LANDMINE IMPACT SURVEY

THE REPUBLIC OF IRAQ

2004-2006

Implemented by the Information Management & Mine Action Programs

PROJECT ABSTRACT

The Landmine Impact Survey in Iraq summarizes the results of a socioeconomic survey of the affects of landmines and unexploded ordnance (UXO) on communities in that country. This survey was conducted over a two-year period, ending in late 2006.

This document is only one in a series of reports, which collectively constitute the Global Landmine Survey initiative. This initiative aims to catalog the socio-economic impacts caused by landmines and UXO and to store this data in a manner that supports strategic national planning and resource allocation decisions.

The following governments and organizations provided contributions to the survey:

Funding for the implementation of this project was provided by the Office of Weapons Removal and Abatement, U.S. Department of State.

Funding for the implementation of this project was provided by the European Union and the Government of Italy through the United Nations Development Programme (UNDP).

The project was implemented by the Information Management & Mine Action Programmes (iMMAP), formerly part of Vietnam Veterans of America Foundation (VVAF)/Veterans for America (VFA).

Quality assurance monitoring has been independently provided by the United Nations Mine Action Service (UNMAS).

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LIST OF ACRONYMS USED IN THIS REPORT

AP	Anti-personnel
AT	Anti-tank
CBU	Cluster Bomb Muntions
CM	Community Meeting
CTA	Chief Technical Advisor
DA	Dangerous Area
DC	Data Collector
DDG	Danish Demining Group
EC	European Commission
EOC	Expert Opinion Collection
EOD	Explosive Ordnance Disposal
ERW	Explosive Remnants of War
EU	European Union
FE	Field Editor
FN	False Negative
FNS	False Negative Sampling
FOB	Forward Operating Base
FP	False Positive
GICHD	Geneva International Centre for Humanitarian Demining
GIS	Geographic Information System
GPS	Global Positioning System
HMA	Humanitarian Mine Action
HQ	Headquarters
ICRC	International Committee of Red Cross
IMCO	Iraq Mine/UXO Clearance Organization
iMMAP	Information Management and Mine Action Programs
IMSMA	Information Management System for Mine Action
LEOC	Local Expert Opinion Collection
LIS	Landmine Impact Survey
MA	Mine Action
MoD	Ministry of Defense
MoU	Memorandum of Understanding
MRE	Mine Risk Education
NGO	Non-Governmental Organisation
NMAA	National Mine Action Authority
QA	Quality Assurance
QC	Quality Control
QAM	Quality Assurance Monitor
RMAC	Regional Mine Action Center
SFN	Search for False Negatives
SGTL	Survey Group Team Leader
SHA	Suspected Hazard Area
SOP	Standard Operating Procedure
STA	Senior Technical Advisor
SWG	Survey Working Group
TL	Team Leader
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNMAS	United Nations Mine Action Service
UXO	Unexploded Ordnance
VFA	Veterans for America
VVAF	Vietnam Veteran of America Foundation

INTRODUCTION

Growing out of the world wide collaborative efforts of the International Campaign to Ban Landmines and its Ottawa Treaty, Landmine Impact Surveys are executed to meet the overlapping needs of international donors, national authorities in landmine-and unexploded ordnance (UXO)-impacted countries, as well as Humanitarian Mine Action planners and implementers.

The overall vision of Landmine Impact Surveys as articulated by the Survey Working Group (SWG) is to *"facilitate the prioritizing of human, material and financial resources supporting humanitarian mine action at the national, regional and global levels".* To fulfill this vision, Landmine Impact Survey projects are executed to meet the same high standard. Their implementation provides for improved collaboration between the three primary stakeholders of the process: national authorities, donors and implementing agencies, and provides for the utilization of the same dataset. The data collected during the survey process provides clear improvements on past efforts in that it:

- Defines the entire problem in terms of scale, type of location, hazards, and socio-economic impacts upon communities;
- Improves national planning efforts by allowing for better prioritization of resources;
- Fosters development of national plans with well-defined immediate, intermediate and long–term objectives;
- Establishes baseline data from which performance can be measured.

Landmine Impact Surveys are considered to be the first and most vital step in the transformation of overall Humanitarian Mine Action (HMA). These surveys dramatically improve the quality of information available for decision makers at all levels.

Subsequent meetings of the SWG further refined this vision to create a number of subordinate objectives focused upon three key constituencies:

- Allow donors to rationalize their allocation of funds to the areas of greatest human need as defined by the impact of landmines and UXO upon communities;
- Permit national authorities to develop national plans focusing upon regions and areas of greatest impact;
- Give implementers baseline impact data that will provide success indicators for mine action programs.

The findings and information presented in this report are available in the Information Management System for Mine Action (IMSMA) database maintained by HMA entities in Iraq. This information is descriptive in nature, and provides the best and most comprehensive picture of the nature of the landmine and UXO threat impacting communities in Iraq.

Although this report is the most useful tool for subsequent planning at the national level, it is not a substitute for a national plan. This report should encourage Iraqi national authorities, decision-makers and planners to become familiar with the current state of landmine/UXO contamination in their country, and to use it when addressing future activities related to allocation of funding, prioritization of efforts and identification of areas for intervention. This survey has transformed the vague or unknown into functional knowledge. The challenge now is to ensure that others will use this knowledge to bring about positive, constructive action.

As a global initiative to standardize available information regarding the landmine problem around the globe, the Landmine Impact Survey process represents a successful, concerted effort to ensure conformity of methods, procedures and processes. These surveys are based upon the best practices in the fields of social science research and Humanitarian Mine Action. To ensure quality of results, internal and external quality assurance mechanisms are imbedded into the methodology of the survey process. Landmine Impact Surveys are executed to internationally recognized standards and measure and score impacts upon affected communities in a generally uniform manner.

EXECUTIVE SUMMARY

SUMMARY OF CONCLUSIONS

The Landmine Impact Survey in Iraq was conducted from March 2004 until November 2006 during a time when mortality and injuries from other forms of violence were much higher than those caused by landmines and unexploded ordnance (UXO). Yet, due to the geographically concentrated threats posed by Explosive Remnants of War (ERW), the survey results remain very relevant in the face of continued high insecurity in Iraq.

The survey was active in four of Iraq's Humanitarian Mine Action (HMA) regions, three of which were completely assessed (North, South and South-Center). Data collection that began in the fourth region in Ta'meem (Kirkuk) Governorate was discontinued due to increased security threats shortly after it started in Diyala, and Salahuddin Governorates.

The survey, while following international mine action standards, adapted its methodology to the special circumstances of Iraq. Notably, absent an effective community gazetteer needed to list communities suspected of contamination, survey teams visited all settlements for which community status was claimed. From among 12,010 recorded locations, the survey identified 1,622 communities impacted by landmines, UXO or other ERW. These communities contain 3,673 distinct landmine and UXO Suspected Hazard Areas (SHA).

The contaminated sites, as estimated by local key informants, comprise 1,730 square kilometers of land. They affect the livelihoods and safety of more than 1.6 million persons. Please note that the contaminated area described above represents only that identified in the 13 of Iraq's 18 governorates visited to date by the survey project. Additionally, the Landmine Impact Survey process focuses upon contamination that impacts populated places (communities). Some formerly populated areas within the surveyed governorates were not visited by iMMAP survey teams because the populations of those areas remain displaced due to the contamination hazard, and thus detailed survey activity was not possible in these places.

iMMAP Landmine Impact Survey team members conduct a community interview and develop a community sketch map.

The full-census approach taken in identifying communities faced with suspected contamination suggests that the survey was successful in reaching virtually all affected communities in the North, South-Center and South regions. The data collected afford extensive opportunities for research, analysis, and project planning, and lead to several key conclusions:

- By settlement size and dominant livelihoods, impacted communities are largely rural, agricultural, and small. The typical (median) population size is around 600 in the South, and 150 in the Northern (Kurdish) governorates.
- Correspondingly, the type of resources to which landmines and UXO block access are chiefly pasture and cropland, as well as, in the North, scrubland used for firewood collection. In the South, irrigated farmland is an important asset type impacted by the contamination.

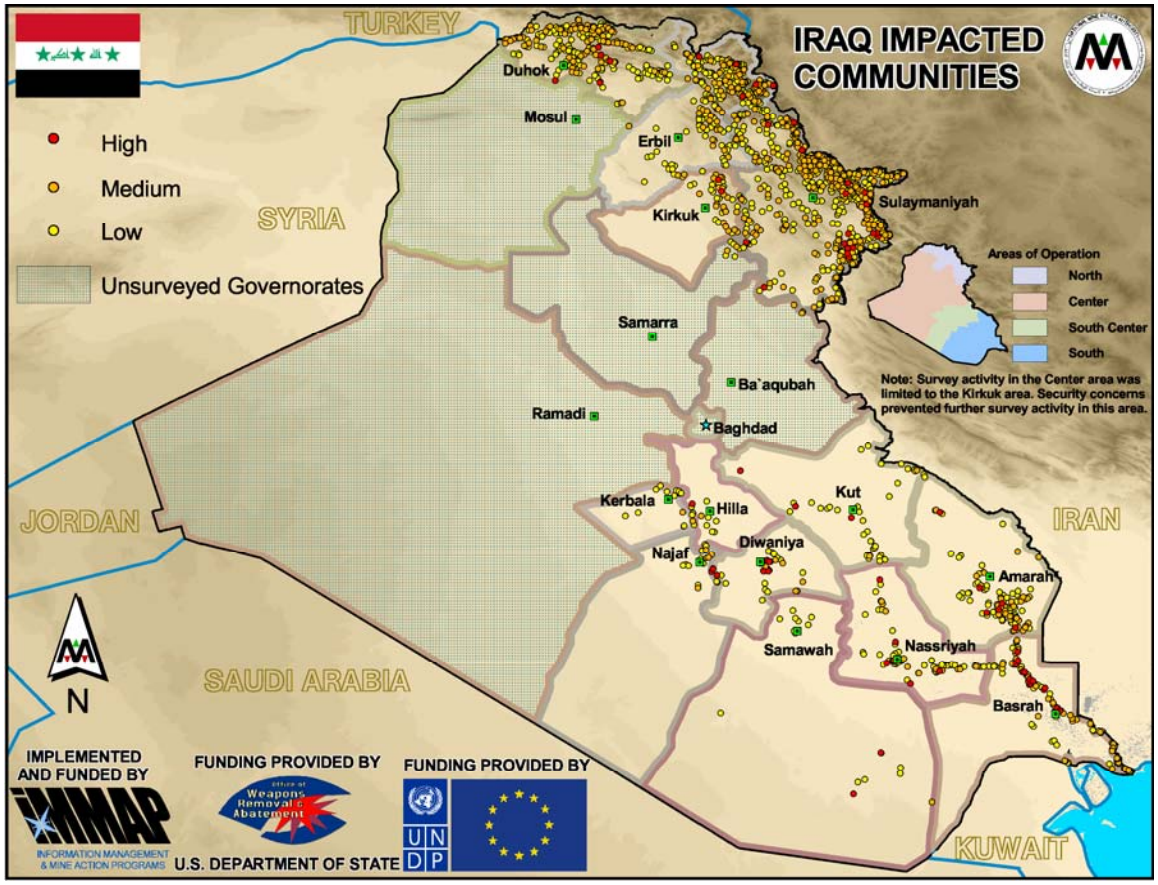
- While the distribution of contaminated sites over small communities and low-value land makes mine action strategies seem uneconomical, prioritization is facilitated by the comparatively low number of communities that are highly impacted. The Landmine Impact Survey identified only 4% of all affected communities as "High Impact" based upon socio-economic criteria.
- Typically, High Impact communities have larger populations than other affected communities and tend to cluster geographically in response to concentrated contamination of past military defensive positions and during hostilities. Clusters of High and Medium Impact communities deserve special attention in HMA planning.
- The rural context of most contamination and resource blockages is manifest in victim profiles as well. The typical person who came to harm in recent landmine and UXO incidents is a boy or man tending cattle or farm operations. The low incidence of tampering and scrap metal collection may be due to underreporting.
- While key informants estimated some SHAs as large 100 square kilometers, particularly in the South, the median size claimed was 4.5 hectares in the North, 25 in the South-Center, and 100 in the South, reflecting different conflict histories as much as, for the North, a longer and more discerning acquaintance with the extent of local contamination.
- Similarly, the association between SHA vegetation and terrain differs strongly among regions, in line with ecological patterns in Iraq. In the North, sites rich in terrain features and with brush and trees dominate. The opposite pattern, flat land with no vegetation or grass only, dominates in the South.
- Differences in the composition of ERW are equally notable between regions. In gross simplification, landmines dominate the contaminant profile in the North, while in the South scattered UXO and stockpiles are more pervasive. The fraction of affected communities reporting cluster bomb units (CBU) is particularly high in the South-Center, an area affected substantially by the 2003 advance of coalition military forces.
- Above and beyond differences in the contamination factors, their relative importance to the risk of incidents also seems to vary between regions. While the additional presence of CBU and other UXO appears to drive up risk in communities of every region, in the North risk grows with community population, while in the South risk appears to depend upon how recently landmines were emplaced or aerial-delivered or indirect fire weapons deployed.

These pronounced differences in characteristics and outcomes of the contamination between the major survey regions suggest that the historic fracturing of Iraq is reflected also in the challenges that a national HMA strategy faces. These may be different to the extent of requiring different policies and priorities to guide the Regional Mine Action Centers (RMAC) within the framework of an overall national strategy. This may be based on the recognition that HMA may form an organic part of rural development, as distinct from pacification policies demanded by the largely urban violence.

BACKGROUND AND PROJECT OVERVIEW

The Republic of Iraq acceded to the Convention on the Prohibition of the Use, Stockpiling, Production, and Transfer of Anti-Personnel Mines and On Their Destruction on 15 August 2007. However, according to the International Campaign to Ban Landmines (ICBL), Iraqi government leaders had been signaling a willingness to accede to the treaty since 2004. In September 2006 the Iraqi Parliament approved an accession law that was signed by the country's president in November of that same year.

Map 1: Impacted Communities in Iraq



The Landmine Impact Survey in Iraq began in March 2004, following almost immediately upon the heels of United Nations Emergency Mine Action Surveys (EMAS) conducted in the northern and southern regions of the country. Veterans for America's (VFA, formerly Vietnam Veterans of America Foundation) Information Management & Mine Action Programs (iMMAP), an international non-governmental organization (NGO) with an extensive HMA history and based in the United States, was awarded a grant by the U.S. Department of State to implement the project.

iMMAP was able to build upon international and national staff already implementing humanitarian activities in Iraq, and deploy a Senior Technical Advisor (STA) to initiate survey operations in the country. iMMAP implemented the Landmine Impact Survey in accordance with the principles and operating protocols established by the Survey Working Group (SWG) and the United Nations Mine Action Service (UNMAS) Certification Guidelines. The data collection phase commenced in June 2004 and was completed in June 2006. However, security conditions and limited program funding curtailed the survey process in some locations, leaving five of Iraq's 18 governorates to be surveyed. iMMAP currently maintains a skeleton survey team inside Iraq, able to rapidly recommence survey field activities should conditions allow.

Table 1: Survey Coverage

Region	Governorates Surveyed	Communities Visited	Communities Found Affected and Surveyed
North	Duhok Erbil Sulaymaniyah	4,291	1,126
Kirkuk	Tameem (Kirkuk)	735	43
South-Center	Babylon Kerbala Najaf Qadissiya Wassit	3,795	118
South	Basrah Missan Thi-Qar Muthanna	3,189	335
Total		**12,010**	**1,622**

iMMAP executed the survey with one primary international staff member, the STA, and with support provided by iMMAP Information Management System for Mine Action (IMSMA) Technical Advisors in Iraq, and the core iMMAP information management team based in Washington, DC. Field Supervisors, Field Editors, Data Collectors and all support staff were Iraqi nationals, totaling more than 90 people. The field staff was organized into two Regional Survey Groups that traveled throughout the 13 governorates surveyed. Survey coordination offices and data entry were located in Erbil for Survey Group North, while facilities shifted based upon areas of operations for Survey Group South, with temporary operations centers located in Basrah and Hilla, among other locations. Data collected was entered into IMSMA. In addition to office space and utilities, PM/WRA-funded HMA programs in Iraq provided the iMMAP team with extensive support during the project, including coordination and liaison, as well as critical security services. Much of this support was provided by RONCO Consulting Corporation on behalf of PM/WRA.

During implementation of the Landmine Impact Survey, iMMAP employed standard survey quality assurance and quality control processes. In addition to these internal measures, the United Nations Mine Action Service (UNMAS), with the concurrence of the international Survey Working Group (SWG), provided a Quality Assurance Monitor (QAM) who examined the Landmine Impact Survey process during the implementation of the project. The QAM has recommended to the United Nations Certification Committee that this survey be certified as meeting internationally accepted norms.

SCOPE OF THE PROBLEM

The survey conclusively identified landmine and/or UXO contamination in each of the 13 Iraqi governorates (provinces) surveyed. Within these governorates, a total of 1,622 communities were identified as affected by landmines and/or UXO. The table below details the number of affected communities, the population at risk, the number of distinct contaminated areas, and the land area that key informants estimated to be contaminated.

Table 2: Affected Communities and Contamination, by Region

Region	Communities Affected	Population at Risk	Distinct SHA	Area Claimed Contaminated (sq km)
North	1,126	748,651	3,024	776
Kirkuk	43	17,397	125	12
South-Center	118	147,326	125	88
South	335	702,753	399	855
Total	**1,622**	**1,616,127**	**3,673**	**1,730**

The survey found an estimated 17.9 new victims per year per 100,000 population in the affected communities. Victim rates are unequally distributed across regions, with the North reporting 10.6, Ta'meem/Kirkuk 34.5, South-Center 33.6 and the South 21.8. Differences between the North and the two southern regions are likely grounded in the longer experience communities in the North have gained with respect to their SHAs, and in the larger exposure of southern communities to surface UXO. Reasons why the South-Center rate exceeds that of the South by half remain speculative and may be linked to extensive CBU dispersal in two clusters of affected communities in Qadissiya, and Babylon/Kerbala governorates.

IMPACT ON COMMUNITIES

The standard Landmine Impact Survey scoring mechanism was used to rank communities in broad categories, which reflect the degree of landmine/UXO impact. Using this ranking system, the survey determined that Iraq contains 70 communities that are faced by High Impacts, 568 Medium Impact communities, and 984 Low Impact communities.

Table 3: Affected Communities, by Impact Category and Region

Impact	North	Kirkuk	South-Center	South	Total
High	28	2	11	29	70
Medium	444	18	15	91	568
Low	654	23	92	215	984
Total	**1,126**	**43**	**118**	**335**	**1,622**

The indicators used to determine this ranking include the number of victims in 24 months prior to community survey, blocked access to facilities or livelihood areas, and the nature of the contaminating munitions. However, the contributions that these three domains make to the ranking outcomes vary significantly across regions, in accordance with the number of recent victims. The impact scoring in the southern regions is driven to a higher degree by recent victims than is the case in the North and Ta'meem/Kirkuk, where types of munitions and resource blockages exert a stronger relative influence. In 13 governorates of Iraq, an estimated 178,700 persons live in communities faced with High Impact, 466,246 in Medium Impact communities and 971,181 in communities that are Low Impact.

Many of the affected communities in Iraqi Kurdistan (North region) and along the former "Green Line" separating the Kurdish areas from the remainder of the country represent a distinct case from areas south of the "Green Line". Whereas much of the rest of Iraq, other than the land along the border with Iran is primarily affected by UXO, the Kurdish region faces a threat composed primarily of landmines. The majority of the large numbers of minefields in this region were emplaced during the Iran-Iraq war of 1980-1988 and during military operations against the Kurdish region conducted by Iraqi governments of the past. The remainder of Iraq, or at least the nine southern governorates surveyed, is plagued primarily by a UXO threat that has resulted from the Iran-Iraq War, the 1990-1991 Gulf War, and the current conflict.

IMPACT ON SECTORS

The survey collected extensive information regarding the types of livelihoods that are denied local populations because landmines and UXO are present. Overall, pasture land is most often blocked by landmines and/or UXO. However, regional differences are important; both in the ways communities classify pasture as fixed or migratory, and in the

ranking of other types of blocked resources. Non-agricultural land, primarily scrubland in which residents forage for fuel and medicinal plants, is important in the North and Ta'meem/Kirkuk, a reason also why roads and trails appear in local descriptions of blocked access at higher frequency than in the southern regions. The differences in the types of cropland blocked – rain-fed versus irrigated – go hand-in-hand with the farm ecologies of the northern and southern regions. Blocked water points are more of a problem in the North than elsewhere. In Iraq, landmines and UXO rarely affect housing areas and other major types of infrastructure, a reflection upon the rural nature of most affected communities and the conduct of past wars that caused dispersal chiefly outside nucleated settlements or their subsequent abandonment. The following table displays the frequencies with which communities of each survey region reported impacted resources.

Table 4: Communities, by Types of Resources Blocked and by Region

Blockage types	North	Kirkuk	South Center	South	All Regions
Fixed Pasture	55%	67%	86%	81%	63%
Migratory Pasture	66%	56%	30%	38%	57%
Non-agricultural Land	75%	70%	1%	5%	55%
Irrigated Crops	20%	14%	86%	88%	38%
Rain-fed Crops	41%	88%	2%	3%	32%
Water for Other Purposes	13%	5%	2%	8%	11%
Roads and Trails	12%	21%	0%	5%	10%
Drinking Water	8%	5%	0%	2%	6%
Housing	1%	0%	2%	2%	1%
Infrastructure Other	1%	0%	1%	1%	1%
Affected Communities	**1,126**	**43**	**118**	**335**	**1,622**

LANDMINE/UXO INCIDENTS

The survey identified 577 persons harmed due to a landmine or UXO incident in the 24 months preceding the survey. The fatality rate among these victims was 38%. A further 7,672 victims were recorded from incidents in the years before the 24-month period consider by this survey. Recent incidents occurred in 241 of the 1,622 impacted communities in Iraq, or roughly 1 in 7. Claims to victims of less recent date were made by 907 communities. 618 of the affected communities did not report any victims.

Table 5: Victim Rates, by Region

Region	Recent Victims (2 Year Period)	Population at Risk	Victim Rate Per 100,000 Persons Per Year
North	159	748,651	10.6
Kirkuk	12	17,397	34.5
South-Center	99	147,326	33.6
South	307	702,753	21.8
Total	**577**	**1,616,127**	**17.9**

Ninety percent of the recent victims in Iraq are males. Victims, male as well as female, are clustered into the prime working years of between 15 to 29 years of age (45%), and 30 to 44 years of age (19%), but children aged 5 – 14 are nearly a quarter of the recent victims.

The most frequent activity at the time of injury was reported to be herding cattle (51%), followed by farm work (19%). Another 8% of recent victims were children playing. Tampering with munitions and collecting scrap metal caused 7% of recent incidents, which may be underreported given the sensitivity surrounding explosives in Iraq at the current time. In the most general terms, the typical profile of an average landmine or UXO incident victim in Iraq is a male, aged between 5 and 44 years, tending to a herd or a farm.

Please note that victimization is often under-reported during landmine survey processes. Due to continuing insecurity in Iraq, a proper landmine/UXO victim surveillance system has not been enacted. Those being visited by Landmine Impact Survey teams are sometimes reticent to draw attention to themselves, as they may still associate some personal risk with reporting to an "official" or outside body. Therefore, victimization is certainly higher because five governorates remain to be surveyed, and is likely higher than reported in at least some of the surveyed governorates.

An Iraq Landmine Impact Surey Group Leader trains his personnel

CAUSALITY

Statistical analysis of the survey data, particularly that relating to community and contamination attributes, allows one to see relationships between a variety of factors and the risks that landmines and UXO pose to specific communities. In Iraq, significant risk-related factors differ between surveyed regions. In the North, communities with larger populations, closer to an international border or the former Green Line, with larger contaminated areas, and those littered with UXO (in addition to landmines) tend to have more recent victims. In the South, shorter times since the latest emplacement or deployment, and the composition of munitions – notably the presence of CBU and anti-personnel landmines – drive recent victim numbers higher. Here the effect of contaminated area size is intermingled with the diversity of munitions present and is illustrated in a tendency of higher-risk communities to cluster. For the South Center region, the statistical results are less cogent; however, the association between spatially clustered communities with recent victims, the presence of CBU and the magnitudes of suspected areas is suggestive of a causal link between war history and the affected communities' greater or lesser ability to avoid incidents.

CONCLUSION

The results of the Landmine Impact Survey plainly indicate that Iraq suffers adversely from the presence of landmines (primarily in the northern, Kurdish governorates) and UXO (primarily in the governorates surveyed outside the Kurdish region). Clearly, the extensive contamination that exists particularly in the livelihood base of rural communities – pasture, cropland, and including scrubland for firewood in the North - will pose a hazard for many years to come. The information gained during the Landmine Impact Survey process will enable the development of appropriate, well-targeted responses that combine marking, area reduction, and large-scale clearance. The results can also further contribute to the development and refinement of planning in Mine Risk Education (MRE) and victim assistance in a manner that will produce positive and immediate results.

SURVEY RESULTS AND FINDINGS

SCOPE OF THE PROBLEM - NORTH

NUMBER OF COMMUNITIES AFFECTED

The Iraq Landmine Impact Survey confirmed that all three of the governorates in the northern region of the country known as Iraqi Kurdistan were extensively contaminated. In all, contamination was documented in 25 of 27 districts, 97 of 124 sub-districts, and 1,126 of 4,291 communities visited. An estimated total of 748,651 persons live in the impacted communities where an international standard Landmine Impact Survey was conducted.

Those 1,126 communities can be seen in a wider context of all of the communities in northern Iraq, and, the other kinds of contamination and impact that were recorded. Of existing Kurdish communities, Iraq Landmine Impact Survey data collectors failed to reach only 39 due to security or inaccessibility; they did visit the other 4,291 communities. Among this number, the survey team documented non-contamination in 2,864 communities and of these, documented 541 communities that had been previously contaminated but were now cleared either with outside assistance, or through local efforts. Of all communities, 66.7% were documented as not contaminated, and 26.2% as sufficiently impacted to warrant application of the full survey instrument.

In addition to the 1,126 communities that were surveyed, the Iraq Landmine Impact Survey documented contamination and impact in a total of 301 other communities, or 7.0% of the total. In 67 of these communities contamination was localized and visible – it endangered the community but presented limited or no socio-economic impact. Further, communities which shared one SHA with another community were also documented though they were not surveyed (234).

Limited contamination (for example a single unexploded bomb in an orchard, or the chemical bomb that yet lies under a house in Halabja, covered with cement) was recorded on UXO Spot Reports, and, unless there were larger Suspected Hazard Areas (SHAs) which had direct socio-economic impacts on that same community, no further survey work was done. In all, 289 UXO Spot Reports were recorded in the three northern governorates of Iraq. Often UXO Spot Reports were recorded in impacted communities where an LIS was done. However, in 67 other communities one or more UXO Spot Reports were recorded, but no survey was conducted.

Figure 1: Survey Effort North

Total Communities Visited	4,291
LIS Surveys Conducted	1,126
Un-surveyed Communities Which Share SHAs with Surveyed Communities Documented	234
Communities with Only UXO Spot Reports	67
Total Communities with Any Kind of Contamination/Impact	1,427
Total UXO Spot Reports Documented	289
Total Communities Documented Not Contaminated	2,864
Total Communities Documented Previously Contaminated	541
Total Abandoned Communities Documented	461
Total New Communities Found	336

The final class of communities which completes the picture of contamination and impact in northern Iraq was also documented. These were communities that were affected by SHAs that were shared with one or more other communities. In such cases, the teams could survey only one community of those involved in each shared SHA. The issue of "Shared SHAs", is described later in this report; here we note that 234 communities shared SHAs which impacted upon them, as well as with other communities; however, these communities are not included in the 1,126 communities mentioned above; the SHAs that they shared were captured and documented during the survey of another community.

Altogether the survey found that 1,427 communities were affected and/or contaminated to one degree or another, or 33.3% of all communities visited by the Landmine Impact Survey in Iraqi Kurdistan. During the course of the survey, the Iraq Landmine Impact Survey data collectors found 336 communities not recorded by the authorities. This is one

indication of the volatility of Kurdish society during the past decade and reflects the extent of the internal displacement and movement of people, often onto land that remained contaminated. Table 6 provides information regarding the number of affected communities in each of the three governorates (Dahuk, Erbil and Sulaymaniyah) and in each of their districts.

Table 6: Affected Districts, Communities and Populations, by Governorate

Governorate	District	Communities	Current Population
Dahok	Akre	32	30313
Dahok	Amedi	95	91705
Dahok	Duhok	37	20276
Dahok	Semel	12	8650
Dahok	Shekhan	13	24023
Dahok	Zakho	56	41098
Dahok Total		**245**	**216065**
Erbil	Choman	73	26654
Erbil	Dashti Hawler	12	2105
Erbil	Erbil	1	3000
Erbil	Khabat	0	--
Erbil	Koysinjaq	29	96348
Erbil	Makhmur	0	--
Erbil	Mergasur	44	15340
Erbil	Shaqlawa	31	69971
Erbil	Soran	109	52609
Erbil Total		**299**	**266027**
Sulaymaniyah	Chamchamal	44	53138
Sulaymaniyah	Darbandikhan	54	11078
Sulaymaniyah	Dukan	41	24764
Sulaymaniyah	Halabja	55	19317
Sulaymaniyah	Kalar	20	15935
Sulaymaniyah	Kfri	13	32750
Sulaymaniyah	Penjwin	95	31419
Sulaymaniyah	Pshdar	58	25994
Sulaymaniyah	Ranya	21	12268
Sulaymaniyah	Sharazur	5	2375
Sulaymaniyah	Sharbazher	147	31318
Sulaymaniyah	Sulaymaniyah	29	6203
Sulaymaniyah Total		**582**	**266559**
Grand Total		**1126**	**748651**

The estimates of the total affected population do not vary greatly from governorate to governorate; the largest figures are from Sulaymaniyah and Erbil, which report approximately 266,000 compared to 216,000 from Dahuk. The districts with the highest number of affected communities are Sharbazher District in Sulaymaniyah (147 affected communities), Soran District in Erbil (109), Amedi District in Dahuk (95), and Penjwin District (95) in Sulaymaniyah. Sharbazher and Penjwin border Iran, Soran and Amedi share a border with Turkey.

SETTLEMENT TYPE AND POPULATION SIZE

The problem of landmines and UXO in northern Iraq is not an urban one. Overwhelmingly, it is the rural communities of Kurdistan which are affected. Table 7 below lists the different kinds of settlement (community) types and the number

of affected communities surveyed of each category. It also shows the total population figures recorded for each type of community and the average size of communities in each category. The most common type of community is the compact rural village (775 of 1126 communities); if the dispersed rural communities are added to these, rural communities as a whole make up 1007 of the 1126 (89.4% of) the communities found affected and surveyed. As Table 7 indicates, these communities average 245 inhabitants (for dispersed rural) and 342 persons (compact rural).

Table 7: Affected Communities and Populations, by Settlement Type

Settlement Type	Affected Communities	Population Living in Affected Communities(*)	Mean Population
Urban	5	149,400	29,880
Suburban	51	261,073	5,332
Compact Village	775	265,370	342
Dispersed Rural	232	56,884	245
Seasonal Settlement	47	5,064	108
Abandoned	16	10,860	572
Total	**1126**	**748,651**	**665**

(*) Living in, or – in abandoned communities – using land of, the affected communities.

