are only present in some of the ERW-affected countries and territories of Europe and Central Asia. They are to be found in Albania's border region with Kosovo, Bosnia and Herzegovina, Croatia, Kosovo, Serbia, Chechnya, and perhaps in Abkhazia, Azerbaijan, Georgia or Nagorno-Karabakh (no confirmation is available). In the circumstances in which they have been deployed, failed submunitions would appear to pose a particular threat to civilians. Various reasons have been put forward for this, but without adequate data it is difficult to explain definitively why it is so. Factors may include the small size and curious appearance of some submunitions – which may lead to misunderstanding of their lethality – or that their pre-formed metal fragments tend to result in multi-casualty incidents.

Kosovo

ERW contamination persists in southeast Europe as a result of conflicts in the 1990s, and in some cases (like Macedonia) as long ago as the First World War. Kosovo, by contrast, was declared safe by the UNMAS after less than three years of intensive ERW and mine action after the 1999 NATO air campaign. Unfortunately, areas previously declared 'safe' in 2001 have subsequently been discovered to be contaminated with unexploded cluster submunitions.

NATO forces initially provided tabular data in June 1999, showing that 1,392 individual bombs had been dropped in 333 different locations in Kosovo. The information, which was subsequently collated on the UN Mine Action Co-ordination Centre (UNMACC) database, simply consisted of two coordinates (Map East and Map North), and the number of individual bombs dropped on each site. There was no differentiation between bomb types, or other important information such as the aircraft heading. This kind of data greatly assists the planning and conduct of clearance operations, because data such as bomber heading and altitude can be correlated against other data including local weather conditions and wind speed to calculate an ellipse where failed munitions are more likely to be located in a particular strike.[264]

More refined data was subsequently requested by UNMACC, and was eventually provided in July 2000. This new data included an additional ten sites that were not detailed in 1999. However, subsequent investigation by survey teams did not locate any evidence of CBU strikes. These inaccuracies, coupled with the fact that the 'refined data' did not include many locations that were initially recorded and subsequently proven to be cluster munition strike sites seriously eroded the value of the 'new and improved' information.

Kosovo appears to offer an important lesson. Even when humanitarian clearance operations are tightly coordinated and well resourced, they can nevertheless be hampered by the inadequate provision of targeting information by protagonists. This information can be inadequate because it is not timely, is inaccurate, or does not contain enough detail. That has negative flow-on effects for rapidly reducing the socio-economic effects of ERW, including casualties. It may lead to wasteful efforts to find failed munitions, put clearance personnel and civilians at unnecessary risk, or lead to otherwise avoidable delays in returning civilian populations to their communities and enabling the resumption of normal life.

Of course, in many conflict situations no data or assessments on targeting and possible failure rates of different munitions are made available. However, in a 'best-case' scenario like Kosovo, where the rationale for the bombing campaign was humanitarian, and sophisticated and modern information-gathering systems were available to Western air forces, it is surprising that NATO failed to provide relevant, timely and appropriately-formatted data for optimum post-conflict alleviation of ERW there.

Europe, Caucasus and Central Asia: country profiles

Abkhazia

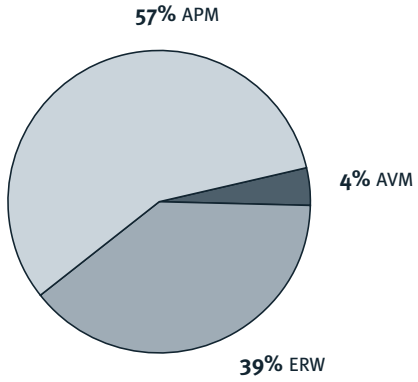
Land Area:	Not Available
Arable land (% of land area):	Not Available
Population:	Not Available
Rural population density: (people per sq km of arable land)	Not Available
GDP:	Not Available
GDP per capita:	Not Available

Abkhazia is a secessionist province of Georgia. Conflict occurred between the Georgian government and Abkhaz separatist forces between 1992 and September 1993 when separatist forces drove Georgian troops from Abkhazia. Although the two parties signed a ceasefire agreement in 1994, sporadic fighting between Abkhaz separatist forces and the Georgian government still occur.[265]

As a result Abkhazia has a serious ERW problem. According to The HALO Trust: 'Abkhazia resembles the worst-affected areas of Bosnia, yet receives a fraction of the international aid deployed in the Balkans'.[266] ERW and mine contamination affects agricultural land, orchards and industrial estates, which lie deserted as a consequence. This contamination has a huge economic cost for the country and is an obstacle to the repatriation of over 300,000 displaced people.[267]

Although the ICRC is currently conducting ERW and mine awareness programmes in Georgia and Abkhazia[268] there is no systematic data collection on casualties.[269]

Figure 23: ERW and mine clearance breakdown in Abkhazia by HALO Trust from 1998 to February 2001[270]



Albania

Land Area:	28,800 sq km
Arable land (% of land area):	21.1
Population:	3.4 million
Rural population density: (people per sq km of arable land)	359
GDP:	US$3.8 billion
GDP per capita:	US$3,506

Most ERW and mine contamination in Albania is a result of the recent conflict in Kosovo, which constitutes a significant threat to Albanians, especially near the Kosovo border. ERW from Serbian artillery strikes and NATO bombing missions presents an ongoing problem, as well as minefields laid on the Albanian-Kosovo border, particularly in the districts of Kukes, Has and Tropoje. In 1999, a general survey carried out by the Albanian Armed Forces (AAF) and CARE-funded consultants identified 57 suspect areas, covering approximately 1,400 hectares, of ERW and mines.[271] These areas are mainly forest, agricultural and grazing areas, with villages and frequently used routes for travel over the border into Kosovo.[272]

ERW in Albania appear to originate from the Serb, Kosovo Liberation Army (KLA), and NATO arsenals (bomblets from NATO Cluster Bomb Unit (CBU) Munitions and the Serbian ORCAN (Ababel-50) Multi-Launch Rocket System (MRLS). All these are thought to have suffered failure rates between 20–30 per cent). To date the AAF has identified ERW in affected border regions including:

- KB-1 Submunitions (Serb origin)
- Mk118 Submunitions (NATO origin)
- Rockets M79 (Serb or KLA origin)
- M62 RLG and other unidentified RLGs. (Serb or KLA origin)
- Unidentified wire guided missiles. (Serb origin)
- Mk83 bombs (NATO origin).[273]

In addition, stockpiles of abandoned Albanian ordnance have been encountered. The exact number of ERW and mines in the country is unknown.[274] Though concentrated along the border with Kosovo, the problem is not limited to this area, as 11 to 13 'hot-spots' or high-risk areas have also been identified.[275] During 2001 a total of 302,000 square metres of land were cleared.[276] In 2001, nine new UXO casualties were reported. Most were the result of ERW incidents.[277] ICRC, UNDP, and UNICEF are conducting ERW and mine awareness programmes in Albania.[278]

Azerbaijan

Land Area:	86,600 sq km
Arable land (% of land area):	19.9
Population:	8 million
Rural population density: (people per sq km of arable land)	200
GDP:	US$5.3 billion
GDP per capita:	US$2,936

After the collapse of the Soviet Union the predominantly Armenian population of the Nagorno-Karabakh region stated their intention to secede from Azerbaijan. However, backed by troops and resources from Armenia proper, the Armenians of Karabakh took control of the region and surrounding territory at the end of 1991. Currently about one-seventh of Azerbaijan's territory remains occupied, while 800,000 refugees and Internally Displaced Persons are scattered around the country.[279]

Broad estimates indicate that there are more than 350 square kilometres of ERW and mine contaminated areas in the territories currently under the control of Armenian forces, with a general survey of 11 accessible regions within Azerbaijan showing their presence in 65 communities.[280] Within this region, 50 million square metres of territory are affected by both ERW and mines. However a much smaller area (830,000 square metres) is affected by explosive remnants of war only.[281] Eighty five distinct ERW sites were identified.[282]

A total of 896,143 square metres of land were cleared in Azerbaijan in 2001. Fifty six million square metres were covered by general surveys and 486,629 square metres underwent technical surveys. Of this territory cleared, the data indicates that explosive remnants of war outnumbered mines.[283]

There were at least 25 new mine and ERW casualties in 2001. Overall, 65 per cent of ERW and mine casualties in Azerbaijan are believed to be civilians.[284] The UN Mine Action Service has assessed that ERW and mines 'have not caused a humanitarian emergency and that current and past accident levels have been limited in number'[285] in Azerbaijan. That said, such contamination is nevertheless recognised as an impediment to reconstruction and rehabilitation, the return of internally displaced persons to their places of origin and the subsequent resumption of normal life and economic and social development.[286] UNDP and UNICEF have launched projects to this end, as well as to support the development of national demining capacities.[287]

Belarus

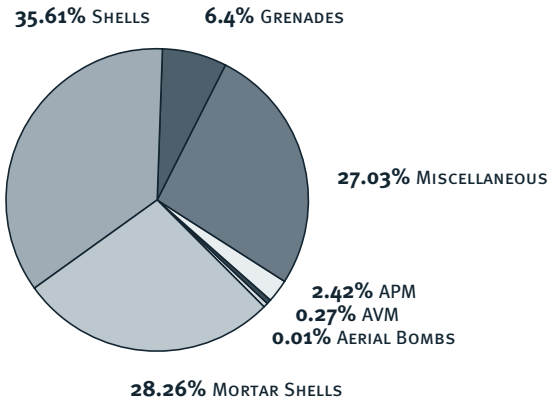
Land Area:	207,600 sq km
Arable land (% of land area):	29.8
Population:	10 million
Rural population density: (people per sq km of arable land)	49
GDP:	US$10.4 billion
GDP per capita:	US$7,544

Belarus is still contaminated by a large amount of unexploded munitions left over from World War I and II. The main areas of contamination are, by consequence, the battlefields where heavy fighting took place during both World Wars. The cities and provinces closest are Gomel, Minsk and Vitebsk (the most heavily mined area).[288] Approximately 10 per cent of all munitions containing explosives did not function as intended.[289]

Belarus' Armed Forces estimate that, since 1945, 26 million unexploded munition items have been cleared.[290] In 2001, Belarus cleared 3.5 million square metres of land, including 11,926 ERW and 65 anti-personnel mines.[291] ERW constitutes a more serious threat than mines, in the assessment of UNMAS.[292] The majority of contaminated areas are agricultural land and forest.[293]

In 2001, *Landmine Monitor* reported that three people, including a child, were killed by UXO: ERW and mines have not been disaggregated. Between 1990 and 2001, 105 ERW and mine victims were recorded in Belarus, although these do not appear to be available in disaggregated form.[294]

Figure 24: ERW and mine clearance breakdown by munition type in Belarus in 1999[295]



Bosnia & Herzegovina

Land Area:	51,100 sq km
Arable land (% of land area):	9.8
Population:	4 million
Rural population density: (people per sq km of arable land)	445
GDP:	US$4.4 billion
GDP per capita:	US$1,800

From 1992 to 1995 Bosnia and Herzegovina (BiH) was the theatre of ethnic conflict after the implosion of the Socialist Republic of Yugoslavia (SFRY). A considerable quantity of unexploded ordnance remains. Most unexploded munitions, especially mines, lie along the Inter-Entity Boundary Line (IEBL) and the Zone of Separation (ZOS).[296]

It is estimated that there are as many as 10,000 contaminated areas, which total approximately 2,145 square kilometres, which still require further survey or clearance.[297] Demining operations cleared 5.5 to 6 million square metres of land in 2001, and 73.5 million square metres of land were surveyed.[298] It is believed that approximately 700,000 to 1,000,000 ERW and mines remain scattered on the ground.[299]

The ICRC reported that Serb aircraft deployed BL755 cluster submunitions early in the war, though this represented only a small fraction of the 10,000 cluster munitions in their arsenal. Yugoslav artillery rockets designated 'Orkan' were used to dispense cluster bomblets known as Dual-Purpose Improved Convention Munitions (DPICM). The 262 mm 'Orkan' was designed to carry two similar types of DPICM – the KB-1 and the KB-2 – but the latter was rarely used. The majority of the ERW in Bosnia resulted from the use of land-service munitions, rather than air-delivered ordnance.[300]

In 2001, there were 27 casualties in Bosnia and Herzegovina

resulting from ERW. In 2002, there were 28 ERW casualties.[301] All age groups under 60 years of age were affected.[302] In 2002, all the casualties were civilians.[303]

Figure 25: ERW and mine victim breakdown by age in Bosnia & Herzegovina in 2002[304]

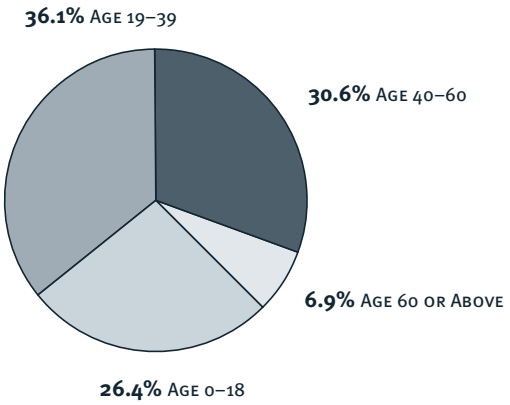
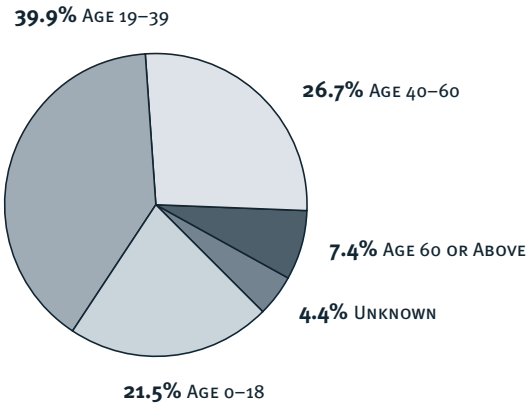


Figure 26: ERW and mine victim breakdown by age in Bosnia Herzegovina from 1996 to 2002[305]



Chechnya

Land Area:	Not Available
Arable land (% of land area):	Not Available
Population:	Not Available
Rural population density: (people per sq km of arable land)	Not Available
GDP:	Not Available
GDP per capita:	Not Available

Chechnyan separatists and the Russian Federation have fought two conflicts (1994-96 and 1999 to the present) resulting in a serious unexploded ordnance problem in the breakaway territory.

