KING'S College LONDON

How to achieve a post-landmine world

Policy briefing

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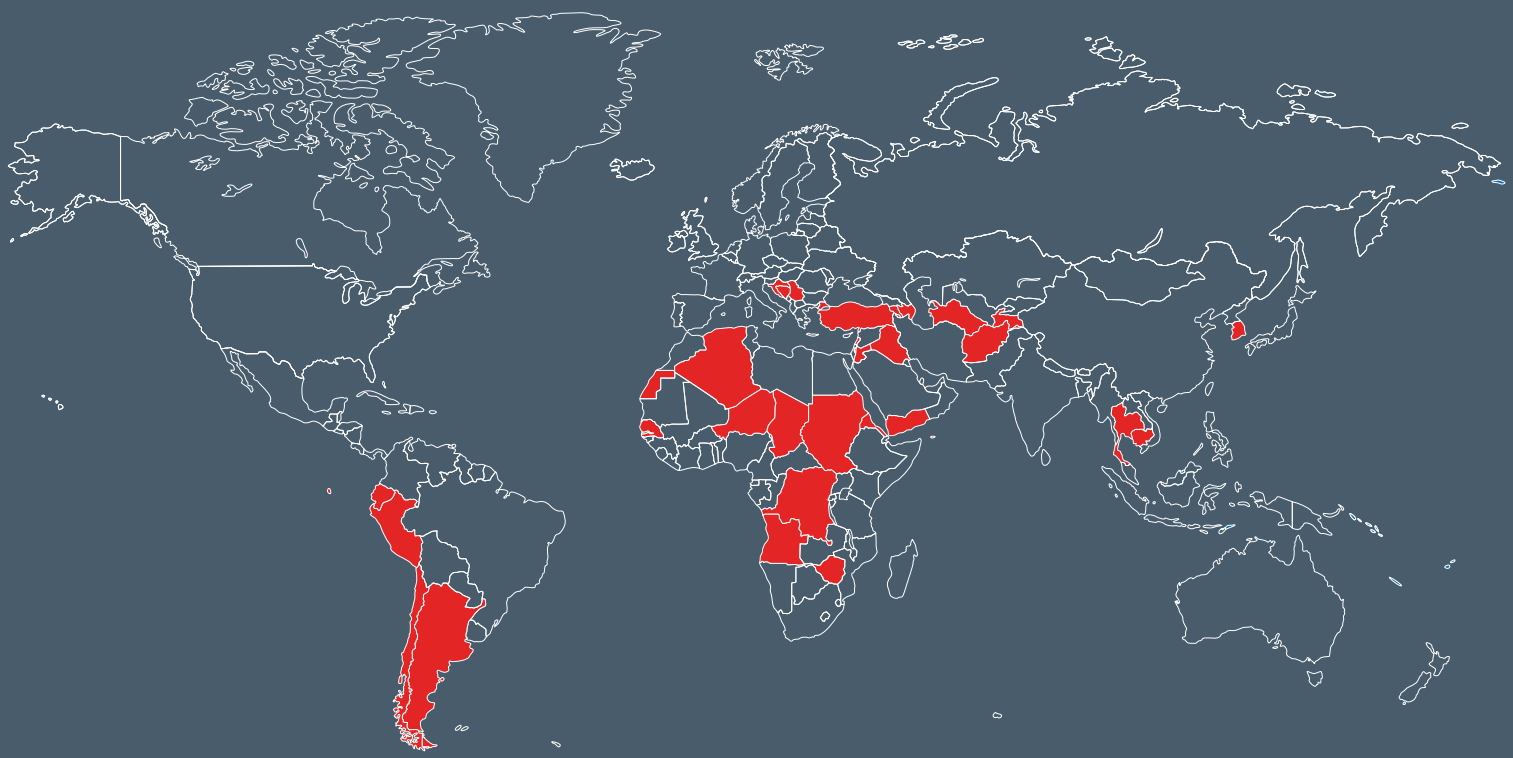


Countries and territories still affected by landmines

The Policy Institute at King's

Front-cover image, and graphics on page 12, adapted from designs by Freepik.

Source for front-cover map data: Landmine & Cluster Munition Monitor (2015) *Landmine Monitor 2015*, p. 18.