However, if we focus on total population, we may have to modify this conclusion. Though the number of urban and suburban communities only make up about 4.7% of all affected communities (and number only 56 in all), they contain nearly 55% of the estimated population recorded among all affected communities. One might conclude from this that vulnerability to the dangers of landmines and UXO is at least as much an urban problem as a rural one. But there are many reasons to believe that as communities grow in size and economic complexity, larger proportions of the population are "drawn" into economic activities (like selling goods and services) that do not intersect with contaminated land. It is likely that most or all of the people in any of the small rural communities are affected by the landmines and/or UXO near their community, while many of the inhabitants of larger, urban settlements may not be at all. From this point of view, we can perhaps safely conclude that in spite of the somewhat even distribution of population among the small number of urban and suburban centers compared to the rural population spread among a very large number of smaller settlements, landmines and UXO in northern Iraq are predominately a rural problem.

Survey teams recorded the settlement or community type according to criteria established in the survey data collection protocols; it was decided at an early stage (during the Survey Pre-Test) that the categories in this table fit the differences in settlement type found in northern Iraq; seasonal communities and even the abandoned communities surveyed are an important part of the picture.

Seasonal settlements are an important part of the economic organization of rural life in northern Iraq and the survey went to great efforts to visit both locations that seasonal communities inhabited during the course of the year to determine if either or both of them was contaminated. Though there are some nomadic groups who transit through northern Iraq (some circulate into Iran), it was very difficult for the surveyors to include them in their efforts. Further, we have no record of nomadic communities transiting in close proximity to affected villages as they were being surveyed. In sum, though there are some nomadic groups in northern Iraq, they were not included in the survey of northern Iraq communities. Affected seasonal communities make up only 4.2% of all affected communities.

Abandoned communities are a prominent part of the social and administrative situation in northern Iraq. It is reported that thousands of small rural communities were destroyed by the government forces of Saddam Hussein, their inhabitants forcibly evicted by the Iraqi military. Hundreds of thousands of Kurds fled to Iran and to Turkey, while others settled in collective towns that the previous Iraqi government constructed. However hundreds of thousands of Kurds now living elsewhere have a strong and lasting emotional attachment to their former and home villages, many in contaminated, insecure and mostly abandoned areas near the Turkish or Iranian borders. Other Kurds continue to live close enough to their abandoned farm land that they go back each year and farm it. The 16 communities listed as abandoned in Table 7 are of this type. The farmers live elsewhere, but have a fixed and intense relationship to the land and they were surveyed as if they were full time residents of an inhabited rural village; though probably not optimal, we took the population of their new habitations as an estimate for these nominally abandoned communities.

Figure 2: Population Size Distribution across Affected Communities

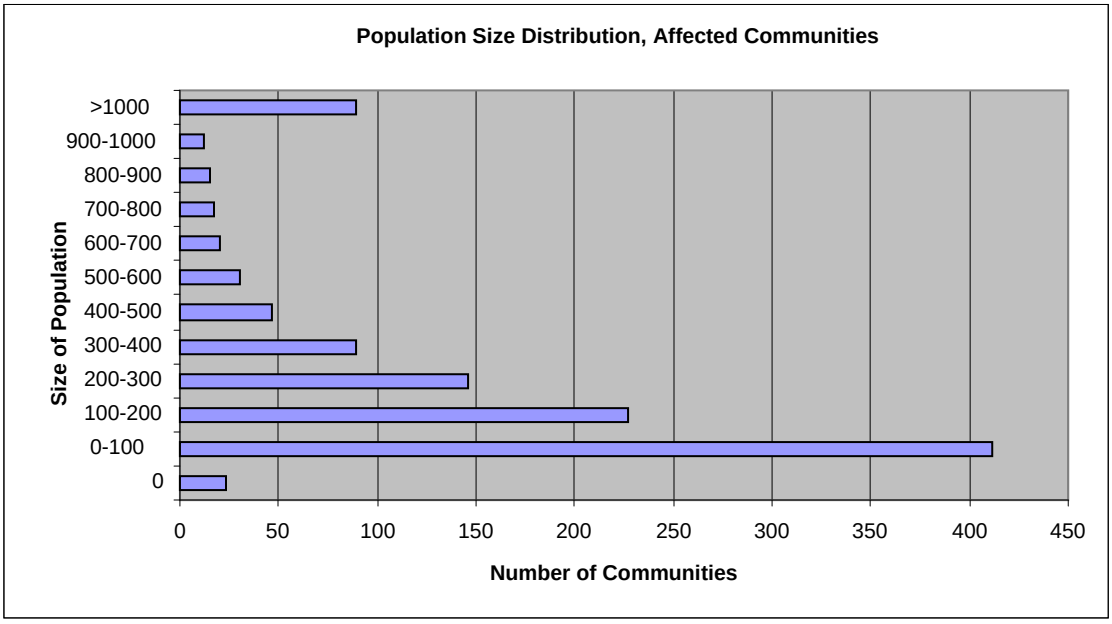
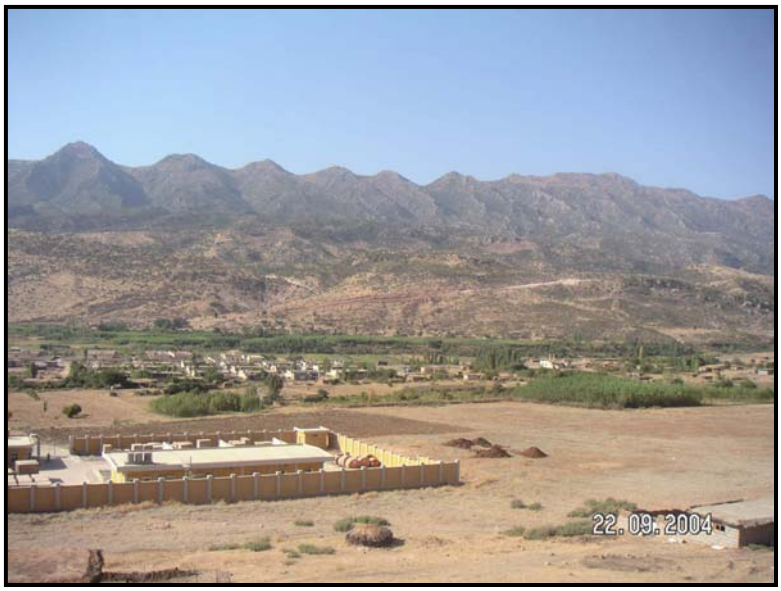


Figure 2 above provides a visual illustration of the distribution of estimated population among the surveyed affected communities of northern Iraq. Overwhelmingly, these rural communities are small in size.

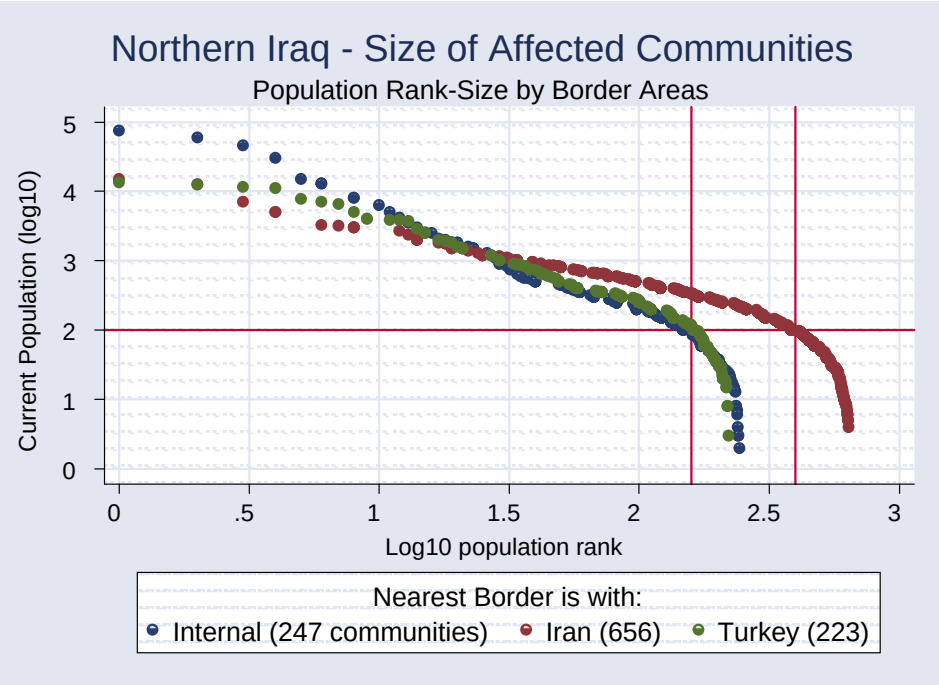
Why were there so many small communities? The first question we can ask is: are these small communities, communities at all? This is a very important question for any community survey; surveys have to work in a way to insure that they find all affected communities, but for efficiency's sake they need to ensure that they do not survey groups of people which are not real communities at all.



A view of a typical community in the Kurdish north of Iraq.

All communities that were surveyed in northern Iraq are accepted as legal communities by their Sub-District and District leaders. The survey took into account other factors before accepting a group of people living near each other as a village, but this was crucial. The survey did identify 336 "new" communities, ones that the Sub-District leaders did not originally have on their list. In all cases the survey teams returned to the authorities and reconciled lists and now have signed lists from the authorities indicating that these communities are accepted, at least at the Sub-District level, as authorized, legitimate communities. But why were there so many small communities?

Figure 3: Size Distribution of Affected Communities, by Nearest Border



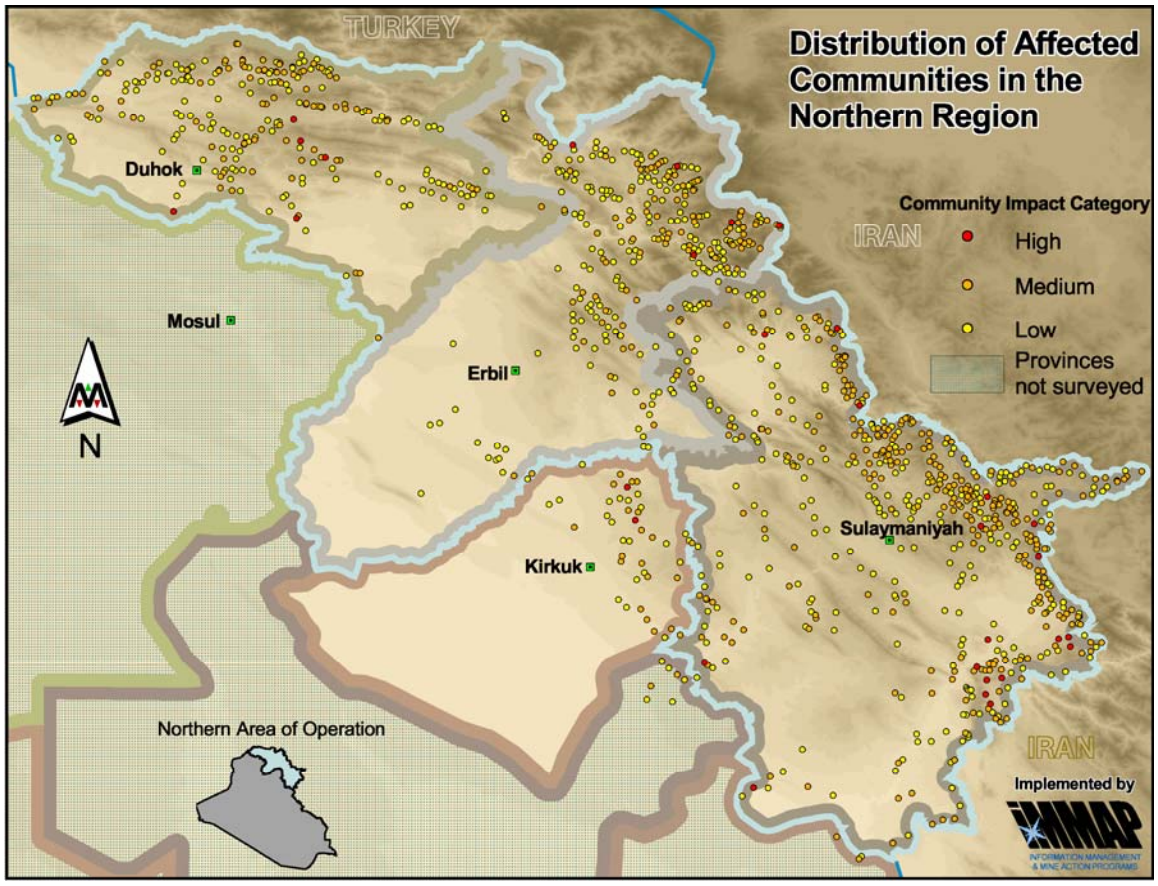
First, at the level of pure description, we do in fact notice a sharp over-representation of very small communities in northern Iraq, on all border sectors, beyond what one would expect in a typical community population size distribution. In the above diagram, the communities, segregated by nearest border and plotted by logarithmic size and rank exhibit the typical descending, more or less straight paths for the larger communities. However, that changes abruptly beyond the crosshairs marked with red lines. Among the smaller communities with 100 and fewer residents (the logarithm of 100 is 2 on the y-axis), there is a precipitous increase of very small communities. This pattern is not caused by the contamination; it was found also among thousands of non-affected communities in the region surveyed under United Nations rapid humanitarian assessments in 2003. This calls for a different explanation:

Many of the contaminated communities are near two very important former battle areas, the border of Iraq with Iran and with Turkey, and the so-called "Green Line" (southern boundary of the no-fly zone established by the Coalition Forces during the early 1990's). The latter was an important area of confrontation between Saddam Hussein's forces and the Kurdish Pesh'merga and the scene of fighting and coalition air-strikes. Some of this area had been the subject of forced evacuation by Saddam Hussein's forces of the original Kurdish inhabitants, and their subsequent replacement by Arab settlers from the south.

Communities along the borders with Iran suffered several periods of forced evacuation, fighting (and contamination) and attempts at resettlement. The result of a very complex pattern of evacuation and re-settlement over a long period of time has resulted in fractured communities of brave Iraqis in many places trying to re-establish themselves in their home villages. In many places the foothold that has been achieved is tenuous; some families have not returned or do not intend to return. Sadly some returned only to leave again, so numbers are low in many villages, but there is no doubt about the commitment of these villagers, whether near the border with Iran, or along the "Green Line" to try re-establish their lives in their home communities. From the survey point of view, it was considered imperative that the dangers and impact that they face daily be recorded.

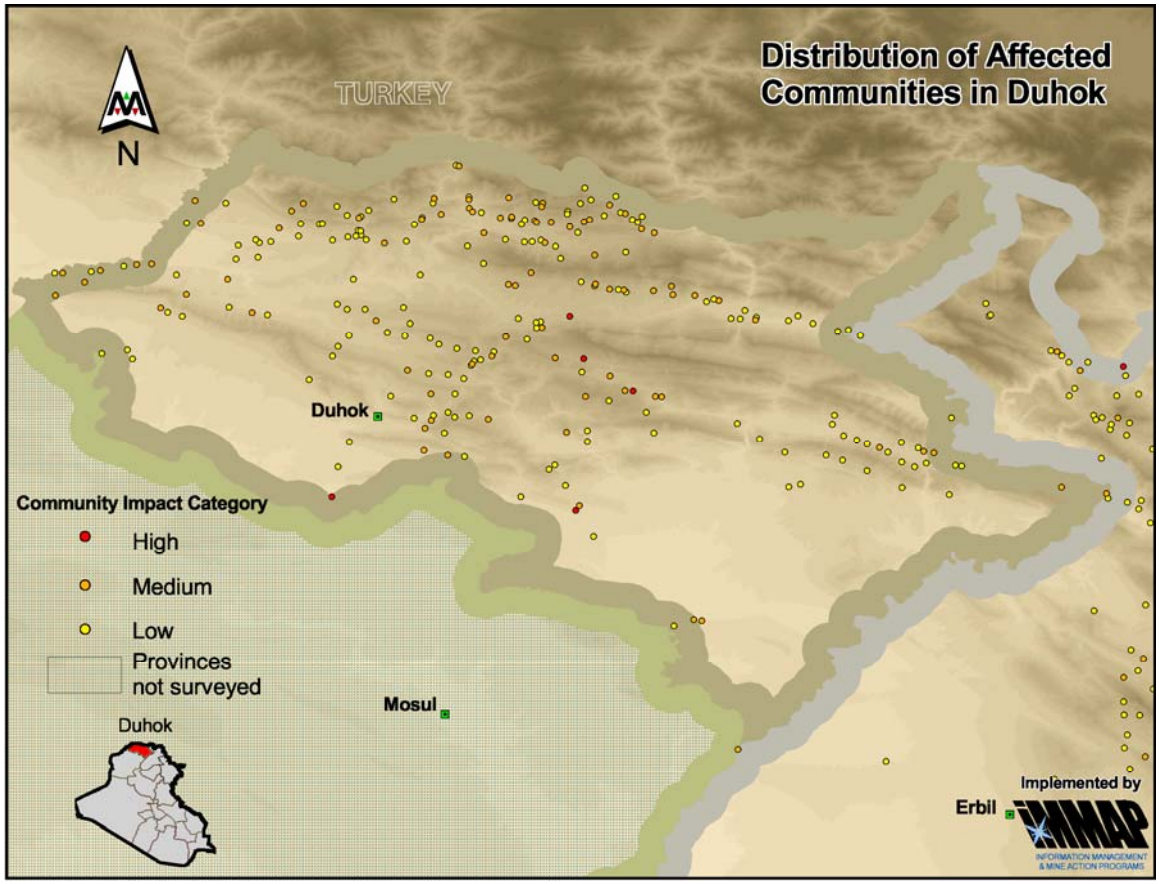
GEOGRAPHIC DISTRIBUTION OF IMPACTED COMMUNITIES

Map 2: Contamination in Northern Iraq



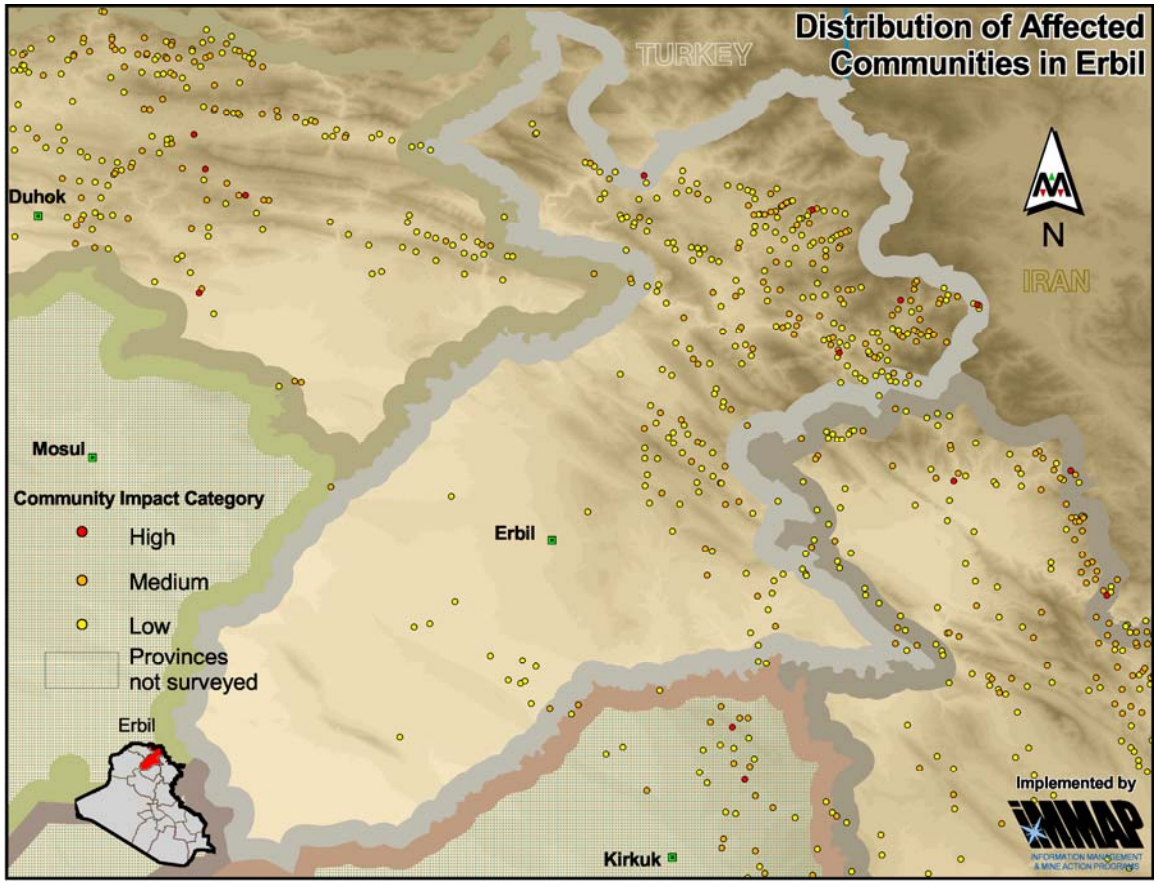
The maps that follow indicate the geographic distribution of affected communities in each of the three governorates in northern Iraq. Each map is of one governorate and each shows the distribution of High, Medium and Low Impact communities. Affected communities are widely dispersed in each of the three northern governorates. With the exception of two districts (Khabat and Makhmur) in Erbil Governorate, all districts here are affected, though the numbers of affected communities differ dramatically from district to district (see again Table 6, in this section).

Map 3: Duhok Governorate

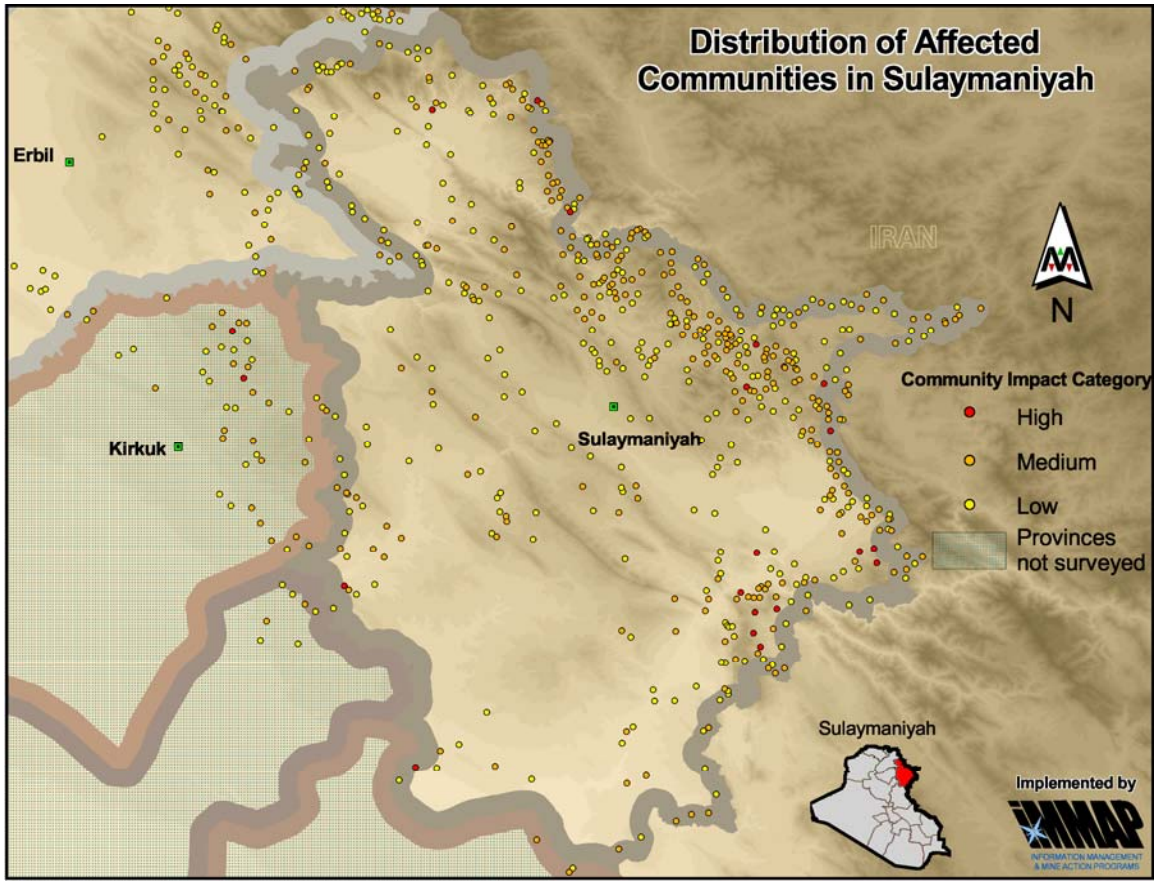


Large concentrations of communities are found on the northern borders, particularly those with Iran. However, there are also large numbers of impacted communities along internal borders, where governorates and districts lie along the so-called "Green Line". After the Iraqi Army was expelled from Kuwait in 1991, a no-fly zone was enforced in northern Iraq that protected the Kurdish people from Iraqi military forces. The Kurdish Pesh'merga ("those who face death") confronted Hussein's army along the Green Line and it was the site of extensive bombing, particularly cluster bomb strikes, and mortar and artillery exchanges. With the fall of the Hussein government in the spring of 2003, many of the villages along this line were evacuated and Kurds who had previously been evicted resettled in those villages and in others that had been abandoned. Many of these are contaminated, information captured by the Landmine Impact Survey process. But of all areas in northern Iraq, and in truth, in the entire country, contaminated communities are most dense along the Iranian border in Sulaymaniyah Governorate, in districts that include Halabja, Penjwin and Sharbazher.

Map 4: Erbil Governorate



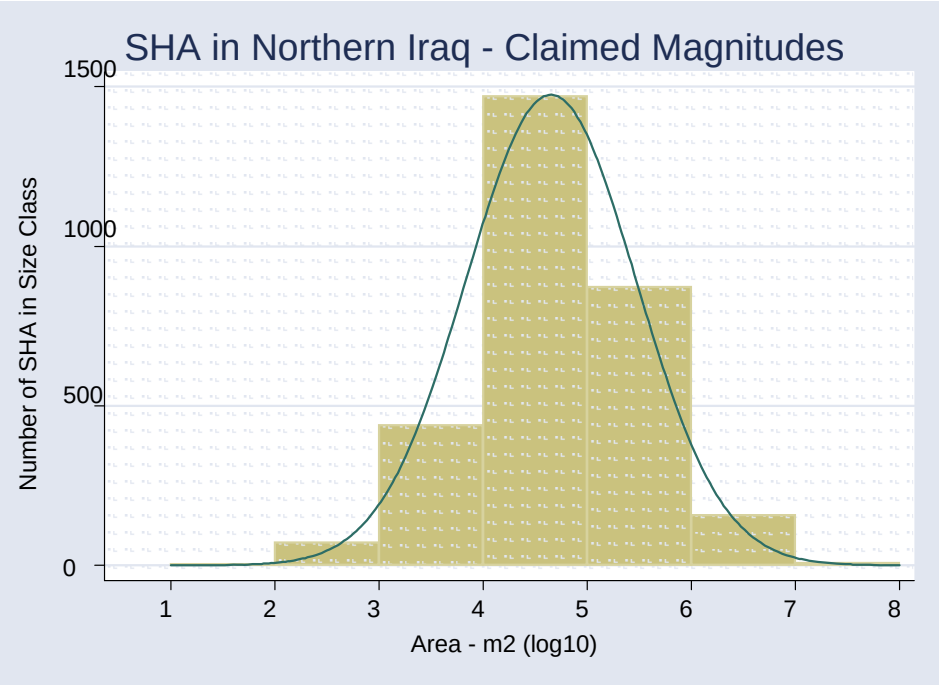
Map 5: Sulaymaniyah Governorate



SUSPECTED HAZARD AREAS

The survey documented 3,024 distinct Suspected Hazard Areas (SHA) which contained landmines and/or UXO contamination. The claimed size of individual SHAs differed greatly; they ranged from 24 square meters to 30 square kilometers. The average claimed size of the SHA is 0.257 square kilometers, or about 26 hectare, and the median size is 45,000 square meters, or 4.5 hectare; the most commonly occurring value was 10,000 square meters, or one hectare.

Figure 4: Claimed Magnitudes of SHAs in Northern Iraq



Among the 3,024 recorded SHAs, 758 were estimated to be one hectare in size or less; 1,334 were greater than one hectare to10 hectare; 803 were greater than 10 hectare to 1.0 square kilometer (100 hectare); 122 SHAs were larger than 1.0 square kilometer to 10 square kilometers. Finally, six SHAs were estimated to be larger than 10 square kilometers. Their claimed magnitudes follow approximately normal distribution, as known also from numerous other contaminated regions.

Table 8: Communities by Number of Distinct Suspected Hazard Areas

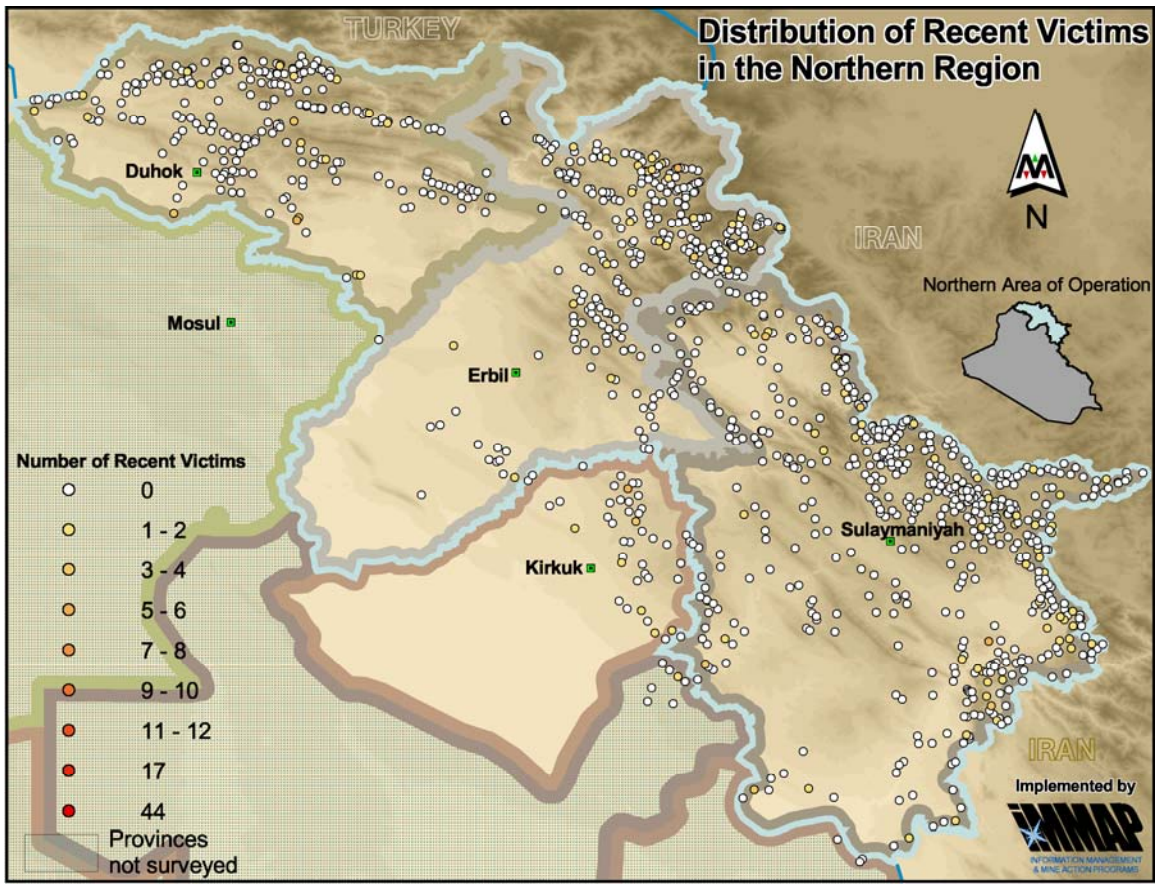
Distinct SHA in the Community	Number of Communities	Percent
1	417	37.0%
2	273	24.2%
3	185	16.4%
4	91	8.1%
5	55	4.9%
6	40	3.6%
7	16	1.4%
8	12	1.1%
9	14	1.2%
10	6	0.5%
>10	17	1.5%
Total	**1126**	**100.0%**

Table 8 above shows that slightly more than 60% of the communities have only one or two SHAs. Slightly more than 80% have five or fewer and 19.6% have more than five SHAs. The largest number of SHAs recorded in one village is 25; it is located on a strategically important road that runs through Choman District of Erbil Governorate to the Iranian border.