Russian forces have made use of extensive air and artillery bombardment, air-deployed anti-personnel and anti-vehicle mines, as well as cluster munitions of every type in the Russian arsenal.[306] These include the uses of artillery in the form of multiple launch rockets systems (Grad, Uragan, Smerch MLRS), cluster bombs dropped from jet aircraft and helicopters, and tactical missiles such as the SS-21 Tochka.[307] 'Submunitions used by Russian forces are thought to include many of those previously seen in Afghanistan: mainly the AO and PTAB bomblet families. These are mainly impact-fuzed bomblets with fragmentation bodies or dual-purpose munitions, which also incorporate anti-armour shaped charges. The impact-fuzed high-explosive fragmentation submunition carried by the SS-21 tactical missile has also been identified.'[308]

Precise data is not currently available concerning the threat of explosive remnants of war or mines in Chechnya. Large numbers of unexploded ordnance make farmland dangerous for raising livestock or cultivation. The HALO Trust assesses Chechnya's ERW threat (from unexploded bombs, rockets and artillery shells) as equal in severity to the territory's mine problem. The HALO Trust cites in particular battlefields in the villages of Smashki, Dargo, Stary Achkoi, and Zony. Between 1997 and 1999, The HALO Trust encountered a number of munitions not encountered before.[309] A preliminary survey found that through April 1997, at least 27 civilians, half of them children, were killed by UXO.[310] In 2001, there were at least 154 civilian casualties caused by explosive remnants of war, mines and improvised explosive devices.[311] ICRC is currently conducting an ERW and mine awareness programme. [312]

Croatia

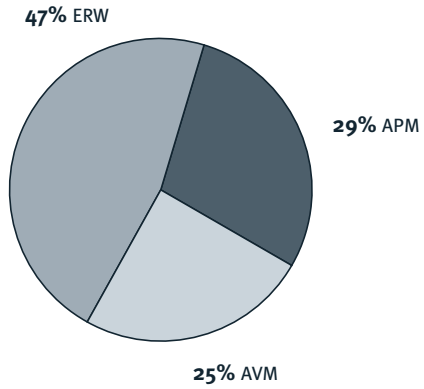
Land Area:	56,500 sq km
Arable land (% of land area):	26.1
Population:	4.4 million
Rural population density: (people per sq km of arable land)	128
GDP:	US$19 billion
GDP per capita:	US$8,091

In 1991, Croatia declared its independence, and clashes with the Yugoslav army immediately followed. Croatia was also a protagonist in the war in Bosnia-Herzegovina (1992-1995).

It is estimated that 17,000 square kilometres of land in Croatia are potentially contaminated with unexploded ordnance.[313] Between half and one million ERW and mines contaminate 14 of 21 counties.[314] The Croatian Mine Action Centre (CROMAC) maintains a Mine Action Information System (MAIS), containing records of 200,000 UXO. ERW is estimated to be about 20 per cent of this total.[315]

In 2001, there were 23 ERW and mine incidents, killing nine people and injuring 25 others.[316] Unexploded munitions 'can be found along former confrontation lines and around areas that were of strategic importance. This land cannot be released for productive use and as a result, the reconstruction of public infrastructure has been delayed. Additionally, the safety of returning Internally Displaced Persons (IDPs) and people living near contaminated areas is threatened'.[317]

Figure 27: ERW and mine clearance breakdown in Croatia in 2001[318]



Czech Republic

Land Area:	78,900 sq km
Arable land (% of land area):	40.1
Population:	10.3 million
Rural population density: (people per sq km of arable land)	84
GDP:	US$50.8 billion
GDP per capita:	US$13,991

Mines are not considered to be a problem in the Czech Republic.[319] However ERW are present. Some ERW is as a result of fighting during World War II. Most of these items are found in the course of activities such as construction work. *Landmine Monitor* reports that the Czech Ministry of Interior estimates that during 2001 some 12,000 items of ERW, excluding infantry ammunition, were found in different locations around the country.[320]

The second type of ERW is left on the former Soviet military zones, especially at Ralsko, which is 250 square kilometres in size. Although no information disaggregating ERW from mines appears to be available, 52,573 unexploded items, excluding infantry ammunition, had been found and destroyed by 2001.[321]

The Czech Ministry of Interior does not distinguish between UXO and stolen weapons. During 2001, four people were killed and one person was injured handling unexploded munitions they had found, in two separate incidents.[322]

Estonia

Land Area:	45,100 sq km
Arable land (% of land area):	26.5
Population:	1.4 million
Rural population density: (people per sq km of arable land)	39
GDP:	US$5 billion
GDP per capita:	US$10,066

Estonia is still affected by unexploded ordnance. Most of it is ERW from the World Wars, especially World War II. Affected areas are mostly in the Narva region in the northeast, and along the Emajogi River in the east central Tatu region, where large battles occurred in 1944. In addition, contamination resulted from the occupation of military bases[323] and former target practice ranges by the Soviet army.[324]

Estonian authorities believe that ERW still remain in the hundreds of thousands. Since 1992, the Government of Estonia has reported finding 27,426 items of ERW and mines.[325] In 2001, 1,347 items were destroyed, and 1,437 more in 2000.[326] Nine people were injured in ERW and mine incidents in 2001, including one deminer. Three people, including a deminer, were killed. In 2000, 18 civilians were injured by ERW and mines and 2 civilians were killed in separate incidents while handling unexploded munitions.[327]

Georgia

Land Area:	69,700 sq km
Arable land (% of land area):	11.4
Population:	5 million
Rural population density: (people per sq km of arable land)	251
GDP:	US$3 billion
GDP per capita:	US$2,664

As soon as Georgia became independent from the Soviet Union in 1991 it faced separatist crises in Abkhazia and in South Ossetia.[328] These conflicts left behind ERW and mines.[329] The riverbanks of the Inguri river, major and secondary roads, the Ochamchira and Tkvartcheli regions are mined, and it is probable that ERW are also present in these former combat areas.[330] The Government of Georgia estimates that ERW number approximately 1,500.[331] This number is probably an underestimate. ERW are present in Orfilo in the Akhaltsikhe region in southern Georgia and at

the former Russian military base at Vaziani, under Georgian control as of 1 July 2001. According to the Georgian government, unexploded munitions, including mines, affect approximately 220 square kilometres of land.[332]

No data on ERW clearance appears to be publicly available. However, in 2002 *Landmine Monitor* reported 98 new casualties caused by ERW, mines or improvised explosive devices (IEDs): 34 people were killed (including four children), and a further 64 injured (among them 14 children). There are no comprehensive official statistics on the number of people killed or injured by ERW or mines in Georgia[333], nor are there any programmes for ERW and mine risk awareness other than in Abkhazia.[334]

Hungary

Land Area:	93,000 sq km
Arable land (% of land area):	52.1
Population:	10.2 million
Rural population density: (people per sq km of arable land)	76
GDP:	US$45.6 billion
GDP per capita:	US$12,416

Hungary is not a mine-affected country. However, World War II and subsequent occupation by Soviet military forces has left a legacy of significant quantities of ERW. The environs of the capital, the State-owned woods around Nagybajom and Marcali, part of the Boronka Tájvédelmi Körzet and the Meszetegnyö area, and other former combat areas are contaminated.[335]

In Hungary, all clearance activities are the responsibility of the 1st Explosive Ordnance Disposal (EOD) Battalion of the Hungarian Army. Each year it receives between 2,600 and 2,800 calls requesting ERW and mine clearance.[336] In 2001, the First Bomb-disposal and Battleship Regiment of the Hungarian Army destroyed 141,180 explosive items. This number includes 103 bombs, 282 mines, 1,197 mine-grenades, 1,275 hand-grenades, 5,074 artillery missiles, and more than 100,000 pieces of infantry ammunition.[337]

No precise details on ERW casualties are available. But Hungarian officials stated on the margins of the December 2001 CCW Review Conference that there had been civilian casualties from 'UXO' in 2001, and an average of two to three deaths per year, 'mainly because people mishandle what they find.'[338]

Kosovo

Land area:	Not Available
Arable land (% of land area):	Not Available
Population:	Not Available
Rural population density (people per sq. km of arable land):	Not Available
GDP: See Serbia & Montenegro	
GDP per capita:	Not Available

Numerous areas of the Serbian province of Kosovo were contaminated with unexploded ordnance during the conflict between the armed forces of the Federal Republic of Yugoslavia (FRY) and the Kosovo Liberation Army (KLA). Bombing by NATO forces in 1999 also contributed to the contamination. Explosive remnants of war posing a humanitarian threat to Kosovar communities and displaced persons returning home mainly included a wide range of small arms and ammunition, fragmentation grenades, rocket propelled grenades, mortar and artillery shells and other explosive devices.[339] Mines were also a danger.

Air-deployed cluster submunitions posed a particular humanitarian threat in Kosovo in the wake of the bombing campaign. Between June 1999 and December 2001 8,485 unexploded submunitions were cleared under the coordination of the UN Mine Action Co-ordination Centre, not including 7,455 submunitions disposed of by KFOR troops.[340] What is not known are the number of submunitions cleared by Serbian Explosive Ordnance Disposal (EOD) teams during the conduct of the bombing campaign. Cluster submunition dud rates were considerably higher than claims of five per cent by Western air forces. 'In many of the cluster-bomb strikes, unexploded submunitions could clearly be seen scattered across the ground, indicating that a very high failure rate had occurred. This was particularly conspicuous where BLU-97 submunitions had been used, since these were painted bright yellow.'[341] The use of cluster munitions on areas covered with thick vegetation, or on ground softened by spring rains had the effect of greatly increasing the failure rate to as high as 30 per cent in some instances.[342]

In total, 361 square kilometres of Kosovo, or 3.32 per cent of its total landmass, was assessed as contaminated at the outset of humanitarian demining operations in mid-1999.[343] However, this included numerous false reports and duplications subsequently eliminated by survey tasks in the subsequent 30 month period. By December 2001, UNMACC stated that clearance of all known minefields and explosive remnant of war sites, including cluster submunitions strikes, had been completed, including more than 32 million square metres of land and 50,000 ERW and mines.[344] Mine Action responsibility was handed over to the UN Mission in Kosovo (UNMIK) and local bodies.[345]

Between June 1999 and January 2000 there were some 235 ERW and mine incidents in Kosovo in which 92 died and other sustained injuries ranging from minor wounds to traumatic loss of limbs.[346] In Kosovo during 2001 there were five separate mine incidents, which killed 2 and injured three civilians. By contrast, there were no less than 12 incidents involving ERW, which killed seven and injured 10. In the view of UNMAS, 'the fact that all the incidents were caused by people touching or deliberately tampering with the items highlights the important role that public awareness can play in preventing injury and death occurring.'[347] Children were especially vulnerable to harm from unexploded cluster submunitions,[348] but casualties from these weapons quickly tailed off once a two-stage clearance process was implemented by clearance organisations.[349] Unfortunately, since December 2001, a number of areas previously declared 'clear' have also subsequently been found to be contaminated with cluster submunitions.[349a]

Kyrgyz Republic

Land Area:	199,900 sq km
Arable land (% of land area):	7.1
Population:	4.9 million
Rural population density: (people per sq km of arable land)	236
GDP:	US$1.4 billion
GDP per capita:	US$2,711

Kyrgyztan became independent after the collapse of the Soviet Union in 1991. Several hundred people were killed in inter-ethnic clashes between Uzbeks and Kyrgyz over access to land and housing around the town of Osh, near the border with Uzbekistan. Mines are present along this border.

There is an unknown amount of ERW in Kyrgyztan.[350] However, the quantity present is probably the consequence of military exercises conducted either by former Soviet troops or, later, by the Kyrgyz army.