Summary

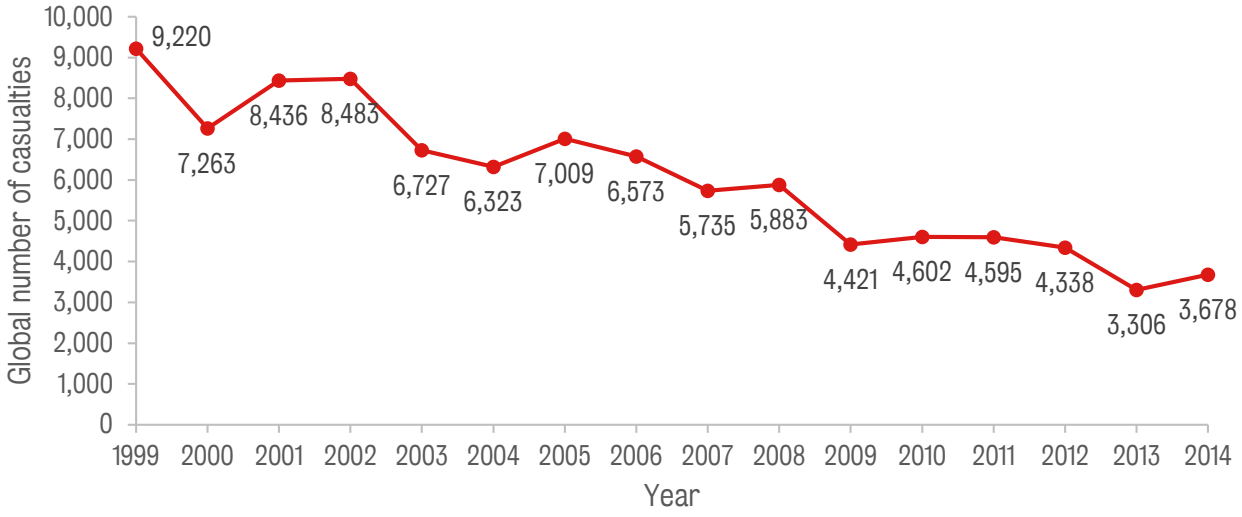
Landmines are a persistent and complex problem. Although numbers have declined significantly in the last two decades, landmines still affect almost 30 per cent of countries, and have caused an average of 3,856 casualties per year from 2010-14.[1] Landmines still pose a serious and global problem despite the work of engineers, NGOs, and policymakers, who have made real headway in the last 20 years, reducing both the number of landmines deployed, and their use, as shown by Figure 1.[2]

While the inroads made against the 'landmine problem' have been enormously impressive, the problem still persists. Landmines laid in previous conflicts have not yet been removed, often in the most challenging of environments, and continue to cause casualties. More worryingly still, new landmines are being deployed by both state and non-state actors.

There is then still work to be done. As in other fields, the last 10 per cent is often the hardest: as a problem attenuates, so public interest and funding declines, only for the problem to be eclipsed by other more pressing issues. In the case of landmines, the problem has been somewhat dwarfed by refugee crises, the rise of so-called Islamic State, and a host of other intransigent issues.

Landmines still pose a problem that is complex, seen in different terms by different players, and therefore defies a clear solution. Furthermore, the rise of asymmetric threats such as improvised explosive devices (IEDs) has perpetuated the problem of landmines, and complicated existing efforts by the mine action industry to counter them.

Figure 1: Global casualties from landmines 1999-2014



1 The 'Global total [number of casualties] caused by mines, victim-activated improvised explosive devices that act as anti-personnel mines, cluster munition remnants and other explosive remnants of war', *Landmine Monitor 2015*. (Accessed: 15/07/16: http://www.the-monitor.org/en-gb/reports/2015/landmine-monitor-2015/major-findings.aspx)

2 Data sourced from *Landmine Monitor* reports, 1999-2014. (Accessed: 15/07/16: http://www.the-monitor.org/en-gb/our-research/landmine-monitor.aspx)

To gauge stakeholder opinion on how new advances in technology can be integrated into demining operations, the Policy Institute at King's brought together academics, NGOs, politicians, policymakers and UK businesses to a 'Policy Lab'. Throughout the discussions, there was a particular focus on the mounting barriers to safer, cheaper and more efficient demining. Participants raised four key issues:

1. The systemic lack of communication between different stakeholder groups in the mine action industry.

2. The inadequacy of existing data attempting to quantify the extent of global landmine contamination.

3. The continuing need for new, particularly internet-based, developments in technology to be focused on landmine detection and the land release process.

4. The increasing rise of the IED threat, which targets vulnerable citizens but has also altered the contexts in which landmines are used.

Together, these four issues represent a major roadblock for stakeholders in the mine action industry on the path to achieving a post-landmine world. Nevertheless, with a more holistic vision and targeted investment, these issues can be overcome. In this policy briefing, we explore each of the four issues raised by participants of the Policy Lab, to make recommendations for future research and investment in the mine action industry.

Recommendations:

- **Communication:** Sustained communication and cooperation between different stakeholder groups must be encouraged in order to develop a shared understanding of the nature of the landmines problem.