VICTIMS OF LANDMINE AND/OR UXO INCIDENTS

Of the 1,026 communities found affected and surveyed, 748 had one or more landmine or UXO victim at some time in the past. Among these communities, 106 recorded one or more recent victims, defined as a victim that was suffered in the 24 months prior to the conduct of the survey. Of the 1,026 affected communities, 378 did not record a victim at all and 642 communities had older victims, but no recent ones.

Map 6: Recent Victim Distribution, North Region



The survey recorded extensive information about each recent victim, and much less about the older victims. This is in line with international Landmine Impact Survey protocols, and is justified in part by the consideration that information about recent victims is likely to be more reliable and at the same time better reflect the more recent impact of the contaminated areas on the community.

Based upon the information collected about the 159 recent victims suffered in the three northern governorates, 62% of them were injured in the incident and 38% were killed.

About 66% of the communities reported victims, both those that occurred more than two years before the survey, as well as more recent ones. Only 378, or 33.6%, of the communities reported no victims at all, recent or "old".

Table 9: Landmine and UXO Victim Survey

		Victims		
Period	**Communities Involved**	**Killed**	**Injured**	**All**
Recent Victims (< 24 months)	106	60	99	159
Victims of Less Recent Data (> 24 months)	730	2443	3109	5552
Victims at Any Time	748	2503	3208	5711
Had no Victims	378	--	--	--

The victim rate per 100,000 persons per year within the affected communities was 10.61. Similar rates for contaminated districts or the region as a whole are not available as no recent census figures are available.

[1] Calculated as 159 recent victims / (2 years * population at risk of 748,651) * 100,000.

SCOPE OF THE PROBLEM - TA'MEEM (KIRKUK) GOVERNORATE

NUMBER OF COMMUNITIES AFFECTED

Ta'meem Governorate in northern Iraq, popularly referred to as Kirkuk after the governorate's capital city, represents a region in which some of the last surveys were implemented by the iMMAP team before growing insecurity curtailed data collection.

Fieldwork came to a halt in this HMA region after survey of Ta'meem Governorate was complete, but had only just begun in Diyala (Baqubah) and Salahuddin (Tikrit) Governorates. Given the incomplete nature of the survey work carried out this survey region, the reporting in this and subsequent chapters that address Ta'meem Governorate is abbreviated.

Contaminated communities were identified in two districts in Ta'meem Governorate. The 43 communities that required full Landmine Impact Survey possessed an estimated 17,397 residents in 2006.

Table 10: Communities and Population Affected

District	Communities	Population
Dibs	5	12,050
Kirkuk	38	5,347
Total	**43**	**17,397**

SETTLEMENT TYPE AND POPULATION SIZE

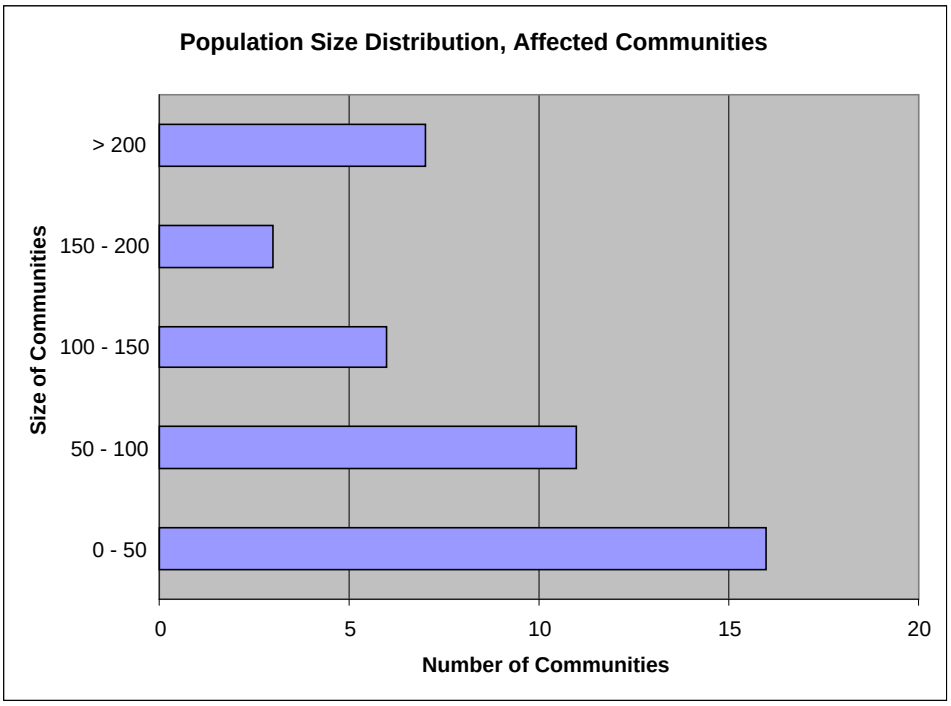
The pattern of affected communities in terms of settlement type is similar to that observed in other survey regions. Overwhelmingly, it is rural communities which are affected. Table 11 below lists the different kinds of settlements and the number of affected communities surveyed of each category. Only one of the 43 communities considered itself urban (the town of Altun Kupri in Dibs District, with a population of 11,600).

Table 11: Affected Communities and Populations, by Settlement Type

Settlement Type	Affected Communities	Population Living in Affected Communities	Mean Population
Urban	1	11,600	11,600
Compact Village	30	4,768	159
Dispersed Rural	12	1,029	86
Total	**43**	**17,397**	**405**

It is obvious from the population size statistic that most of the affected communities are very small. More than half of them possessed 100 or fewer residents. This area, much as in other northern areas, has seen considerable change over pre-war populations, plausibly as a result of Iraqi Kurds reclaiming ancestral villages and Iraqi Arabs whom previous Iraqi governments had settled here leaving.

Figure 5: Population Size Distribution among Affected Communities



SUSPECTED HAZARD AREAS

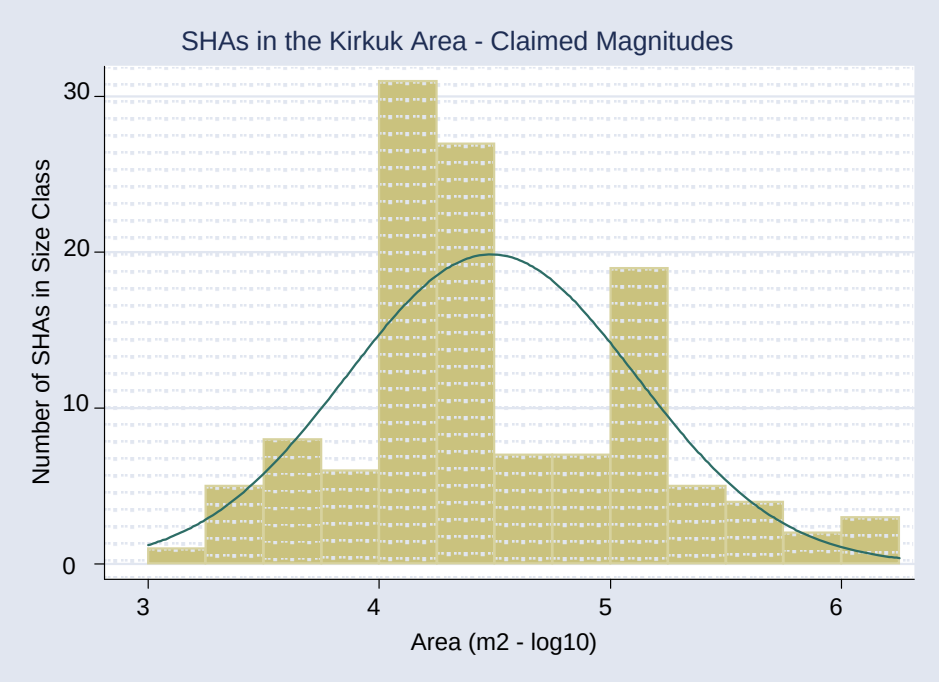
The survey documented 125 distinct Suspected Hazard Areas (SHA) which contained landmines and/or UXO contamination. This number, given only 43 affected communities, is remarkably high; more than half of the communities reported more than one distinct SHA. Such local awareness of the contaminated environment is unusual for communities with rapid population influxes, and with relatively few recent incidents; it may be explained by the particular local history of Humanitarian Mine Action (HMA). After the major conventional combat phase of the 2003 war, these communities were rapidly accessed by HMA agencies such as Mines Advisory Group (MAG) and the Kurdish Organization for Mine Action (KOMA). All but one had received some kind of Mine Risk Education (MRE); three quarters had been the object of marking and survey work; and in more than half of the communities, some formal clearance had already taken place. Collaboration with external agencies thus created a differentiated image of the local hazard.

Table 12: Communities by Number of Distinct Suspected Hazard Areas

Distinct Suspected Areas in the community	Number of Communities	Percent
1	17	40%
2	7	16%
3	7	16%
4	3	7%
5	3	7%
6	1	2%
7	1	2%
8	3	7%
9	1	2%
Total	**43**	

The claimed size of individual SHA differs greatly; they range from 1,600 square meters to 1.25 square kilometers. The average claimed SHA size is approximately 10 hectares, and the median size is 2.3 hectares.

Figure 6: Claimed Magnitudes of SHAs in Ta'meem (Kirkuk) Governorate



The size distribution is clearly discontinuous and more irregular than that found in other regions.

Among the 125 recorded SHAs, 25 were estimated to be one hectare in size or less; 69 were greater than one hectare and as large as ten hectares; 26 were greater than ten hectares and as large as one square kilometer (100 hectares); finally, two SHAs were estimated by key informants to be 1.2 and 1.25 square kilometers.

VICTIMS OF LANDMINE AND/OR UXO INCIDENTS

Of the 43 communities found affected and surveyed in this governorate, 15 had one or more landmine or UXO victims at some time in the past. Among these communities, six recorded one or more recent victims, defined as the victim of an incident that took place in the 24 months prior to survey visit. Of the affected communities, 28 did not record a victim at all, and nine communities had older victims, but no recent ones.

Table 13: Landmine and UXO Victim Survey

		Victims		
Period	Communities Involved	Killed	Injured	All
Recent Victims (<24 Months)	6	3	9	12
Victims of Less Recent Data (>24 Months)	10	14	27	41
All Victims	15	17	36	53
No Victims	28			

The survey recorded substantial amounts of information about each recent victim, but much less concerning older victims. This is in line with international Landmine Impact Survey protocols, and is justified in part by the consideration that information about recent victims is likely to be more reliable and at the same time better reflect the more recent impact of contaminated areas upon the community.

Based upon information collected about the 12 recent victims suffered in Ta'meem Governorate, nine were injured in the incidents, and three were killed.

The victim rate per 100,000 persons per year within the affected communities was 34.52. Similar rates for contaminated districts or the governorate as a whole are not available as no recent census figures are available. For comparison, the corresponding figure for the South is 21.8, and 10.6 for the North.

[2] Calculated as 12 recent victims/(2 years * population at risk of 17,397) * 100,000.

SCOPE OF THE PROBLEM - SOUTH

NUMBER OF COMMUNITIES AFFECTED

The four southern-most governorates in Iraq were organized by the Iraq National Mine Action Authority (NMAA) into one Humanitarian Mine Action (HMA) region under the control of a Regional Mine Action Center (RMAC) in Basrah – the RMAC South.

There is significant contamination in the south, especially near international borders. Many of these areas are virtually uninhabited. Also, significant surface contamination has been cleaned up by coalition forces, by organizations such as Mine Tech International working during the early post-conflict days, and by organizations such as Danish Demining Group (DDG) working as late as 2007, and by Iraqi military units and the Iraqi NGO Iraq Mine/UXO Clearance Organization (IMCO) trained by RONCO Consulting Corporation at the behest of the U.S. Department of State. Iraqi civilians were also involved in the 'clean-up' in other ways: some of them have been recorded by the Iraq Landmine Impact Survey as recent victims. Still, the survey teams found 300 communities impacted by landmines and UXO.

Since the Landmine Impact Survey is a community survey, it records contamination where people live in communities. In the case of southern Iraq, contamination focused upon the main river and communication systems of the four governorates which are dominated by the Tigris and Euphrates Rivers, and where they merge to form the Shatt al-Arab waterway. This is where the majority of the communities are located, clustered like grapes on a vine. Most roads to Baghdad from the region follow these rivers and so, coalition forces advanced along the very highways on which these communities lie, leaving a trail of cluster munition sites and other UXO. Of course, forces of the Ba'ath regime played their own role: abandoned munitions and some landmine emplacement in advance of the most recent war (especially in Muthanna Governorate) produced much of the Explosive Remnants of War contamination that still plays an important part in keeping land unusable and increasing the threat to Iraqis struggling in this region.

These four governorates have each experienced Iraq's last three wars in different ways. The Iran-Iraq War affected the two border governorates (Basrah and Missan) the most heavily, with deep border mine fields that exist to this day. This area is heavily contaminated and largely abandoned. Prior to the Iran-Iraq War, it is reported that this area was perhaps the largest date palm plantation in the world. Much of that agricultural bounty has been destroyed, and what remains in many areas is a large mined area crisscrossed with trenches and dotted with armored vehicle fighting positions.

Figure 7: Survey Effort South

Total Communities Visited	3,189
LIS Survey Conducted	335
Un-surveyed Communities Not Visited for Reasons of Insecurity or Inaccessibility	21
Total UXO Spot Reports Documented	107
Total Abandoned Communities Documented But Not Visited	91
Total New Communities Found	489

The Iraq Landmine Impact Survey confirmed that all four of the governorates in the southern region of Iraq were contaminated. In all, contamination was documented in all 21 districts and in 335 of the 3,189 communities visited. An estimated total of 702,753 persons live in the impacted communities where an international standard Landmine Impact Survey was conducted.

Those 335 communities can be seen in a wider context of all of communities in southern Iraq and the other kinds of contamination and impact that were recorded. Of the existing 3,301 communities, Iraq Landmine Impact Survey data collectors failed to reach only 21 due to poor security conditions or other inaccessibility. The Landmine Impact Survey also recorded 91 abandoned communities, which were documented because of their former importance as population centers and the possibility that they would be re-inhabited in the future. Of all communities in the south, 89.5% were documented as not contaminated and 10.5% as sufficiently impacted to warrant a full survey.

In some communities contamination was localized and, in most such cases, visible. Limited contamination (for example a single unexploded bomb in an orchard) was recorded as UXO Spot Reports, and, unless there were larger

Suspected Hazard Areas which had direct socio-economic impacts on that same community, no further survey work was done. In all, 107 UXO Spot Reports were recorded in the four southern governorates of Iraq.

During the course of the project, the surveyors also found 489 communities not recorded by the Iraqi or international authorities. This is one indication of the volatility of Iraqi society during the past decade and reflects the extent of the internal displacement and movement of people, often onto land that remained contaminated.

Table 14 provides information regarding the number of affected communities in each of the four southern Governorates (Basrah, Missan, Muthanna and Thi-Qar) and in each of their districts.

Table 14: Affected Districts, Communities and Populations, by Governorate

Governorate	District	Communities	Current Population
Basrah	Abu Al-Khaseeb	10	8,385
Basrah	Al-Midaina	10	21,130
Basrah	Al-Qurna	25	81,215
Basrah	Al-Zubair	9	39,405
Basrah	Basrah	3	2,425
Basrah	Fao	46	4,197
Basrah	Shatt Al-Arab	29	103,472
Basrah Total		**132**	**260,229**
Missan	Al-Kahla	23	28,589
Missan	Al-Maimouna	12	11,900
Missan	Al-Mejar Al-Kabi	7	18,450
Missan	Ali Al-Gharbi	5	2,800
Missan	Amara	13	26,350
Missan	Qal'at Saleh	53	95,650
Missan Total		**113**	**183,739**
Muthanna	Al-Rumaitha	10	13,250
Muthanna	Al-Salman	9	4,810
Muthanna	Al-Samawa	2	100,300
MuthannaTotal		**21**	**118,360**
Thi-Qar	Al-Chibayish	17	39,530
Thi-Qar	Al-Rifa'i	10	12,000
Thi-Qar	Al-Shatra	2	3,610
Thi-Qar	Nassriya	24	68,625
Thi-Qar	Suq Al-Shoyokh	16	16,660
Thi-Qar Total		**69**	**140,425**
Grand Total		**335**	**702,753**

The estimates of the total affected population vary from governorate to governorate; the largest affected population was recorded in Basrah (260,229), and the second largest in Missan Governorate which reports an affected population of 183,739. Muthanna reported 118,360 people living in contaminated communities and Thi-Qar 140,425. The districts with the highest number of affected communities are Qal'at Saleh District in Missan (53 affected communities), Fao District in Basrah (46), Shatt Al-Arab District, also in Basrah (29), and Nasriya District (24 in Thi-Qar).

Basrah and Thi-Qar have the Tigris-Euphrates River systems traversing them, parallel with the locations of the main transportation routes and population centers in the south. These routes were the main transportation axes and were bombed extensively by coalition forces and mined and littered with abandoned munitions by retreating Iraqi troops during the last two wars. Basrah also shares a border with Kuwait to the south, an area heavily mined in the past.

SETTLEMENT TYPE AND POPULATION SIZE

The problem of landmines and UXO in southern Iraq is not an urban one. Overwhelmingly, it is the rural communities of which are affected. Table 15 below lists the different kinds of settlement (community) types and the number of affected communities surveyed of each category. It also shows the total population figures recorded for each type of community and the average size of communities in each category. The most common type of community is the compact rural village (225 of 335 communities); if the dispersed rural communities are added to these, rural communities as a whole comprise 295 of the 335 (88%) communities found affected and surveyed. As Table 15 indicates, these communities average 1,748 inhabitants (for dispersed rural) and 547 persons (compact rural).

Table 15: Affected Communities and Populations, by Settlement Type

Settlement Type	Affected Communities	Population Living in Affected Communities	Mean Population
Urban	23	202,895	8,822
Suburban	10	67,225	6,723
Compact Village	225	393,399	1,748
Dispersed Rural	70	38,264	547
Nomadic	4	650	163
Seasonal Settlement	3	320	107
Total	**335**	**702,753**	**18,108**

Even if we focus upon total population in the south, we do not have to modify this conclusion as we did in the north. Urban and suburban communities make up nearly 10% of all affected communities (and number only 33 in all) and contain 38.4% of the estimated population recorded among all affected communities. Thus, vulnerability to the dangers of landmines and UXO is a significant problem for urban populations as well as rural ones. However, there are many reasons to believe that as communities grow in size and economic complexity, larger proportions of the population are "drawn" into economic activities (such as selling goods and services) that do not intersect with contaminated land. It is likely that most or all of the people in any of the small rural communities are affected by the landmines and/or UXO near their community, while many of the inhabitants of larger, urban settlements may not be at all. In fact, this assumption is fully borne out by the distribution of recent victims; the recent victim rate, per year of exposure and per 100,000 residents, is 3.1 for affected urban and suburban communities, and 33.5 for all affected rural communities.

Some of the extensive unexploded ordnance in southern Iraq prepared for destruction by HMA implementers.

Figure 8: Population Size Distribution among Affected Communities

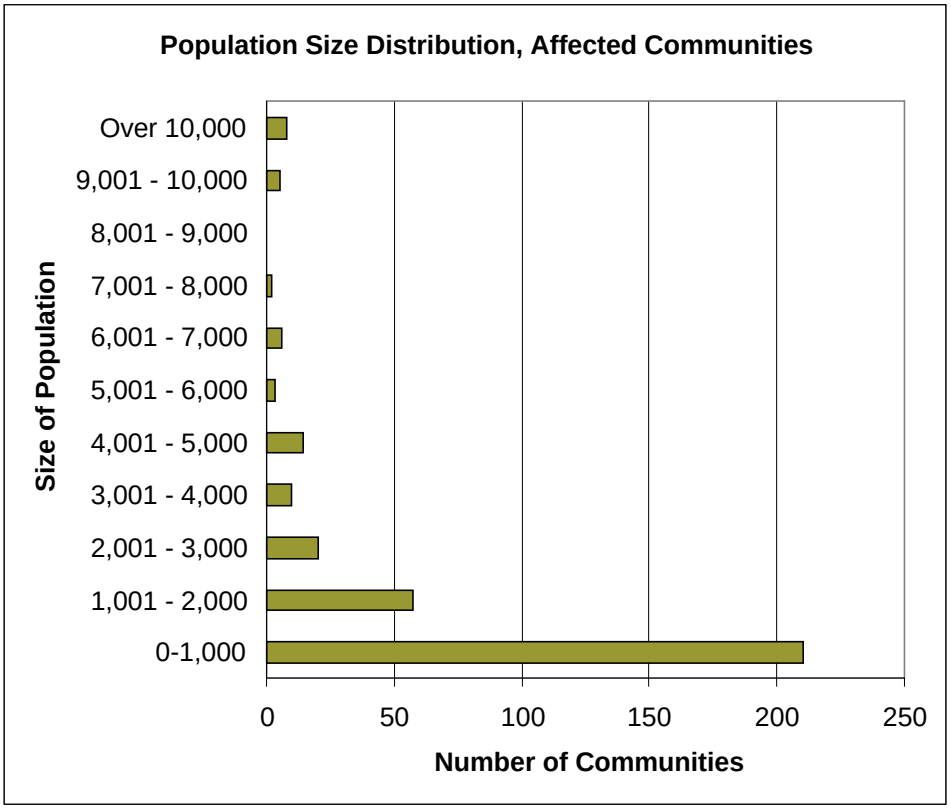
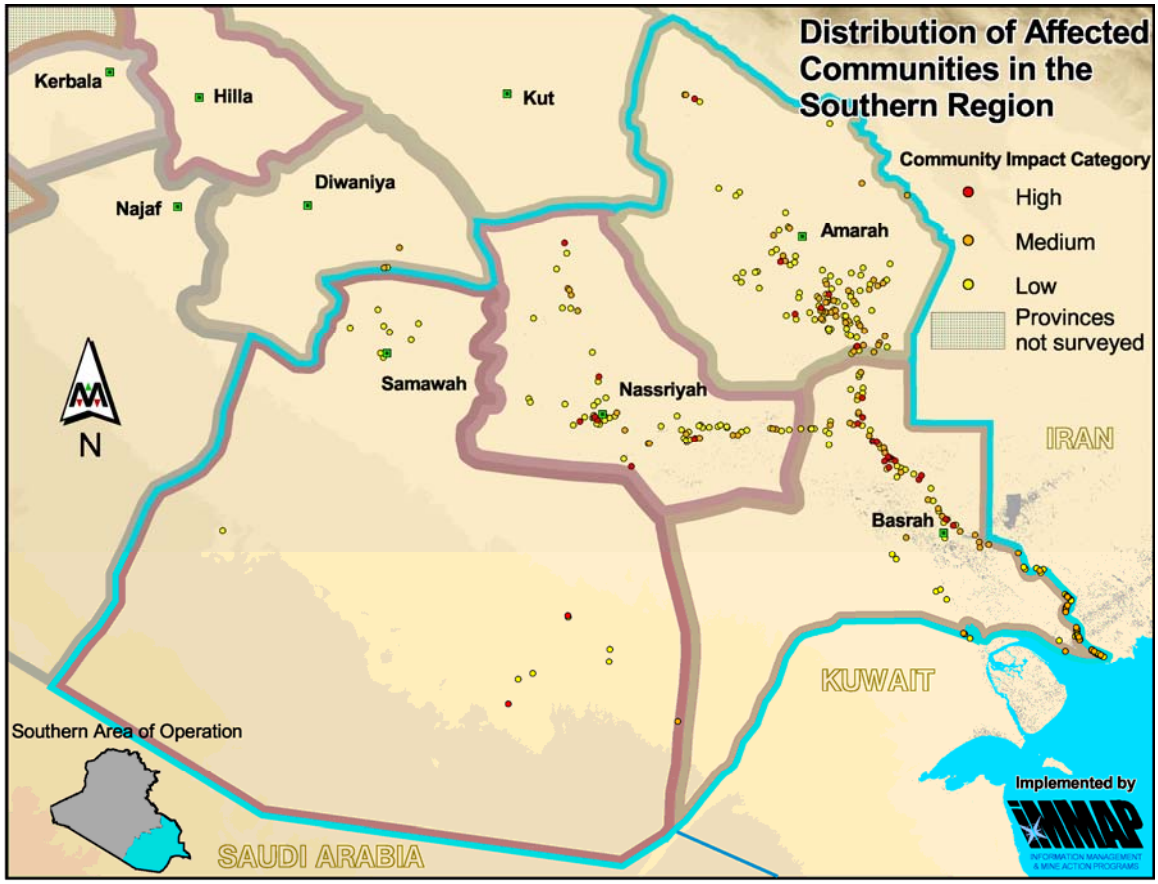


Figure 8 above provides a visual illustration of the distribution of estimated population among the surveyed affected communities of southern Iraq. Overwhelmingly, these rural communities are small in size, with 210 communities possessing populations of 1,000 or less.

DISTRIBUTION OF IMPACTED COMMUNITIES

The map on the next page gives the geographic distribution of affected communities in the four governorates in southern Iraq. Color-coded dots indicate the locations of High, Medium and Low Impacted communities. Affected communities are highly concentrated along the main river systems and transportation routes in each of the four southern governorates. All districts are affected, though the numbers of affected communities differ dramatically from district to district (see again Table 14, in this section).

Map 7: Southern Region of Iraq

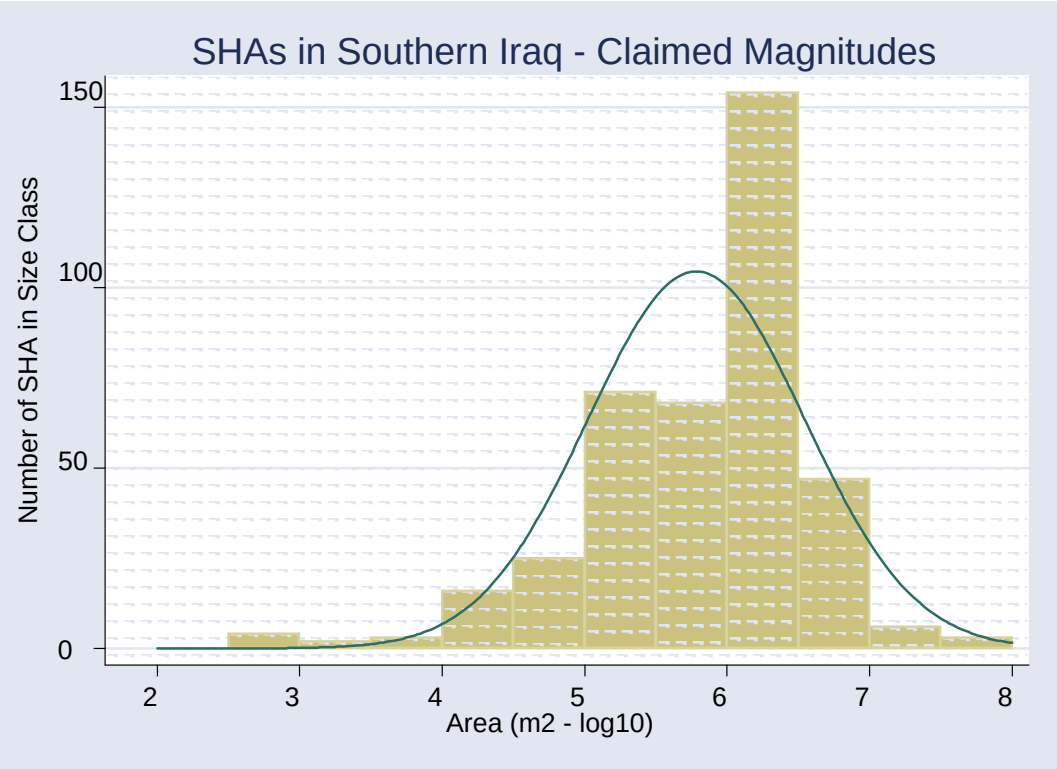


Large concentrations of communities are found along the Tigris and Euphrates River systems and associated transportation axes, including on the western shore of the Shatt Al-Arab waterway in the south.

SUSPECTED HAZARD AREAS

The survey documented 399 distinct Suspected Hazard Areas which contained landmines and/or UXO contamination. The claimed size of individual SHA differed greatly; they ranged from 600 square meters to more than 100 square kilometers. The average claimed size of the SHA is 2.1 square kilometers, or about 210 hectares, and the median size is one square kilometer, or 100 hectares; the most commonly occurring value was also one square kilometer or 100 hectares.

Figure 9: Claimed Magnitudes of SHAs in Southern Iraq



Among the 399 recorded SHAs, 16 were estimated to be one hectare in size or less; 36 were greater than one hectare to ten hectares; 233 were greater than 10 hectare to one square kilometer (100 hectares); 108 SHAs were larger than one square kilometer to 10 square kilometers. Finally, only six SHAs were estimated to be larger than 10 square kilometers. Their claimed magnitudes follow approximately a normal distribution, as known also from numerous other contaminated regions, except that key informants disproportionately tended to estimate the size of SHAs as 1 sq km (96 SHAs).