Although comprehensive figures are not available, *Landmine Monitor* reports that in both 2001 and 2002, incidents involving explosive remnants of war have been reported. On 29 August 2001, two children were killed in Batken while playing with an unidentified explosive item. On 10 March 2002, a 13-year-old was reportedly killed while playing with a hand grenade found in a military training field; also in the first half of 2002 a 14-year old was killed and an eight-year old injured while playing with an unspecified item of ERW.[351]

Macedonia, FYR

Land Area:	25,700 sq km
Arable land (% of land area):	23.1
Population:	2 million
Rural population density: (people per sq km of arable land)	132
GDP:	US$3.6 billion
GDP per capita:	US$5,086

In early 2001, ethnic Albanian Armed Groups (EAAG) occupied a number of key villages north and northwest of Skopje. During the following months a short, but violent, armed conflict developed between EAAG and Macedonian government forces with two sides exchanging considerable fire, including artillery shells, mortars and rockets. As a result of the conflict, more than 130,000 people fled the area.[352] Macedonia is also still contaminated with World War I munitions in the southern part of the country, in Gevgelija, Kavardaci and Bitola: all three areas, once part of the Thessalonica line from 1915 to 1918 are still heavily contaminated with unexploded munitions.[353]

Another consequence of this conflict is that ERW and mines have contaminated the north and west of the country. Because of the harsh exchanges of shelling, ERW are considered to be a far greater threat in the area than mines. However, UNMAS's assessment is that the ERW and mine threat is low and presents only a localised problem; one that is relatively easy to deal with.[354] In 2001, 1,045 mines and grenades, and 354 other explosive devices were collected and destroyed.[355]

The types of ordnance encountered to date include:

- 122mm artillery rounds, HE / smoke
- 100mm tank round HE / AP
- 82mm / 120mm mortar round
- 20mm / 30mm cannon round
- 50mm HE rocket
- Assorted small arms ammunition.[356]

Artillery bombardments were often targeted on villages. ERW and mines are considered a significant threat to the population living in about 80 affected villages. These are also thought to be a constraint on the return of Internally Displaced Persons and refugees, as well as for the delivery of humanitarian assistance.[357]

Officially, there were 12 ERW and mine casualties in 2001 (excluding the police).[358] *Landmine Monitor* reported 28 people killed and 20 injured from ERW and mines in 2001.[359] The ICRC reported 11 casualties (included 4 injured children).[360] The ICRC, in coordination with the Macedonian

Red Cross (MRC) and UNICEF, has embarked on conducting mine awareness programmes.[361]

Moldova (Republic of)

Land Area:	33,900 sq km
Arable land (% of land area):	55
Population:	4.3 million
Rural population density: (people per sq km of arable land)	128
GDP:	US$1.3 billion
GDP per capita:	US$2,109

Fighting broke out in Moldova in the turmoil following the collapse of the Soviet Union, particularly in the Transdniester region, which attempted to proclaim its independence in 1991. Moldova is currently split into two main regions, Transnistria and Bessarabia, but the Turkish-speaking minority in the Gagauz region in the southwest of Moldova also has ambitions to secede.[362] Moldova is affected by ERW and mines from World War II and the Transdniester conflict of 1999. One hundred and twenty 'UXO' were cleared between January and May 2001.[363] Three hundred and seventy one acres still remained un-cleared.[364] Other data on ERW is unavailable.

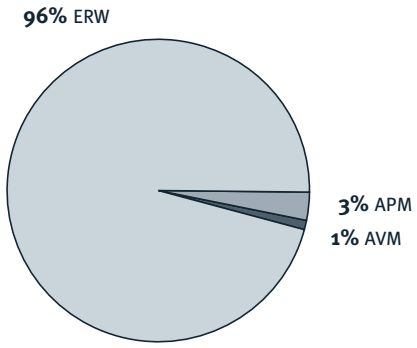
Nagorno-Karabakh

Land Area:	Not Available
Arable land (% of land area):	Not Available
Population:	Not Available
Rural population density: (people per sq km of arable land)	Not Available
GDP:	Not Available
GDP per capita:	Not Available

Nagorno-Karabakh is a region of Azerbaijan, which became autonomous after several armed clashes between state forces and separatists between 1988 and 1994. ERW and mines remain from these conflicts. According to The HALO Trust, ERW is as great a problem as mines in Nagorno-Karabakh.[365] Approximately 167 villages are affected.[366]

In 1999, 30 people (over half of them children) were injured or killed.[367] In 2001 the official casualties were 4 people killed and 14 injured in ERW and mine incidents.[368] But other sources indicate that there may be somewhere between 30 and 50 casualties a year, and that 60 per cent of these casualties are caused by ERW.[369] The Halo Trust estimates that ERW and mine incidents have caused more than 900 deaths and injuries since the 1994 ceasefire.[370] As of early 2002, a total of 5-7 million square metres out of 150 million square metres of contaminated land had been cleared.[371]

Figure 28: ERW and mine clearance breakdown by HALO Trust in Nagorno-Karabakh in 2001



Poland

Land Area:	323,300 sq km
Arable land (% of land area):	46.2
Population:	38.7 million
Rural population density: (people per sq km of arable land)	96
GDP:	US$157.6 billion
GDP per capita:	US$9,051

The problem of explosive remnants of war in Poland dates back to World War II, and the subsequent occupation by the Soviets of military bases and use of military training facilities. In Poland, estimates of contaminated area by ERW and mines vary, but one estimate puts this at 96,560 square metres.[372] Forty per cent of the areas considered as contaminated by ERW and mines are the drainage basins of the Vistula and Odra rivers, around Warsaw, the Mazury Lakes/Narew region, the Carpathian foothills, and the Wal Pomorskie.[373] Some were discovered in urban areas during construction.

The Polish Ministry of Defence believes that between 90 and 97 per cent of the total contaminated area had been cleared by the end of 2001: it was difficult to precisely identify land still contaminated. In 2001, 45,322 ERW and 3,842 mines were destroyed.[374]

Between 1957 and 1999, explosive remnants of war and mines killed and wounded 13,161 Poles, including 3,997 civilian fatalities and another 8,481 injuries. Children and teenagers accounted for the majority of these deaths (3,186) and injuries (6,701).[375] In 2001, seven people were reported killed because they tampered with unexploded munitions. There were 40 such incidents in total in Poland the same year.

Russian Federation

Land Area:	17,075,400 sq km
Arable land (% of land area):	7.4
Population:	145.6 million
Rural population density: (people per sq km of arable land)	31
GDP:	US$259.6 billion
GDP per capita:	US$8,377

Explosive remnants of war and mines heavily impacted the Soviet Union as a result of fighting during World War II. Many ERW and mines are located along the former German-Russian front in Kaliningrad, Leningrad, Briyansk, and Pskov oblasts. There are no reliable estimates of their numbers or the amount of land they still affect.[376] Ten territories where Second World War battles took place have requested clearance assistance.[377]

The Soviet Union undertook major unexploded ordnance clearance in the post-World War II period. During the first stage of clearance operations by military engineering forces (1946-1953), 183,000 square kilometres were cleared and more than 56.7 million pieces of ERW and mines were removed. During the second stage (1954-1965), only the most infested areas were cleared (i.e. Leningrad, and the northern and Baltic regions). More than 12,000 square kilometres were cleared of 10,000 unexploded munitions. During the third stage (1966-1970) more than 214,000 square kilometres were cleared of 72 million ERW explosive items.[378]

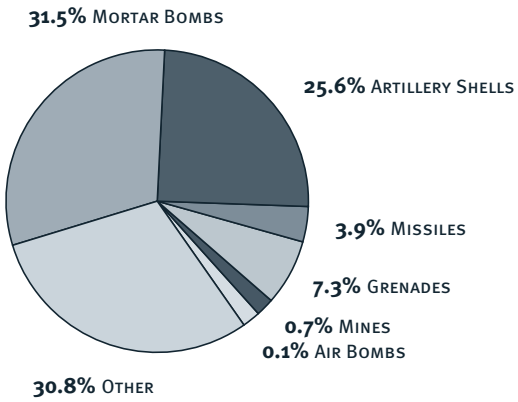
Between 1992 and 1998 there were 84 ERW and mine accidents within the territories of former World War II battlefields; 39 people died and 67 were wounded (50 per cent of the casualties apparently were children).[379] No up-to-date statistics on casualties due to explosive remnants of war in Russia appear to be available.

Serbia & Montenegro

Land Area:	102,000 sq km
Arable land (% of land area):	Not Available
Population:	10.6 million
Rural population density: (people per sq km of arable land)	Not Available
GDP:	US$8.4 billion
GDP per capita:	US$5,308

Serbia & Montenegro, (formerly known as Federal Republic of Yugoslavia – FRY) was involved in a succession of conflicts after the collapse of communist Yugoslavia in the early 1990s, including the 1999 Kosovo crisis. The last major bout of ERW contamination in Serbia probably dates from the

Figure 29: ERW and mine clearance breakdown by munition type in the Russian Federation in 1998[380]



NATO strikes/air bombardment of 1999, when industrialised areas, communications infrastructure and other centres of military significance were targeted. These targets for NATO bombing included locations in inhabited areas, such as Belgrade. Montenegro, which distanced its position from that of Serbia during the Kosovo crisis, was largely unscathed.

Information on the ERW and mine situation in Serbia remains incomplete. The Ministry of Foreign Affairs identified 6 municipalities contaminated with unexploded cluster bomblets, 31 municipalities contaminated with large aerial bombs, as well as 26 municipalities contaminated with ERW and mines from armed conflicts prior to 1999.[381]

In 2001, according to official figures, ERW and mines killed 11 people and injured 21 others.[382] ICRC figures for 2001 report three people killed (including 2 children), and four others injured.[383]

As of April 2002, 727 items of unexploded ordnance from the 1999 bombardments (missiles, aerial bombs, cluster bombs, mines, hand grenades and other unknown items of UXO), were destroyed. Additionally, 3,120 unexploded munitions have been located.[384]

Tajikistan

Land Area:	143,100 sq km
Arable land (% of land area):	5.2
Population:	6.2 million
Rural population density: (people per sq km of arable land)	611
GDP:	US$991.1 million
GDP per capita:	US$1,152

Tajikistan became independent after the Soviet Union's collapse in 1991. The new country experienced civil unrest between 1992 and 1997. Up to 50,000 people were killed and over one-tenth of the population fled the country in the five-year civil war between the Moscow-backed government and the Islamist-led United Tajik opposition (UTO).[385]

It is thought that ERW persists as a consequence of this conflict. No specific data on its nature, extent or severity appears to be currently available. Nor does a national data-gathering network appear to exist for casualties of explosive remnants of war or mines.[386] Between 1997 and 2001, two accidents (two boys playing with unexploded munitions) involving ERW were reported by ICRC,[387] which is conducting an ERW and mine awareness programme in Tajikistan.[388]

Ukraine

Land Area:	603,700 sq km
Arable land (% of land area):	56.4
Population:	49.5 million
Rural population density: (people per sq km of arable land)	49
GDP:	US$31.3 billion
GDP per capita:	US$3,816

Ukraine has a residual ERW presence, which dates from World War II. The number of ERW present on the ground appears to exceed the number of mines. Between 1945 and 1992, over 62 million ERW and mines were cleared, but many remain.[389] Although ERW is present throughout the country, the most affected areas are thought to be in rural woods and fields, and in major World War II battle sites fought between Russia and Germany mostly in the Crimea. More than 100,000 tonnes of UXO could remain around Sevastapol and Kerch alone according to some estimates. Odessa, Dnepropetrovsk, Vinnitsa, Ternopol, Zhitomir, Kiev, and Kharkiv, as well as former bombarded cities are also affected.[390] *Landmine Monitor* reported in 2001 that some 15,500 pieces of unexploded ordnance were cleared, although it is not reported what proportion of this was ERW.[391]

In 2001, there were 18 reported ERW and mine casualties in Ukraine: 14 people died and four were injured. The real figure may be higher. But claims that almost 1,000 people are injured or killed by old munitions each year in Ukraine seem exaggerated.[392]

9 Middle East & North Africa

Regional Overview

Seventeen countries and territories in the Middle East and North Africa experience socio-economic impacts from explosive remnants of war or mines. In many cases little information exists on the specific nature or total severity of these effects, for a variety of reasons. It is often not possible to usefully disaggregate ERW and mines in the overall national profile of the threat of unexploded ordnance. There are huge variations in the profiles of ERW threat.

Kuwait, for example, inherited extensive ERW contamination in the wake of the 1991 Gulf War, and even today continues to clear significant amounts of ERW from its territory each year. It has been able to conduct these operations mainly within its own resources and has reduced ERW casualty rates substantially.

The best information on the extent and socio-economic impacts of ERW contamination is to be found in Yemen. A *Landmine Impact Survey* in Yemen completed in 2001, however, presents a systematic picture of the socio-economic impacts of mines and ERW there, particularly on rural life. But the usefulness of this work must be set against the fact that ERW is a comparatively small problem in Yemen compared with that of mines. Furthermore data collection in the LIS on ERW does not disaggregate between different types of explosive remnants of war. As a result all 'other UXO' beside mines are lumped together, which makes description and analysis of the ERW threat there more difficult.

Some useful information is available on Kuwait, Northern Iraq, and Lebanon. But we know little about threat profiles of explosive remnants of war on post-conflict societies in Algeria, Iran, Iraq, Jordan, Libya, Morocco, Oman, Syria, Tunisia and Western Sahara.