- **Comprehensive data:** The adequacy of data used to support key research areas, such as the extent of landmine contamination in the world today and number of casualties caused by explosive threats, needs to be improved by standardising metrics for data collection.

- **Continue R&D investment in internet-based solutions:** Future donor investments should continue to be targeted towards the development of internet-based landmine detection technologies and the land release process, to save costs, effort and time for NGOs and on-the-ground demining organisations.

- **Consider the IED threat:** The mine action industry must also consider how IED detection and destruction activities can be integrated into future guidelines and standards for NGOs and commercial demining organisations.

1 | Communication
Landmines are a 'wicked problem'

Although the work of stakeholders across the mine action industry has yielded successful results, with an impressive global yearly average of 48,235 acres of contaminated land being cleared between 2010 and 2014 alone,[3] the question still remains: why have we not yet achieved a post-landmines world?

A crucial aspect of this challenge is the fact that landmines are characteristic of what public policy analysts refer to as 'wicked problems'. Extremely complex and impossible to address without creating further problems, wicked problems require an approach as multifaceted as their symptoms. Rittel and Webber,[4] in their seminal treatise on planning policy, identified 10 characteristics of wicked problems which are also distinctive to landmines (Figure 2).

At heart, it is the multiple stakeholders and their perspectives that have made landmines a wicked problem. This is further complicated by diverse stakeholder motivations, be it to generate funding or gain public recognition. Ultimately, these different frames have conspired to impede a stakeholder-wide consensus on the landmines problem, preventing the development of holistic solutions.

Given the complexity of this wicked problem, there is a real need for stakeholders to better communicate and coordinate their approaches to effectively reduce landmine contamination. For example, symbiotic relationships in which engineers develop demining technology informed by NGO requirements, and in which NGOs are aware of new technological developments pursued in universities, must be encouraged. International coordinating bodies, such as the United Nations, must also recognise the priorities of both engineers and NGOs in order to guide the mine action community. Sustained communication between stakeholders is crucial for fostering a shared understanding of the nature of the landmines problem. This can also encourage the development of stronger relationships between diverse stakeholder groups, and facilitate the transfer of information and ideas, which are essential for the future development of holistic solutions.

Figure 2: Landmines as a wicked problem

1. **No definitive formulation**
   Stakeholders do not agree
2. **No 'stopping rule'**
   Landmines are a continuous and multifaceted problem
3. **Solutions are not 'true' or 'false', but 'good' or 'bad'**
   Stakeholder judgements of the landmines problem depend on individual or organisational value-sets
4. **No immediate or ultimate test of a solution**
   Solutions require long-term investments unlikely to yield immediate returns
5. **Every attempted solution is a 'one shot' operation**
   There is no opportunity to learn what works by trial-and-error
6. **No enumerable set of potential solutions**
   Instead, standardised foundations must be built
7. **Essentially unique**
   No two areas are contaminated by landmines in the exact same way
8. **A symptom of another problem**
   Landmines arise from conflict, and generate further complications themselves
9. **The choice of explanation determines the nature of the problem's resolution**
   The 'world view' of stakeholders is the strongest determining factor for solving the landmines problem
10. **The planner has no right to be wrong**
    Stakeholders are liable for the consequences they generate, and negative consequences are met with little tolerance

3 Landmine & Cluster Munition Monitor (2011-15) *Landmine Monitor.* (Accessed: 15/07/16: http://www.the-monitor.org/en-gb/our-research/landmine-monitor.aspx)

4 Rittel, H. W. J. and Webber, M. M. (1973) 'Dilemmas in a General Theory of Planning, *Policy Sciences*, 4, pp. 155-169.

2 | Comprehensive data
Improving the adequacy and provision of data

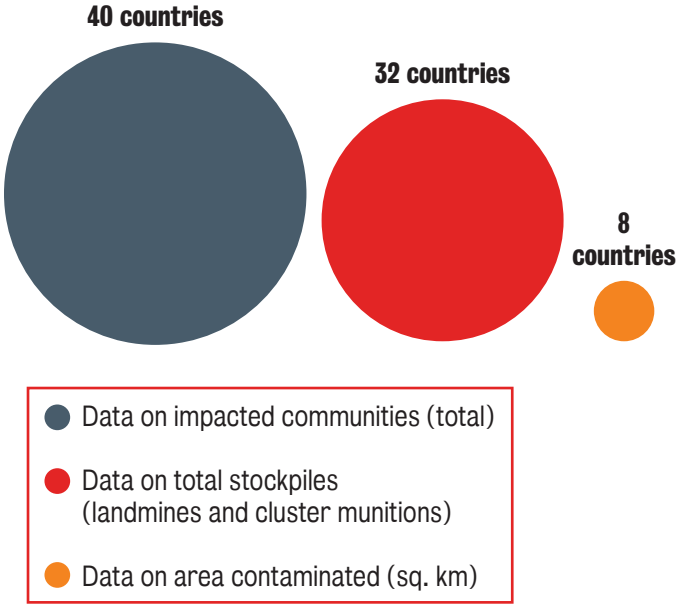
In among stakeholder debate about the nature of the landmine problem, agreement has emerged on one issue in particular: that the lack of comprehensive and reliable data recording the extent of landmine contamination and clearance represents a crucial barrier to achieving a post-landmines world.