Table 16: Communities by Number of Distinct Suspected Hazard Areas

Distinct Suspected Areas in the Community	Number of Communities	Percent
1	277	82.7%
2	53	15.8%
3	4	1.2%
4	1	0.3%
Total	**335**	**100%**

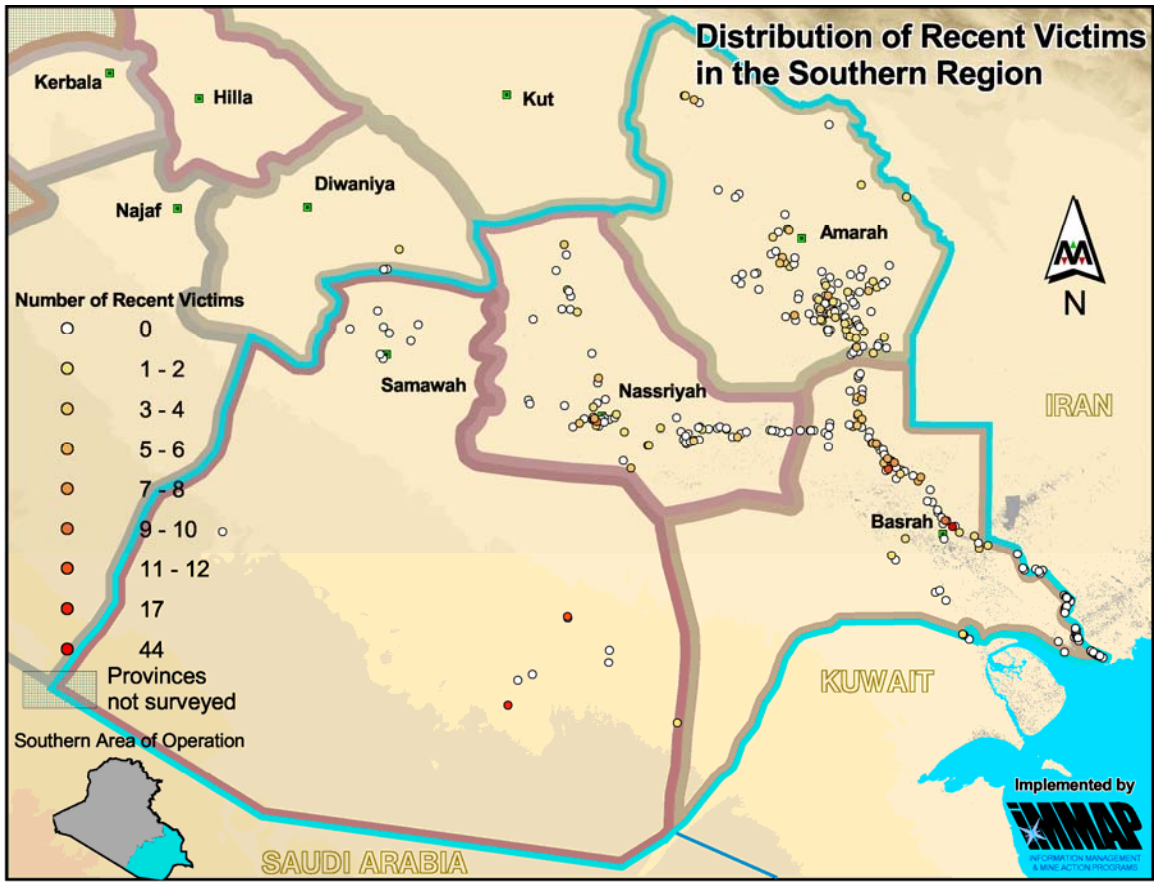
Table 16 above shows that 98.5% of the communities have only one or two SHAs. Only 1.2% (or four communities) of all contaminated communities have three SHAs. All of these communities lie within Basrah Governorate, with two located in Al-Qurna District and two in Fao District. Only one community reported four SHAs – the village of Al-Shiwelat Al-Thaniyeh in the district of Al-Kahla in Missan Governorate.

VICTIMS OF LANDMINE AND/OR UXO INCIDENTS

Of the 335 communities found affected and surveyed, 178 had one or more landmine or UXO victims at some time in the past. Among these communities, 85 recorded one or more recent victims, defined as the victim of an incident that took place in the 24 months prior to the conduct of the survey. Of the 335 affected communities, 157 did not record a victim at all and 138 communities had older victims, but none recent.

The survey recorded significant information about each recent victim, and much less about the older victims. This conforms with international Landmine Impact Survey protocols, and is justified in part by the consideration that information about recent victims is likely to be more reliable and at the same time better reflect the more recent impact of the contaminated areas on the community.

Map 8: Recent Victim Distribution, South Region



Based upon the information collected about the 307 recent victims suffered in the four southern governorates, 62.2% of them were injured in the incident and 37.8% were killed.

About 53% of the communities reported victims, ones that occurred more than two years before the survey and more recent ones. Only 157, or nearly 47%, of the communities reported no victims at all, recent or earlier.

Table 17: Landmine and UXO Victim Survey

		Victims		
Period	Communities involved	Killed	Injured	All
Recent Victims (<24 Months)	85	116	191	307
Victims of Less Recent Date (>24 Months)	138	602	1,327	1,929
All Victims	178	718	1,518	2,236
Had No Victims	157	-	-	-

The victim rate per 100,000 persons per year within the affected communities was 21.83. Similar rates for contaminated districts or the region as a whole are not available as no recent census figures are available.

[3] Calculated as 307 recent victims / (2 years * population at risk of 702,753) * 100,000.

SCOPE OF THE PROBLEM – SOUTH CENTER

NUMBER OF COMMUNITIES AFFECTED

The South Center region for which results are reported here is not an official administrative unit but a convenience region employed by NMAA for operational and administrative purposes, and covered by a particular phase of the Iraq Landmine Impact Survey. It is comprised of the five governorates of Babylon, Kerbala, Najaf, Qadissiya and Wassit. Compared to other regions surveyed, the extent of contamination is smaller, although in no way negligible. The number of affected communities, for example, is approximately a third of the number claimed in the South region; in terms of their resident population it is barely a fifth of the southern figure. Given the smaller extent, we report results in an abbreviated manner.

Since the Iraq Landmine Impact Survey is a community survey, it records contamination where people live in communities. In the case of the South Center region, contamination focused upon the main river and communication systems alongside the Tigris and Euphrates Rivers, in extension of the clusters of affected communities found in the South. Thus, Qadissiya Governorate shows two clusters, one straddling a tributary of the Euphrates River, the other along its western branches. Most of the affected communities in Babylon and Kerbala Governorates too are close to Euphrates branches and to highways following or crossing them. Similar conditions apply to Wassit Governorate, alongside the Tigris. This governorate also shows scattered, affected communities near the border with Iran.

However, unlike in the South, where all the districts were affected, in the South Center region some districts were only lightly impact, or not affected at all. In part, this proposition remains unverifiable because by the time these governorates came into the Landmine Impact Survey ambit, rampant insecurity limited the movement of interviewer teams. Thus, in Babylon, the governorate closest to Baghdad, survey staff returned data on affected communities fewer districts. In the other four governorates of this region, all districts were affected, but some districts reported very small numbers of affected communities and populations.

All in all, 118 affected communities were surveyed. Table 18 provides information regarding the number of affected communities in each of the five concerned governorates and in each of their affected districts.

UXO scattered around a former Iraqi Army fighting position in southern Iraq.

Table 18: Affected Districts, Communities and Populations, by Governorate

Governorate	District	Communities	Current Population
Babylon	Hilla	7	9,450
Babylon Total		**7**	**9,450**
Kerbala	Ain Al-Tamur	2	2,020
Kerbala	Al-Hindiya	6	9,450
Kerbala	Kerbala	9	5,480
Kerbala Total		**17**	**16,950**
Najaf	Al-Manathera	7	13,150
Najaf	Kufa	7	12,900
Najaf	Najaf	10	13,020
Najaf Total		**24**	**39,070**
Qadissiya	Afaq	8	5,550
Qadissiya	Al-Shamiya	1	200
Qadissiya	Diwaniya	13	44,850
Qadissiya	Hamza	6	6,900
Qadissiya Total		**28**	**57,500**
Wassit	Al-Hai	17	11,960
Wassit	Al-Na'maniya	8	5,290
Wassit	Al-Suwaira	1	480
Wassit	Badra	3	1,100
Wassit	Kut	13	5,526
Wassit Total		**42**	**24,356**
Grand Total		**118**	**147,326**

The estimates of the total affected population vary strongly among governorates, from a relatively (in the context of this region) high 58,000 in Qadissiya to a low 9,000 in Babylon. As mentioned, the variation is strong within governorates as well – one district (Diwaniya) within Qadissiya contains three quarters of the affected population of the governorate.

SETTLEMENT TYPE AND POPULATION SIZE

The pattern of affected communities in terms of settlement type is very similar to that observed in the South. Overwhelmingly, it is rural communities which are affected. Table 19 below lists the different types of settlements and the number of affected communities surveyed of each category. It also shows the total population figures recorded for each type of community and the average population in each category. However, there is considerable overlap, with the eight communities termed "urban" ranging from 600 to 30,000 people, and both compact and dispersed rural communities reaching a maximum of 5,000.

The most common type of community is the compact village or town (95 of 118 communities). In terms of population, urban and suburban communities are not unimportant; as they host more than one third of the population living in affected communities.

Table 19: Affected Communities and Populations, by Settlement Type

Settlement type	Affected Communities	Population Living in Affected Communities	Mean Population
Urban	8	53,576	6,697
Suburban	1	2,500	2,500
Compact Villages	95	76,910	810
Dispersed Rural	13	14,190	1,092
Nomadic Settlements	1	150	150
Total	**118**	**147,326**	**1,249**

Therefore, by the raw statistics, vulnerability to the dangers of landmines and UXO is a significant problem for urban populations, as well as rural ones. However, there are reasons to believe that as communities grow in size and economic complexity, larger proportions of the population are "drawn" into economic activities (such as selling goods and services) that do not intersect with contaminated land. It is likely that most or all of the people in any of the small rural communities are affected by landmines and/or UXO near their community, while many of the inhabitants of larger, urban settlements may not be at all. In fact, key informants in two thirds of the affected communities pointed to government service as an economic mainstay, as opposed to roughly one tenth of rural communities of which that was true, with nearly the same proportions holding for trade. Not surprisingly, then, we also find that recent victim rates of 51 per year and per 100,000 residents in affected rural communities, as opposed to 5.3 for the urban ones.

From this point of view, we can safely conclude that despite the large numbers of urban and suburban people reporting contamination, landmines and UXO in the South-Center region, just as much as in the South, are predominantly a rural problem.

Figure 10: Affected Communities and Populations, by Settlement Type

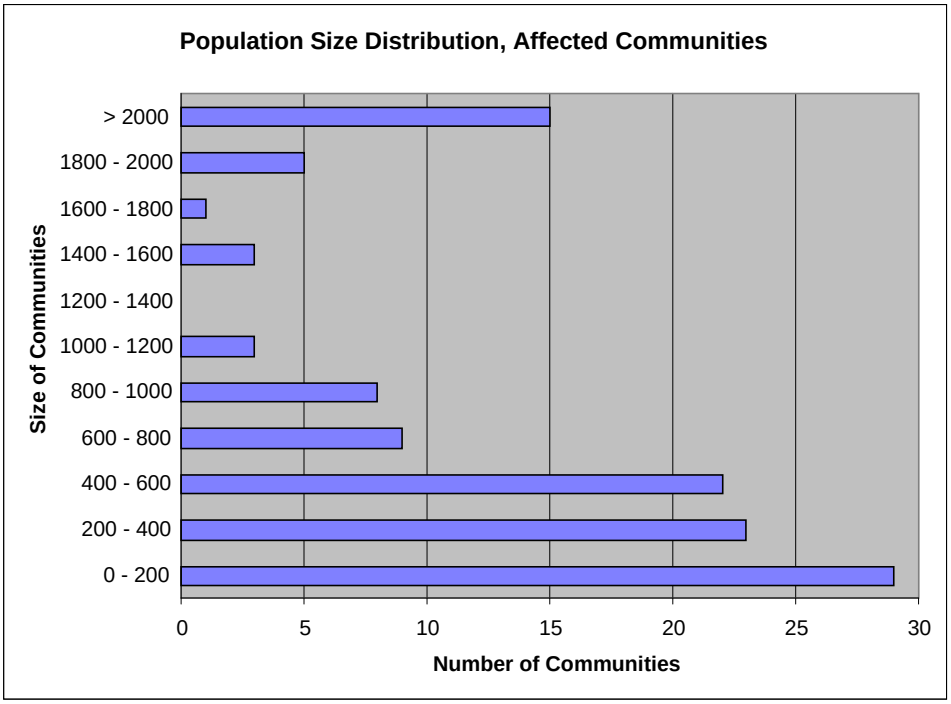
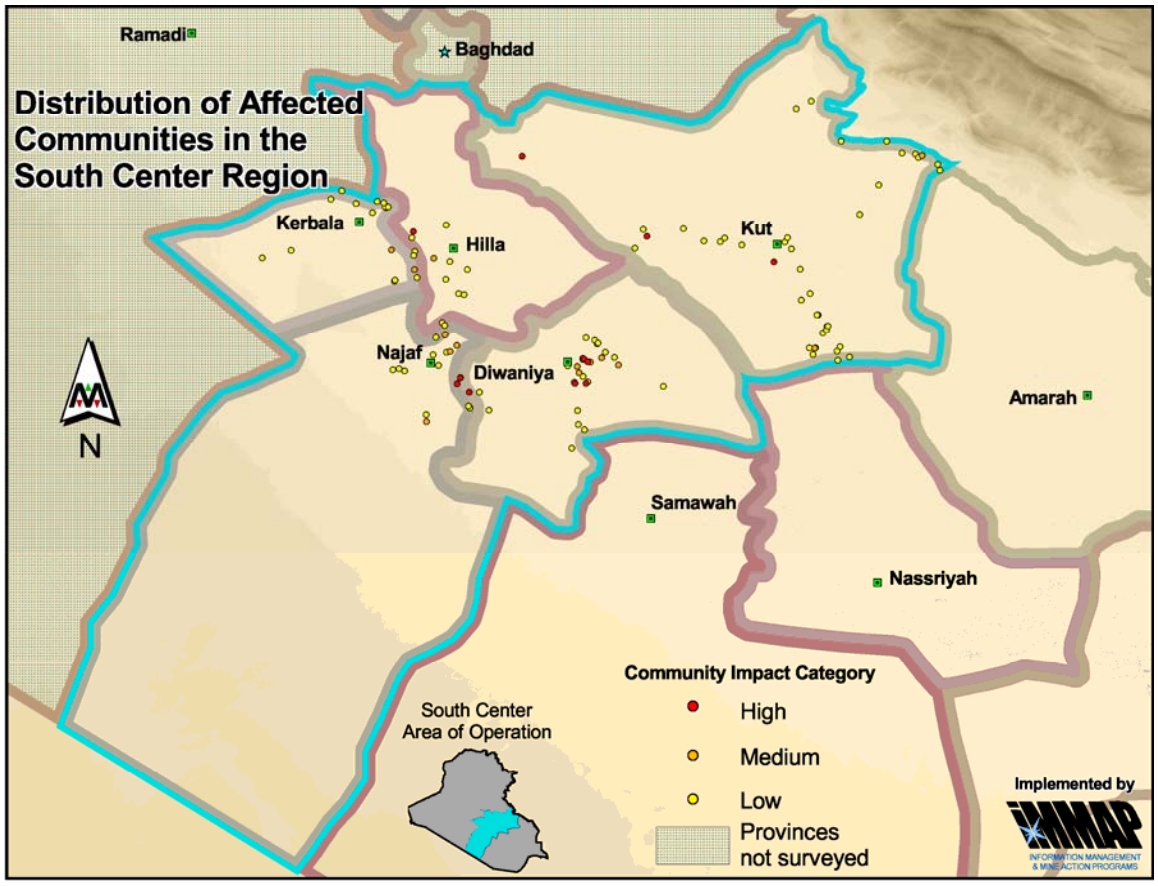


Figure 10 above provides a visual illustration of the distribution of estimated population among the surveyed affected communities of the South-Center region. Because communities with more than 2,000 residents were grouped together, this gives the impression of a U-shaped, bipolar distribution. This, however, is not the case; the population magnitudes (i.e., logarithms) are still fairly normally distributed. Practically speaking, half of the affected communities have populations of 500 and smaller, and only a tenth have populations of 3,000 and larger.

GEOGRAPHIC DISTRIBUTION OF IMPACTED COMMUNITIES

Already in the introduction to this chapter, we mention the clustering of affected communities along the major rivers and highways, as well as, in much smaller number, near the border with Iran. In the map below, the track of the major rivers and road networks may be followed by following the clustered contaminated communities represented.

Map 9: South Center Region of Iraq

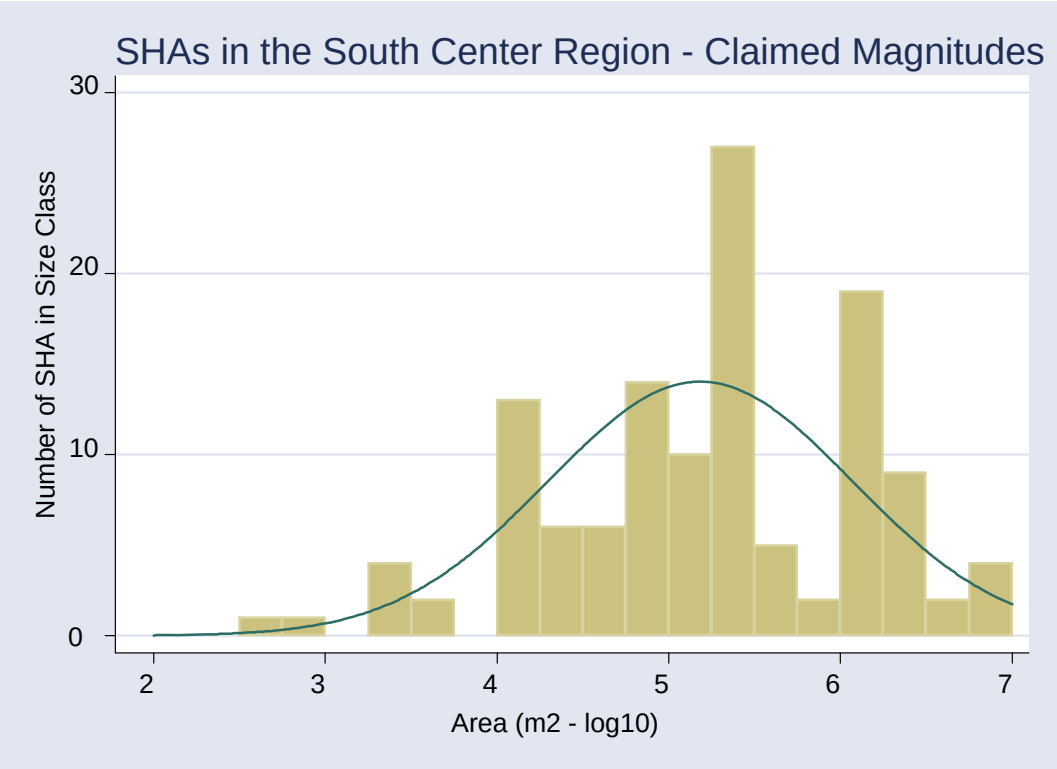


SUSPECTED HAZARD AREAS

The survey documented 125 distinct Suspected Hazard Areas (SHAs) which contained landmines and/or UXO contamination. The claimed size of individual SHAs differed greatly, albeit less so than in the south; they ranged from 400 square meters to 9 square kilometers. The average claimed size of the SHA is 0.7 square kilometers, or 70 hectares, and the median size is 25 hectares.

UXO found in the South Center region of Iraq.

Figure 11: Claimed Magnitudes of SHAs in the South Center Region



The size distribution is clearly discontinuous and more irregular than those found in other regions. In part, this is a result of key informants tending to estimate SHA sizes as either 250,000 square meters or 1 square kilometer.

Among the 125 recorded SHAs, 19 were estimated to be one hectare in size or less; 34 were greater than one hectare to ten hectares; 57 were greater than 10 hectare to one square kilometer (100 hectares); finally, 15 SHAs were larger than one square kilometer to 9 square kilometers.

Very few communities distinguished between more than one SHA.

Table 20: Communities by Number of Distinct Suspected Hazard Areas

Distinct SHAs in the Community	Number of Communities	Percent
1	112	94.9
2	5	4.2
3	1	0.9
Total	**118**	**100.0**

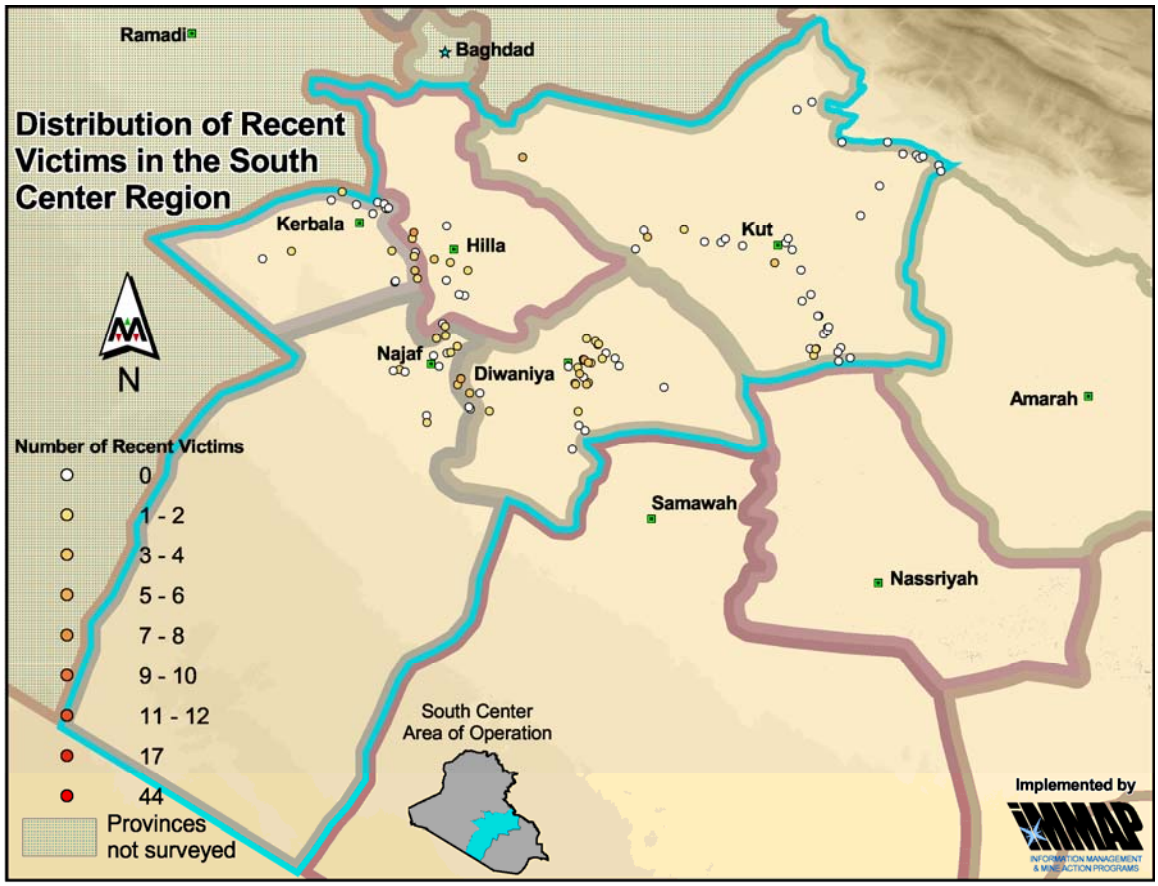
Table 20 above shows that 95% of the communities have only one SHA. The maximum is three SHAs in a community. This relatively undifferentiated definition of SHAs is expected, given the recency (2003) of most of the contamination.

VICTIMS OF LANDMINE AND/OR UXO INCIDENTS

Of the 118 communities found affected and surveyed in this region, 63 had one or more landmine or UXO victims at some time in the past. Among these communities, 44 recorded one or more recent victims, defined as the victim of an incident that occurred in the 24 months prior to the conduct of the survey. Of the affected communities, 55 did not record a victim at all and 8 communities had older victims, but no recent ones.

The survey recorded significant information about each recent victim, and much less about the older victims. This is in line with international Landmine Impact Survey protocols, and is justified in part by the consideration that information about recent victims is likely to be more reliable and at the same time better reflect the more recent impact of the contaminated areas on the community.

Map 10: Recent Victim Distribution, South Center Region



Based upon the information collected about the 99 recent victims suffered in the South-Center region, 58 of them were injured in the incidents, and 41 were killed.

The victim rate per 100,000 persons per year within the affected communities was 33.64. Similar rates for contaminated districts of the region as a whole are not available as no recent census figures are available. For comparison, the corresponding figure for the South is 21.8, and 10.6 for the north.

Table 21: Landmine and UXO Victim Survey

		Victims		
Period	Communities Involved	Killed	Injured	All
Recent Victims (<24 Months)	44	41	58	99
Victims of Less Recent Data (>24 Months)	29	80	70	150
All Victims	63	121	128	249
Had No Victims	55	-	-	-

[4] Calculated as 99 recent victims / (2 years * population at risk of 147,326) * 100,000.

SEVERITY OF IMPACTS

For each affected community, the survey calculated a point score expressing the severity of the various landmine and/or UXO impacts. The score takes three major factors into account:

- Number of recent victims;
- Livelihood and institutional areas to which landmines and UXO block access;
- Class of munitions.

The score is used to classify the communities according to degree of impact. There are three impact categories: High, Medium, or Low. In northern Iraq the range of impact scores was from one to 19. The average value (arithmetic mean) was 5.54; the most common value was 5, which is also the median (half of the communities scored five or less).

The community must have some contamination to get any score at all, and very, very low scores imply the presence of contamination, but limited or no socio-economic effects and most likely no recent victims.

Table 22: Impact Score Classification

Score Range	Classification
1 - 5	Low
6 - 10	Medium
11 and Higher	High

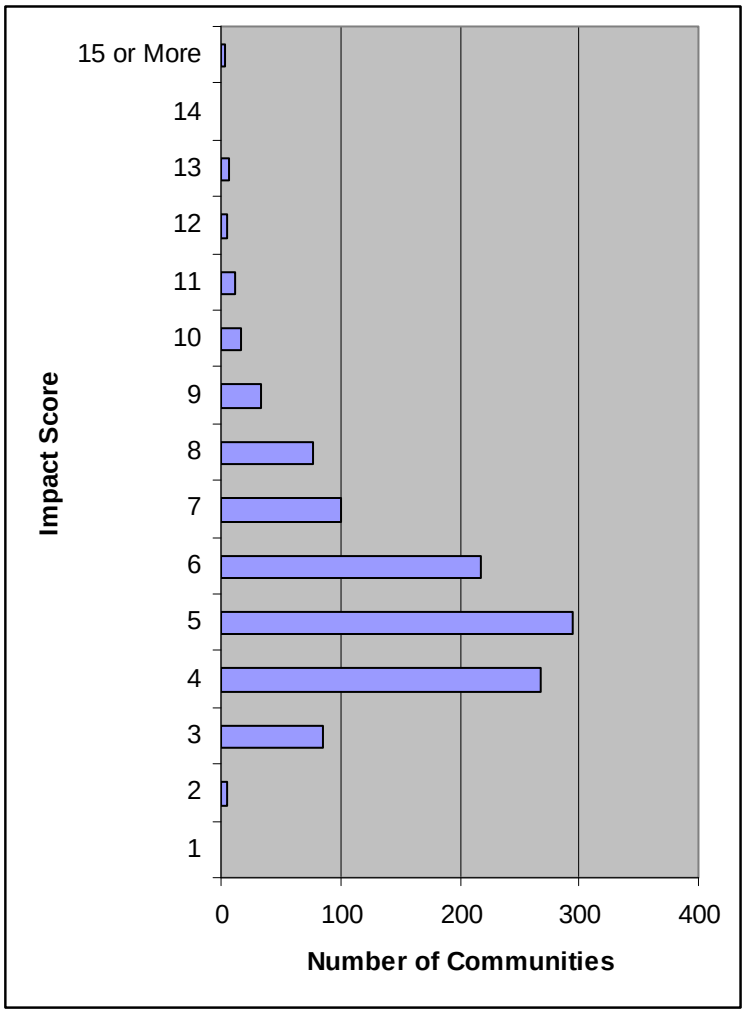
In the Iraq Landmine Impact Survey it was normally impossible to get a score of one. That would mean that there were UXO present in the community, but that their presence did not cause any socio-economic blockages (each separate kind of blockage normally increases the score by one point) and no recent victims (each recent victim normally increases the score by two points). Visible, localized UXO contamination which caused no socio-economic blockages and which did not result in victims was typically documented by the Iraq Landmine Impact Survey through UXO Spot Reports.

However, two northern Iraq communities did record an impact of one. One community was endangered by UXO left over from an extensive cluster bomb unit (CBU) strike, but suffered no socio-economic impact as a result. Because of the extent of the area containing UXO, a survey was implemented to document the danger. In the other community, UXO were present, but the community had suffered five older (but no recent) victims; this community was also surveyed because of the high number of older victims, even though currently there were no socio-economic blockages. Five communities registered impact scores of two (2). Two of these communities had landmines, older victims, but no recent victims and no blockages. Three communities had extensive UXO contamination and one socio-economic blockage (for example pasture land that could not be used because of the contamination).

However, these very low levels of impact were rare; the seven communities detailed here represent only 0.62% of the total. We noted that the most common impact score was five and that half of the communities had a score higher, and half lower. What would the situation in such an "average" community be? A typical community with this score suffered from both landmines and UXO and two socio-economic blockages and no victims, or from landmines, one type of blockage and one recent victim. The blockages would most likely be blocked pasture and/or blocked agricultural land.

Seven hundred and fifty-nine communities have impact scores that equal four, five or six, the most common cluster of scores; together they make up 67.4% of the total. A further 243 communities have scores between 7 and 11, and 89% of all communities (1,002 in total) have scores from 4 to 11. This range extends from the upper-most end of the Low Impact level to the lowest level of the High Impact and includes the entire Medium Impact range.

Figure 12: Distribution of Impact Scores

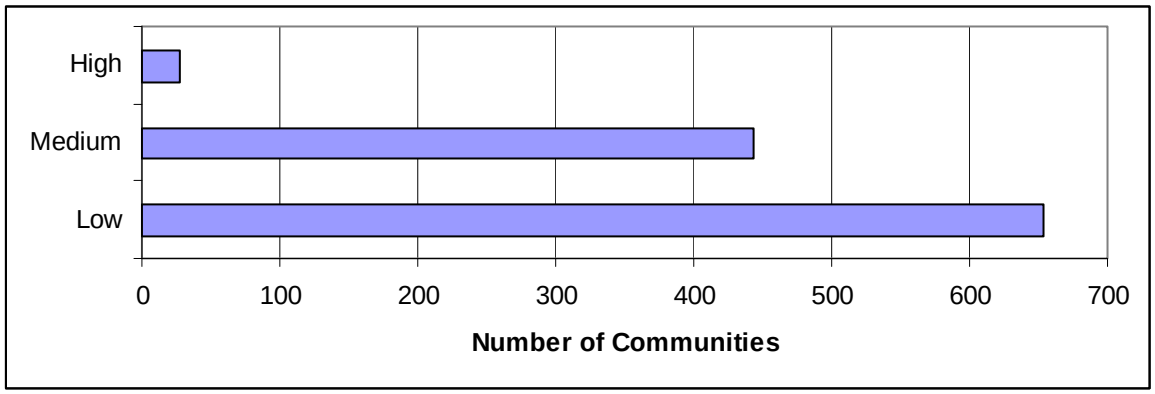


The vast majority of the impacted communities in Iraqi Kurdistan are not High Impact communities, as only 2.5% are such. The single fact that separates Medium Impact communities from High Impact is the existence of recent victims (If recent victims were not scored at all there would be only one high impact community). The bulk of the communities are distributed between the Low and Medium Impact categories (97.5% of all impacted communities).

At the other extreme, the Landmine Impact Survey documented four communities which had a score of 16 or higher; they make up 0.36% of the total. The highest impact score recorded was 19; this occurred in one community. Five communities had a score of 14 or higher, the highest two are in Sulaymaniyah, the next is from Dukhan, the third from Erbil and the fifth from Dukhan. Two communities are in districts on the border with Iran, one on the border with Turkey and two are in districts on the Green Line.

In sum, 28 communities (2.5%) are in the High Impact category, 444 communities (39.4%) are in the Medium, and 654 are in the Low Impact category (58.1%).

Figure 13: Impact Classification



POPULATIONS BY IMPACT CATEGORY

It is estimated that 748,651 persons live in landmine- and/or UXO-affected communities in northern Iraq. Of these, 81,713 live in High Impact communities, and 241,026 in Medium Impact communities. However, the majority of the persons living in affected communities reside in Low Impact communities – 56.9% of all residents of these affected communities, or 425,912. Twenty-four of the High Impact communities are rural: compact villages (18), dispersed rural communities (4), or seasonal settlements (2). The remaining four communities are suburban; however, these four communities contain 82% of all residents of High Impact communities: 14,928 persons; 18% of the total for all High Impact communities live in rural areas. This information is summarized in Table 23.