Both Israel and the Palestinian Authority concede that unexploded ordnance pose threats to their civilians, but data collection appears secondary in importance to other considerations. In Israel, all UXO victims are simply added to a larger pool of casualties termed 'victims of hostile activities.' Data on casualties and other socio-economic impacts in the Palestinian territories, which cannot be regarded as 'post-conflict', tend to be collected by international relief agencies rather than the Palestinians themselves, and are incomplete. Nevertheless there exists evidence of a significant ERW problem.

The use of cluster munitions

The use of cluster munitions is capable of producing both a high density of surface and sub-surface contamination, which is consistently more problematic than many other forms of unexploded ordnance. These syndromes have been amply borne out in Kuwait. Despite a massive and hugely expensive clean-up operation immediately after the 1991 Gulf War, cluster submunitions, as well as other unexploded ordnance, continue to be encountered in Kuwait. Thanks to these intensive efforts, which would have been beyond the internal financial means of many other countries, casualty rates have now fallen, on average, to single digits per annum. But widespread ERW contamination continues to hinder reconstruction and land use in almost all areas of the country, and the government receives several reports a day of ERW and mines being uncovered in the course of normal community activities.

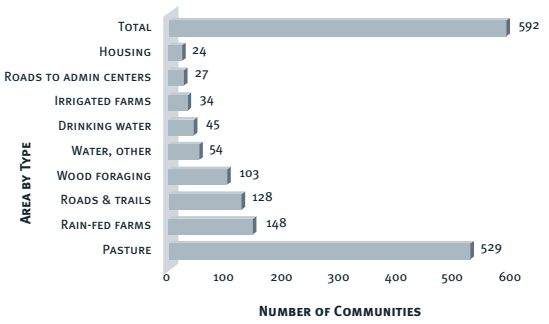
Iraq has not been as fortunate as Kuwait. Both northern areas under Kurdish control and the rest of the country ruled by Baghdad have severe ERW contamination problems from all manner of ordnance, including the extensive use of cluster munitions. Despite great numbers of mines used since the outbreak of the Iran-Iraq war in 1980, it is believed that in parts

of central and southern Iraq the post-conflict threat from cluster submunitions is greater in numbers of duds and casualties.

A common problem

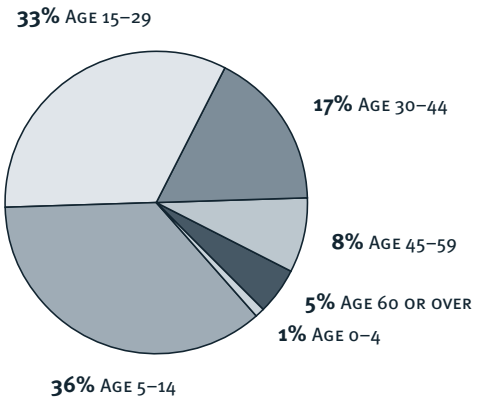
Many Middle Eastern and North African communities depend on pastoral agriculture for their economic well-being and cultural identities. Explosive remnants of war, as well as mines, can have especially severe impacts on them. In arid or semi-arid climates, the ability to graze and move animal herds is essential, especially in nomadic or semi-nomadic communities. Yet the presence of ERW or mines can impede or block off access to important grazing areas or water sources, livestock routes or access to markets. A *Landmine Impact Survey* in Yemen, although mainly focused on the threat of mines, found that explosive remnants of war were also a component of these sorts of socio-economic impacts on the welfare of a large number of local communities. Similar detrimental consequences have been observed in virtually every affected country or territory in the Middle East or North Africa, to varying degrees.

Figure 30: Areas blocked to communities by ERW and mines in Yemen in 2000[393]



Dependence on pastoral agriculture may also assist in explaining why the preponderant profile of casualties in this regional set is amongst boys and young men. Responsibility for keeping an eye on flocks tends to fall to this demographic group, who spend long periods shepherding livestock in areas away from villages and towns in rural communities. Found objects, such as explosive remnants of war, may hold particular interest – and therefore risk. In Yemen, victims were most likely to be civilian, male and between the ages of 5 and 45 with pastoral herding the most common occupation. Similar victim profiles have been observed elsewhere, for instance in Tunisia, Iraq, as well as further a field in other regions such as sub-Saharan Africa and Central Asia.

Figure 31: Male victims breakdown by age group in Yemen from July 1999 to July 2000 due to mines and ERW[394]



Explosive remnants of war are not only a rural problem, however. Evidence from Kuwait, Northern Iraq and the Palestinian Territories, for instance, indicates that ERW incurs casualties in urban areas. Iraqi forces maintained considerable ammunition and arms dumps in a number of Northern Iraqi towns and other strategic locations, which they abandoned after the 1991 Gulf War. Although details are sketchy, there may be significant contamination in certain areas of the West Bank due to Israeli incursions and the use of heavy weapon systems such as tanks, fighter aircraft and missile- and cannon-armed helicopter gun-ships in built-up areas where large concentrations of civilians are present. It is perhaps telling that the United Nations apparently called in explosive ordnance disposal experts in the wake of Israeli operations against the Jenin refugee camp in 2001.

Middle East and North Africa: country profiles

Algeria

Land Area:	2,381,740 sq km
Arable land (% of land area):	3.2
Population:	30.4 million
Rural population density: (people per sq km of arable land)	157
GDP:	US$53.3 billion
GDP per capita:	US$5,308

Algeria was the location of heavy fighting between Allied and Axis troops during the Second World War during which extensive mining of the country by both sides occurred. Later, Algeria experienced an independence struggle against French rule until 1962, war with Morocco in 1963-64 and, most

recently, internal conflict since 1992 between government and Islamic Salvation Front forces. Little is known about the nature or extent of explosive remnants of war in Algeria or to what extent its effects have been mitigated by clearance or other activities – although both mine clearance and education programs run by the government are underway.[395] Nor has the full extent of Algeria's mine problem been fully assessed, though the government estimates that 1.3 million mines (913,000 in the east and 420,000 in the west) remain uncleared.[396]

Similarly, few records regarding the number of ERW and mine victims and casualties in Algeria are available. In cases where incidents have occurred, it is hard to determine whether newly manufactured anti-personnel mines or previously existing ERW or mines were the cause.[397]

Egypt

Land Area:	1,001,450 sq km
Arable land (% of land area):	2.8
Population:	64 million
Rural population density: (people per sq km of arable land)	1,217
GDP:	US$98.8 billion
GDP per capita:	US$3,635

The Arab Republic of Egypt is considered seriously affected by mines and unexploded ordnance as a result of combat operations between Axis and Allied forces during World War II, and between Egypt and Israel on four occasions between 1948 and 1973. This problem most significantly affects locations in the Western Desert region, the Sinai Peninsula, and areas in the vicinity of the Suez Canal, as well as the Red Sea coast to the east.[398] Egypt's ERW and mine problems are considered to be unique. 'First, a huge area of land is affected – some estimates put the total at about 25,000 square kilometres. Second, the age of the material: up to 60 years. Third, much of the mines and UXO is covered by thick deposits of mud or sand so that conventional detection techniques are often of little value.'[399] Many of the unexploded munitions encountered such as freefall bombs and anti-tank mines pose a high risk.[400] According to the *Journal of Mine Action*, the Egyptian Army Corps of Engineers has, since 1948, been able to clear approximately 31 per cent of the total mined areas and approximately 51 per cent of the estimated ERW and mines.[401]

The UN considers the scope and density of the ERW and mine problems within Egypt to be dramatic, and to have a serious impact upon development within the country – particularly as it expands to facilitate the large population growth forecasted for the next 15 to 20 years. Irrigation projects, electrical power supply, petroleum, industrial and urban development zones have all reported delays due to the need to deal with mine and ERW impeding progress.[402] Estimates of the total number of explosive remnants of war and mines vary widely, possibly because of confusion associated with terminology where the Arabic term 'El-Gham' (bomb) is used for any explosive device.[403] According to the US State Department, the Egyptian government estimates that there are approximately 5-5.75 million mines and 15-15.25 million pieces of ERW on its territory.[404]

In 2001, 11 new casualties were reported in nine 'UXO' incidents; three people were killed and eight injured. All were civilians. In 2000, there were 12 new mine or ERW casualties reported. Many other incidents most likely go unreported, especially amongst the nomadic Bedouin tribes in the Western desert.[405]

Iran

Land Area:	1,633,190 sq km
Arable land (% of land area):	10.7
Population:	63.7 million
Rural population density: (people per sq km of arable land)	141
GDP:	US$101.6 billion
GDP per capita:	US$5,884

Iran's devastating war with Iraq between 1980 and 1990 resulted in massive numbers of mines being laid along the two countries' common border, and the generation of a significant amount of other unexploded ordnance. Mines, however, appear to be a much greater post-conflict threat than other explosive remnants of war. The total mine infested border area is estimated to be 1,200 kilometres in length and averaging about 35 kilometres wide for a total of 42,000 square kilometres, and most heavily impacts five western provinces.[406]

There is a shortage of available data on explosive remnants of war in order to reliably assess its impact post-conflict in Iran, especially as there seems to be no systematic nationwide data collection system on ERW incidents. However, Iran's Medical Engineering Research Centre estimates that there are about 300 ERW or mine casualties in Iran every year, of which roughly 36 per cent are fatal.[407] Casualties appear to have been highest amongst farmers, other civilians and children. Agricultural production, according to the United Nations, has been 'severely limited'.[408]

Iraq

Land Area:	438,320 sq km
Arable land (% of land area):	11.9
Population:	23.3 million
Rural population density: (people per sq km of arable land)	104
GDP:	Not Available
GDP per capita:	Not Available

Iraq has a long and severe legacy of explosive remnants of war and mines dating back at least as far as the Second World War (the British Royal Air Force bombed rebellious tribes from the air with primitive ordnance as early as the 1920s). The Iran-Iraq War from 1980 to 1990, as well as the 1991 Gulf War in which Iraqi forces were expelled by a US-led military coalition from Kuwait, have compounded this situation. ERW and mine contamination is particularly prevalent along the Iraq-Iran border and the south and central parts of the country. (Northern Iraq under Kurdish control is dealt with in a separate section of this study.) The situation was further complicated by internal military repression by Baghdad of various minority communities including the Shi'ites of the Southern Marshes, as well as British and American military invasion of the country from March 2003.

It would appear that ERW contamination in Iraq stems from virtually every category of conventional munition and many different manufacturing countries of origin ranging from the World War II-era to modern American, European and Soviet/Russian designed ordnance. In one of the only studies conducted on the problem in Iraq, the ICRC identified cluster submunitions amongst other forms of unexploded ordnance as a more significant threat to communities in southern Iraq than mines.[409] Pastoral activities are especially affected. A US General Accounting Office report of American use of mines in the 1991 Gulf War concluded that cluster submunition failure reports had been significantly higher than the two to four per cent claimed by the US Department of Defence.[410]

Very little is known about the extent of care for those injured by ERW and mines in Iraq, but it is believed to be minimal. According to a Human Rights Watch report, United Nations peacekeepers stationed on the Iraq-Kuwait border treated 87 people with ERW and mine related injuries.[411] *Landmine Monitor* reported 21 Iraqis killed by ERW or mines in 2001, including 19 children, although the true figure is believed to be much higher.[412]

Israel

Land Area:	21,060 sq km
Arable land (% of land area):	17
Population:	6.2 million
Rural population density: (people per sq km of arable land)	155
GDP:	US$110.4 billion
GDP per capita:	US$20,131

Little information is available about the nature or extent of the problem of explosive remnants of war in Israel. *Landmine Monitor* reports that 'it would appear that the role of anti-personnel mines is not significant in the ongoing conflict between Israel and armed Palestinian groups, although there have been incidents involving mines and unidentified explosive devices.'[413] Beside media reports about use of improvised explosive devices (which are not ERW) by anti-Israeli factions, small arms and light weapons including rocket-propelled grenades and mortars have been used against targets inside Israel. Without reliable information it can only be assumed that the ERW threat, which use of these weapons could create, are dealt with by the Israeli Defence Force or police forces. There is no systematic humanitarian ERW and mine clearance conducted, although 'the priority given to marking active landmine areas and the clearing of unnecessary minefields has increased significantly in recent years.'[414]

No record of civilian ERW or mine victims is available for inside the state of Israel because mine victims are listed under an umbrella category of 'victims of hostile activities', according to *Landmine Monitor*. It notes, however, that corroborating sources indicate no ERW and mine victims since 2000.[415]

Jordan

Land Area:	89,210 sq km
Arable land (% of land area):	2.7
Population:	4.9 million
Rural population density: (people per sq km of arable land)	512
GDP:	US$8.5 billion
GDP per capita:	US$3,966

Mines rather than other types of unexploded munition primarily affect the Hashemite Kingdom of Jordan. Although casualties have been attributed to ERW, at least one donor source has assessed that unexploded ordnance is not a serious problem, possibly referring to mines as well.[416] Both the Israeli and Jordanian defence forces laid minefields containing anti-personnel and anti-vehicle mines along their common border between 1948 and 1973. However, on the

Jordanian side minefields were laid most frequently by experienced soldiers with proper records kept, which have aided their disposal. Clearance operations began in 1993 and continue in the Jordan Valley.