Although innovative resources for data collection, including the cutting-edge Mine Intelligence Tool developed by the Geneva International Centre for Humanitarian Demining (GICHD) and the World DataBank resource, have improved the process considerably, the actual extent of global landmine contamination remains impossible to accurately determine. Factors including critical gaps in the existing data, the sensitive nature of this information, and the lack of standardised metrics applied for data collection, have resulted in consolidated databases remaining few and far between.

A key example of such inadequacies in data provision is the World DataBank of Landmine Contamination, Casualties and Clearance,[5] launched in 2011 as part of the World Bank Open Data Initiative. This resource has recorded the impact of mines and unexploded ordinance (UXO) in the communities of approximately 199 countries, synthesising data on the size of contaminated areas, the rate of clearance and extent of funding for demining.[6] Nevertheless, critical gaps in the data remain; a problem identified by stakeholders in the Policy Lab discussions as characteristic of other databases, such as the Landmine Monitor.

The World DataBank resource includes data from two sources cited prolifically by organisations in the mine action industry: Landmine Monitor and the United Nations Mine Action Team (UNMAT). However, both sources record contrary data on the geographic extent of global landmine contamination, and the degree of cluster munition and landmine stockpiles in different countries. In addition, both are fraught with inconsistencies. Figure 3 illustrates the notable lack of any data recording areas contaminated by landmines. Although the World DataBank includes just eight countries, the Landmine Monitor independently reported in the same year that a total of 66 states and seven other areas were affected by landmines.[7]

Figure 3: Gaps in the data: Landmine Monitor



5 World Bank, 'Landmine Contamination, Casualties and Clearance Database'. (Accessed: 10/5/16: http://data.worldbank.org/data-catalog/landmine-database)

6 Smith, J. (2011) 'New Database Provides Resource for Mine-action Community', *The Journal of ERW and Mine Action*, 15:3, pp. 33-34.

7 International Campaign to Ban Landmines (2010) *Landmine Monitor 2010.* (Accessed: 10/5/16: http://www.the-monitor.org/media/1641811/Landmine_Monitor_2010_lowres.pdf)

Gaps in data recorded by UNMAT are even more startling, since data recording the extent of global landmine contamination and total stockpiles of mines and cluster munitions, as illustrated by Figure 4, is non-existent. Further discrepancies within the World DataBank are evident in analysis of the data recording the number of communities impacted by landmines. Surprising inconsistencies between the data recorded by Landmine Monitor and that of UNMAT raise questions about the reliability of both sources. These gaps in the data are problematic, precisely because they make the extent of damage caused by landmines even harder to determine. If one dataset demonstrates that some communities are more threatened by landmines than others, yet other datasets suggest the opposite conclusion, it is even more difficult for NGOs and commercial demining organisations to prioritise areas where costly clearance or detection resources should be allocated.

Figure 5 presents some of the World DataBank figures sourced from Landmine Monitor, which record the number of communities that have been impacted by landmines in 40 countries. This comprehensive database contains more detailed information than the data recorded by UNMAT, which records the same variable in just 21 countries. Such discrepancies in the data recording community impact provide further evidence to suggest that this dataset is limited in its ability to pronounce on the current extent of landmine contamination.

Stakeholders representing a range of different mine action industry sectors suggested in the Policy Lab that the pursuit of comprehensive data is an essential first step for improving demining processes. This analysis suggests there is a long way to go before the evidence base approaches a satisfactory standard. Yet, without an effective synthesis of comprehensive data, key areas for research and investment will be difficult to prioritise, and stakeholder judgements about the nature of the problem will remain as fractured as ever.

This is of particular concern for international coordinating agencies, commercial demining companies and NGOs, all of which require as much information as possible in order to plan operations detecting and removing landmines.