Table 23: Communities and Populations, by Impact Category

Impact Category	Communities	Resident Population
High	28	81,713
Medium	444	241,026
Low	654	425,912
Total	**1,126**	**748,651**

GEOGRAPHIC AND ADMINISTRATIVE DISTRIBUTION OF RECENT VICTIMS

The survey identified 159 recent victims in affected communities in the three northern governorates of Iraq. Recent victims were documented in 107 of the 1,126 communities. Recent victims were reported in 21 of the 27 districts and 46 of the 124 sub-districts. Sidakan Sub-District (Soran, Erbil) and Darbandikhan Sub-District (Darbandikhan, Sulaymaniyah) recorded the highest totals of victims with eleven each. Of the 1,126 communities surveyed, 1020 had not suffered any recent victims.

Table 24: Community Distribution of Recent Victims

Total Recent Victims Per Community	Number of Communities	Percent of Communities	Total Victims
0	1,020	90.6%	0
1	75	6.7%	75
2	18	1.6%	36
3	7	0.6%	21
4	3	0.3%	12
5	3	0.3%	15
Total	**1,126**	**100%**	**159**

The survey found a very small range in the numbers of recent victims per community. Only three communities of 1,126 recorded five victims (see table above), 6 communities recorded 4 or 5, most (95%) of communities with any recent victims at all had between one and three.

DEMOGRAPHY OF RECENT VICTIMS

The victims are overwhelmingly male (152); only seven were female. It is clear from the data that males in northern Iraq (and primarily in the rural areas) are much more exposed to the risk of death or injury caused by landmines or UXO than are female Iraqis.

Not only are the victims of landmines and UXO in northern Iraq primarily male, they are overwhelmingly young. The most common age range for victims is 15 to 29; 74 (47%) victims lie in this 15-year span as indicated in Table 25. If we take ages 0 to 30 to include all children and young adults, we find that this age range includes 70% of all victims. Thus only 30% of all victims were 31 years old or older at the time that they were killed or injured. Female victims were distributed fairly evenly among almost all age ranges found in Table 25; they were not really concentrated in one age range.

Table 25:Recent Victims, by Age and Gender

Age	Male	Female
0 - 4	0	1
5 - 14	35	2
15 - 29	73	1
30 - 44	19	1
45 - 59	15	0
60 & Above	10	2
Totals	**152**	**7**

Table 26 presents a breakdown of recent victims by gender, by occupation and whether any were in the military. The majority of all victims (155) were civilians; only four were military.

Table 26:Occupation at Time of Incident

Activity	Male	Female	Total
Military	4	0	4
Civilian	148	7	155
Herding	74	0	74
Education/Training	27	1	28
Farming	19	1	20
Trading	13	0	13
Government Employment	5	0	5
Household Work	0	3	3
Unemployed	2	0	2
Transport	1	0	1
Voluntary Work	1	0	1
Artisan	1	0	1
Other	5	2	7
Total	**152**	**7**	**159**

The survey did not collect data regarding accidents that might have occurred during demining operations; the survey was fundamentally focused upon victims that come from the community being surveyed, suffered on the land within the community's boundaries. That means, further, that injuries to visitors to a community were also not recorded as community recent victims (they were recorded, where they occurred, on Information Management System for Mine Action [IMSMA] victim forms outside of the survey). Similarly, if there were military operations conducted in the area and someone was injured, by protocol this information was not recorded as a loss to the community by the Landmine Impact Survey, though the survey team is unaware of this occurring at all.

The three most common occupations were Herding, Education/Training, and Farming. It should be noted that the survey distinguished between occupation and the activity at the time of the incident. For example, the victims whose primary occupation was education were probably school children who were playing at the time of their incident or may even have been herding animals after school. They accounted for 18% of the incidents. It is clear from the data that herders are most at risk in northern Iraq, as they were involved in nearly 47% of the incidents; farmers were third with 13% of the incidents.

INCIDENTS AND CONSEQUENCES

The survey collected information on the activity that the victim was engaged in at the time of the landmine or UXO incident. This is important information because it helps Humanitarian Mine Action (HMA) and other officials understand how economic and social roles and activities can increase or decrease vulnerability to injury or death from landmines or unexploded ordnance.

The data presented in Table 27 provides an overview of the information that was collected. The table shows that the activity of herding is the single most common and, the activity most likely among those listed to produce death or injury. Collecting firewood and herbs (non-agricultural and non-pastoral uses of land), playing and farming are the next three activities that created the greatest numbers of landmine or UXO incidents. Together these four activities were related to 131 of 159 incidents, or 82.4% of the total.

The two incidents involving females working in the house perhaps demand some explanation. In both cases, someone brought an item of UXO into the house while they were working and it exploded. Both cases involved tampering by male children, in one case the child of the victim, and in the other someone from outside the house. In both cases, there were multiple victims.

Table 27: Activity at Time of Incident

Activity at Time of Incident	Male	Female	Total
Military	3	0	3
Civilian	149	7	156
Herding	77	0	77
Collecting Firewood and Herbs	18	2	20
Playing	18	1	19
Farming	13	1	14
Traveling or Picnicking/Walking	7	1	8
Tampering, Collecting Scrap Metal	7	0	7
Working in the House	0	2	2
Construction	1	0	1
Hunting	1	0	1
Other	7	0	7
Total	**152**	**7**	**159**

The incidence of tampering as an activity at the time of the incident is relatively low (7 of 159, or 4.4%). This seems to be somewhat in contradiction to the high rates of spontaneous demining in northern Iraq. Approximately 57%, or 643 communities, reported this type of activity.

Why are there not more injuries from this relatively widespread activity? The survey data collectors learned three things that help to explain this:

- Most of the spontaneous demining was conducted by former soldiers or militiamen (Pesh'merga);
- Most of the demining had occurred before the two year limit for recent victims. If the self-demining had resulted in casualties, most often those casualties would have been counted among the old, not recent victims, and therefore the survey did not collect information about their activity at the time of the incident (this is only collected for recent victims); and,

- Tampering is likely underreported because, in the history of Iraqi Kurdistan, herders have been at the forefront of collecting scrap and sometimes explosive items. Much of the victimization that occurred (certainly in the past, perhaps in the near present) occurred because of widespread collection and tampering by herders who were looking for supplementary income for their families.

Table 28 shows the distribution, by gender, of landmine incident survivors and fatalities. Female victims are rare; therefore the apparent difference in fatality rates between the genders may not be significant. The overall proportion of victims who died as a result of their injuries was 38%.

Table 28: Landmine/UXO Incidents and Fatalities, by Gender

Incident fatalities	Male	Female	Total
No	96	3	99
Yes	56	4	60
Total	**152**	**7**	**159**

Table 29 presents the information collected in village meetings about the kind of care provided to the 99 victims who survived their incidents (some victims received more than one kind of care). A very high proportion of these victims received emergency care (89 of 99 cases, or 90%); however follow-up care is incidence is low (a total of 14 instances of care of 108 recorded, or 13%).

Table 29: Type of Care Received by Victims Not Killed Immediately

Care	Male	Female	Total
Emergency Care	89	3	92
Rehabilitation Care	7	0	7
Vocational Training	1	0	1
Other Care	5	1	6
No Care	2	0	2
Total	**104**	**4**	**108**

The reliability of this information is relatively good in one sense, but not as good as it might be in another. This information is collected in the context of a group meeting of the villagers, and therefore may not include surviving victim or members of their families, so it is not as reliable as it would be if the family were located and included (which the survey protocols do not require and for which the survey did not have sufficient time); at the same time the vast majority of these villages are quite small, and the level of common knowledge can be very high. The survey teams believe that this information is, as a consequence of these considerations, a fairly reliable indicator of the levels of assistance available to victims of landmines and UXO in northern Iraq.

As a result of their wounds, 18 of the 99 victims received amputations of their upper limbs, and 33 men and one woman suffered amputations of at least one of their lower extremities. Fourteen men lost their eyesight, and 45 of the men sustained a variety of other wounds. This information is summarized in Table 30 below.

Table 30: Type of Injury, by Gender

Injury	Male	Female	Total
Amputation Upper Limb	18	0	18
Amputation Lower Limb	33	1	34
Loss of Eye Sight	14	0	14
Other Wounds	45	3	48
Total	**110**	**4**	**114**

The current occupation and gender of the surviving victims is shown in Table 31. The second largest group is made up of those who remain unemployed – those who after their injury are no longer working. Table 26 indicated that only two of the victims were without a job before the incident; among the surviving victims we see that 20 (of the 98 surviving victims for which we have information) are not earning. A (perhaps) surprising fact is that the most common

occupation for the survivors is exactly the kind of activity that is the most dangerous: herding (others are farmers); 31 surviving victims are engaged in activities that are the most dangerous (31%). A very good indication of social adaptation and support to the surviving victims (while still acknowledging the high rate of unemployment among the survivors compared to their own employment history) may be the fact that 18 of the surviving victims are engaged in some type of education and seven are in government employ.

Table 31: Current Occupations of Survivors

Occupation of Survivor	Male	Female	Total
Military	0	0	0
Civilian			
Herding	21	0	21
Not Earning	19	1	20
Education/Training	17	1	18
Farming	10	0	10
Trading	9	0	9
Government Employment	7	0	7
Artisan	3	0	3
Volunteer Work	2	0	2
Household Work	0	1	1
Other	7	0	7
Unknown	1	0	1
Total	**96**	**3**	**99**

SEVERITY OF IMPACTS

For each affected community, the survey calculated a point score expressing the severity of the various landmine/UXO impacts. The score takes three major factors into account:

- Number of recent victims;
- Livelihood and institutional areas to which landmines and UXO block access;
- Class of munitions.

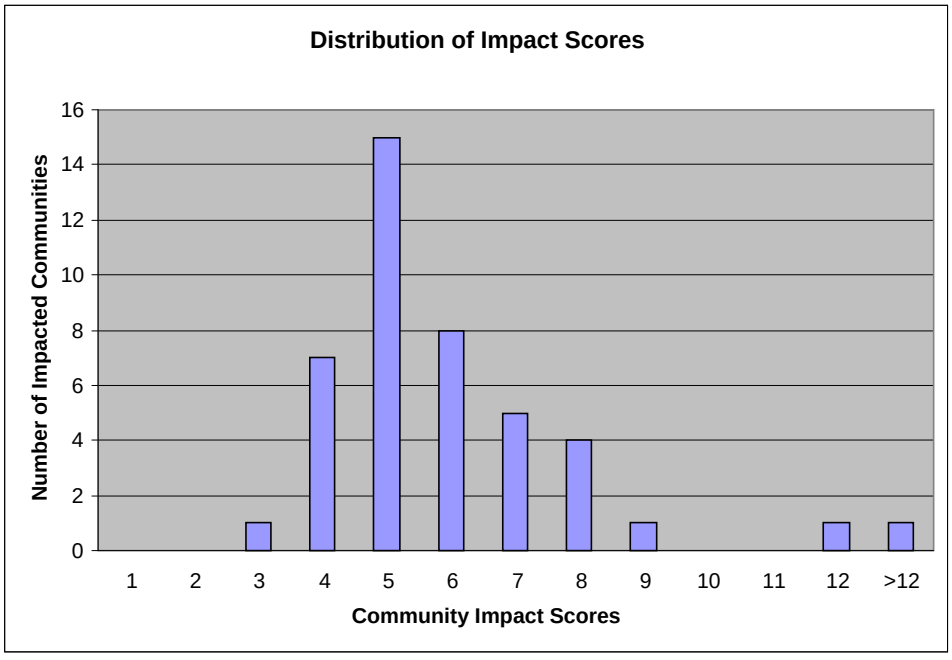
The score is used to classify the communities according to degree of impact. There are three impact categories: High, Medium, or Low. In the area of Tameem Governorate surveyed by the iMMAP team, the range of impact scores was between three and 17. The average value (arithmetic mean) was 6.0; half of the communities scored five or less (the median).

The community must have some contamination to get any score at all, and very low scores imply the presence of contamination, but limited or no socio-economic impacts, and most likely no recent victims.

Table 32: Impact Score Classification

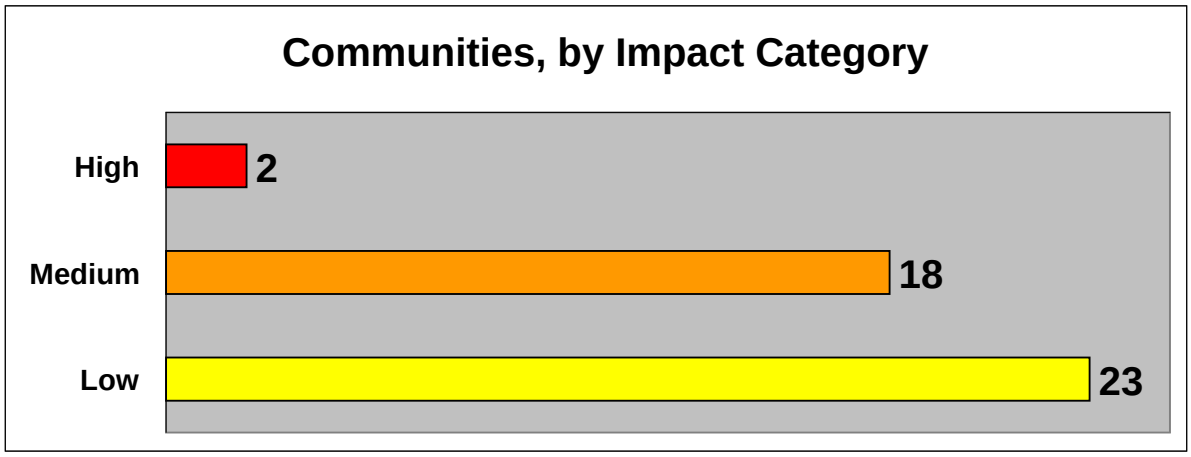
Score Range	Classification
1 - 5	Low
6 - 10	Medium
11 and Higher	High

Figure 14: Distribution of Impact Scores



The vast majority of the impacted communities in this area are not High Impact communities, only two of the 43 are such. 18 communities received Medium Impact grade. Slightly more (23) are Low Impact.

Figure 15: Impact Classification



POPULATIONS BY IMPACT CATEGORY

It is estimated that 17,397 persons live in the 43 communities surveyed in Ta'meem Governorate. It is worth repeating that because of insecurity the Landmine Impact Survey team was not able to visit all suspected communities in this governorate.

Of these 17,397 persons, only 197 live in High Impact communities, and 2,064 in Medium Impact communities. The majority of the persons living in these affected communities – 15,136 - reside in Low Impact communities, chiefly because the one urban settlement (Altun Kupri) was classified as Low Impact. This information is summarized in Table 33.

Table 33: Communities and Populations, by Impact Category

Impact	Communities	Current Population
High	2	197
Medium	18	2,064
Low	23	15,136
Total	**43**	**17,397**

DEMOGRAPHY OF RECENT VICTIMS

All of the 12 victims recorded in six communities are male. They are fairly evenly spread over all age classes from 5 to 59 years. All but one had been economically active, ten of them as herders, one as a farmer.

Similarly, at the time of the incident, nine were with their cattle, one in construction work, and two in other, unspecified endeavors. One of the victims was a child playing.

As mentioned earlier, nine of the 12 victims survived. All of the survivors received emergency care. No other form of care was reported, but one of the injured herdsmen is reported to be back in school.

Among the survivors, two suffered limb amputations, and three lost their eyesight. The nature of injuries among the others was not reported.

Four of the survivors are still herdsmen, one became a driver, one does other work. Two are no longer earning, one is in school.

SEVERITY OF IMPACTS

For each affected community, the survey calculated a point score expressing the severity of the various landmine and/or UXO impacts. The score takes three major factors into account:

- Number of recent victims;
- Livelihood and institutional areas to which landmines and UXO block access;
- Class of munitions.

The score is used to classify the communities according to degree of impact. There are three impact categories: High, Medium, or Low. In southern Iraq the range of impact scores was from one to 94. The average value (arithmetic mean) was 5.9; the most common value (the mode) was three, and half of the communities scored five or less (the median).

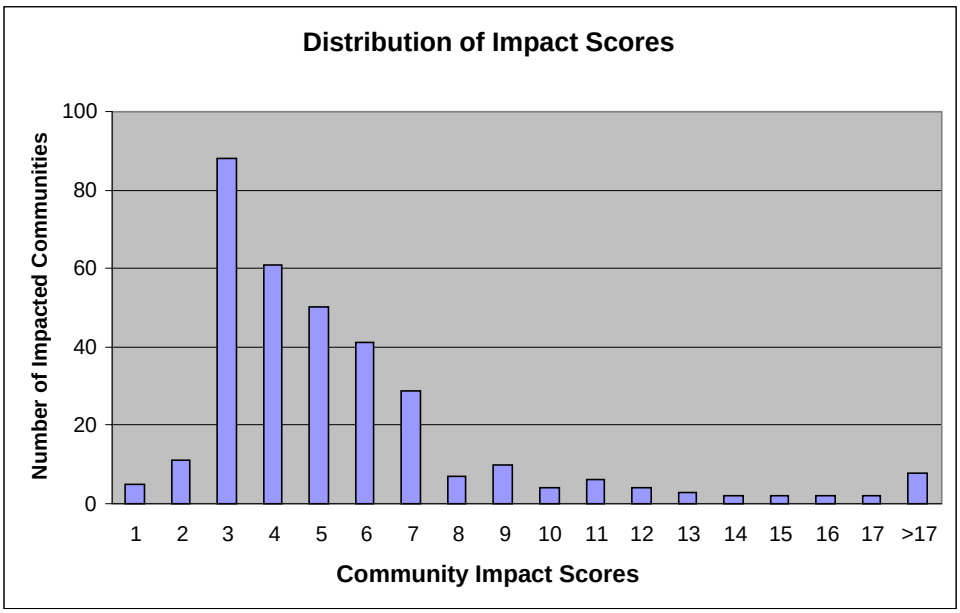
The community must have some contamination to get any score at all, and very, very low scores imply the presence of contamination, but limited or no socio-economic effects and most likely no recent victims.

Table 34: Impact Score Classification

Score Range	Classification
1 - 5	Low
6 - 10	Medium
11 and Higher	High

In the Iraq Landmine Impact Survey it was normally impossible to get a score of one. That would mean that there were UXO present in the community, but that their presence did not cause any socio-economic blockages (each separate kind of blockage normally increases the score by one point) and no recent victims (each recent victim normally increases the score by two points). Visible, localized UXO contamination which caused no socio-economic blockages and which did not result in victims was typically documented by the Landmine Impact Survey through UXO Spot Reports.

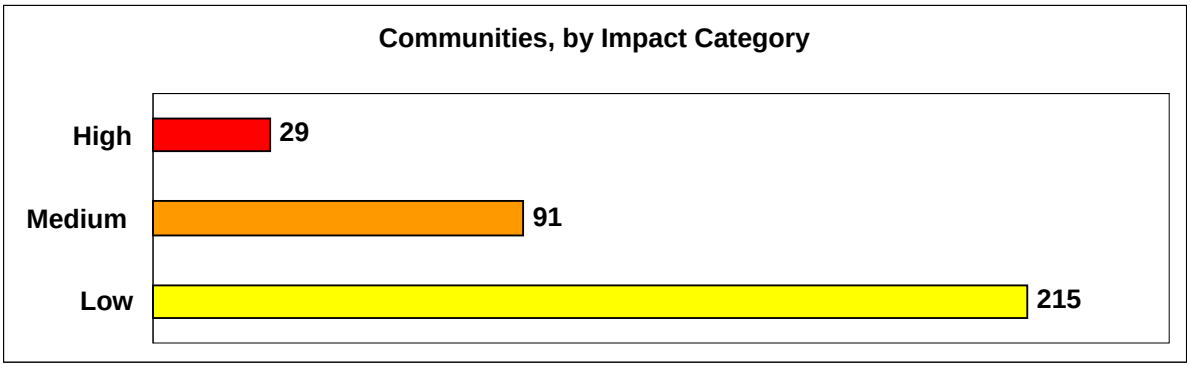
Figure 16: Distribution of Impact Scores



The vast majority of the impacted communities in southern Iraq are not High Impact communities - only 8.7% are. The bulk of the communities are distributed between the Low and Medium Impact categories (91.3% of all impacted communities). At the other extreme, the survey documented ten communities which had a score of 17 or higher; they make up nearly 3% of the total.

In sum, 29 communities are in the High Impact category, 91 communities (27.2%) are in the Medium, and 215 are in the Low Impact category (61.2%).

Figure 17: Impact Classification



POPULATIONS BY IMPACT CATEGORY

It is estimated that 702,753 persons live in landmine- and or UXO-affected communities in the south of Iraq. In these locations, 77,430 persons live in High Impact communities, and 173,536 in Medium Impact. However, the majority of the persons living in affected communities reside in Low Impact communities – 64.3% of all residents of these affected communities, or 451,787.

This information is summarized in Table 35.

Just more than 93% (27) of the 29 High Impact communities are rural: compact villages (23), dispersed rural communities (3), or seasonal settlements (1). The remaining three High Impact communities are spread evenly between urban, suburban, and nomadic categories.

Table 35: Communities and Populations, by Impact Category

Impact	Communities	Current Population
High	29	77,430
Medium	91	173,536
Low	215	451,787
Total	335	702,753

GEOGRAPHIC AND ADMINISTRATIVE DISTRIBUTION OF RECENT VICTIMS

The survey identified 307 recent victims in affected communities in the four southern governorates of Iraq. Recent victims were documented in 91 of the 307 communities. The majority of communities (77, or 84.7%) with recent victims recorded between one and four. Only 14 communities recorded five or more victims.

All districts in southern Iraq reported recent victims except for Basrah and Fao Districts in Basrah Governorate; Al-Mejar Al-Kabi in Missan Governorate and Al-Samawa in Muthanna Governorate. Shatt Al-Arab District in Basrah Governorate documented the largest number of victims (97), followed by Al-Qurna District, also in Basrah, with 49 recent victims.

Table 36:Communities by Number of Recent Victims

Recent Victims by Community	Number of Communities	Percentage of Communities	Total Victims
1	32	35.2%	32
2	22	24.2%	44
3	13	14.3%	39
4	10	11.0%	40
5	6	6.6%	30
7	2	2.2%	14
9	2	2.2%	18
12	1	1.1%	12
17	2	2.2%	34
44	1	1.1%	44
Total	**91**	**100.0%**	**307**

The survey found a very large range in the numbers of recent victims per community. The community of Jurf Al Meleh in Shatt Al-Arab District in Basrah Governorate reported the highest number, with 44 recent victims. The communities of Al Hawafidh in Shatt Al-Arab District in Basrah Governorate and Mentaquat 'Adin in Al Salman District in Muthanna Governorate had 17 recent victims each. Markaz Al Basyah also in Al Salman District, Muthanna Governorate, reported 12 recent victims.

DEMOGRAPHY OF RECENT VICTIMS

The recent victims are overwhelmingly male (275); only 32 were female. It is clear from the data that males in southern Iraq (and primarily in the rural areas) are more exposed to the risk of death or injury by landmines or UXO than are female Iraqis.

The victims are also overwhelmingly young. The most common age range for victims is 15 to 29; 141 or 45.9% of victims lie in this 15-year span as indicated in Figure 18. Only 30.3% of all victims were 30 years old or older at the time that they were killed or injured.

Figure 18: Recent Victims, by Age and Gender

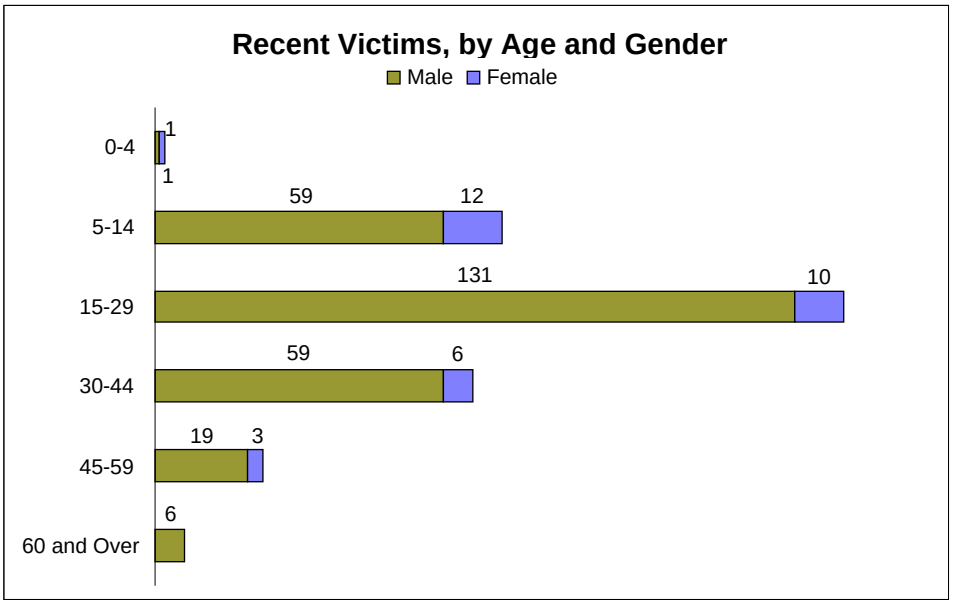


Table 37 presents a breakdown of recent victims by gender and civilian occupation. All landmine and UXO victims in southern Iraq were civilians.

Table 37: Occupation at the Time of Incident

Occupation	Male	Female	Total
Herding	136	17	153
Farming	63	6	69
Other	38	1	39
Trading	7	0	7
Household Work	5	4	9
Office Work	1	0	1
Not Earning	24	4	28
Unknown	1	0	1
Total	**275**	**32**	**307**

The three most common occupations nominated by respondents were herding (nearly 50%), farming (22.5%) and not earning (7.8%). It is clear from the data that herders and farmers are at highest risk of being involved in an incident with landmines or UXO in southern Iraq.

The survey did not collect data regarding accidents that might have occurred during demining operations; the survey was fundamentally focused upon victims that come from the community being surveyed, the incident occurring on land lying within the community's boundaries. That means, further, that injuries to, or deaths of visitors to a community were not recorded as community recent victims (they were recorded, where they occurred, on Information Management System for Mine Action [IMSMA] victim forms outside of the survey). Similarly if there were military operations conducted in the area and a soldier was injured, by protocol that was not recorded as a loss to the community by the Landmine Impact Survey.

INCIDENTS AND CONSEQUENCES

The survey collected information concerning the activity that the victim was engaged in at the time of the landmine or UXO incident. This is important information because it helps Humanitarian Mine Action and other officials to understand how economic and social roles and activities can increase or decrease vulnerability to injury or death from landmines or UXO.

The data presented in Table 38 provides an overview of the information that was collected. The table shows that the activity of herding, as well as being the occupation at highest risk, is also the single most common activity likely among those listed to produce death or injury. Together with farming, herding accounts for nearly three quarters of all incidents. Tampering with munitions and its frequent companion activity, collecting scrap metal, were responsible for roughly one in ten incidents.

The 18 incidents that occurred while the victims were working at home demand some explanation. In some of these cases, someone may have brought UXO into the house while they were working and it exploded, often causing multiple victims. Note that even in these cases the majority of the victims were male, as was the case with children wounded while they were playing.

The category “other” groups a variety of activities. Of note, collecting firewood and herbs occurred in only two cases, differently from many other contaminated rural regions that report collecting activities as a far more common cause.

Table 38: Activity at the Time of Incident

Activity	Male	Female	Total
Herding	139	17	156
Farming	63	6	69
Tampering with Landmine/UXO	20	1	21
Collecting Scrap Metal	9	2	11
Working in the House	15	3	18
Playing	10	2	12
Other	14	1	15
Unknown	5	0	5
Total	**275**	**32**	**307**

Table 39 shows the distribution, by gender, of landmine/UXO incident survivors and fatalities. Female victims are rare; therefore the apparent difference in fatality rates between the genders may not be significant. The overall proportion of victims who died as a result of their injuries was 37.8%.

Table 39: Landmine Incidents and Fatalities, by Gender

Gender	Survived	Fatal	Total
Male	173	102	275
Female	18	14	32
Total	**191**	**116**	**307**

Table 40 presents the information collected in village meetings about the kind of care provided to the 196 victims who initially survived their incident (note that five victims succumbed to their injuries later. Some victims received more than one kind of care). A very high proportion of victims received emergency care (170 of 196 cases, or 87%); however rehabilitative care is very low, with only two instances recorded (or 1%) and no vocational training was documented. About one-in-ten of the original survivors received no care at all.

Table 40: Type of Care Received by Those Victims Not Killed Immediately

Care Received	Male	Female	Total
Emergency Care	153	17	170
Rehabilitative Care	2	0	2
Vocational Training	0	0	0
Other Care	4	0	4
No Care	20	1	21
Total Cases	**178**	**18**	**196**

The reliability of this information is relatively good in one sense, but not as good as it might be in another. This information is collected in the context of a group meeting of the villagers that may not even include the surviving victim or members of the victim's family. Therefore, it is not as reliable as it would be if the family were located (which the survey protocols do not call for and for which the survey did not have time); at the same time the vast majority of these villages are quite small, and the level of common knowledge can be quite high. The survey team considers this information, as a consequence of these considerations, as a fairly reliable indicator of the levels of assistance available to victims of landmines and UXO in southern Iraq.

As a result of their wounds, 45 of the 196 initial survivors (23%) received amputations of upper limbs, and 56 of them (28%) suffered amputations of at least one lower extremities. Twelve men and four women lost their eyesight, 83 of the victims sustained a variety of other wounds. The information is summarized in Table 41 below.

Table 41:Type of Injury, by Gender

Injury	Male	Female	Total
Amputation, Upper	43	2	45
Amputation, Lower	50	6	56
Loss of Sight	12	4	16
Other Wound	61	6	67
Unknown	16	0	16
Total Cases	**178**	**18**	**196**

The current occupation and gender of the surviving victims is shown in Table 42. The largest group is comprised of those who remain unemployed – those who after their injury are no longer working. Table 37 indicated that only 28 of the victims were without a job before the incident, whereas among the surviving victims we see that 103 of the 191 surviving victims for which we have information are not earning. The second and third most common occupations for the survivors are exactly the kinds of activity that is the most dangerous: herding and farming, 37 and 12 survivors respectively. This means that a quarter of the surviving victims are still engaged in activities that are the most dangerous.

Table 42:Current Occupation of Survivors

Occupation	Male	Female	Total
Herding	34	3	37
Farming	12	0	12
Trading	5	0	5
Household Work	0	3	3
Transport	3	0	3
Volunteer Work	1	0	1
Other	25	2	27
Not Earning	93	10	103
Total	**173**	**18**	**191**

SEVERITY OF IMPACTS

For each affected community, the survey calculated a point score expressing the severity of the various landmine/unexploded ordnance (UXO) impacts. The score takes three major factors into account:

- Number of recent victims
- Livelihood and institutional areas to which landmines and UXO block access
- Class of munitions

The score is used to classify the communities according to degree of impact. There are three impact categories: High, Medium, or Low. In the South-Center region of Iraq, the range of impact scores was from 1 to 17. The average value (arithmetic mean) was 4.9; half of the communities scored four or less (the median).