A United Nations Assessment Mission carried out in 1999 reported that around 10 per cent of the Jordanian population live in areas where mines are present. But little data was presented on ERW, and it was observed that injuries and disabilities due to mines are limited in numbers compared with other types of trauma.[417] *Landmine Monitor* has, however, reported casualties in Jordan from unexploded munitions not identifiable as mine-related. Of the three related incidents in the country in 2001, only two were classed as caused by mines. In 2002, up to mid-June, another four landmine incidents and one ERW incident were recorded: three people were killed and five injured.[418] The Red Cross/Red Crescent has identified a clear need to improve data collection systems on unexploded ordnance in Jordan. Data on mine and ERW casualties 'has been gathered by various bodies, (the Landmine Survivors' Network, etc.), but not on a systematic basis. As a result, there is no comprehensive figure on the number of casualties in Jordan. Thus, it is crucial to organize a data collection system so that the extent of the problem can be assessed and mine-related activities can be better targeted.'[419]

Kuwait

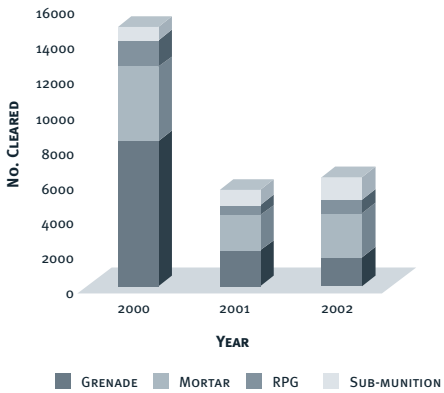
Land Area:	17,820 sq km
Arable land (% of land area):	0.3
Population:	2 million
Rural population density: (people per sq km of arable land)	808
GDP:	US$37,8 billion
GDP per capita:	US$15,799

Areas of Kuwait are still contaminated with explosive remnants of war of different types including rocket propelled grenades and mortars, as well as significant quantities of anti-personnel and anti-vehicle mines from the 1991 Gulf War. Ten different types of Allied cluster submunitions were amongst the unexploded munitions discovered following the liberation of Kuwait in February 1991 by US-led Coalition forces.[420] A September 2002 US General Accounting Office report concluded that 'During the Gulf War, accumulations of thousands of US non-landmine submunition duds on the battlefield created unintended de facto minefields. This problem was exacerbated by dud rates for these submunitions that appear to have been higher than the two to four percent submunition dud rate that DOD [Department of Defence] had previously reported.'[421] There is evidence that 'this dumping of old, unreliable stock on Kuwait and neighbouring countries increased the probability of a large residual problem caused by munitions failing to explode as intended.'[422]

Immediately after the conflict, the Kuwaiti government initiated a two-year clearance programme of the country, which is estimated to have cost US$728 million, as well as ERW and mine awareness programmes. Contamination by ERW was extensive. Between February 1991 and June 1997, more than 111,000 tonnes of ordnance were cleared in Kuwait. Environmental conditions – high temperatures, sand storms and flash floods – hampered clearance operations. Today, significant quantities of ERW continue to be found and cleared. Between 2000 and 2002, 26,454 items of explosive remnants of war have been disposed of.

Although there has been a steady decline in ERW-related injuries over the last decade in Kuwait, there were still five injuries in 2001 and four in 2002. The majority of total casualties, including fatalities, were male, which is perhaps related to patterns of employment. The majority of victims appear to be between 10 and 30 years old.[424] In February 2002 the Kuwait Institute for Scientific Research published a report on injuries to civilians in Kuwait that was prepared by a panel of nine physicians from the Ministry of Health. The findings of this report indicated that ERW accounted for 175 (seven per cent) of the total of 2,386 war injuries and 119 (28 percent) of those killed. By contrast, mine injuries (type unspecified) accounted for 1,026 (43 per cent) injured, and 85 (20 per cent) of the total of 421 deaths.[425]

Figure 32: ERW clearance breakdown by type in Kuwait from 2000 – 2002[423]



Widespread ERW contamination in Kuwait affected civilians and military personnel alike, hindering reconstruction and land use in the coasts, deserts, mosques, schools, agricultural, residential and recreational areas. The Kuwait Ministry of Defence, the agency responsible for responding to the remaining ERW threat, continues to receive several

reports of mines and other explosive ordnance every day.[426]

Lebanon

Land Area:	10,400 sq km
Arable land (% of land area):	17.6
Population:	4.3 million
Rural population density: (people per sq km of arable land)	255
GDP:	US$16.5 billion
GDP per capita:	US$4,308

Lebanon was devastated by conflict between 1975 and 1990. The outbreak of civil war in 1975 was followed by Syrian intervention, an Israeli invasion in 1982 and a Syrian-Phalangist coup in 1990. Danger posed by mines and unexploded ordnance throughout southern Lebanon is significant, although quantitative estimates vary.[427] A nationwide *Landmine Impact Survey* began in March 2002, but has yet to complete or present its findings.[428] The Lebanese Army Engineering Corps, the Syrian Army, a Ukrainian Army Engineering Battalion of UNIFIL, the Mines Advisory Group as well as commercial demining outfits have presented various figures for their respective ERW and mine clearance activities in Lebanon in 2001. In most cases, considerable numbers of ERW – including cluster submunitions – as well as anti-vehicle and anti-personnel mines have been reported cleared.[429]

A 1999 United Nations report noted that 'at the national level the socio-economic damage and impact of the presence of landmines and UXO [sic] is very limited and cannot be considered a major impediment to social development or economic activity.' That is to say that these problems 'do not constitute a humanitarian emergency' in Lebanon.[430] Minefields and extensive areas of ERW in southern areas (occupied by Israel until 2000) appeared to be well known and marked. *Landmine Monitor* reported 90 new casualties due to ERW and mines in 2001, a decrease from 113 in 2000. Mines were the cause of the majority of casualties, followed by cluster bombs and other ERW.[431] A US State Department report, however, stated that it considers the ERW and mine problem in Lebanon to be unusually complex and diverse. 'More than 40 per cent of victims suffered their injuries while engaged in agricultural activities, the major source of income for Lebanese villagers. In South Lebanon and West Bekaa there has been a noticeable decrease in agricultural production because of the presence of landmines.'[432]

Libyan Arab Jamahiriya

Land Area:	1,759,540 sq km
Arable land (% of land area):	1
Population:	5.3 million
Rural population density: (people per sq km of arable land)	37
GDP:	Not Available
GDP per capita:	US$7,570

Libya suffers from mine and ERW contamination from the North African Campaign in World War II and, later, along its borders, from conflicts with Egypt and Chad. In addition to desert areas, there are minefields close to ports and urban areas such as Tobruk and Benghazi.[433]

Little information is available about the types and numbers of explosive remnants of war encountered in Libya, although various types of British, Italian, German and American munitions are no doubt present. *Landmine Monitor* 2000 observed that Libya appears not to classify all explosive devices on its territory as mines, the implication being that these may not be included in its quantitative assessments of the mine threat, the case for many other countries. Photographs provided to *Landmine Monitor* researchers of clearance work in Libya 'suggest that the majority of explosive devices removed are categories of UXO [sic] rather than mines (including artillery shells, bombs and grenades).'[434] A later assessment is that 'unexploded ordnance appears to be a more significant problem than mines.'[435] Data on socio-economic impacts (beyond Libya's claim that 27 per cent of its agricultural land is affected by mines) also appears to be scant. There were no reports of ERW or mine victims in 2001. Yet there also appears to be no national body tasked with collecting or collating such data either.

Morocco

Land Area:	446,550 sq km
Arable land (% of land area):	19.0
Population:	28.7
Rural population density: (people per sq km of arable land)	148
GDP:	US$33.3 billion
GDP per capita:	US$3,546

Morocco's problem with unexploded ordnance appears to be limited to the territory it controls in Western Sahara.[436] The sovereignty of Western Sahara remains the subject of a dispute between the government of Morocco and the Polisario Front. Since 1991 the United Nations has deployed a force in the Western Sahara (MINURSO) mandated, amongst its functions, to monitor the ceasefire agreement there, and organise a 'free and fair' referendum.'[437]

Western Sahara is dealt with in a separate entry.

Northern Iraq

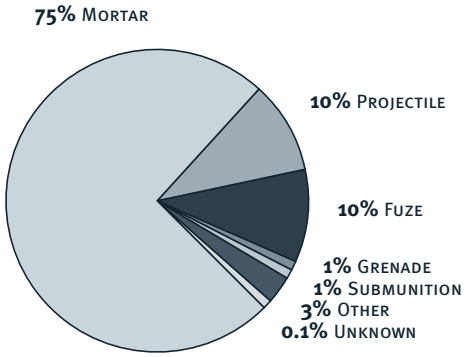
Land Area:	41,000 sq km approx
Arable land (% of land area):	Not known
Population:	3.6 million approx
Rural population density: (people per sq km of arable land)	Not known
GDP:	Not known
GDP per capita:	Not known

Northern Iraq (Iraqi Kurdistan) is very seriously affected both by explosive remnants of war and mines. Some ERW and mines in Northern Iraq dates back as far as the Second World War. Others are the legacy of the Iran-Iraq War, Baghdad's attempts to subjugate the Kurdish-majority population and the 1991 Gulf War. 'In the early 1990s, a lot of unexploded ordnance was still lying around the region, left behind in a more or less stable state. It could be found in hilltop forts, in stockpiles, in caches, and littering the battlefields all along the former front lines' and in large stockpiles behind these lines.[438] In addition, Iraqi forces abandoned some stockpiles of munitions in northern towns and cities in 1991. Since then this area has been governed autonomously and an Iraqi No-Fly Zone enforced over the region by Western air forces. US and UK military operations launched from Northern Iraq in 2003 have created more ERW.

Useful, multiple sources of data on Northern Iraq's ERW and mine problems exist. However, precise total figures are difficult to arrive at because many of these partially overlap. The United Nations, unable to operate mine clearance programmes in central and southern Iraq, has been able to operate in this region with funds from the UN-Iraq oil-for-food programme that began in 1996. It estimates that the extent of contamination affects more than 1000 communities, with known accidents caused by mines and other UXO occurring at an average rate of 31 per month, with more than 30 per cent of victims killed instantly.[439] The Mines Advisory Group (MAG) has constructed a database and collected ERW and mine clearance data since 1991. Between 1993 and 1998, for example, MAG reported 347,450 individual pieces of ordnance cleared: 3,105 tonnes of mines and ERW in total. Other NGOs, such as Norwegian Peoples' Aid, also operate in the region and add to the pool of data as well as the ICRC and other organisations. A *Landmine Impact Survey* carried out in Northern Iraq has identified 3,444 distinct areas contaminated by ERW and mines.

At least 25 different types of mines and numerous ERW munition types have been identified in Northern Iraq. Many people were killed or wounded trying to salvage ERW to sell, especially in the early 1990s. 'MAG reports 6,250 injuries and 3,450 deaths as a result of mine and ERW explosions. These figures may significantly under-estimate the casualty level due to under-reporting, particularly the number of deaths in the region. The nature of rural life and the absolute need for grazing of animals dictates that the number of livestock casualties is 10 to 15 times higher than human casualties, with severe economic consequences.'[440] A survey by the University of Durham indicated that the presence of mines in rural areas poses a direct or indirect threat to most of Northern Iraq's rural population of about 886,000.[441]

Figure 33: Clearance breakdown of 79,743 ERW and mines in Northern Iraq from abandoned stockpiles and arms caches, January 1993 to December 1998[442]



Oman

Land Area:	212,460 sq km
Arable land (% of land area):	0.1
Population:	2.4 million
Rural population density: (people per sq km of arable land)	2,595
GDP:	US$15.7 billion[443]
GDP per capita:	US$13,356

Oman has an ERW and mine problem as a legacy of an internal conflict with the Popular Front for the Liberation of Oman and the Gulf (PFLOG). The great majority of ERW and mines are located in the Dhofar region in southern Oman. US military demining experts have assessed this problem as 'low to moderate', although exacerbated by extreme weather conditions which have allowed some ERW and mines to migrate from their original positions.[444] No details appear to be available about the types or quantities of explosive remnants cleared.