Figure 4: Number of countries covered by UNMAT data

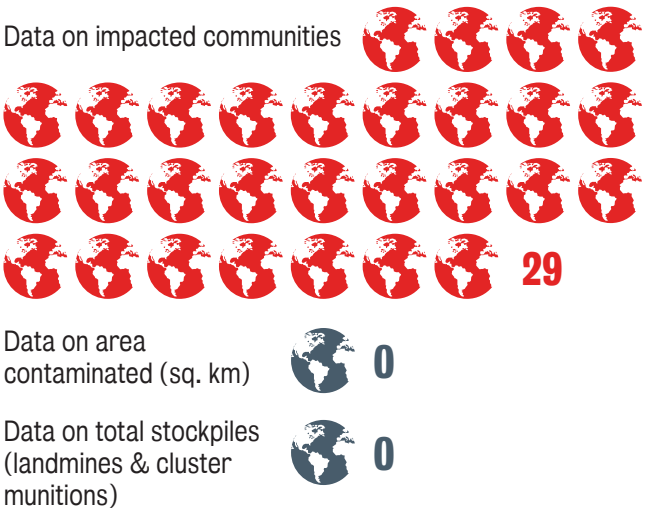
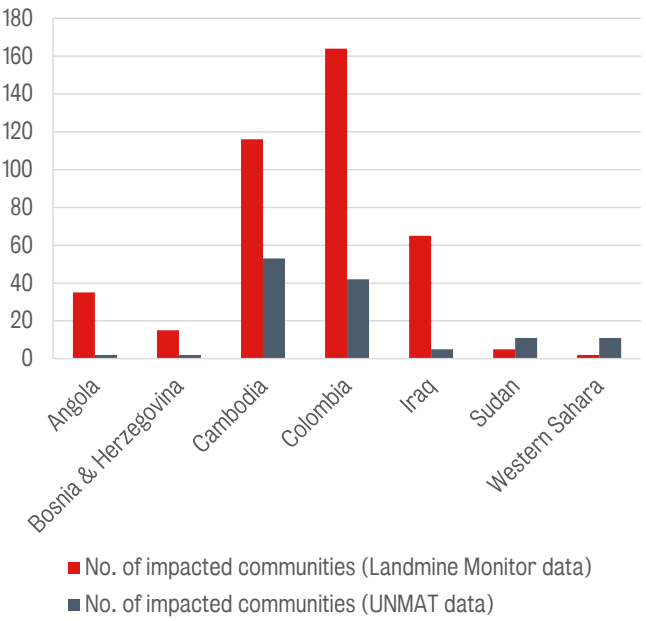


Figure 5: Discrepancies between data on total communities impacted by landmines, recorded by World dataBank



3 | Continue R&D investment in internet-based solutions

Investing in online technologies for detection and land release

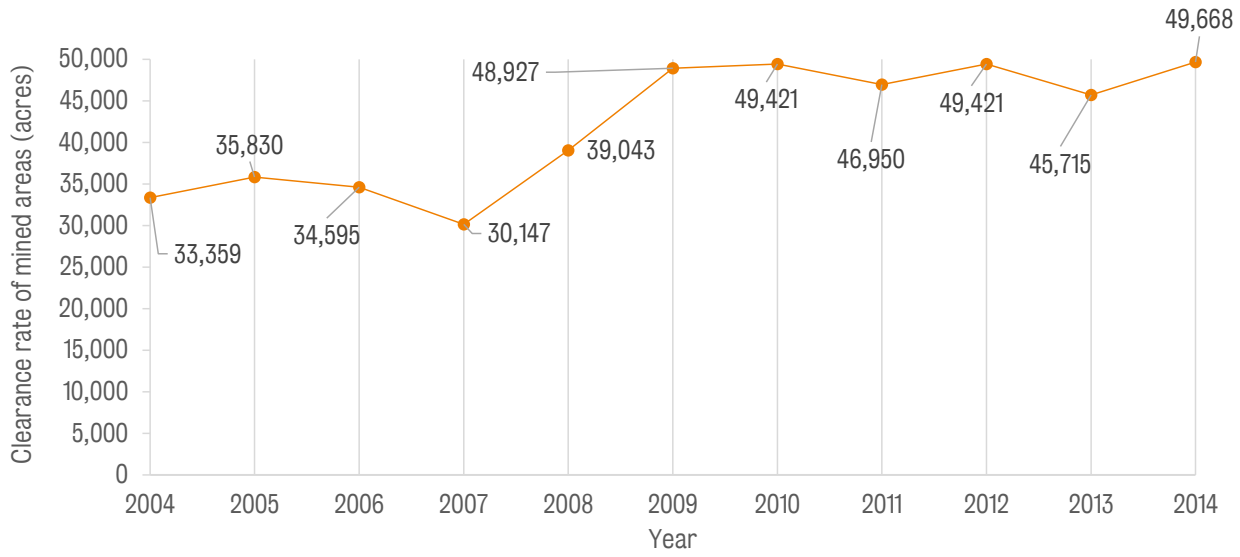
Findings from the Policy Lab emphasised the importance of allocating donor investments towards the development of internet-based solutions. In particular, this should be targeted in two key areas: landmine detection technology and the land release process.