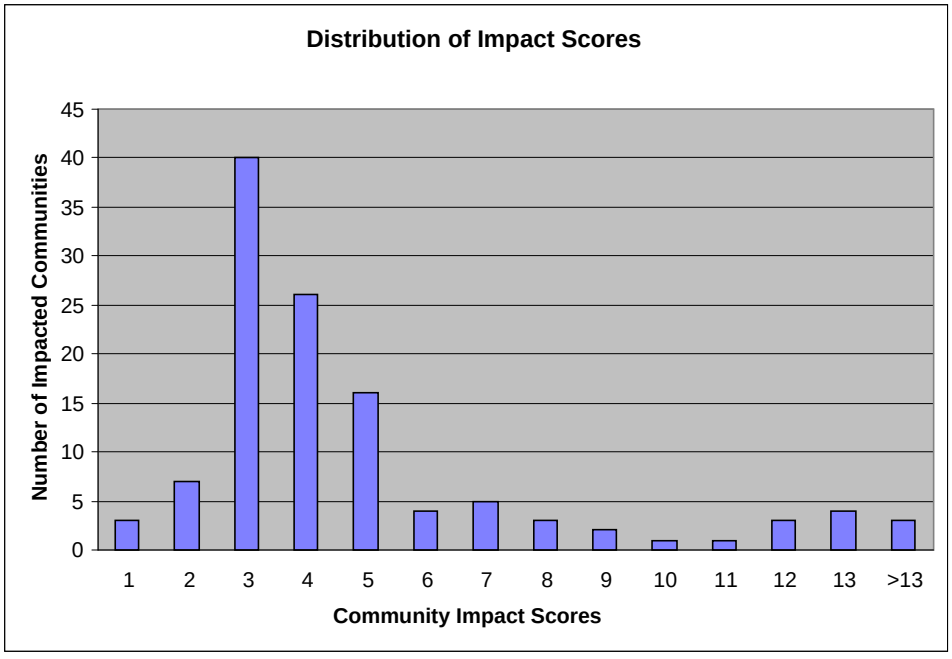
The community must have some contamination to get any score at all, and very low scores imply the presence of contamination, but limited or no socio-economic effects and most likely no recent victims.

Table 43:Impact Score Classification

Score Range	Classification
1 - 5	Low
6 - 10	Medium
11 and Higher	High

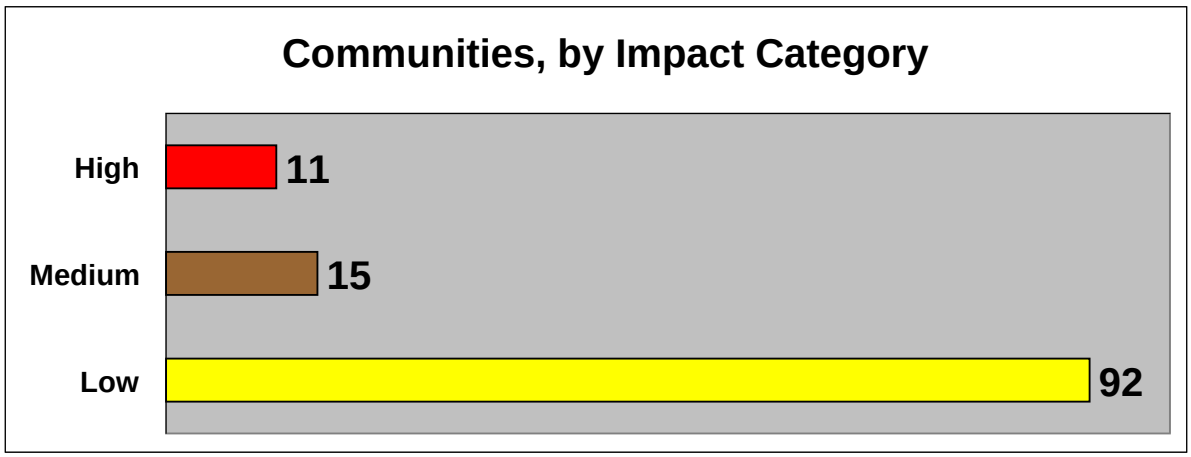
In the Iraq Landmine Impact Survey it was normally impossible to get a score of one. That would mean that there were UXO present in the community, but that their presence did not cause any socio-economic blockages (each separate kind of blockage normally increases the score by one point) and no recent victims (each recent victim normally increases the score by two points). Visible, localized UXO contamination which caused no socio-economic blockages and which did not result in victims was typically documented by the Iraq Landmine Impact Survey through UXO Spot Reports.

Figure 19: Distribution of Impact Scores



The vast majority of the impacted communities in this region are not High Impact communities - only 11 of 118 are. A surprisingly small – compared to impact patterns of other regions – number of affected communities received the grade of Medium Impact (15 communities). The bulk of the impacted communities in the South-Center region are Low Impact (92). The unusual proportion of High- and Medium Impact communities is statistically related to the distribution of recent victims. A large fraction (81%) of all affected communities reported zero or one recent victim; communities reporting two or three and those claiming more were equally frequent. Speculatively, this distribution may be the result of the particular dynamics of the war in 2003, with many locations overrun with little action and littering of munitions, and with a small number that saw significant combat action, concomitant contamination and subsequent incidents affecting civilians.

Figure 20: Impact Classification



POPULATIONS BY IMPACT CATEGORY

It is estimated that 147,326 persons live in landmine- and/or UXO-affected communities in the South-Center region of Iraq. In these locations, 19,360 persons live in High Impact communities, and 49,620 in Medium Impact communities. However, the majority of the persons living in affected areas reside in Low Impact communities –78,346. This information is summarized in Table 44.

Ten of the 11 High Impact communities are rural; we pointed out the greater hazards that rural communities incur already in the previous chapter.

Table 44:Communities and Populations, by Impact Category

Impact	Communities	Current Population
High	11	19,360
Medium	15	49,620
Low	92	78,346
Total	**118**	**147,326**

GEOGRAPHIC AND ADMINISTRATIVE DISTRIBUTION OF RECENT VICTIMS

The survey identified 99 recent victims in affected communities in the five governorates of this region. Recent victims were documented in 44 of the 118 communities. Exactly half of the communities with recent victims recorded just one victim. A quarter reported two or three, another quarter between five and seven.

All affected districts in this region reported recent victims except for Badra District in Wassit Governorate.. However, the district-based distribution of recent victims is very uneven, with Diwaniya District in Qadissiya Governorate being an extreme outlier with 23 victims.

DEMOGRAPHY OF RECENT VICTIMS

The recent victims are in their large majority male (80); only 19 were female. It is clear from the data that males in the region are more exposed to the risk of death or injury caused by landmines or UXO than are female Iraqis.

Almost half of the recent victims are adolescents or young adults; that is, 43 of the 99 are in the age range from 15 to 29 years. Roughly equal numbers are on either side of that age range. The distribution by age and gender appears in Figure 21.

Figure 21: Recent Victims, by Age and Gender

Table 45 presents a breakdown of recent victims by gender and by civilian occupation. All landmine and UXO victims in the South-Center region were civilians.

Table 45:Occupation at Time of Incident

Occupation	Female	Male	Total
Herding	9	40	49
Farming	4	22	26
Household Work	4	0	4
Trading	0	1	1
Other	1	5	6
Was Not Earning	1	12	13
Total	**19**	**80**	**99**

The three most common occupations nominated by respondents were herding, farming and not earning, similar to the distribution in the South region. It is clear from the data that herders and farmers are the most at risk of being involved in an incident with a landmine or UXO in this region as well.

The survey did not collect data concerning accidents that might have occurred during demining operations; the survey was fundamentally focused upon victims that come from the community being surveyed, the incident occurring on land lying within the community's boundaries. That means, further, that injuries to visitors to a community were also not recorded as community recent victims (they were recorded, where they occurred, on Information Management System for Mine Action [IMSMA] victim forms outside of the survey). Similarly if there were military operations conducted in the

area and someone was injured, by protocol that was not recorded as a loss to the community in the Iraq Landmine Impact Survey.

INCIDENTS AND CONSEQUENCES

The Landmine Impact Survey collected information regarding the activity that the victim was engaged in at the time of the landmine or UXO incident. This is important information because it helps Humanitarian Mine Action (HMA) and other officials to understand how economic and social roles and activities can increase or decrease vulnerability to injury or death from landmines or UXO.

Table 46 provides that information. The activity of herding, as well as being the occupation of highest risk, is also the single most common activity likely among those listed to produce death or injury. Together with farming, herding accounts for three quarters of all incidents.

Of note, tampering with munitions and its frequent companion activity, collecting scrap metal, were never invoked for any of the incidents that occurred in this region.

Table 46: Activity at Time of Incident

Activity	Female	Male	Total
Herding	9	42	51
Farming	4	21	25
Collecting Fuel or Water	5	3	8
Playing	1	11	12
Traveling	0	3	3
Total	**19**	**80**	**99**

Table 47 shows the distribution, by gender, of landmine/UXO incident survivors and fatalities. The proportion of victims who died as a result of their injuries was 41%.

Table 47: Landmine Incidents and Fatalities, by Gender

Gender	Survived	Fatal	Total
Female	11	8	19
Male	47	33	80
Total	**58**	**41**	**99**

Table 48 presents the information collected in key informant meetings about the kind of care provided to the 59 victims who initially survived their incident (note that one victim succumbed to his/her injuries later. One victim received more than one kind of care). Virtually all survivors received emergency care; however, rehabilitative care is almost totally absent, and no vocational training was documented.

Table 48: Type of Care Received by Those Victims Not Killed Immediately

Care Received	Female	Male	Total
Emergency Care	11	47	58
Rehabilitative Care	1	0	1
Vocational Training	0	0	0
Other Care	1	0	1
No Care	0	0	0
Total Cases	**12**	**47**	**59**

As a result of their wounds, 11 of the 58 initial survivors suffered limb amputations. One person lost her eyesight. 30 of the victims sustained a variety of other wounds. The information, which is not satisfactory because of the high number of unspecific “Other wounds” and “Unknown”, is summarized in Table 49 below.

Table 49: Type of Injury, by Gender

Injury	Female	Male	Total
Amputation	2	9	11
Loss of Sight	1	0	1
Other Wound	5	25	30
Unknown	3	13	16
Total	**11**	**47**	**58**

The current occupation and gender of the surviving victims is shown in Table 50. The largest group is comprised of those who remain unemployed – those who after their injury are no longer working. Table 45 indicated that only 13 of the victims were without a job before the incident, whereas among the surviving victims we see that 32 are not earning. The second and third most common occupations for the survivors are exactly the kinds of activity that are the most dangerous: herding and farming, with 10 and 8 survivors respectively. Frequent unemployment or continuation of dangerous activities is found not only in this region, but is the pattern among survivors in the south as well.

Table 50: Current Occupation of Survivors

Occupation	Female	Male	Total
Herding	2	8	10
Farming	0	8	8
Household Work	4	0	4
Government Service	0	1	1
Industry	0	1	1
Not Earning	5	27	32
Studying	0	2	2
Total	**11**	**47**	**58**

TYPES OF BLOCKAGE

The Iraq Landmine Impact Survey data collectors obtained extensive information regarding the types of socio-economic blockages that affected communities suffer. A socio-economic blockage might be defined as the elimination of certain kinds of economic opportunities that an unaffected community would have if their land were not contaminated by landmines or unexploded ordnance (UXO). Simply put, if land is contaminated with landmines or UXO to the extent that it is unusable, then community dwellers are denied the ability to productively use the land: their use of the land for various purposes is blocked. The surveyors collected information regarding exactly those blockages.

In northern Iraq it was found that three kinds of blockages were the most prevalent and the most important: non-agricultural uses, pasture, and agriculture. Non-agriculture uses of land are quite varied in northern Iraq, and are described below. Here we will focus on agricultural use of land and herding; these economic activities are central to the rural economy in northern Iraq. Pasture is divided into migratory and fixed pasture, and agricultural land is divided into land that is rain-fed and land that is irrigated. In terms of population and communities affected, and number of SHAs involved, these three primary types of blockages dominate all others: blockages of water source for whatever use, road blockages and blocked infrastructure are relatively rare.

Table 51:Percentages of Communities Reporting Blocked Access

Area of Blocked Access	Communities Affected	Percentage
Any Kind of Pasture	1103	98.0%
Migratory Pasture	748	66.4%
Fixed Pasture	621	55.2%
Crop Land	609	54.1%
Rain-fed	467	41.5%
Irrigated Crop	229	20.3%
Non-Agricultural Uses of Land	888	78.9%
Wild Food	798	71%
Firewood/Charcoal	551	49%
Wild Herbs	79	7%
Building Materials	22	2%
Other	254	23%
Any Water Usage	144	12.8%
Drinking Water	94	8.3%
Other Water than Drinking	141	12.5%
Any type of road	131	11.6%
Roads to Administrative Centers	6	0.5%
Other Roads	128	11.4%
Infrastructure		
Housing	9	0.8%
Other Infrastructure	11	1.0%
Total Communities	**1,126**	100%

Table 51 above indicates the various kinds of blockages reported and their rates of incidence. From an examination of this data and from conversations with community dwellers, a number of important conclusions can be drawn. There

are 254 communities that report other kinds of blockages; these are described further in this chapter. (Note: Affected communities can report more than one kind of blockage, therefore, the numbers of communities reporting different blockages will not add to 1,126.)

- Non-agricultural land uses are very important in northern Iraq; among these are the collection of firewood, edible plants, fodder for animals, and medicinal herbs. Surveyors learned that vast tracts of land have been deforested in northern Iraq as a consequence of fuel shortages during the period when the United Nations sanction regime was imposed on Iraq; this has severely depleted the amount of forest cover existing in the north. Consequently, rural males (whose job this is) range farther and farther from their villages to cut firewood; in many places the only firewood now available is in areas that have been protected because they are dangerous (contaminated with landmines/UXO). Women are the villagers most likely to harvest edible plants, but they tend to stay closer to their community.
- Pasture blockages are the second most common blockage (after non-agricultural uses of the land). Sixty-six percent of all affected communities reported that one or more of the SHAs in their community involved blocked pasture and 55% of the communities reported that their communities suffered from blocked access to fixed pasturage because of landmine or UXO contamination. Goats, sheep and cattle are an important component of the rural economy in northern Iraq and a critical source of meat and milk (for yoghurt and cheese in particular). The survey did not assess whether other land was accessible for pasture, and whether that land was sufficient to meet the needs of the community for pasture, but the fact that the highest risk category for recent victims was herders is some indication that there are pressures on contaminated land for pasturage (and/or that herders engage in high-risk behavior).
- The pasturage that we are calling migratory pasturage is really also common pasturage in two senses: 1) it is pasturage that all members of the community have a right to use, and 2) (in addition) it can be pasturage that is accessible to members of other nearby communities. Rarely, it also means that migratory communities might use the land on their seasonal rounds. The meaning of this category of pasturage reflects clearly the economic and social organization of land use in these communities and reflects the understanding of the members of the communities and the survey data collectors. Fixed pasture is normally understood to be pasture land that belongs to some member of the community and that person or family has the right to exclude all others from using that piece of land for pasture. However, interviews with community leaders indicated that fixed pasture is pasture that is only for the use of the community, is not shared with any other community (what we have called migratory pasture), but that no member of the given community can be blocked from using. In many cases a given SHA may overlap with both kinds of pasturage, and both kinds of blockages may be reported for one SHA (In the impact score the community will get "credit" only once for each kind of blockage, even if several SHAs in that one community suffer this kind of blockage).
- Blocked rain-fed cropland and irrigated cropland were also prevalent blockages recorded among the communities. Land which is irrigated is not common, and found mainly in narrow valleys in the more mountainous areas near the northern borders. Rain-fed grain-growing land is extremely important to the economy of northern Iraq and much of it is found in broad flat valleys that lie south and southwest of the more mountainous areas. These broad expanses are immense and rarely contaminated, and are also not irrigated. The mountainous areas have access to water in the spring and into the summer from springs and, importantly, from snow melt from mountains in Iran and Turkey. The narrower canyons and defiles where communities crowd are often contaminated because it was these areas where much past military activity occurred, to include emplacement of landmines. Because the militarily important elevated areas and narrow canyon-like valleys were the focus of military activity, and because they are also the areas most likely to be fed by springs, streams and rivers, these are areas where cropland is less important overall, where rain-fed agriculture is still more important than irrigated, but where irrigation systems are most likely to be found.
- Other prevalent blockages included drinking water, and water for any use, as well as roads. Access blockages to infrastructure and housing were very uncommon (each was reported in only one percent of the communities).

Table 52 provides a breakdown, by number of communities affected, of the population in the communities that report each kind of blockage, of the number of unique SHAs that report each kind of blockage, and the estimated surface area of all SHAs that report each kind of blockage. Since each SHA can involve more than one kind of socio-economic blockage, the total number of SHAs reporting each of the different kinds of blockages will be greater than the number

of SHAs (greater than the total number SHAs recorded, which was 3,024). The situation is similar for population numbers, the numbers of communities and the estimated surface area.

Table 52: Magnitude of Blocked Access

Impact Type	Communities Affected	Resident Population	Contaminated Areas	Estimated Area (Sq. Km.)
Migratory Pasture	748	546537	1463	415.29
Fixed Pasture	621	359932	1475	370.08
Rain-fed Crops	467	388839	886	184.11
Irrigated Crops	229	112794	380	161.75
Non-Agricultural Uses	888	528755	2187	668.65
Water Uses Other Than Drinking	141	112061	188	129.87
Drinking Water	94	87321	125	110.16
Any Roads	131	115009	174	50.98
Infrastructure	11	13275	11	0.56
Housing	9	14005	12	11.30

OTHER LESS COMMON SOCIAL AND ECONOMIC BLOCKAGES

Economic blockages are not the only price that contamination exacts from communities in northern Iraq. Landmines and UXO also reduce the ability of the community to live normal lives and support their families in many other ways. The next table provides a list of other kinds of blockages that communities suffer from. These blockage types represent a breakout of the 254 blockages to non-agricultural land used for purposes grouped as "Other" in Table 51. The numbers of communities involved provide some measure of their distribution. The percentages reflect the number of communities reporting these blockages compared to the total number of impacted communities surveyed. In total, 472 of 3,024 recorded SHAs have one or more of these blockages (communities may also report more than one of these blockages).

Table 53: Other Blockages

Blockage	Number of Communities	% Of All Communities
Walking	231	20.5%
Picnicking	103	9.1%
Acquiring Fodder	50	4.4%
Hunting	39	3.5%
Cross-Country Travel	33	2.9%
Access to Cemetery	5	0.4%
Play Area for Children	8	0.7%
Access to Abandoned Village	3	0.3%

TYPICAL COMBINATIONS OF IMPACTS

Many of the affected communities reported access blocked to more than one resource type. These blockages come in numerous combinations. This variety is considerable even when we consider only the more common blockage types. Theoretically, considering blockages to

- Pasture
- Non-agricultural land
- Rain-fed cropland
- Irrigated cropland
- Water bodies for any use
- Roads and trails

26 = 64 blockage combinations are possible. In reality, the affected communities in northern Iraq reported 36 of those 64 combinations, and only 29 of these were present in more than one community. Eight of the 36, or less than a quarter of the combinations actually used, accounted for 81% of the communities. The largest number (336) were communities that reported blockages of their pasture and non-agricultural land.

However, using an approximation procedure, this large complexity can be greatly reduced, with a small number of typical blockage combinations appearing. Such a typology is instructive particularly when affected communities reporting different blockage combinations are distinguished also with regard to some other important impact. This is indeed the case when the number of recent victims is considered.

A statistical procedure called cluster analysis produces a community classification of just four different dominant blockage combinations. The following table displays the dominant blockages for each group (or "cluster") of communities in grey shades. It reports also the number of communities assigned to the clusters, the mean number of blockages reported in each cluster, and the mean number of recent victims.

The figures in the cells mean the percentage of the communities in a certain cluster that shared a particular trait. For example, two thirds of the affected communities (64%) in Cluster D experienced some blocked irrigated cropland.

Table 54: Combinations of Impacts

Blockage Type	All Affected Communities	A	B	C	D
Pasture	98%	94%	99%	99%	100%
Non-agricultural Land	75%	0%	100%	100%	99%
Rain-fed Crops	41%	47%	0%	100%	40%
Irrigated Crops	20%	15%	0%	0%	64%
Water Blockage, Any Kind	13%	6%	0%	0%	44%
Road, Any	12%	4%	0%	0%	41%
Communities Concerned	**1,126**	**272**	**339**	**221**	**294**
Mean Blockages Claimed	2.60	1.66	1.99	2.99	3.87
Mean Recent Victims	0.14	0.11	0.08	0.15	0.23
Percentage with Some Recent Victims	9.4%	7.0%	5.6%	9.5%	16.0%

Cluster A is essentially defined by the absence of non-agricultural land blocked by landmines or UXO. Cluster B hosts communities reporting blocked pasture and blocked non-agricultural land, but no other blockages within the types considered here. Cluster C adds blocked rain-fed cropland, again to the exclusion of irrigated cropland, water points and roads. Cluster D attracts communities that reported blockages of these last three kinds with significantly (3 times) higher frequency than the overall averages.

The mean number of blockage types reported by the affected communities increases from cluster A to B to C to D.

The mean recent victims are higher for communities in Cluster C than for those in Clusters A or B, and the mean for D is higher than for C. Similarly, the fraction of communities that suffered some recent victims increases in the same order.

Two substantive conclusions follow. First, more complex combinations of blockages arrive by the addition of resource types with greater unit productivity, i.e. rain-fed farms then irrigated farms, as well as water points and roads. Second, combined blockages of these productive resources tend to cause more victims. While the exact causal mechanism is not known, one may suspect that by moving from clusters A or B to C, and particularly from C to D, livelihood alternatives become increasingly scarce, and pressures rise to use contaminated land, thus exposing residents to greater hazards.

TYPES OF BLOCKAGE

The Iraq LIS surveyors collected extensive information regarding types of socio-economic blockages that affected communities suffer (though due to curtailed data collection activities in Ta'meem Governorate, this data was collected for a relatively small sample of communities). A socio-economic blockage might be defined as the elimination of certain kinds of economic opportunities that an unaffected community would have if its land was not contaminated by landmines or UXO. Simply put, if land is contaminated with landmines or UXO to the extent that it is unusable, then community dwellers are denied the ability to productively use the land: their use of the land for various purposes is blocked. The surveyors collected information targeting those blockages.

The two most common types of blockages in the 43 surveyed communities in the Kirkuk area of Tameem Governorate were pasture and cropland. All 43 reported some pasture contaminated, and 40 reported some cropland blocked. In 30 communities, some non-agricultural land was affected.

Table 55 indicates the various kinds of blockages reported and their rates of incidence, with two types of pasture and two types of cropland distinguished.

Table 55:Percentages of Communities Reporting Blocked Access

Area of Blocked Access	Communities Affected	Percent
Rain-fed Crops	38	88%
Non-agricultural Land	30	70%
Fixed Pasture	29	67%
Migratory Pasture	24	56%
Roads, Any Type	9	21%
Irrigated Crops	6	14%
Water for Other Purposes	2	5%
Drinking Water	2	5%
Infrastructure Other	0	0%
Housing	0	0%
Total Affected Communities	**43**	**100%**

Table 56 provides a breakdown, by number of communities affected, of the population in the communities that report each kind of blockage, of the number of unique Suspected Hazardous Areas (SHA) that report each kind of blockage, and the estimated surface area of all of the SHA that report each kind of blockage. Since each SHA can involve more than one kind of socio-economic blockage, the total number of SHA reporting each of the different kinds of blockages will be greater than the number of SHA (greater than the total number SHA recorded, which was 125). The population numbers, numbers of communities and estimated surface area are similarly affected.

Mines Advisory Group (MAG) Training Aids, Northern Iraq.

Table 56: Magnitude of Blocked Access

Impact Type	Communities Affected	Resident Population	Contaminated Areas	Estimated Surface (sq km)
Rain-fed Crops	38	16,906	97	9.57
Non-agricultural Land	30	3,996	80	10.74
Fixed Pasture	29	16,334	76	5.81
Migratory Pasture	24	1,847	48	6.28
Road Any	9	1495	8	1.39
Irrigated Crops	6	787	6	0.48
Water for Other Purposes	2	47	2	0.47
Drinking Water	2	35	2	0.42
Housing	0	0	0	0.00
Infrastructure, Other	0	0	0	0.00
All Affected Communities	**43**	**17,397**	**125**	**12.09**

TYPES OF BLOCKAGE

The Iraq Landmine Impact Survey teams collected extensive information regarding the types of socio-economic blockages that affected communities suffer. A socio-economic blockage might be defined as the elimination of certain kinds of economic opportunities that a community would have if their land were not contaminated by landmines or unexploded ordnance (UXO). Simply put, if land is contaminated with landmines or UXO to the extent that it is unusable, then community dwellers are denied the ability to productively use the land: their use of the land for various purposes is blocked. The surveyors collected information regarding exactly those blockages.

The three most common kinds of blockages in southern Iraq were irrigated cropland, fixed pastureland and migratory pastureland. Here we will focus upon agricultural use of land and herding; these economic activities are central to the rural economy in southern Iraq. In terms of population and communities affected and number of Suspected Hazard Areas (SHAs) involved, these three primary types of blockages dominate all others. Marshland is the fourth most important blockage recorded, indicating the importance of the southern marshlands for local communities and the intensity of the conflict that took place there under Saddam Hussein. Blocked roads, rain-fed crops, water sources, housing, and blocked infrastructure are relatively rare.

Table 57:Percentages of Communities Reporting Blocked Access

Area of Blocked Access	Communities	Communities Affected
Irrigated Crops	295	88%
Fixed Pasture	272	81%
Migratory Pasture	127	38%
Marshes	59	18%
Roads	16	5%
Non-Cultivated Areas	16	5%
Rainfed Crops	11	3%
Water Other Than Drinking	11	3%
Drinking Water	7	2%
Housing	7	2%
Other Infrastructure	3	1%
Desert	2	1%

Table 57 above indicates the various kinds of blockages reported and their rates of incidence.

In contrast to the north, the most heavily impacted type of blocked access in the south is irrigated cropland. This is indicative of some of the differences between the two regions. Pasture blockages are the second most common blockage with 81% of all affected communities reporting blocked pasture and 38% reporting their communities suffered from blocked access to fixed pasturage. Goats, sheep and cattle are an important component of the rural economy in Iraq and a critical source of meat and milk (for yoghurt and cheese in particular). The survey did not assess whether other land was accessible for pasture, and whether that land was sufficient to meet the needs of the community for pasture, but the fact that the highest risk category for recent victims was herders is some indication that there are pressures on contaminated land for pasturage and that herders are exposed to a high level of risk factors.

Table 58 provides a breakdown, by number of communities affected, of the population in the communities that report each kind of blockage, of the number of unique Suspected Hazard Areas that report each kind of blockage, and the estimated surface area of all of the SHAs that report each kind of blockage. Since each SHA can involve more than one kind of socio-economic blockage, the total number of SHA reporting each of the different kinds of blockages will be greater than the number of SHAs (greater than the total number SHAs recorded, which was 399). The situation is similar for the population numbers, the numbers of communities and the estimated surface.

Table 58: Magnitude of Blocked Access

Impact Type	Communities Affected	Resident Population	Contaminated Areas	Estimated Surface (sq km)
Irrigated Crops	295	527,656	351	684.58
Fixed Pasture	272	478,259	327	605.43
Migratory Pasture	127	197,476	146	393.31
Marshes	59	58,501	74	81.22
Roads	16	37,549	24	70.08
Non-Cultivated Areas	16	33,641	22	27.47
Rainfed Crops	11	17,120	12	8.04
Other Water	11	17,120	12	8.04
Drinking Water	7	16,863	10	101.73
Housing	7	111,855	8	24.20
Other Infrastructure	3	5,250	4	4.58
Desert	2	10,500	3	106.50

TYPICAL COMBINATIONS OF IMPACTS

Many of the affected communities reported access blocked to more than one resource type.

These blockages come in numerous combinations. If we restrict the analysis to five of the more consequential blockage types:

- Irrigated Cropland
- Fixed Pasture
- Migratory Pasture
- Marshland
- Water Bodies for Any Use

25 = 32 combinations are possible in theory. Using an approximation procedure, this large complexity can be further reduced, with a small number of typical blockage combinations appearing. Such a typology is instructive particularly when affected communities reporting different blockage combinations are distinguished also with regard to some other important impact. This is indeed the case when the number of recent victims is considered.

In the table of cluster associations below, the clusters have been named and re-ordered for better readability. The number of communities in each cluster is also shown. The figures in the cells mean the percentage of the communities in a certain cluster who shared a particular trait. For example, almost all communities (89%) in Cluster B experienced some blocked irrigated cropland.

Table 59: Combinations of Impacts

Cluster	A	B	C	D	E	Frequency
Irrigated Cropland	100%	89%	100%	100%	37%	88%
Fixed Pasture	100%	100%	100%	21%	39%	81%
Migratory Pasture	0%	100%	0%	100%	10%	38%
Marshland	0%	0%	100%	38%	24%	18%
Water Bodies for Any Use	0%	0%	0%	14%	43%	8%
Communities Concerned	133	80	31	42	49	335

Cluster A is robustly defined by irrigated cropland and fixed pastureland blocked by landmines or UXO, to the exclusion of all other types. Cluster B hosts communities reporting blocked irrigated cropland, fixed pasture and migratory pasture, but no other blockages within the types considered here. Cluster C is defined by three categories: blocked irrigated cropland, fixed pasture and marshlands, to the exclusion of migratory pasture and water points. Cluster D attracts communities that reported blockages of irrigated cropland and migratory pasture with some influence from

marshland and water for any use. Cluster E is a residual category, marked by the absence of any constant trait across its 49 members, but with a disproportionately high frequency of blocked water bodies.

TYPES OF BLOCKAGE

The Iraq Landmine Impact Survey teams collected extensive information regarding the types of socio-economic blockages that affected communities suffer. A socio-economic blockage might be defined as the elimination of certain kinds of economic opportunities that an unaffected community would have if their land were not contaminated by landmines or unexploded ordnance (UXO). Simply put, if land is contaminated with landmines or UXO to the extent that it is unusable, then community dwellers are denied the ability to productively use the land: their use of the land for various purposes is blocked. The surveyors collected information on exactly those blockages.

The three most common types of blockages in the South-Center region of Iraq were fixed pastureland, irrigated croplands and migratory pastureland. Here we will focus upon agricultural use of land and herding; these economic activities are central to the rural economy in southern Iraq. In terms of population and communities affected and number of Suspected Hazard Areas (SHAs) involved, these three main kinds of blockages dominate all others. In fact, blockages of other resource types are exceedingly rare in this region. Specifically, and in contrast to the south, none of the affected communities claimed any roads blocked by landmines or UXO. This is counterintuitive; for the geographical distribution of affected communities and of recent victims indicates that combat activity in the war of 2003 was particularly intense along highways and river crossings.

Table 60: Percentages of Communities Reporting Blocked Access

Area of Blocked Access	Communities Affected	Percent
Fixed Pasture	102	86%
Irrigated Crops	101	86%
Migratory Pasture	35	30%
Rain-fed Crops	2	2%
Water for Other Purposes	2	2%
Housing	2	2%
Non-agricultural Land	1	1%
Infrastructure Other	1	1%
Road Any	0	0%
Drinking Water	0	0%
Total Affected Communities	**118**	**100%**

Pasture blockages are the most common blockage type, with 92% of all affected communities reporting access blocked to some of their fixed or migratory pastureland.

This is closely followed by the fraction of affected communities with blocked irrigated cropland. By contrast, rain-fed cropland and non-agricultural land blockages are rare, for agro-climatic reasons. The frequencies of these claimed impacts are almost the reverse of those found in the north of the country.

Table 61 provides a breakdown, by number of communities affected, of the population in the communities that report each kind of blockage, of the number of unique SHAs that report each kind of blockage, and the estimated surface area of all of the SHAs that report each kind of blockage. Since each SHA can involve more than one kind of socio-economic blockage, the total number of SHAs reporting each of the different kinds of blockages will be greater than the number of SHAs (greater than the total number SHAs recorded which was 399). The situation is similarly for the population numbers, the numbers of communities and the estimated surface.