According to the Omani government, mines and ERW have killed 12 people and wounded 84 since the end of the Dhofar conflict in 1975. In March 2001 two people were seriously injured in incidents involving unspecified explosive items, according to *Landmine Monitor*.[445]

Palestine

Land Area:	Not Available
Arable land (% of land area):	Not Available
Population:	3.0 million
Rural population density: (people per sq km of arable land)	Not Available
GDP:	US$4.4 billion
GDP per capita:	Not Available

There is little information available about the scope or extent of the problem of explosive remnants of war in either the West Bank or Gaza Strip components of the Palestinian territories. Large proportions of these territories are currently under the military occupation of the Israeli Defence Force (IDF) and violent clashes continue, including the use of heavy weapon systems by the latter and a range of small arms and light weapons by both sides. This makes accurate or up-to-date assessments of ERW difficult to develop. In addition, Palestinian armed groups are believed to have access to mines, and have sometimes used their contents to make human-activated bombs, booby-traps and Improvised Explosive Devices (IED).[446]

Unexploded ordnance does seem to be recognised as a humanitarian problem by the Palestinian Authority and Israel, but neither party appear to attach priority to it at the current time. ERW and mines affect Palestinian villages adjacent to Israeli minefields and military training bases. 'The scope of the UXO problem *[sic]* increased during [2001-02] beyond minefields and military training zones to include areas of confrontation between the Palestinians and Israeli soldiers, and areas subject to attacks like shelling and other direct and indirect firing. Many UXO have been found in these areas.'[447] Other evidence supports this. Following conflict in April 2002 in the Jenin refugee conflict between Israeli forces and Palestinians, the United Nations brought in explosive ordnance disposal experts after UNICEF reported that contamination from ERW, mines and IEDs was 'severe'.[448]

Casualty figures for unexploded ordnance in the Palestinian territories cannot be regarded as complete. However, they do appear to be worsening. Ten mine and ERW incidents, which resulted in 20 casualties, were documented in 2001, of which 14 were children under the age of 18 years – a significant increase over 2000. Seven civilians were killed, including 6 as the result of an explosive device (possibly a booby trap) and one from ERW after the Israeli Defence Force shelled the area. In the first five months of 2002, Defence for Children International reported 45 'UXO' casualties including five deaths (four of them children) and six injured (four children).[449]

Syria

Land Area:	185,180 sq km
Arable land (% of land area):	25.6
Population:	16.2 million
Rural population density: (people per sq km of arable land)	154
GDP:	US$17.3 billion
GDP per capita:	US$3,556

The Syrian Arab Republic was involved in a succession of conflicts with Israel from 1948 until 1973, and supported various factions in the Lebanon conflict. In addition, Syria and Israel have been involved in border hostilities in the Golan Heights region over a long period of time. From the limited amount of data available, unexploded remnants of war would appear to be an issue in the Golan area, which is also extensively mined. There may be a persistent ERW and mine problem in other areas of Syria dating back to the Second World War, but there is at present insufficient data to substantiate this.

Golan was the scene of heavy fighting as recently as the Arab-Israeli conflict in 1973. All Golan zones are mined, and many minefields are unmarked and unmapped. Most mines and explosive remnants of war are in areas of close proximity to Syrian occupied areas of Quanaitra Governorate, in prime agricultural lands. Their presence would appear to have had some impact on land use. There are few official Syrian statistics, and civilian UXO casualties are unknown.[450]

Tunisia

Land Area:	163,610 sq km
Arable land (% of land area):	18.3
Population:	9.6 million
Rural population density: (people per sq km of arable land)	117
GDP:	US$19.5 billion
GDP per capita:	US$6,363

Tunisia was the scene of hard fighting between Allied and Axis armies in late 1942 and 1943, particularly inland around important mountain passes standing between the link up of British and Commonwealth forces to the east with American ground forces approaching from the west. Unexploded ordnance dating from this period is still found from time to time in various locations. The Tunisian government also deployed mines on a couple of occasions in remote regions along the Libyan border that are not considered a humanitarian problem.

Incidents that occurred in 2001 and the first quarter of 2002 appeared, from the minimal information available, more

consistent with ERW than mines. Three children, in two separate incidents, were injured in the course of pastoral herding activities.[451]

Western Sahara

Land Area:	Not Available
Arable land (% of land area):	Not Available
Population:	Not Available
Rural population density: (people per sq km of arable land)	Not Available
GDP:	Not Available
GDP per capita:	Not Available

The sovereignty of Western Sahara remains the subject of a dispute between the government of Morocco and the Polisario Front. Since 1991 the United Nations has deployed a force in the Western Sahara (MINURSO) mandated, amongst its functions, to monitor the ceasefire agreement there, and organise a 'free and fair' referendum.'[452]

All parties in the Western Sahara conflict used mines extensively, which appear to constitute the bulk of the humanitarian problem now, especially as Mauritania used them to protect economic assets. The Polisario, for its part, used mines to cover its retreat and to disrupt economic activity. It is believed that Western Sahara may also be affected to some degree by explosive remnants of war, but no specific information is available.

Yemen

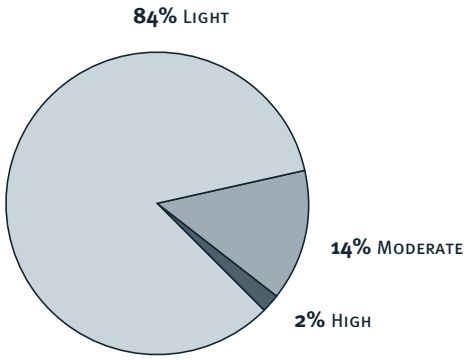
Land Area:	527,970 sq km
Arable land (% of land area):	2.9
Population:	17.5 million
Rural population density: (people per sq km of arable land)	833
GDP:	US$9,3 billion
GDP per capita:	US$893

Yemen has an unexploded ordnance problem mainly as a consequence of internal conflict in the 1980s and 1990s affecting a total reported surface area of 923 million square metres. A good level of data is available about the scope and severity of Yemen's ERW and mine situation because the first comprehensive *Landmine Impact Survey* of the socio-economic impacts of mines was completed in Yemen, and has been made publicly available. According to this Survey, six per cent, or 828,000 Yemenis, live in areas affected by mines and other forms of unexploded ordnance.[453]

Table 4: Breakdown of ERW and mine affected areas in Yemen

UXO Type	Number of mined areas	Contaminated surface (sq m)
APM	631	157,149,373
APM, AVM	114	446,389,765
APM, AVM, other UXO	49	188,928,804
APM, other UXO	65	7,310,565
AVM	128	49,212,706
AVM, other UXO	27	32,767,650
Unknown	5	2,660,000
Other UXO	59	38,308,018
TOTAL:	**1,078**	**922,726,881**

Figure 34: Community UXO impact severity breakdown in Yemen based on *Landmine Impact Survey* findings[454]



By far the bulk of Yemen's unexploded munition problem is from anti-personnel mines (APM), followed by anti-vehicle mines (AVM). By comparison, ERW are not a major problem, constituting the sole threat to only 59 of 1,078 communities surveyed, and 200 communities in total.[455] However, when aggregated, 'this means that at least one in every 16 Yemenis lives or works near or is otherwise affected by the presence of landmines', or other unexploded ordnance, which for general purposes in the Survey seems to be have been subsumed.[456] A scoring mechanism ranked communities in terms of the degree of mine impact, the results of which are listed in the graph above.[457]

The *Landmine Impact Survey* recorded a total of 4,904 casualties of which 2,560 were killed and 2,344 were injured. Among the 592 communities surveyed, 488 had a history of 'UXO' accidents injuring one or more persons. Victims were most likely to be civilian, male and between the ages of 5 and 45 with pastoral herding the most common occupation.[458] Since the Survey was conducted *Landmine Monitor* has reported further casualty data for 2001 and the first half of 2002 that appears consistent with these trends.[459]

Conclusions 10

The presence of explosive remnants of war in post-conflict communities has undeniable socio-economic impacts. Moreover, these impacts are widespread: at least 57 countries and territories reported casualties from ERW between January 2001 and the end of June 2002. At least 35 others were affected by the presence of explosive remnants of war in other ways, even if casualties were not reported.

These socio-economic impacts vary enormously. They depend to some extent on the nature of the explosive remnant of war threat, including the types and quantities of the munitions that have failed to function as intended, and their precise locations. Other factors include how communities respond and adapt to the presence of ERW, and how effective efforts to deal with it have been in the past. In Laos and Cambodia there is some capacity to reduce the impact of ERW. But economic necessity, combined with the large amount of unexploded munitions still present three decades or more after conflict in the region ended, have resulted in situations where contact with ERW or mines is not always sufficiently stigmatised. Casualties from ERW may be exacerbated because some people in these communities may have become accustomed to the presence of ERW, and more readily interact with it.

Casualties

The most obvious socio-economic impacts of explosive remnants of war are the deaths and injuries they cause. This Survey has focused on civilian impacts, but it is also important to remember that ERW inflict casualties amongst military personnel too. At some stage these people will become civilians again. As well as the human tragedy involved, survivors of ERW are often economically and socially marginalised. Their ability to support their families and contribute productively to local community life is often reduced, particularly in developing societies that tend to be dependent on manual labour for agriculture and other economic activities. And, it is of course dependent on whether there are survivors in an ERW incident. The dead contribute nothing to the economic wealth of a community.

The following general trends are observable from the limited data set we have:

- Males aged between 18 and 40 appear generally most at risk from death or injury in ERW incidents, but casualties come from all demographic groups.
- Children also appear to be a significant risk group, although more research is needed to confirm this.
- ERW incidents tend to cause a higher proportion of fatalities than mine incidents.
- More people are injured or killed per incident on average from ERW than anti-personnel mines.
- Tampering with unexploded munitions, or being a bystander in areas where explosive remnants of war might be interfered with, are common reasons for ERW casualties across all regions.

Other socio-economic impacts

In many of the countries or territories we have surveyed there is little or no established capacity to deal with an ERW threat or rehabilitate survivors. This is especially so when the socio-economic effects of ERW – or mine – contamination, as serious as it may be, has to be considered in the light of the many other basic challenges of post-conflict reconstruction and development. Cost-benefit analyses performed by UNDP

on Laos and Mozambique, for instance, yielded significantly different results with regard to tackling their respective ERW and mine problems. In Laos, ERW clearance could be justified on economic grounds alone. 'Conversely, the analysis for Mozambique suggests that large-scale clearance of agricultural land will not, in itself, make a significant net contribution to Mozambique's continued development' in light of alternative needs that, if met, could yield greater socio-economic benefit.[460]

In this way, there is strong evidence that, like mines, threat from ERW compounds the existing developmental problems of affected communities by modifying their social and economic patterns:

- The presence of ERW prevents the use and rehabilitation of community infrastructure and resources. These include housing, water and irrigation systems, villages, schools, clinics and markets, and the paths or roads between them. Clearance activities are often needed before they can be used or new construction can go ahead.
- ERW presence dissuades the inhabitants of affected communities from certain types of land use, or makes exploitation of local resources less efficient. Ultimately, land denial not only affects economic productivity; it can also produce wholesale change in traditional social and economic practices. At its most extreme, whole communities may be abandoned.
- Most communities socio-economically impacted by ERW are in the developing world. Generating capacities with which to deal with ERW must come from the very limited amount of resources available to such communities (unless it comes from outside).
- ERW and other military debris have value as an economic resource in many poor communities. ERW can provide access to cash within communities where this is otherwise rare. For those on the very margins of society, ERW can be the mainstay of their economic survival. This leads people to undertake high-risk activities to locate explosives and scrap that are a major cause of accidents in many countries. Such behaviour has been documented in Laos, Eritrea, Guinea-Bissau and Chad for instance.

The weapons and what they do

The wounding effects of ERW can be more severe than those of anti-personnel mines in post-conflict situations where it is present. The tendency of ERW to cause multiple casualties has potentially significant impacts, especially for families and small communities. Such accidents may also leave child survivors who will spend the rest of their lives coping with the legacy of their accidents.[461]

The data in this Survey indicates that:

- Grenades and mortar shells appear to be especially common across a wide range of post-conflict situations.
- All other factors being equal, a particular type of unexploded munition is more likely to cause ERW incidents in a post-conflict situation the more common it is.
- However, cluster submunitions appear to pose an especially severe risk to civilians in the limited set of conflicts in which they have been used. This trend, associated with the fact that cluster munitions are being procured or manufactured by an increasing number of countries, means that their post-conflict threat to civilians can be expected to further increase given the high failure rates and high lethality of this weapon type.
- ERW threat to civilians post-conflict does not remain static. ERW threat profiles may evolve over time between immediate post-conflict situations and circumstances of persistent long-term contamination. In addition, topographical movement or extreme weather conditions can move explosive remnants from their original locations.

ERW is not just a problem for post-conflict societies

ERW is not only a post-conflict threat in war-torn societies: it can also affect adjacent countries or territories not directly involved in conflict.

Laos and Cambodia are perhaps the two best-known examples of 'spill-over' of explosive remnant of war threat. Although not directly involved in conflict between North Viet Nam and the United States, huge quantities of ordnance were dropped on both countries during the 1960s and 1970s by the United States in attempts to interdict the Ho Chi Minh Trail. As a result, very large numbers of ERW of almost every type of air delivered ordnance, from cluster submunition 'bombies' to large high explosive bombs continue to pose a severe threat to communities within Laos and Cambodia, as well as Viet Nam.

There is a modest amount of evidence to indicate that, to a lesser extent, similar phenomena have occurred in the vicinity of Central Africa. While most fighting in recent years has been centred on the Democratic Republic of Congo, troop movements and fighting have sometimes strayed into adjoining countries. This was also a feature of several independence struggles in the region in the second half of the 20th century in the region. Zambia's location at the junction of Angola, Zimbabwe and Mozambique, combined with its relatively unpopulated border regions, led to its use as a safe haven and arms cache by various armed non-state actors throughout this period. While this has not resulted in high casualties, it has created impediments to infrastructure development and activities such as livestock grazing, hunting

and tourism. These impediments create socio-economic costs. To some extent, Albania's ERW problem follows this pattern in Europe.