Over the past 10 years, commercial businesses and research engineers alike have pioneered the development of cheaper, safer and more efficient technologies which have positively impacted the rate of landmine clearance, as illustrated by Figure 6.[8] Nevertheless, a consensus emerged between stakeholders that funding should be increasingly focused on how technology can be used to improve mine detection instead of clearance, when discussing future areas for mine action investment.

A key point of discussion on this topic focused on ways in which the land release process could be improved. Land release seeks to detect mines remotely in suspected areas. Through both technical and non-technical surveys of affected areas, land release processes determine whether land thought to be contaminated qualifies for manual clearance. As depicted in Figure 7 (over page),[9] processes of land release are significantly more economical than those which seek to clear mines manually, by viewing clearance options as expensive last resorts.

It was suggested by stakeholders that through information-gathering, aggregating survey results and analysing historical data, the land release process provides a compelling evidence-

Figure 6: Total global rate of landmine clearance



8 Source for data: Landmine & Cluster Munition Monitor (2005-2015) *Landmine Monitor.* (Accessed: 2/6/16: http://www.the-monitor.org/en-gb/reports/2005/landmine-monitor-2005.aspx)

9 Information taken from: GICHD, 'Evolution of the Land Release Pyramid'. (Accessed: 27/5/16: http://www.gichd.org/mine-action-topics/land-release/#.V0hfhBUrLVo)

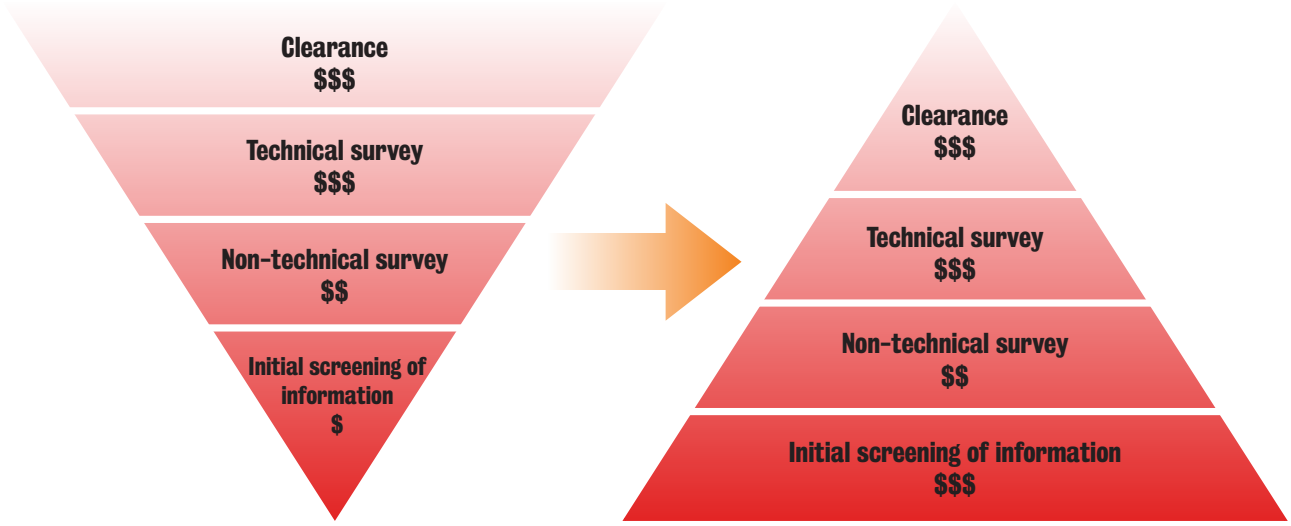
based approach to determining whether land can be returned to affected communities, or subjected to clearance operations.

Consequently, another key topic of stakeholder discussion focused on the importance of developing internet-based mine detection and information management systems, to ensure the accurate and comprehensive collection of data. The United Nations Mine Action Service (UNMAS) has prolifically indicated that data should be collected from previous discoveries of explosive hazards. However, many stakeholders pointed out in discussions that in order to acquire such information at a sufficiently rapid pace to improve efficiency, the development of cost-efficient methods of mine detection must be prioritised over technologies designed specifically for clearance purposes. By implication, one of the most cost-effective methods for data collection is through the application of online systems.