Table 61: Magnitude of Blocked Access

Blockage Type	Communities Affected	Resident Population	Contaminated Areas	Estimated Surface (sq km)
Fixed pasture	102	104,726	109	75.07
Irrigated crops	101	99,436	107	75.33
Migratory pasture	35	41,166	36	34.68
Rainfed crops	2	330	2	4.00
Water for other purposes	2	850	2	0.25
Housing	1	500	2	0.74
Non-agricultural land	1	600	1	1.00
Infrastructure other	1	1,000	1	0.02
Road of any kind	0	0	0	0.00
Drinking water	0	0	0	0.00
All Affected Communities	**118**	**147,326**	**125**	**87.60**

FACTORS INFLUENCING HUMANITARIAN MINE ACTION - NORTH

Humanitarian Mine Action operators in northern Iraq understand that among the factors that influence planning for clearance, four stand out: the size of the suspected area, the type of vegetative cover, the characteristics of the terrain itself and the types of ordnance that contaminate it. This chapter focuses on the information collected by the survey of northern Iraq from 3024 Suspected Hazard Areas (SHAs).

Among these four factors, terrain stands out as a particularly difficult constraint. Therefore, an attempt has been made to present more detail than is normal regarding the different kinds of terrain and their vegetation found among the SHAs of northern Iraq.

SIZE AND DEFINITION OF SUSPECTED HAZARD AREAS

Areas of landmine and UXO contamination in Iraq range from 24 square meters to 30 square kilometers in size. The reports that the surveyors collected regarding each of the 3,024 SHAs they documented were based upon the beliefs and experience of the community members who chose one or more guides to lead the surveyors to a safe viewing point from which the SHA could be examined, photographed, and sketched (using Global Positioning System [GPS] information, compass bearings, and estimated distances and size). In no way can this work replace the need for later verification and area reduction accomplished by competent technical survey. However it is a useful starting point for general discussion of the major features found in many of the SHAs, and for specific initial operational planning when a particular community and its SHA are targeted for HMA intervention.

A good deal of technical survey and marking activity has been executed in northern Iraq in past years. However, it was the consistent experience of the Landmine Impact Survey data collectors that villagers are not confident that the previously marked sizes of SHAs any longer hold accurate. The survey found hundreds of contaminated communities that are not recorded in the data available to HMA authorities in northern Iraq, and hundreds of SHAs (they also

confirmed the non-contamination of hundreds of communities recorded in existing data as contaminated), but in communities where HMA activity had occurred, the surveyors often recorded fewer distinct dangerous areas than previous interventions in the community. The reason for this was simple: the rains and snows of northern Iraq move landmines on the steep slopes. HMA authorities will find as they return to many villages where survey or marking was not followed by demining that the communities have reason to believe that the boundaries of hundreds of SHAs have expanded. Of course it is the job of the Landmine Impact Survey data collector to record the well-founded beliefs of the community about the size of their SHAs. The consequence for many communities was the elimination of previously recorded SHAs that the community had cleared and the consolidation of SHAs into larger contaminated areas where the suspected movement of landmines on steep slopes had been the greatest.

The tables below provide information regarding the distribution of SHAs among the districts of the three northern governorates and their average sizes; it also provides an estimate of the fraction of that the total SHA with respect to the total land area of each governorate. The amount of land that is included in all SHAs documented by the Landmine Impact Survey of Iraq's northern three governorates ranges from 1.2% to 3.1%, with the smallest belonging to Sulaymaniyah, and the largest Erbil. In absolute size, the table shows that Sulaymaniyah has about the same total of SHA as Erbil, and both have more than twice as much as does Dahuk.

Table 62: SHA Distribution and Size, Governorate Level

Governorate	Estimate of Contaminated Land (sq. km.)	Percent of Total Land Area Contaminated
Duhok	117	1.2%
Erbil	333.1	3.1%
Sulaymaniyah	325.9	1.6%
Total	776	1.9%

Within each of the three governorates, there is considerable variation in the number of contaminated area and in their estimated total size among districts:

Table 63: SHA Distribution and Size, Erbil Governorate

Erbil Districts	Total Number SHAs	Total SHA Area (sq. km.)	Average SHA Area (sq. km.)
Choman	199	141.4	0.71
Dashti Hawler	13	4.3	0.33
Erbil	1	0.0	0.00
Koysinjaq	70	17.3	0.25
Mergasur	80	42.6	0.53
Shaqlawa	86	16.5	0.19
Soran	230	111.0	0.48
Total	679	333.1	0.49

In Erbil Governorate, among seven districts, 679 SHAs were documented among 299 communities; the average size of these SHAs is about one-half of a square kilometer. Among the seven districts of Erbil, average size ranged from about one-fifth of a square kilometer (Shaqlawa) to almost three-fourths of a square kilometer (Choman District). The district that surrounds the governorate center, also called Erbil has one SHA whose size is estimated at 1500 square meters, or 0.0015 square kilometers.

Table 64: SHA Distribution and Size, Dahuk Governorate

Dahuk Districts	Total Number SHAs	Total SHA Area (sq. km.)	Average SHA Area (sq. km.)
Akre	67	10.6	0.16
Amedi	345	52.5	0.15
Duhok	87	6.8	0.08
Semel	25	2.6	0.10
Shekhan	28	7.7	0.28
Zakho	157	36.8	0.23
Total	709	117	0.17

Dahuk Governorate has the fewest number of contaminated communities among the three northern governorates of Iraq, but the second highest number of SHAs. However, the average size of the Dahuk SHA is smaller than the other two, 0.17 square kilometers, and within the governorate, district averages range from 0.08 to 0.28 (in Shekhan, on the Green Line, near Ninewa Governorate).

Sulaymaniyah Governorate is the largest geographically of the three northern Governorates, and has the largest number of contaminated communities (582), the largest number of SHAs (1636). However, the average size of these SHAs is one-fifth of a square kilometer (20 hectares), less than half that of Erbil, and slightly larger than the average in Dahuk.

Table 65: SHA Distribution and Size, Sulaymaniyah Governorate

Sulaymaniyah Districts	Total Number SHAs	Total SHA Area (sq. km.)	Average SHA Area (sq. km.)
Chamchamal	97	21.6	0.22
Darbandikhan	197	78.3	0.40
Dukan	88	8.1	0.09
Halabja	158	48.4	0.31
Kalar	37	21.0	0.57
Kfri	47	1.8	0.04
Penjwin	284	52.5	0.18
Pshdar	178	18.6	0.10
Ranya	42	4.8	0.11
Sharazur	8	0.2	0.03
Sharbazher	446	62.3	0.14
Sulaymaniyah	54	8.3	0.15
Totals	**1636**	**325.9**	**0.20**

CONTAMINATED LAND BY VEGETATION AND TERRAIN

The 3,026 SHAs identified in northern Iraq vary greatly in ground profile (terrain) and vegetation coverage. All three governorates lie in the northeastern highlands of Iraq, an area stretching from Mosul and Kirkuk toward the north and northeast where Iraq borders Turkey and Iran. In this area, higher ground is found separated by broad, undulating steppes which then give way to mountains ranging from 1,000 to nearly 4,000 meters (3,300 to 13,100 ft) in height near the international borders.

Landmine Impact Survey data collectors operating in the Kurdish areas found that the types of terrain in which SHAs were located differed dramatically from one another. We divide the data based upon terrain type and vegetation into three main groups of SHA. They are SHAs that lie:

- At lower elevations;
- On mountainsides at higher elevations, but are generally featureless;
- On mountainsides at higher elevations, and which include secondary features.

In the tables below we divide both the SHAs that lie at lower elevations (III), and, those at higher elevations but which include secondary features (II), into two groups. In both major groups there are SHAs that are generally flat (II-a, III-a) and other SHAs that contain gullies, ridgelines, and other secondary features or descriptions (II-b, III-b). The third major group includes SHAs that are featureless (no secondary features or descriptions at all) but all of which lie in higher altitude mountain areas (I).

Table 66: Elevation and Terrain

Location		Number of SHA	Total Area (sq. m.)	% Of Total	Total Area (sq. km.)	Average Size (hectare)
I.	On Mountainside (Featureless)	347	59,633,124	7.69%	59.6	17.2
II a	On Mountainside (Flat Areas Only)	37	6,092,000	0.79%	6.1	16.5
II b	On Mountainside (Hills, Gullies, etc.)	1098	299,819,914	38.69%	299.8	27.3
III a	At Lower Elevations (Flat Land Only)	220	39,684,960	5.12%	39.7	18.0
III b	At Lower Elevations (Hills, Gullies, etc.)	1317	369,796,555	47.71%	369.8	28.1
Totals		**3019**	**775,026,553**	**100.00%**	**775.0**	**25.7**

Iraq Landmine Impact Survey data collectors recorded terrain features for each of the SHAs that they documented. Most of the SHAs in Iraqi Kurdistan are found in somewhat hilly to very mountainous terrain. The international standard Landmine Impact Survey questionnaire records terrain profiles (physically) within the SHA (like gullies, hillsides or ridges), but does not typically record the larger topographic context. This international standard for recording operationally relevant terrain information was adequate for only one of three distinguishable groups of SHAs found in northern Iraq.

This group of SHAs is found in lower altitude areas, where access is not necessarily so difficult and where reports indicate that the general profile of the SHAs includes gullies, ridges, or hills is important information. However, the vast majority of SHAs recorded by the Iraq Landmine Impact Survey are in mountainous terrain, some of it very steep and difficult to access. Thus we also distinguish two other categories of terrain: 1) terrain that is on steeply sloped mountains or along the tops of mountains, but is otherwise (internally) featureless; 2) terrain that is on steeply sloped mountainsides or along the tops of mountains, but does contain secondary elevations (hills and hilly undulations), gullies or other ridges, and even flat areas.

The three groups of tables presented below include both internal terrain profiles and vegetation types. The vegetation categories are mutually exclusive in the following sense: each successive set vegetation type includes all SHAs that have that vegetation, except any that include more difficult vegetation for clearance. For example, all SHAs that have no vegetation at all are the first category. The next category includes all SHAs that have only short grass. If there are SHAs that have both short grass and tall grass, those are included in the tall grass category, and so on. The forest category, the most difficult for clearance includes all SHAs that have at least some forest cover, though it may also include some short grass, long grass, and bushes. Thus each successive category of vegetation cover, from none to forest, is successively more difficult for clearance operations to handle. At the lower extreme, land with no vegetation at all is a significant distinguishing characteristic.

I. SHAs Found on Mountain Slopes with No Secondary Features

The 347 SHAs in the following table are distinguished from all other SHAs recorded by the Iraq Landmine Impact Survey by the fact that they occur on higher elevation mountain slopes or mountain tops, but do not contain within them other secondary terrain features, such as gullies, ridges, hilltops, or relatively flat areas. Since these SHAs do not include secondary terrain features, they are only sorted in the table below by vegetation, which is ranked from the vegetative cover found in Kurdistan that is easiest (no vegetation at all) for demining operations to that which is the most difficult (forest).

Table 67: SHA at Higher Elevations, No Secondary Terrain Features

SHA at Higher Elevations With No Secondary Terrain Features, are Mainly Long-sloped, Undulating Mountainsides	Number SHAs	Total Area (sq. m.)	Total Area (sq. km.)	% of Total Area	Total Area (hectare)	Average Size (hectare)
No Vegetation at All	9	796,200	0.80	1%	79.6	8.8
Short Grass Only	36	4,502,350	4.50	8%	450.2	12.5
Some Tall Grass	12	1,236,824	1.24	2%	123.7	10.3
Some Bushes and Trees	285	52,617,750	52.62	88%	5261.8	18.5
Forest	5	480,000	0.48	1%	48.0	9.6
Totals	347	59,633,124	59.63	100%	5963.3	17.2

The table above indicates that 88% of the entire SHA area has at least some bushes and trees. Since all of the SHAs in this topographic category are on major mountain slopes, and though they do not contain other secondary terrain features – they are generally gently undulating, higher altitude slopes - demining operations here will face the significant difficulty of working at higher altitudes where road access is likely to be minimal or completely absent.

The following two tables focus upon the second broad category of SHAs: SHAs which are found at higher elevations (on mountainsides) where access by road is likely to be very difficult. Like the category of SHA in the previous section, these can be distinguished between those that contain secondary terrain features (such as hillsides, ridges or gullies) and those that are relatively flat. Again the tables below provide information about the distribution of vegetation among these SHAs which have been distinguished by included terrain types.

II a. Flat SHAs Found at Higher Elevations

This group of SHAs is distinguished from all other SHAs by the fact that they are found at higher elevations, but are on relatively flat land, and lack any secondary terrain features (such as slopes, ridges or hillsides); they are also the smallest group, at only 37. These SHAs should be relatively easier to work in from an operational point of view than the other SHAs found at higher elevations. However, operators are likely to face significant access problems compared to SHAs found at lower altitudes.

Table 68: Flat SHAs Found at Higher Elevations

Flat SHAs at Higher Elevations	Number SHA	Total Area (sq. m.)	Total Area (sq. km.)	% of Total Area	Total Area (hectare)	Average Size (hectare)
No Vegetation at All	1	5,000	0.01	0.08%	0.50	0.50
Short Grass Only	2	13,000	0.01	0.21%	1.30	0.65
Some Tall Grass	0	0	0.00	0.00%	0.00	0.00
Some Bushes and Trees	34	6,074,000	6.07	99.70%	607.40	17.86
Forest	0	0	0.00	0.00%	0.00	0.00
Totals	**37**	**6,092,000**	**6.09**	**100.0%**	**609.20**	**16.46**

These 37 SHAs contain only six square kilometers of area (average size is approximately 17 hectares), but again the most common vegetation type includes at least some isolated bushes and trees, and very likely short grass. None of these SHAs included any forest cover and only one had no vegetation at all.

II b. SHAs Found at Higher Elevations Which Contain Secondary Terrain Features

These SHAs are likely to be the most difficult of the contaminated terrain found in northern Iraq to operate in. The 1,098 SHAs included in the next table not only contain secondary terrain features like gullies, ridges, and hills (or hillsides) within them, they also lie at higher elevations, on major mountain slopes or along mountain ridgelines. This

terrain is the most difficult because, like the group of SHAs found in the first section, they generally lack roads and access, other than foot and goat paths, and lie as all of the other SHAs described previously at higher elevations. Additionally, this group of 1098 SHAs are made even more difficult because they contain prominent secondary terrain features within them (the first category was mostly flat, though sloped, often gently undulating terrain).

Table 69: SHAs at Higher Elevations with Secondary Terrain Features

SHAs at Higher Elevations With Secondary Terrain Features	Number SHA	Total Area (sq. m.)	Total Area (sq. km.)	% of Total Area	Total Area (hectare)	Average Size (hectare)
No Vegetation at All	43	3,168,120	3.17	1.06%	316.81	7.37
Short Grass Only	193	44,932,900	44.93	14.99%	4493.29	23.28
Some Tall Grass	25	4,745,000	4.75	1.58%	474.50	18.98
Some Bushes and Trees	824	240,796,394	240.80	80.31%	24079.64	29.22
Forest	13	6,177,500	6.18	2.06%	617.75	47.52
Totals	**1098**	**299,819,914**	**299.82**	**100.00%**	**29981.99**	**27.31**

The 1098 SHAs in this group are similar to the SHAs found at lower altitude in that the most common vegetation types include isolated trees, with some bushes and short and long grass – among these 1098 SHA, 824 have these vegetation types, or about 81% of the total. The second most common group of SHA in this category are those that have no trees or bushes at all, but may include short or long grass or both (218 SHA, comprising 16.6% of total land area in this group).

III a. SHAs Found At Lower Elevations Which Are Flat

A separate category of SHA is found at lower elevations; this is land that is mostly flat. Together these represent 7.2% of the total SHA coverage; they are an important and distinguishable category in that they are both relatively easy to access and less difficult to operate on. None of these was found to be forested, and among them short or long grass were the most common vegetation types.

Table 70: Flat SHAs at Lower Elevations

Flat SHA At Lower Elevations	Number SHA	Total Area (sq. m.)	Total Area (sq. km.)	% of Total Area	Total Area (hectare)	Average Size (hectare)
No Vegetation at all	10	1,401,000	1.40	3.5%	140.10	14.01
Short Grass Only	108	28,830,400	28.83	72.6%	2883.04	26.69
Some Tall Grass	31	2,839,090	2.84	7.2%	283.91	9.16
Some Bushes and Trees	71	6,614,470	6.61	16.7%	661.45	9.32
Forest	0	0	0.00	0.0%	0.00	0.00
Totals	**220**	**39,684,960**	**39.68**	**100.0%**	**3968.50**	**18.04**

III b. SHAs Found At Lower Elevations with Secondary Terrain Features

The most common vegetation type found among these 1317 SHAs are bushes and small trees (at least some), but they would not be considered to be covered with forest. Of these, 982 SHAs (73% of the total SHA land area) are likely covered with short and long grasses. Another 271 of these SHAs are without any vegetation at all, or at most tall grasses (about 26%).

Table 71: SHAs at Lower Elevations with Secondary Terrain Features

SHAs at Lower Elevations With Secondary Terrain Features	Number SHA	Total Area (sq. m.)	Total Area (sq. km.)	% of Total Area	Total Area (hectare)	Average Size (hectare)
No Vegetation at All	41	5,376,200	5.38	1.5%	537.62	13.11
Short Grass Only	225	82,993,225	82.99	22.4%	8299.32	36.89
Some Tall Grass	55	10,010,300	10.01	2.7%	1001.03	18.20
Some Bushes and Trees	982	268,126,405	268.13	72.5%	26812.64	27.30
Forest	14	3,290,425	3.29	0.9%	329.04	23.50
Totals	**1317**	**369,796,555**	**369.80**	**100.0%**	**36979.66**	**28.08**

CONTAMINATED LAND BY ORDNANCE CLASS

The types and distribution of munitions in contaminated areas also affect the choice of clearance technique. The survey sought information about anti-personnel landmines, anti-tank landmines, cluster submuntions, other UXO, and any stockpiles that might have existed. These are somewhat generic categories and the survey did not seek more specific information (such as specific type of anti-personnel landmine). Since an SHA may be contaminated by more than one type of munition, the frequencies add up to more than the total number of SHAs.

Table 72: Distribution of Ordnance, Type and Governorate

Ordnance Type	Erbil	Dahuk	Sulaymaniyah	Total	Percent
Anti-Personnel Landmines	646	698	1602	2946	97.4%
Unexploded Ordnance	190	117	749	1056	34.9%
Cluster Sub-Munitions	30	24	7	61	2.0%
Anti-Tank Landmines	26	14	57	97	3.2%
Stockpiles	14	4	1	19	0.6%
Other	8	1	3	12	0.4%
Total SHA	**679**	**709**	**1636**	**3024**	**100.0%**

The inhabitants of the affected communities in northern Iraq believed themselves, for the most part to be affected by landmines. More than 97% of the 3024 SHAs recorded in northern Iraq have anti-personnel landmines, according to the information recorded from the inhabitants of the communities affected by each SHA. Almost 35% of the SHAs are said to have UXO contamination, and 2% (or 30 SHAs) to have cluster sub-munitions specifically. Stockpiles are not a problem often reported in the north (in contrast to southern Iraq), and this problem was recorded in only 0.6% of the SHAs (or 14).

FACTORS INFLUENCING HUMANITARIAN MINE ACTION - SOUTH

The governorates of the South Region are typified by flat rocky desert, alluvial farmland, extensive marshes/former marsh lands, and date palm plantations. Large urbanized areas stretch along the rivers. Ridges and hillsides are most often riverbanks and irrigation channels. The area is bounded by southern borders with Saudi Arabia and Kuwait and the Persian Gulf, and eastern borders with Iran. Much of the border areas were cleared of all human settlements during several wars. Since 2003 many "new" communities have sprung up through the return and resettlement of displaced landowners. The south is also the home of the extensive marsh ecosystem that was all but destroyed during the last regime. Discussions concerning marsh restoration should critically evaluate plans against suspected contamination results from this survey.

There are many factors to be considered when planning landmine clearance and explosive ordnance demolition that directly affect available time and resources. Of these, the physical characteristics that most influence clearance are the types of ordnance, the size of the suspected areas, the type of existing vegetation and characteristics of the terrain.

SIZE AND DEFINITION OF SUSPECTED HAZARD AREAS

The size and the definition of the boundaries of Suspected Hazard Areas (SHAs) are fundamental issues when reviewing approaches to clearance. The Landmine Impact Survey survey recorded 399 SHAs with an estimated surface of 854.51 square kilometers.

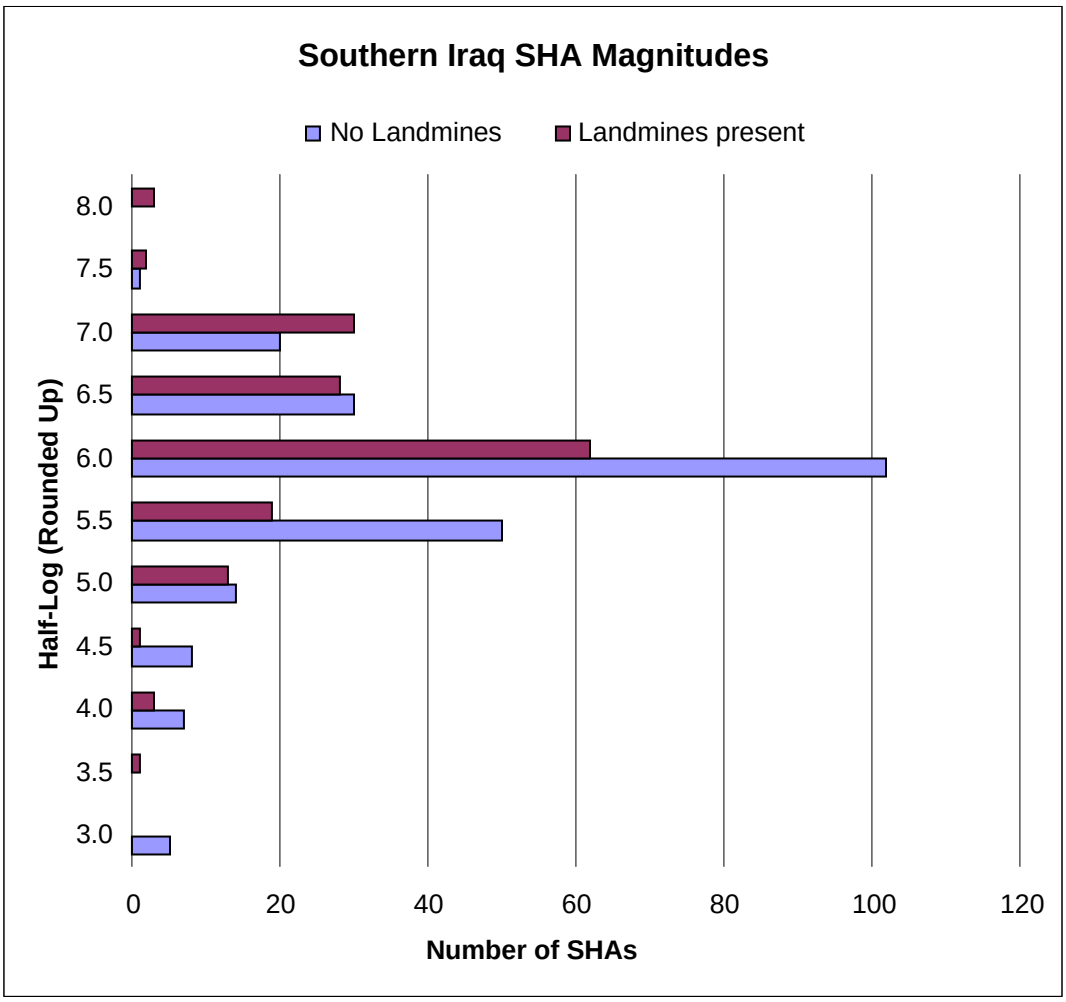
The majority of SHAs found (79%) were attributed by local informants to be from the post-2002 period. The average size of reported SHAs increased from .74 square kilometer for those originating prior to 1991, to 2.36 square kilometers for those attributed to the post-2002 period.

Table 73: Attribution of Contamination to Conflict Period

Age of Conflict	Contaminated Areas	Contaminated Surface (sq km)	Average Size of Area (sq km)
< 1991	32	23.68	0.74
1991 - 2002	51	83.56	1.64
>2002	316	747.27	2.36
Total	**399**	**854.51**	**2.14**

While most of the SHAs were found to hold multiple types of ordnance hazards, analysis revealed that those claimed to harbor mines (AT/AP) comprise some of the largest SHAs. This lends credence to the observation that the use of landmines tended toward conventional barrier type emplacements, versus the more indiscriminant use seen in other recent post-conflict environments, such as Cambodia.

Figure 22: Surface Logarithms in Square Meters



The survey does not provide the same kind of information as a technical landmine/UXO survey, which would redefine the boundaries of each SHA, often reducing the size considerably from that reported by the community. The Landmine Impact Survey results are designed to be used as a starting point to define the scope of the problem and inform choices regarding skills, equipment, and ordnance based operational techniques.

CONTAMINATED LAND BY VEGETATION AND TERRAIN

Seventy seven percent (655.1 sq. km) of the SHAs are found on flat land, most of which lies in short grass areas. The only other significant terrain/vegetation factors are those with ridge, gully or hillside, representing 17% (143.2 sq. km).

Table 74: Area of Suspected Contamination by Terrain and Vegetation

Terrain/Vegetation	Flat Land Only	Contains Gullies, Ridge, or Hillside	Other*	Unknown	Total
None	54.8	0.4	1.0	0.0	56.2
Short Grass Only	407.3	136.6	11.7	13.0	568.5
Some Tall Grass	10.7	0.0	1.4	17.0	29.1
Some Bushes or Trees	65.8	5.8	5.4	0.0	77.0
Other*	116.5	0.6	0.6	2.1	119.7
Unknown	0.0	0.0	0.0	4.0	4.0
Total	**655.1**	**143.2**	**20.1**	**36.1**	**854.5**

* Vegetation, Other includes date Palm plantations and marsh reeds. * Terrain, Other includes marshes

CONTAMINATED LAND BY ORDNANCE CLASS

The types and distribution of munitions in the contaminated areas also affect the choice of clearance technique and equipment. The survey elicited information about generic types of munitions, i.e., anti-personnel (AP) landmines, anti-tank landmines (AT), cluster bomb units (CBU) or Unexploded Ordnance (UXO).

The survey found a pattern of contamination that was overwhelmingly mixed, with few locations presenting a single type of contamination. This will significantly complicate clearance methods, training and equipment to achieve HMA standards for civilian use.

Exclusive contamination by a single type of ordnance comprises only one quarter of all affected communities and SHAs.

- Exclusive contamination from landmines (both AT and AP) is relatively rare, amounting to only 2.7% (9) of affected communities, 2.5% (10) of all SHAs, and 5.9% (5.08 square kilometers) of surface area;
- In comparison, exclusive CBU and UXO contamination rank respectively at 10.44% and 13.4% of all affected communities, 9.5% and 13.5 % of all SHAs and 2.7% and 9.4 % of total surface area.

Most of the ERW problem in the South Region is of a compound nature. When examined in total a number of factors stand out:

- UXO contamination is claimed by 84.2% (282) of all communities, for 85.2% (340) of all SHAs and representing 87.1 % (744.22 square kilometers) of all contaminated surface area;
- AP Landines are claimed by 39.4 % (132) of all communities, 42.4% (169) of all SHAs and 67 % (572.64 square kilometers) of all contaminated surface area;
- AT Landmines are claimed by 27.5% (92) of affected communities, 29.8% (119) of SHAs and 56.6% (483.76 square kilometers)of all contaminated surface area;
- CBU are claimed by 43.3 % (145) of affected communities, 43.1% (172) of SHAs and 49% (419.1 square kilometers) of all contaminated surface area.

FACTORS INFLUENCING HUMANITARIAN MINE ACTION - SOUTH CENTER

Too few contaminated communities were identified during conduct of the Landmine Impact Survey in the South Center Region to allow specific analysis of the five represented governorates. Hence caution should be exercised when drawing conclusions from what is less than standard representative sample.

The governorates of the South Central Region are typified by flat rocky desert, alluvial farmland, dense urban settlements, industrial areas, and many archeological and religious heritage sites. The area is bounded to the southwest by Saudi Arabia and to the east by Iran. Much of the border areas were cleared of all human settlements during several past wars.

There are many factors to be considered when planning landmine clearance and explosive ordnance demolition that directly affect available time and resources. Of these, the physical characteristics that most influence clearance are the types of ordnance, the size of the suspected areas, the type of existing vegetation and the characteristics of the terrain.

The survey found 118 affected communities with 125 SHAs, totaling an estimated 87.60 square kilometers of contaminated surface area in the South Central Region.

CONTAMINATED LAND BY VEGETATION AND TERRAIN

Most of the contaminated land, some 81.2%, is flat, and of which 77.7% is covered with short grass. The remainder is covered with bushes and trees.

Table 75:Area of Suspected Contamination by Terrain and Vegetation

Terrain/Vegetation	Flat Land Only	Other	Unknown	Total

None	1.50	0.00	0.00	1.50
Short grass only	55.27	16.16	<0.01	71.44
Tall grass, at least some	0.27	0.00	0.00	0.27
Bushes or trees, at least some	7.20	0.27	0.00	7.47
Other	6.92	0.00	0.00	6.92
Total	**71.17**	**16.43**	**0.00**	**87.60**

CONTAMINATED LAND BY ORDNANCE CLASS

No incidence of stockpiles of abandoned ordnance or anti-tank (AT) landmines were found in this region. Contamination in the South Center Region comes from a combination of antipersonnel (AP) landmines, UXO and cluster bomb units (CBU). Contamination resulting from a combination of different classes of ordnance presents special challenges that affect time and difficulty, as well as equipment and methodologies applied.

The most significant contamination resulted from cluster munitions, with 64% of all affected communities and SHAs, and 43.6% of all contaminated surface area claiming CBU contamination exclusively. All other factors are below 10%.

When taken in combination with other ordnance, UXO represents 76% of all affected communities and SHAs in this region, and 70.7% of all contaminated surface area. AP landmines and CBU are roughly equal across all factors.

GENERAL PLANNING CONSIDERATIONS

The results of the Iraq Landmine Impact Survey plainly indicate that the country suffers from the presence of landmines (primarily in the northern, Kurdish governorates) and UXO (primarily in the governorates surveyed outside the Kurdish region). The extensive contamination that exists particularly in the livelihood base of rural communities – pasture, cropland, and including scrubland for firewood in the North - will pose a substantial hazard for many years. The information gathered by the Landmine Impact Survey can enable the development of appropriate, well-targeted responses that combine marking, area reduction, and large-scale clearance. The results can also further contribute to the development and refinement of planning in Mine Risk Education (MRE) and victim assistance in a manner that will produce positive and immediate results.

Statistical analysis of the survey data, particularly that relating to community and contamination attributes, allows one to see relationships between a variety of factors and the risks that landmines and UXO pose to specific communities. In Iraq, significant risk-related factors differ between surveyed regions. In the North, communities with larger populations, closer to an international border or the former Green Line, with larger contaminated areas, and those contaminated with UXO (in addition to landmines) tend to have more recent victims. In the South, shorter times since the latest combat use and the types of munitions – primarily the presence of cluster sub-muntions and anti-personnel landmines – cause victim numbers to rise. There, the effect of contaminated area size is intermingled with the variety of munitions present and is illustrated in a tendency of higher-risk communities to appear grouped together. For the South Center region, the statistical results are less clear; but the association between spatially clustered communities with recent victims, the presence of CBU and the magnitudes of suspected areas suggests a causal link between war history and the ability communities to avoid incidents to varying degrees.