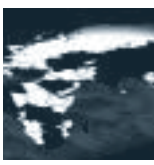
In addition, undesired explosive events in ammunition storage areas during peacetime can cause serious (but relatively localised) socio-economic consequences. Arms depot explosions in Nigeria, Guinea and Guinea-Bissau caused many casualties around the period of our study. Another major arms dump explosion also seems to have occurred in Somaliland, with unknown consequences. These accidents can fling ERW for many kilometres, and create the same types of risks to communities as post-conflict ERW.

Moving beyond snapshots

This Survey represents a snapshot of the global profile of explosive remnants of war between January 2001 and the end of June 2002. As such, it can only provide a very limited analysis of the types of threats ERW pose to civilians post-conflict. More research is needed to explore and account for many of the trends and other features highlighted here, based on more comprehensive evidence and related within the context of specific communities, or across them. And it should be clear that ERW threat varies enormously across different countries and regions.

Enough evidence of this ERW threat is visible, however, that it should alarm the international community. There is an urgent need to take positive action. With a few important exceptions, such as the Ottawa Treaty, the progress of arms control processes have been painfully limited in recent years. Further regulation of the weapons that cause ERW within processes like the CCW is important. Ways need to be found to reduce the post-conflict threat of munitions that have failed to function as intended. But it is not sufficient. What also needs to be recognised is that unless international humanitarian law and the international donor community address ERW problems as central components of post-conflict community reconstruction and redevelopment, ERW is a threat that will only widen and worsen with disastrous consequences for many communities around the world.

This Survey shows that post-conflict situations in which ERW poses a socio-economic problem today have relevance to the process of developing measures to reduce its proliferation in the future. ERW is an urgent problem with serious humanitarian and socio-economic consequences. It is gratifying that humanitarian and military imperatives in the CCW process have, at least up to now, appeared to converge. But the paramount objective of the exercise must be to meaningfully enhance the protection of civilian populations from the effects of ERW during and after conflict, in order to be credible. If necessary, this must take precedence over counter-arguments based on 'military utility'.



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United States Department of State, *To Walk the Earth in Safety: the United States commitment to humanitarian demining – 2002*.

Susan Willett (ed.), *Participatory Monitoring of Humanitarian Mine Action: Giving Voice to Citizens of Nicaragua, Mozambique and Cambodia*, (Geneva, United Nations Institute for Disarmament Research, 2003).

Endnotes

URL links to many of the sources used in this Survey are provided in the following notes. These web links were current as of 26 February 2003. They may change over time, especially as they are updated.

1 Discussion paper prepared by the GICHD and ICRC, 'The Types of Munitions Which Become Explosive Remnants of War: Factors Which Contribute to the Occurrence of Explosive Remnants of War', (CCW/GGE/I/WP.5, 14 May 2002), p. 22.

2 2002 Landmine Monitor.

3 The latter in partnership with the Sri Lanka Campaign to Ban Landmines, funded by the Cooperative Bank. Initial findings were presented to the CCW's Group of Governmental Experts on ERW, Geneva, December 2002.

4 These include The International Committee of the Red Cross (ICRC), the Geneva International Centre for Humanitarian Demining (GICHD), Human Rights Watch, the UN Mine Action Service and some affected States.

5 Geneva International Centre for Humanitarian Demining, Explosive Remnants of War (ERW): A Threat Analysis, (Geneva, GICHD/ICRC, 2002), p. 19.

6 'Explosive Remnants of War: the Global Problem – Preliminary Findings', (London, Landmine Action, December 2002).

7 International Campaign to Ban Landmines, Landmine Monitor Report 2002: Toward a Mine-Free World, (New York, Human Rights Watch, August 2002).

8 GICHD and ICRC, discussion paper for the Group of Governmental Experts established by the Second Review Conference of the CCW (WP.5), May 2002, p. 24.

9 For further background see Landmine Action, CCW Discussion Paper on 'Factors and types of munitions that cause humanitarian problems after a conflict', (CCW Group of Governmental Experts on ERW, July 2002).

10 Landmine Action, Explosive Remnants of War: unexploded ordnance and post-conflict communities, (London, Landmine Action, March 2002).

11 GICHD and ICRC, discussion paper (WP. 5), op cit.

12 Guide for the Application of International Mine Action Standards (IMAS), (IMAS 01.10), (New York, UN Mine Action Service, First Edition, October 2001), p. 14. A more up to date draft exists (although as of writing it had not been posted publicly), IMAS 04.10 dated 1 January 2003, but this appears to be identical to the version used here.

13 United Nations Mine Action Service, Explosive Ordnance Disposal, (IMAS 09.30), (First edition, 2001-10-01), p. iv: 'Unexploded ordnance (UXO) has many definitions, but for the purposes of IMAS the term applies to all munitions other than landmines which form part of a mine action programme, and which present a significant risk to human life.' (Authors underline.)

14 Report of the Meeting of States Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to be Excessively Injurious or to Have Indiscriminate Effects, (CCW/MSP/2002/2), 2-10 December 2002, p 4.

15 Two other areas identified by the GICHD that could fit within a broad definition of ERW were not explicitly included in the CCW's mandate either:

- Explosive ordnance disposal (EOD) clearance of armoured fighting vehicles (AFV), which can involve clearance components such as surrounding mines and UXO, depleted uranium fragments, explosive reactive armour, smoke dischargers, unstable stocks of internally stowed ammunition and access denial devices and booby-traps; and
- Small arms and light weapons (SALW) which in themselves contain a very low risk of causing casualties, but whose interaction with the inhabitants of an area immediately post-conflict are dangerous because of their desirability for revenge, criminal activity etc.

For further information see GICHD/ICRC, op cit, pp. 25-27.

16 IMSMA (Information Management System for Mine Action) is a system designed to improve capabilities for decision-making, coordination and information policy related to humanitarian mine action. Since 1999 IMSMA has been the UN-approved standard for such information systems. Set up as a networked multi-user computer system, IMSMA contains two modules. First, UXO data is collected and evaluated in affected countries at Mine Action Centres, then entered into the IMSMA Field Module. This is intended to improve capabilities for coordinating, prioritising and executing mine action activities. The GICHD provides the Field Module free-of-charge. In addition, information can be transferred to IMSMA Web Services for consolidation and analysis. Results of this can be used at the regional and global level to support strategic decision-making and eventually provide information to the general public. See http://www.imsma.ch for more information.

17 See http://www.unmas.org.

18 See UNDP/GICHD, A Study of Socio-Economic Approaches to Mine Action, (Geneva, UNDP/GICHD, March 2001), p. 6. The authors of this study take this observation to its logical conclusion with concern to mine action: 'Different socio-economic structures mean that different priorities should prevail in mine action programmes.'

19 Accusations that APMs created superfluous and indiscriminate effects by design strengthened calls in the 1990s for a ban on this weapon. This was eventually achieved through the Ottawa Treaty, rather than through the CCW. See Dr. Robin Coupland, 'Abhorrent Weapons and 'superfluous injury or unnecessary suffering', from field surgery to law,' British Medical Journal, (Volume 315), (29 November 1997), pp. 1450 – 1452.

20 Landmine Action, CCW Discussion Paper on 'Factors and types of munitions that cause humanitarian problems after a conflict', op cit, p. 1.

21 For more information about classifying injuries from different types of weapons, the following sources are useful. On wound classification see Robin M. Coupland, The Red Cross Wound Classification, (Geneva, International Committee of the Red Cross, 1991). Some elements of this publication are summarised in the text box on this page. Also useful is an article by Coupland and Hans O. Samnesgaard, 'Effect of type and transfer of conventional weapons on civilian injuries: retrospective analysis of prospective data from Red Cross hospitals,' as well as Coupland's article, 'Clinical and legal significance of fragmentation of bullets in relation to size of wounds: retrospective analysis,' both in The British Medical Journal, (Volume 319), (14 August, 1999), pp. 410 – 412 and pp. 403 – 406.

22 See Landmine Action, Explosive Remnants of War: the Global Problem – Preliminary Findings, op cit.

23 See ICRC, Explosive Remnants of War: Submunitions & Other Explosive Ordnance – A Study, op cit, p. 26.

24 See Landmine Action, Explosive Remnants of War: Unexploded Ordnance and Post-Conflict Communities, op cit, p. 23.

25 See Human Rights Watch, Memorandum to Delegates to the Convention on Certain Conventional Weapons' Group of Governmental Experts on Explosive Remnants of War – Cluster Munitions: Measures to Prevent ERW and to Protect Civilian Populations, (Human Rights Watch, Geneva, March 2002), p. 3. Saudi Arabia has not been included in the Survey because it appears not to have suffered socio-economic impacts from ERW as these are found in sparsely populated northern border areas.

26 See Landmine Action, Explosive Remnants of War: Unexploded Ordnance and Post-Conflict Communities, op cit, p. 49.

27 See ICRC, Explosive Remnants of War: Submunitions & Other Explosive Ordnance – A Study, op cit, p. D-2. Accidents in the Falkland Islands earned BL-755 submunitions a reputation for being very unpredictable when unexploded, according to the ICRC. Failure rates here, and in former Yugoslavia, appear to be in the region of 20 per cent, in its estimation. Our research supports this view, and failure rates could be even higher in other conflicts when BL-755 submunitions have been deployed, for instance by Ethiopian forces in its conflict with Eritrea in 2000.

28 Ibid, p. 36.

29 See GICHD, Explosive Remnants of War (ERW): Undesired Explosive Events in Ammunition Storage Areas, (Geneva, GICHD, November 2002).

30 See Rae McGrath, Cluster Bombs: the Military Effectiveness and Impact on Civilians of Cluster Munitions, (London, UK Working Group on Landmines/Landmine Action, 2000), pp. 38 – 41.

31 See Landmine Action, Explosive Remnants of War: Unexploded Ordnance and Post-Conflict Communities, op cit, pp. 50 – 53.

32 See UNOCHA, Multi-Country Action Study: Angola – the Development of Indigenous Mine Action Capacities, (1997), for detailed background: http://www.mineaction.org/countries/ref_docs.cfm?doc_ID=269&country_ID=489.

33 MAG clearance figures would appear to include abandoned stockpile disposal in their total numbers. This perhaps helps to account for very large numbers of UXO encountered as opposed to mines, at least at Kuvelai in Cunene (9,106 items of UXO as opposed to 131 mines). There is no doubt, however, from MAG's 2001 figures for other areas, in Moxico for instance, that a huge proportion of total clearance is that of unexploded remnants rather than mines. Intersos, an NGO working in Huila and Kuando provinces has undertaken battlefield clearance in these regions, and has almost entirely encountered and cleared UXO (47,019 compared with 77 mines). All figures quoted are from 2002 Landmine Monitor, pp. 70-72.

34 41 per cent of known victims were from AVM-related incidents, and 40 per cent the result of APM. Ibid, p.74.

35 UNMAS, Inter-Agency Assessment Mission Report, Burundi, http://www.mineaction.org/countries/_refdocs.cfm?doc_id=266&country_id=492.

36 Ibid.

37 2002 Landmine Monitor, p. 541.

38 UN Integrated Regional Information Network report of 26 March 2001, posted 30 March, available online at http://www.who.int/disasters/repo/6489.doc.

39 Survey Action Centre/Handicap International, Landmine Impact Survey: Republic of Chad, (Washington D.C., Survey Action Centre, 2001), p. 7.

40 Nearly half of these communities have estimated populations of 500 or less, and more than two-thirds have populations of 1,500 or less. Ibid, p. 15.

41 Ibid, p. 13.

42 Ibid, p. 25.

43 Chad's National High Commission for Demining (HCND) reported to 2002 Landmine Monitor report that 645,663 square metres of land were cleared, destroying 28,781 ERW, 2,228 APM and 2,112 AVM in the process. See 2002 Landmine Monitor, p. 167.

44 Survey Action Centre/Handicap International, Landmine Impact Survey: Republic of Chad, (Washington D.C., Survey Action Centre, 2001), p. 33. It should be noted that in the table in the report on which this graph is based, reference is made only to mines. However, we have interpreted this to include other forms of unexploded munition as well, since the Landmine Impact Survey makes little actual distinction between mines and ERW, and disaggregation here would appear to be inconsistent with the other data presented. In other words, we believe that although reference is made to mines, we believe the authors of the Landmine Impact Survey also meant ERW, and in any case we do not see how they could draw a distinction given the level of data that seemed to be available to them.

45 Chad's National High Commission for Demining (HCND) reported to 2002 Landmine Monitor report that 645,663 square metres of land were cleared, destroying 28,781 ERW, 2,228 APM and 2,112 AVM in the process. See 2002 Landmine Monitor, p. 167.

46 Ibid, p. 33.

47 UNMAS, Country Profile, Democratic Republic of Congo, accessible online at: http://www.minaction.org/countries/countries_overview.cfm?country_id=497.

48 2002 Landmine Monitor has noted, for instance, that anti-personnel mines appear to have been used in 'many different parts of the country' (p. 196).