One such example of how online technologies can be applied to mine detection processes was highlighted in the Policy Lab. Internet-based systems such as Google Earth were noted by stakeholders as useful tools for mapping mined areas. To do so, satellite imagery, already implemented by NGOs such as the HALO Trust, is used to identify contaminated land, and necessarily, suspected areas which may or may not be contaminated by mines. Commercial demining companies and NGOs alike can hence 'release' land found to be unaffected by mines, and concentrate resources on suspected hazardous areas, saving additional costs, effort and time.

However, the effective use of Google Earth and satellite imagery represent just one example out of the countless possibilities which internet technologies can provide for landmine detection and clearance efforts. There is further work to be done to ensure that such cost-effective processes are prioritised by NGOs and international organisations in their demining efforts. For example, further engagement between the providers of such technology, and end-users on the ground should be encouraged, and more should be done to raise awareness among stakeholders of how exactly internet-based solutions can be applied to mine action.

Figure 7: Evolution of the land release pyramid



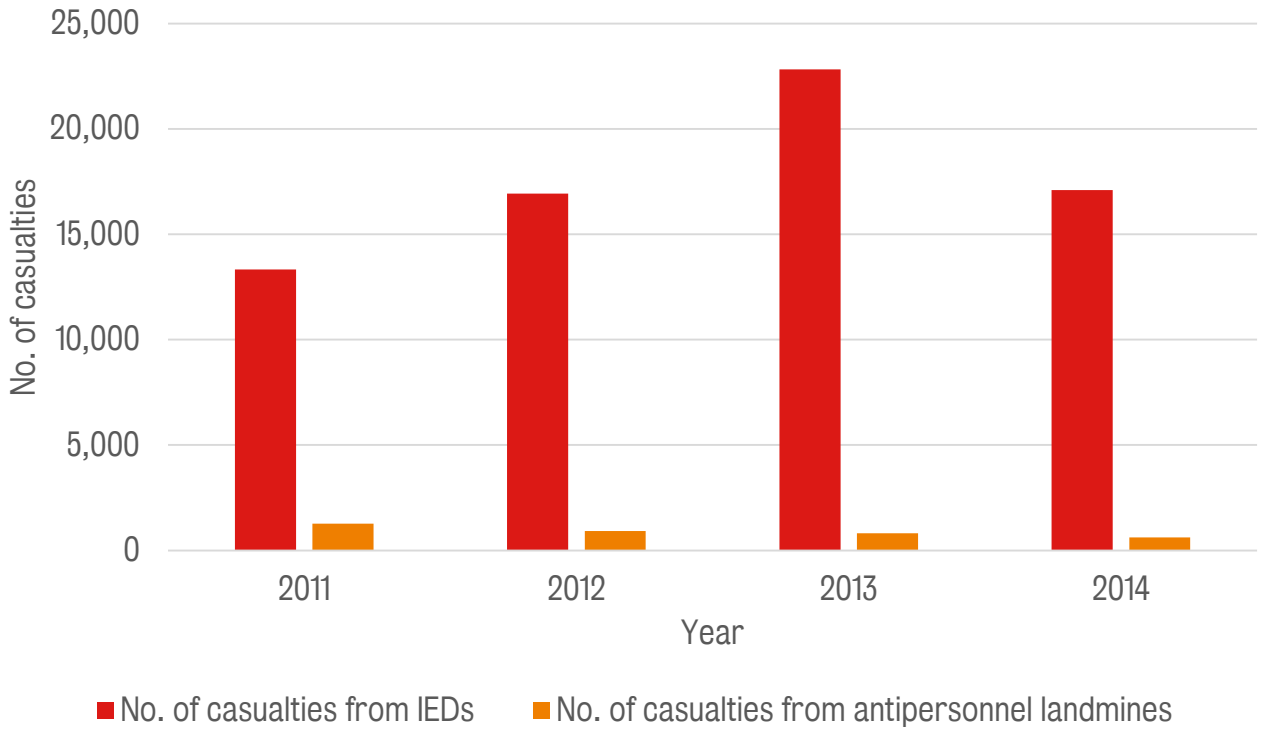
4 | Considering IEDs
Integrating the detection and destruction of IEDs into demining

A final area of concern raised by stakeholders was the threat increasingly posed by IEDs, particularly in countries already affected by landmines. Figure 8 illustrates the growing threat of IEDs in relation to antipersonnel landmines over the past four years. Action on Armed Violence's 'Explosive Weapons Monitor' has compiled the number of casualties from IEDs in 58 countries over the past four years, demonstrating a significant threat to civilian life.

Although antipersonnel mines clearly continue to pose a threat to civilian life, and efforts to detect and clear them must be sustained, Figure 8 shows that IEDs, which are also present in countries contaminated by landmines, are indeed a growing threat. Given this, it is imperative that organisations responsible for demining operations must also consider the threat of IEDs in their operations, to preserve the lives of civilians and deminers.