49 Ibid, p. 202.

50 See UN Organisation Mission in the Democratic Republic of the Congo (MONUC), Democratic Republic of Congo: Work Plan 2002, available online at: http://www.minaction.org/countries/_refdocs.cfm?doc_ID=705&country_id=497.

51 United States Department of State, To Walk the Earth in Safety: the United States commitment to humanitarian demining – 2002, available online at: http://www.state.gov/t/pm/rls/rpt/walkearth/2002/14869.htm#djibouti.

52 2002 Landmine Monitor, p. 233.

53 See Rae McGrath, Cluster Bombs: the Military Effectiveness and Impact on Civilians of Cluster Munitions, op cit, p. 41.

54 For further information about ERW in the Korokon camp, see Landmine Action, Explosive Remnants of War: Unexploded Ordnance and Post-conflict Communities, op cit, pp. 50 – 53.

55 See 2002 Landmine Monitor, p. 250.

56 See ICRC, 'Eritrea: ICRC community-based mine/unexploded ordnance awareness programme', available online at: http://www.icrc.org/Web/siteeng0.nsf/iwpList74/D648562285F6A227C1256CB80047.

57 Quoted in 2002 Landmine Monitor, p. 250.

58 This figure is an aggregate prepared by UNMEE, quoted in 2002 Landmine Monitor, p. 253. Landmine Monitor also contains quite detailed figures of the munitions being cleared by various demining agencies, and these numbers also confirm that large quantities of ERW are being cleared.

59 For further information see: http://www.sac-na.org/surveys_eritrea.html

60 See UNMEE S/2001/1194, Progress Report of the UN Secretary-General on Ethiopia and Eritrea, 13 December 2001, available online at: http://www.mineaction.org.

61 See 2002 Landmine Monitor, p. 257.

62 UN Mine Action Service, Country Profile, Eritrea, available online at: http://www.mineaction.org/countries/countries_overview.cfm?country_id=498.

63 UNMEE MACC Weekly Update: 10 February 2003. Available online at: http://www.mineaction.org/countries/_refdocs.cfm?doc_id=1077&country_id=498.

64 ICRC, 'Eritrea: ICRC community-based mine/unexploded ordnance awareness programme', op. cit.

65 Susanna Sprinkel, 'Ethiopia, Meet Eritrea: an Overview of the Landmine Situation in Ethiopia and Eritrea as a Result of the Border Conflict,' Journal of Mine Action, (Issue 6.2), available online at: http://www.hdic.jmu.edu/journal/6.2.

66 UN Mine Action Service, Country Profile, Ethiopia, available online at: http://www.mineaction.org/countries/countries_overview/cfm?country_id=499.

67 See Rae McGrath, Cluster Bombs: the Military Effectiveness and Impact on Civilians of Cluster Munitions, op cit, p. 41.

68 UNMEE Press briefing, 5 April 2002. See http://www.un.org/depts/dpko/unmee/pc050402.pdf.

69 For further information see: http://www.sac-na.org/surveys_ethiopia.html.

70 See 2002 Landmine Monitor, p. 285.

71 See 2001 Landmine Monitor, pp. 77-78.

72 United States Department of State, To Walk the Earth in Safety: the United States commitment to humanitarian demining – 2002, available online at: http://www.state.gov/t/pm/rls/rpt/walkearth/2002/14869.

73 Quoted in 2002 Landmine Monitor, p. 287.

74 UN Mine Action Service, Country Profile, Guinea-Bissau, available online at: http://www.mineaction.org/countries/countries_overview.cfm?country_id=502.

75 2002 Landmine Monitor, p. 289.

76 Ibid, p. 290.

77 See 2002 Landmine Monitor, p. 323. 228 Masai and Samburu tribes' people also lodged a case against the British government in a London court, and in July 2002 received a £4.5 million out of court settlement.

78 Ibid, p. 324.

79 Quoted in 2001 Landmine Monitor, p. 88.

80 See 2002 Landmine Monitor, p. 326.

81 UN Mine Action Service, Mauritania: country profile, http://www.mineaction.org/countries/countries_overview.cfm?country_id=508.

82 2002 Landmine Monitor, p. 344.

83 UN Mine Action Service, 'Explosive Remnants of War – Experience from Field Operations: a Discussion Paper prepared by John Flanagan, former Programme Manager of the UN Mine Action Programme in Kosovo, for the United Nations Mine Action Service', (CCW/GGE/II/WP.13), (15 July 2002), p. 1.

84 Survey Action Centre/Canadian International Demining Corps, Landmine Impact Survey: Mozambique, (Washington D.C., Survey Action Centre, 2001), p. 28.

85 See http://www.sca-na.org/surveys_mozambique_executive_summary.html.

86 2002 Landmine Monitor, p. 359.

87 See http://www.sca-na.org/surveys_mozambique_executive_summary.html.

88 UNDP/GICHD, 'Case Study of Mozambique', in Socio-Economic Approaches to Mine Action, op cit, p. 150.

89 United Nations Mine Action Service, Joint Assessment Mission Report: Namibia, (13 March 2000), p. 5.

90 Ibid, p. 10.

91 2002 Landmine Monitor, p. 364.

92 Exact figures are not available. Other estimates put the number of fatalities at up to 1,674, with 128 injuries. See Geneva International Centre for Humanitarian Demining, Explosive Remnants of War (ERW): Undesired Explosive Events in Ammunition Storage Areas, op cit, p. 37.

93 See 2002 Landmine Monitor, p. 386.

94 GICHD, Explosive Remnants of War (ERW): Undesired Explosive Events in Ammunition Storage Areas, op cit, p. 10.

95 Harold Lockwood, Aquaconsult (UK), Presentation on Nigeria Ammunition Dump Explosion to the Ottawa Mine Ban Convention Standing Committee on Stockpile Destruction, (30 May 2002), available online at: http://mineaction.org/countries/_refdocs.cfm?country_id=394.

96 2002 Landmine Monitor, p. 194.

97 J.J. Scott, 'Landmines in Africa: Rwanda Country Profile', Journal of Mine Action, (vol. 6 no. 2) (Summer 2002), available online at: http://www.maic.jmu.edu/journal/6.2.

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101 UN Mine Action Service, United Nations Mine Action Service country report, Sierra Leone, available online at: http://www.mineaction.org/countries/countries_overview.cfm?country_id=279.

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108 Ibid.

109 See 2001 Landmine Monitor, pp. 261-262, and 2002 Landmine Monitor, p. 745.

110 2002 Landmine Monitor noted 'it appears that mine clearance is occurring only in north-west Somalia, in the self-declared Republic of Somaliland' (p. 745). However, in its country profile for Somalia, the UN Mine Action Service reported that NGOs and some commercial demining companies are carrying out clearance. In addition, a Landmine Impact Survey is underway. See http://www.mineaction.org/countries/countries_overview.cfm?country_id=513.

111 Quoted in 2002 Landmine Monitor, pp. 853-854.

112 Ibid, pp. 854-855. See also http://www.mag.org.uk/magtest/magwproj/projsom.htm.

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117 OSIL reported that between April 2001 and March 2002 it cleared 21,531 pieces of ERW, compared with 125 AVM and 439 APM. See 2002 Landmine Monitor, p. 579.

118 Ibid, p. 581.

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122 Intervention by Zambia's Permanent Representative to the United Nations in Geneva at the Ottawa Treaty Standing Committee on Mine Clearance, 29 January 2002. Reference in the 2002 Landmine Monitor, p. 528

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124 UN Mine Action Service, Mine Action Assessment Mission Report, Republic of Zambia, op. Cit, pp. 10-11.

125 See Colombia's profile in the Americas section of this Survey for more details. The other 8 per cent of UXO incidents, as defined by the Colombian Anti-Personnel Mine Observatory, resulted from abandoned gas cylinders.

126 For further background, see the Colombia entry in 2002 Landmine Monitor.

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128 'Colombia: the landmine and UXO threat and its impact', UN Mine Action Service website: www.mineaction.org/countries/countries_overview.cfm?country_id=495.

129 2002 Landmine Monitor, p. 188.

130 Table uses figures from Colombian Anti-Personnel Mine Observatory, 'Anti-Personnel Mines in Colombia', December 2001, quoted in 2002 Landmine Monitor, p. 189. It is not known whether this is a total estimate of such incidents for that period in Colombia.

131 UN Inter-Agency Assessment Mission Report, Ecuador, (UNMAS, 15 November 1999), p. 3 of 18.

132 Ibid, p. 15 of 18.

133 2002 Landmine Monitor, p. 239.

134 2002 Landmine Monitor, p. 242.

135 Ibid, p. 245.

136 Ibid, p. 246.

137 GDP and GDP per capita estimates are from the CIA Fact Book entry for this territory. GDP is based on a 1996 estimate, GDP per capita on a 1995/1996 financial year estimate.

138 2002 Landmine Monitor, p. 821.

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145 Honduras' initial Article 7 report to the Ottawa Treaty, as reported by 2002 Landmine Monitor, p. 294.

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148 2001 Landmine Monitor, p. 363.

149 United Nations Inter-Agency Assessment Mission Report, Nicaragua, p. 8.

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151 2002 Landmine Monitor, pp. 376-377.

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156 2002 Landmine Monitor, p. 405.

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159 Susan Willet, Participatory Monitoring of Humanitarian Mine Action, UNIDIR, 2002, op cit, p. 98.

160 Handicap International Belgium, Living with UXO: Final Report, 1997, p.26.

161 According to Landmine Action, 51 per cent of deaths and injuries between August 2000 and the end of July 2001 were as a result of mines, and 49 per cent from explosive remnants. See Landmine Action, Explosive Remnants of War: Unexploded Ordnance and Post-Conflict Communities, op cit, p. 18.

162 Ibid, p. 42.

163 Handicap International Belgium, Living with UXO: Final Report, 1997, p. 26.

164 Note that it is unclear what the upper age limit of this group is in the figures being discussed. Our impression from Handicap International Belgium's report Living with UXO is that the 'children' category applies to those 15 years of age or under (page 21). However, it should be pointed out that Handicap International's 'Accident Form' (listed in Annex C of that publication) does not specify an age range for children affected, although there is a data box for age.

165 Masahiro Morikawa, Sebastian Taylor and Marjie Persons, 'Death and injuries due to unexploded ordnance (UXO) in northern Lao PDR (Laos)', Injury: International Journal of the Care of the Injured, (vol. 29, No. 4, 1998), pp. 301 – 304, p. 303.

166 Landmine Action, Explosive Remnants of War, op cit, p. 44.

167 UNDP/GICHD, A Study of Socio-Economic Approaches to Mine Action, op cit, p. 125.

168 See Durable Solutions Progress Report No. 6 – The Bulletin of the United Nations Inter-Agency IDP Working Group, (4 September 2002), in UNHCR's IDP Return update of 2 October 2002, http://www.peaceinsrilanka.org/insidepages/RRR/UNHCR/UNHCR6.asp. This working group estimates that from January to July 2002 some 128,000 IDPs returned home, relocated elsewhere or were in transit.

169 For more details see the Survey Action Centre's updates at http://www.sac-na.org/surveys_afganistan.html.

170 The main types of American cluster submunition used, according to a Human Rights Watch team, were the BLU-87 (a veteran of the 1991 Gulf War and Kosovo) as well as the 'wind-corrected BLU-103 and smaller numbers of BLU-99s, BLU-100s and JSOW-As. See Fatally Flawed: Cluster Bombs and Their Use by the United States in Afghanistan, op cit.

171 Afghanistan – Preliminary Needs Assessment for Recovery and Reconstruction, (UNDP/World Bank, 15/1/02), http://www.mineaction.org/countries/_refdocs.cfm?doc_ID&country_id=524.

172 UNMACA figures, supplied January 2003. In October and November 2001, American and coalition forces dropped cluster dispensers containing BLU-97 submunitions on a range of targets in Afghanistan in support of Northern Alliance military action against the Taliban. Unexploded submunitions are assessed by MACA as 'extremely hazardous', and have been the cause of 112 incidents throughout the country. The clearance of these munitions has become a priority issue for the Afghan demining effort, and the status of clearance is shown in the table. Remaining uncleared strikes are in remote areas that are inaccessible in winter, or else inaccessible for security reasons.

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175 Afghanistan – Preliminary Needs Assessment for Recovery and Reconstruction, op. cit.

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178 Ibid.

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181 Ibid.

182 Ibid.

183 GICHD and ICRC, discussion paper for the Group of Governmental Experts established by the Second review Conference of the CCW (CCW/GGE/I/WP.5), May 2002, p 42.

184 Rohan Maxwell, 'Cambodia: a country profile' in Landmines in Asia and the Pacific, The Journal of Mine Action, issue n°5.1, Internet document: http://maic.jmu.edu/journal/5.1/index.htm.

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187 Reuben McCarthy, 'Mine/UXO Casualties and Casualty Surveillance in Cambodia', in Landmines in Asia and the Pacific, op cit.

188 Susan Willett (Ed.), Participatory Monitoring of Humanitarian Mine Action: Giving Voice to Citizens of Nicaragua, Mozambique and Cambodia, op cit, p. 99.

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