Figure 9 (over page) illustrates the sheer impact of IEDs on both civilian and military casualties in Afghanistan alone. The augmenting numbers of casualties over the past five years provides further evidence to suggest that this threat must be addressed as part of future humanitarian operations. IEDs themselves are also wicked problems which are difficult to define, and even more challenging to counter,

Figure 8: Comparative threats: casualties caused by IEDs and antipersonnel landmines



given the multifaceted nature of their design and deployment. Prolifically used by non-state actors in a bid to fundamentally alter the climate of conflict in multiple territories across the world, the intensity of threats caused by IEDs has grown significantly over recent years.

Moreover, the recent threats created by IEDs have also compounded the wicked problem of landmines, by making mine detection and removal in some countries even more difficult. The detection and destruction of IEDs does not currently fall within the remit of mine action, since international coordinating bodies have not yet established clear guidelines or standards for demining organisations to address this asymmetric threat. This ambiguity in the available guidelines for mine action has ignited debate among stakeholders over the extent to which demining operations should also consider the asymmetric threat of IEDs.

Given the lack of comprehensive guidelines or standards, it is clear that until such policies can be determined and implemented by the appropriate coordinating body, such as the UN or GICHD, demining organisations will continue to operate in increasingly dangerous and unpredictable environments.

Figure 9: Comparative threats: casualties caused by IEDs and antipersonnel landmines in Afghanistan

Year	Casualties from antipersonnel landmines	Casualties from IEDs
2014	52	809
2013	61	565
2012	34	987
2011	76	331
2010	128	383

5 | Ways forward for a post-landmines world

Communication

One of the key characteristics of a 'wicked problem' is the inability of stakeholders to agree on its nature. Without consensus among key sectors in the mine action industry, such as NGOs, international coordinating bodies, donors and commercial demining companies, holistic solutions to the 'landmine problem' will continue to be difficult to formulate. Events, such as the Policy Lab, which bring together stakeholders in specific discussions, are useful for creating an environment in which relationships between diverse stakeholders can grow, and solutions can be shared. At the centre of such initiatives is the recognition that increased communication in the industry is unequivocally beneficial.

Consider the IED threat

The increasingly complex threat of IEDs has made the detection and clearance of landmines in many countries significantly more difficult in recent years. Civilian casualties from IEDs are rapidly increasing, and international efforts to produce guidelines and standards for dealing with this threat are still non-existent. Consequently, mine action organisations, which continue to operate in dangerous and unpredictable environments, need to consider how IED detection and destruction can be integrated into demining procedures.

Comprehensive data

The analysis of this briefing alone has demonstrated the concerning gaps that exist within datasets which attempt to record the extent and impact of landmine contamination. This is just the tip of the iceberg; many databases which have commanded significant investment from donors also struggle to compile full sets of data on variables from community impact to the extent of national stockpiles. One step forward in the pursuit of better data, which itself is essential for end-users to determine how to allocate expensive resources such as information-management technology or mine clearance robots and drones, would be the standardisation of metrics for data collection.

Continue R&D investment in internet-based technology

The increasing adoption of land release processes has precipitated a shift in how the mine action industry approaches demining operations. This shift has witnessed a move from the frequent clearance of landmines, to the increase in efforts focused on surveying suspected areas and detecting mines instead. This approach is significantly more economical, reducing dependencies on costly robotics technology. However, cost-effectiveness could be improved even further with the application of internet-based systems to the land release process. Much work is yet to be done in raising awareness of how online, and even social media, resources can be harnessed by NGOs and demining organisations.

About this project

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About Policy Lab

Policy Lab, a specialist team based in the Cabinet Office, was set up in 2014 with the aim of bringing new approaches, tools and techniques to the work of UK Civil Service policymakers. A University of the Arts London review of how Policy Lab operated in the context of Civil Service reform, particularly the Open Policy Making agenda, found that Policy Lab encouraged the re-framing of policy problems and co-evolution of solutions. By co-evolving problems and solutions through iterative learning cycles, Policy Lab projects have engaged a range of people in the collective exploration of particular policy issues.

The Policy Institute at King's

The Policy Institute at King's College London acts as a hub, linking insightful research with rapid, relevant policy analysis to stimulate debate, inform and shape policy agendas. Building on King's central London location at the heart of the global policy conversation, our vision is to enable the translation of academic research into policy and practice by facilitating engagement between academic, business and policy communities around current and future policy needs, both in the UK and globally. We combine the academic excellence of King's with the connectedness of a think tank and the professionalism of a consultancy.

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