The survey conclusively identified landmine and/or UXO contamination in each of the 13 Iraqi governorates (provinces) surveyed. Within these governorates, a total of 1,622 communities were identified as affected by landmines and/or UXO. The table below is revisited to detail the number of affected communities, the population at risk, the number of distinct contaminated areas, and the land area that key informants estimated to be contaminated. While the distribution of contaminated sites over small communities and low-value land causes HMA strategies to appear uneconomical, prioritization is facilitated by the relatively low number of communities that are High Impact. The Landmine Impact Survey identified only 4% of all affected communities as High Impact based upon socio-economic criteria.

Home owner in Halabja, Iraq explaining that his family placed concrete over an unexploded chemical bomb (underneath the floor where those pictured are standing) so that the family could continuing using the home.

Table 76: Affected Communities and Contamination, by Region

Region	Communities Affected	Population at Risk	Distinct SHA	Area Claimed Contaminated (sq km)
North	1,126	748,651	3,024	776
Kirkuk	43	17,397	125	12
South-Center	118	147,326	125	88
South	335	702,753	399	855
Total	**1,622**	**1,616,127**	**3,673**	**1,730**

By settlement size and dominant livelihoods, impacted communities are largely rural, agricultural, and small. The typical (median) population size is around 600 in the South, and 150 in the northern (Kurdish) governorates. Typically, High Impact communities have larger populations than other affected communities and tend to cluster geographically in response to concentrated contamination of past military defensive positions and during hostilities. Clusters of High and Medium Impact communities deserve special attention in HMA planning.

While key informants estimated some SHAs as large 100 square kilometers, particularly in the South, the median size claimed was 4.5 hectares in the North, 25 in the South Center, and 100 in the South, reflecting different conflict histories as much as, for the North, a longer and more discerning acquaintance with the extent of local contamination.

Two critical issues that will require development of HMA strategies include:

SHARED SUSPECTED HAZARD AREAS

Shared Suspected Hazard Areas describes a community that suffers from socio-economic blockages due to an SHA which it shares with one or more other communities, but was not itself surveyed. A predominant characteristic in northern Iraq, the Landmine Impact Survey documented contamination and/or impact in hundreds of communities that shared the impact of an SHA. The standard IMSMA database does not permit this type of recording, hence, managers will be dependent upon institutional memory and the ability of IMSMA Technical Advisors to reconstruct relationships form internal data fields. HMA planners should investigate the relative priority for remediation of these areas as part of the overall strategy.

DOCUMENTING UNKNOWN CONTAMINATION: ABANDONED COMMUNITIES

Contamination is significantly under-reported along the Iraqi borders with Iran and Turkey where there are large formerly inhabited areas which are now abandoned. Areas in Erbil, Duhok and Sulaymaniyah Governorates along the borders with Turkey and Iran have many abandoned communities. The same is true in the southeastern governorates of Wassit, Messan and Basrah. There is massive, extensive contamination in these areas, but there are no communities to identify existence and impact; therefore the Iraq Landmine Impact Survey could not collect information in these areas. The result is that while the Landmine Impact Survey did a thorough job reporting on impact and contamination among communities that are populated, the total amount of contamination that was recorded understates the total amount in Iraq. It is incumbent on the HMA community to ensure that this undocumented risk is widely known by the full range of government entities seeking to undertake activities in these border regions.

LANDMINE CLEARANCE

The survey collected extensive information regarding the types of livelihoods that are denied local populations because landmines and UXO are present. Overall, pasture land is most often blocked by landmines and/or UXO. However, regional differences are important; both in the ways communities classify pasture as fixed or migratory, and in the ranking of other types of blocked resources. Non-agricultural land, primarily scrubland in which residents forage for fuel and medicinal plants, is important in the North and Tameem/Kirkuk, a reason also why roads and trails appear in local descriptions of blocked access at higher frequency than in the South and South Center regions. The differences in the types of cropland blocked – rain-fed versus irrigated – go hand-in-hand with the farm ecologies of the northern and southern regions. Blocked water points are more of a problem in the North than elsewhere. In Iraq, landmines and UXO rarely affect housing areas and other major types of infrastructure, a reflection upon the rural nature of most affected communities and the conduct of past wars that caused dispersal chiefly outside nucleated settlements or their

subsequent abandonment. Table 77 displays the frequencies with which communities of each survey region reported impacted resources.

Table 77: Communities, by Types of Resources Blocked and by Region

Blockage types	North	Kirkuk	South Center	South	All Regions
Fixed Pasture	55%	67%	86%	81%	63%
Migratory Pasture	66%	56%	30%	38%	57%
Non-agricultural Land	75%	70%	1%	5%	55%
Irrigated Crops	20%	14%	86%	88%	38%
Rainfed Crops	41%	88%	2%	3%	32%
Water for Other Purposes	13%	5%	2%	8%	11%
Roads and Trails	12%	21%	0%	5%	10%
Drinking Water	8%	5%	0%	2%	6%
Housing	1%	0%	2%	2%	1%
Infrastructure Other	1%	0%	1%	1%	1%
Affected Communities	**1,126**	**43**	**118**	**335**	**1,622**

Vegetation and Ground Profile

The association between SHA vegetation and terrain differs strongly among regions, in line with ecological patterns in Iraq. In the North, sites rich in terrain features and with brush and trees dominate. The opposite pattern, flat land with no vegetation or grass only, dominates in the South.

Of particular importance to interagency planning in the South is the planned marsh restoration. Those tasked with managing and implementing restoration of the great marsh ecosystem and the livelihood system it supported in the past should ensure they account for clearing contamination prior to re-flooding affected areas.

Class of Munitions

Differences in the composition of munitions, or ERW are equally notable between regions. In gross simplification, landmines dominate the contaminant profile in the North, while in the South and South Center, scattered UXO and stockpiles are more pervasive. The fraction of affected communities reporting CBU is particularly high in the South Center, an area affected substantially by the 2003 advance of coalition military forces.

Many of the affected communities in Iraqi Kurdistan and along the former Green Line separating the Kurdish areas from the remainder of the country represent a distinct case from areas south of the Green Line. Most of Iraq, other than the land along the border with Iran, is primarily affected by UXO, while the Kurdish region faces a threat composed primarily of landmines. The majority of the large numbers of minefields in this region were emplaced during the Iran-Iraq war of 1980-1988 and during the Anfal ("the Spoils") military campaigns against the Kurdish region conducted by Iraqi governments of the past. The remainder of Iraq, or at least the nine southern governorates surveyed, is plagued primarily by a UXO threat that has resulted from the Iran-Iraq War, the 1990-1991 Gulf War, and the current conflict.

These pronounced differences in characteristics and outcomes of the contamination between the major survey regions suggest that historic internecine conflict in Iraq is reflected also in the challenges that a national HMA strategy faces. These may be different to the extent of requiring different policies and priorities to guide the RMACs within the framework of an overall national strategy. This may be based on the recognition that HMA may form an organic part of rural development, as distinct from pacification policies demanded by the largely urban violence.

MINE RISK EDUCATION

The rural context of most contamination and resource blockages is manifest in victim profiles as well. The typical person who came to harm in recent landmine and UXO incidents is a boy or man tending cattle or conducting farm operations. The low incidence of tampering and scrap metal collection may be due to underreporting.

Above and beyond differences in the contamination factors, their relative importance to the risk of incidents also seems to vary between regions. While the additional presence of CBU and other ERW appears to drive up risk in communities of every region, in the North risk grows with community population, while in the South risk appears to depend upon how recently landmines were emplaced or aerial-delivered or indirect fire weapons deployed.

The survey found an estimated 17.9 new victims per year per 100,000 population in the affected communities. Victim rates are unequally distributed across regions, with the North reporting 10.6, Tameem/Kirkuk 34.5, South Center 33.6 and the South 21.8. Differences between the North and the two southern regions are likely grounded in the longer experience communities in the North have gained with respect to their SHAs, and in the larger exposure of southern communities to surface UXO. Reasons why the South Center rate exceeds that of the South by half remain speculative and may be linked to extensive CBU dispersal in two clusters of affected communities in Qadissiya, and Babylon/Kerbala governorates.

One of many sad stories in Iraq – a father and daughter in a Kurdish village near the border with Iraq in Sulaymaniyah Governorate. Each was injured in a separate landmine incident.

VICTIM ASSISTANCE

The survey identified 577 persons harmed due to a landmine or UXO incident in the 24 months preceding the survey. The fatality rate among these victims was 38%. A further 7,672 victims were recorded from incidents in the years before the 24-month period consider by this survey. Recent incidents occurred in 241 of the 1,622 impacted communities in Iraq, or roughly 1 in 7. Claims to victims of less recent date were made by 907 communities. 618 of the affected communities did not report any victims.

Table 78: Victim Rates, by Region

Region	Recent Victims (2 Year Period)	Population at Risk	Victim Rate Per 100,000 Persons Per Year
North	159	748,651	10.6
Kirkuk	12	17,397	34.5
South-Center	99	147,326	33.6
South	307	702,753	21.8
Total	**577**	**1,616,127**	**17.9**

Ninety percent of the recent victims in Iraq are males. Victims, male as well as female, are clustered into the prime working years of between 15 to 29 years of age (45%), and 30 to 44 years of age (19%), but children aged 5 – 14 are nearly a quarter of the recent victims.

The most frequent activity at the time of injury was reported to be herding cattle or other livestock (51%), followed by farm work (19%). Another 8% of recent victims were children playing. Tampering with munitions and collecting scrap metal caused 7% of recent incidents, which may be underreported given the sensitivity surrounding explosives in Iraq at the current time. In the most general terms, the typical profile of an average landmine or UXO incident victim in Iraq is a male, aged between 5 and 44 years, tending to a herd or a farm.

Please note that victimization is often under-reported during landmine survey processes. Due to continuing insecurity in Iraq, a proper landmine/UXO victim surveillance system has not been enacted. Those being visited by Landmine Impact Survey teams are sometimes reticent to draw attention to themselves, as they may still associate some personal risk with reporting to an "official" body. Therefore, victimization is certainly higher because five governorates remain to be surveyed, and is likely higher than reported in at least some of the surveyed governorates.

COMMUNITY ADAPTATION

The history of conflicts that created the landmine and UXO hazard in hundreds of local communities is well known to the Iraqi people and is not the subject of this survey. However, much less is known about the response that the affected communities have developed to the hazard. The significant number of communities whose key informants had a clear recollection of past Mine Risk Education and clearance events – conducted by either local or external entities - suggests that this response has been active in many of those communities.

Where the hazard is ongoing, it may be assumed that the communities go on refining their response to it. This includes the communications that community members exchange regarding threat assessment and risk reduction, the circumspect use of resources in Suspected Hazard Areas (SHAs) and the continued search for, and development of, alternatives.

Social science assumes that the response depends not only upon the nature of the hazard, but also upon the social factors that operate upon those exposed to it. Community adaptation, much like individual adaptation, is circumscribed by history as well as current organization and resources. Unfortunately, in the case of a landmine and UXO problem affecting a large number of communities, it is difficult to find indicators that are universally available and that make a valid point about the degree of successful adaptation to the landmine and/or UXO hazard.

One such candidate is the ability to avoid landmine and UXO incidents. It stands to reason that the ability to know the location of landmines and UXO, to develop alternatives to the use of resources trapped in contaminated areas, and to mobilize outside connections for clearance should be inversely proportional to the risk of new incidents. Also, it is plausible to assume that not all communities can build this ability to similar degrees. Moreover, the choice of this indicator is motivated by the belief that the data about recent landmine/UXO incident victims is of good reliability.

Statistical methods were used to find associations between recent landmine/UXO incidents and the characteristics of the communities in which they occurred. Knowledge of such correlations can help to determine indicators of vulnerability to which the Humanitarian Mine Action community in the Kurdish areas of Iraq (and elsewhere) should be sensitive. Also, it may help to validate the method used in scoring and classifying the affected communities for priority attention.

It does not, however, obviate the need to listen to the concerned communities and to other knowledgeable groups about what they have to say due to long-term adaptation and rehabilitation.

FACTORS CONSIDERED FOR THE ADAPTABILITY OF THE COMMUNITIES

A great many factors affect a community's ability to deal with landmines and UXO; the survey did not gather information regarding all of them. The survey did, however, collect data regarding a number of variables that are commonly thought to be relevant to community adaptation and/or landmine situations.

1) THE SIZE OF THE CURRENT POPULATION

Other things being equal, more people means more chances to interact with the hazard. In addition, in poorer communities that have few employment alternatives, more people may increase the pressure upon available resources. A positive correlation with incidents is assumed. However, it is possible that landmines and UXO may affect the land or property of only a few people and not the entire population, in which case the relationship between population size and incidents is not direct.

2) THE PRINCIPAL BASES OF LIVELIHOOD

Most landmines tend to be hidden below ground (rather than above ground level, such as in the rubble of collapsed buildings), and a common assumption, therefore, has been that frequent contact with soil such as in land-based occupations entails greater risks from landmines. Communities that rely chiefly upon farming and animal husbandry should therefore have more landmine incidents than communities with economic bases that are more diversified into off-land industries.

3) SERVICES AND FACILITIES

The level and complexity of services and facilities available to residents should have a positive effect on their ability to adapt to the contamination. Higher levels index a local economy more diversified and better suited to offer non-land based earning opportunities. This is already expressed in the livelihood variable. In addition, more diverse institutions create problem-solving capacities that go beyond the immediate purposes for which they were created. The presence of a primary school, for example, means that buildings and teachers can be relied upon for venues and multipliers of Mine Risk Education (MRE) events. The same teachers will interpret between the community and outside clearance agencies. Apart from such practical benefits, a higher institutional complexity should translate into keener perceptions of the community environment in general, including the risks from landmines and UXO.

4) THE LEGACY OF CONFLICT

This is expressed in several dimensions: the estimated surface of the contaminated areas in the community, the intensity of regional landmine use, and by the number of years that have passed since landmines or UXO were last emplaced or employed in the community. In addition, the nature of the munitions present will differentiate the hazard, and through this, the ability to avoid further incidents. An obvious distinction is between landmines, which generally are hidden, and surface UXO, most of which residents may come to identify, if not remove, early following cessation of hostilities.

Readers may readily appreciate the first factor - population. The others demand more explanation. The non-technical explanation is provided here, and technicalities are relegated to the appendix.

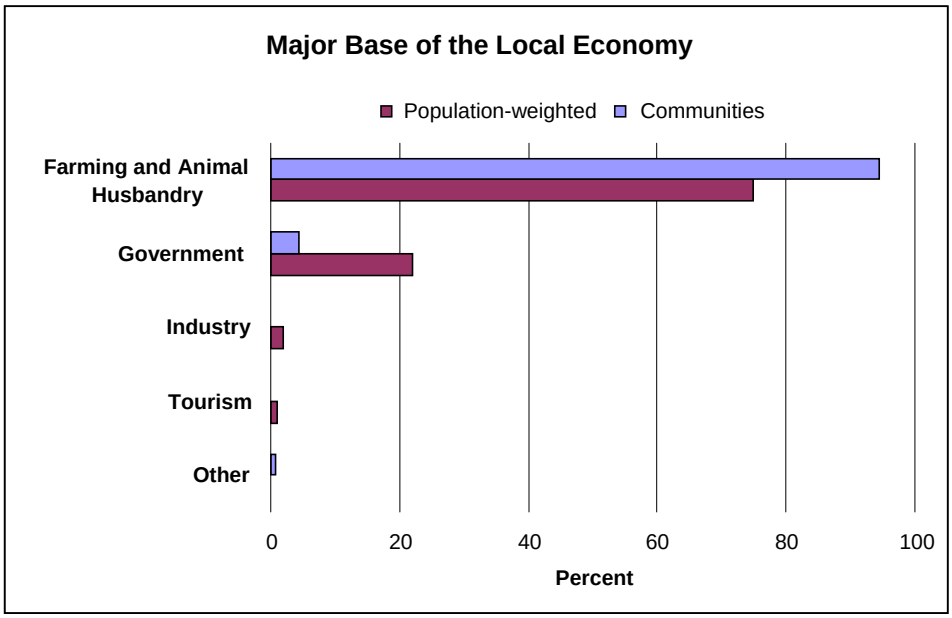
LIVELIHOOD BASES

In some landmine-affected countries other than Iraq, considerable social change has taken place since local communities became contaminated, and has continued since conflict ended. For example, a large part of the population may currently be commuting to urban centers; and many families meet or significantly supplement their household budgets with remittances from relatives working in the cities or internationally. These changes have reduced the risk of landmine incidents by reducing contact with the land, particularly such land as has become agriculturally marginal due to increased competition by foreign suppliers of farm produce.

In Iraq, due largely to the economic stagnation since the outbreak of the war with Iran in 1980, the sanctions regime and continued insecurity after the war of 2003, this diversification away from the land has at most been limited to particular regions. In Iraqi Kurdistan, some limited economic development took place during the sanctions regime, due to the influx of foreign aid. However, its impact upon economic diversification is difficult to document for the communities that this survey encountered, but it makes it all the more important to examine local livelihoods in order to gauge adaptability to landmine and UXO contamination.

In the absence of household interviews, the survey measured livelihoods in summary ways. Interviewer teams asked local key informants to nominate the most important livelihood from a list of principal income sources. The list included agriculture (including husbandry), industry, tourism, government employment, and “other”. In the following graph some of the responses have been grouped, and very rare types of economic mainstays were excluded.

Figure 23: Economic Bases



Two estimates are given, the first being the simple percentage of communities that chose a particular sector, and the second weighting their choices by the relative size of their resident populations. This second measure gives more influence to the larger communities.

On both measures, farming and animal husbandry is the dominant economic base for a high portion of the affected communities. When larger communities exercise a heavier weight, it loses 20 percentage points, yet remains the principal base in three quarters of the affected communities. Government employment is a distant second in terms of community and population-level dominant-sector choices. In Kurdistan, "government service" often means employment in one or the other of the armed militias (Pesh'merga). The militias may not contribute much to diverse economic institutions, but they will likely include many local people with experience in landmine/UXO clearance.

However, with only 5% of all communities naming a livelihood mainstay other than farming and animal husbandry, this feature does not discriminate sufficiently, and our statistical model of recent victims will place more emphasis upon the highly variable complexity of services and facilities.

SERVICES AND FACILITIES

As outlined above, communities with more complex institutions should possess more of the skills required to reduce the hazard, to develop alternatives to using contaminated land, and to deal with risk factors in more sophisticated ways in general. The institutional complexity available to affected communities in southern Iraq was measured through the presence or absence of certain services and facilities. Those used in the construction of a services and facilities index are given in this table, in descending frequency:

Table 79: Institutional Complexity Indicators

Community Trait	Percent Reporting
Electricity (Some Households)	84%
Piped Water Supply (Some Households)	69%
Primary School	63%
Telephone (Some Households)	32%
Health Care Facility	21%
Secondary or Intermediate School	12%
Higher Administrative Status	7%

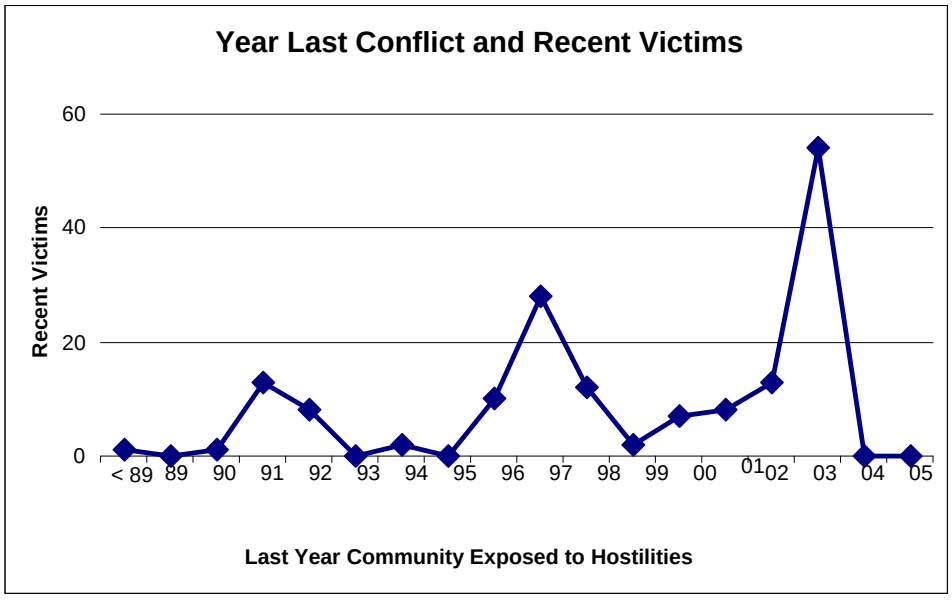
Higher administrative status refers to the fact that a community is not an ordinary village or town, but serves as a sub-district, district or governorate (provincial) center for neighboring communities. The resulting index is formed, not as a count of traits present, but as a score on a common underlying dimension. All traits except administrative status and telephone access are strongly associated with this statistical measure. As one would expect, larger communities tend to score higher regarding institutional complexity. In fact, the association between this measure and the population magnitude is very strong. It is largely mediated through the settlement type. Urban and suburban communities, on average, have larger populations and more services and facilities than their rural counterparts.

THE LEGACY OF CONFLICT

The particular characteristics of the armed conflicts and the risk structure that they created in the local communities are not easy to capture in a very small number of common variables. But a few of them may have more or less universal validity for the effort that it will take the communities to come to terms with the contamination and to be able to live without, or at least with fewer, incidents. The magnitude of the contaminated area belongs here. The estimates that the key informants work out together with the interviewers of the area that they believe to be contaminated with landmines and UXO is an indicator of the seriousness of the problem, even though they may deviate significantly from the true hazard area that later technical surveys and clearance operations may establish.

Another important indicator used to gauge community adaptation is the number of years that have passed since landmines or UXO were last emplaced or employed in the community. The assumption is that the more time has passed since the various devices were left, the more time the community has had to become familiar with the locations of the landmines and UXO and to find ways around them, as well as to develop alternatives to blocked resources. In the following graph, recent victims were totaled over the years their communities had been living without reported fresh contamination. This lets the reader see to what degree communities with longer and shorter adaptation periods have managed to avoid incidents during the most recent times. For data reasons, the last year of active contamination is approximated by the most recent year the community was exposed to hostilities.

Figure 24: Conflict and Victimization



The peak to the right represents 208 affected communities, with 54 recent victims total, for which hostilities during the spring 2003 war were the most recent conflict. The peak formed between 1996 and 1998 is an outgrowth of the conflict that pitted the Kurdish political parties and their militias against each other. The earlier peak is comprised of recent victims from communities for which the 1991 Gulf War and the suppression of the Kurdish uprising provided the last serious exposure to hostilities.

Also, it has been thought that the intensity of armed conflict is spatially concentrated and that this extends to the density of landmine emplacement or UXO contamination. The assumption is that the more intense the conflict, the greater the density of landmines or UXO in a region. Therefore, it is possible to reason that incidents in one community may predict incidents in neighboring communities. This measure may be approximated by the distance to the nearest community with recent incident victims. Typically, communities that had some recent victims were about 6.0 kilometers from the nearest other such community; other communities, without recent victims, were 7.4 kilometers apart from the nearest that had some5.

In a second measure of spatial concentration, affected communities are compared for their distance to the nearest internal-conflict or international boundary. The so-called Green Line formed the unofficial demarcation line between the central-government controlled and Kurdish-controlled areas. International boundaries in the north are with Turkey and Iran. The following table shows that communities with recent victims were those typically closer to the borders.

Table 80: Victimization Near Borders

		Had Some Recent Victims		
Nearest Border With		**No**	**Yes**	**All Affected Communities**
Internal	Communities	229	18	247
	Distance (median, km)	23.4	8.1	22.3
Iran	Communities	586	70	656
	Distance (median, km)	12.4	7.7	12.0
Turkey	Communities	205	18	223
	Distance (median, km)	14.4	11.6	14.4
All Affected Communities	Communities	1,020	106	1,126
	Distance (median, km)	14.3	8.5	13.6

We will use this variable, rather than the distance to the nearest other community with some recent victims, in the model of factors influencing the probability of landmine/UXO incidents. The two distance measures compensate for each other statistically, and in this context the distance to the nearest border is more straightforward to interpret.

FACTORS INFLUENCING THE PROBABILITY OF LANDMINE/UXO INCIDENTS

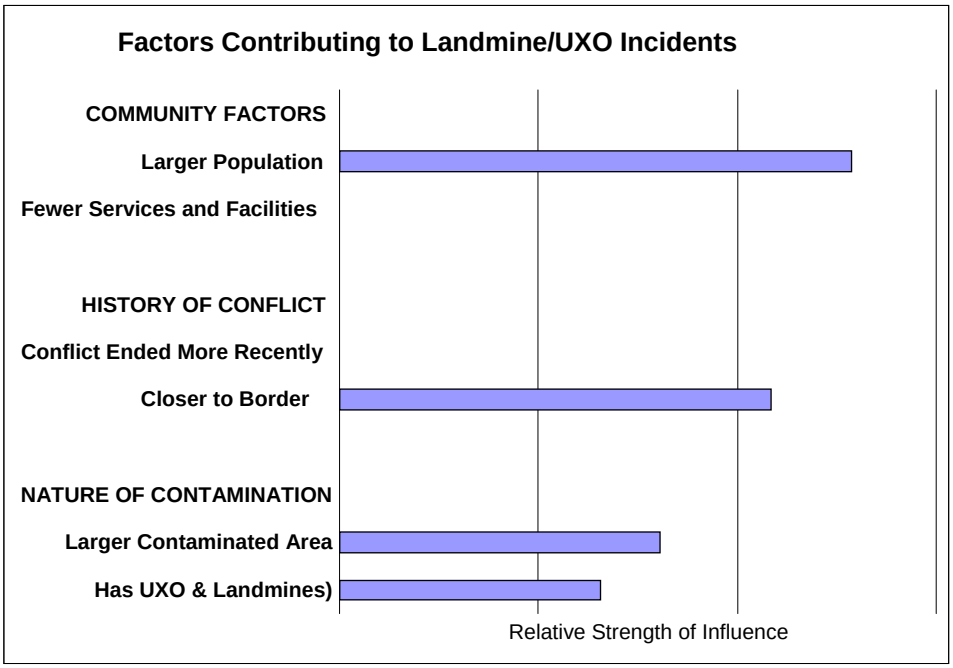
As noted previously, 106 of the 1,126 affected communities suffered one or more incidents with UXO or landmines in the two years prior to the survey. There were a total of 159 victims. The number of victims in a particular incident depends upon situational factors and is not likely correlated with the social structure of the community. The key informants may not reliably know the number of landmine/UXO incidents. Therefore, this analysis is limited to investigating the association of risk factors with the number of recent victims, but not the number of separate incidents in which they came to harm.

Figure 25 portrays the relative strength of factors helping to reduce landmine and UXO incidents. The factors are grouped into community structure, history of conflict, and nature of munitions. Only those that are statistically significant are shown6.

[5] These are the median distances for those two groups. Overall the distances ranged from 270 meters to 153 kilometers.

[6] The length of the bars is proportionate to the z-score for the test that the marginal contribution of the factor to the number of recent victims is different from zero. This metric strikes a compromise between two desirables – effect size and certainty. No bar is shown if $p > 0.10$.

Figure 25: Factors Contributing to Landmine/UXO Incidents



Some of the illustrated effects upon landmine/UXO incidents are expected. Others surprise, and a few may be statistical aberrations. One is surprised by the discovery that the amount of time that has lapsed since the latest exposure to hostilities did not significantly dampen the number of recent victims. Communities that were the object of contamination in conflicts earlier than the 2003 war continued to experience incidents. Their longer time span available to learn the whereabouts of Explosive Remnants of War (ERW), and, presumably, their greater opportunities for clearance have not resulted in statistically significant reductions of victims in the most recent years.

Population size and distance from the nearest border have the greatest effects on recent victims. Since the model already controls for institutional complexity, the population effect may be a rough proxy for the unobserved effect from people still dependent on farming, herding, and wood collection and thus from those likely to interact with contaminated sites. To wit, a tenfold increase of the population adds an expected 0.15 victims, all other things remaining equal. Moving closer to a border from the average distance to one tenth of it sends up the prediction by the same amount. Communities who estimated their total contaminated area to be one magnitude larger than the mean area expected to suffer a mere 0.05 more victims.

The level of facilities and services is positively associated with the ability to reduce incidents. The effect, however, is rather weak and misses the statistical significance mark. This may be so because economic diversification and the attendant opportunities to move away from contaminated land remain scant.

Most of the affected communities (99%) reported the presence of landmines. The exceptions are too few in order to estimate the effect upon recent victims. Slightly less than half of the communities (47%) also reported the presence of one form or another of UXO. These communities tended to have more victims.

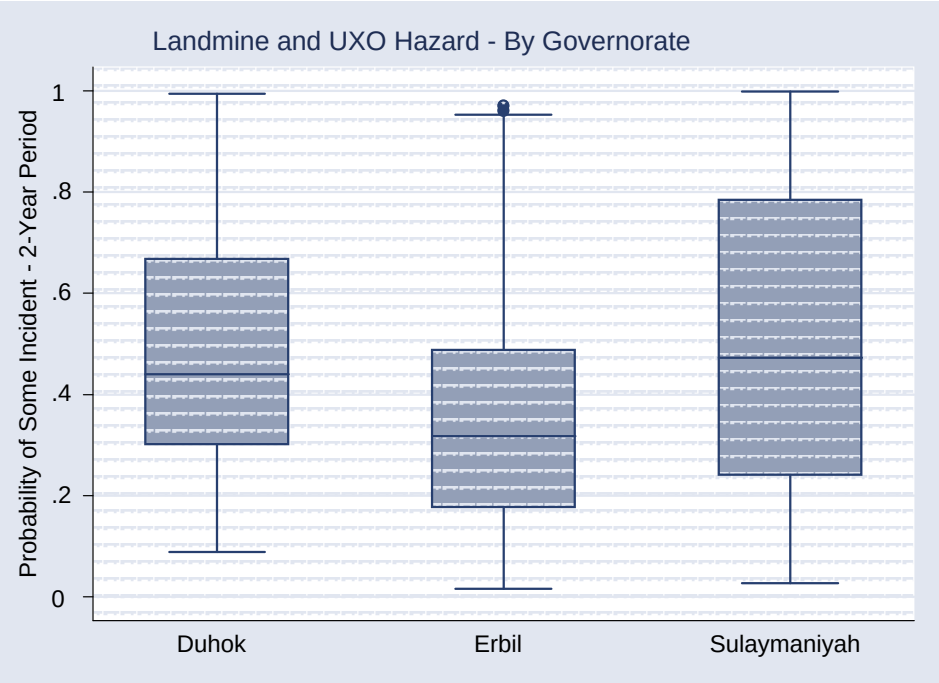
In broad summary, community structure, history of the conflict and nature of the contamination are similarly important for the outcomes in the Kurdish region. A noteworthy finding is the absence of significant learning effects as a function of the time that has lapsed since the latest active contamination.

PREDICTED HAZARD IN A TWO-YEAR PERIOD

For each of the 1,093 communities with complete data to estimate the aforementioned. model, the expected number of victims in a two-year period can be computed, and similarly the probability of at least one incident happening in a two-year period. The mean expected victims work out to 0.15, as compared with 0.14 observed, per community.

The mean probability to suffer at least one incident in a two-year period is 0.46. In this model, fewer than half of all affected communities should remain incident-free during this length of time. This is a massive over-prediction of communities with victims, compared to the 9% of all affected communities that actually had recent victims.

Figure 26: Landmine/UXO Hazard by Governorate



While the model is hardly usable for the entire set of affected communities, it may nevertheless be instructive to compare the three northern governorates on the chances of some incident happening to their landmine-affected communities. Within each governorate, the range is very wide – from almost complete certainty that some incident will happen, to the obverse safe assumption that none will occur. For communities in Erbil, the median probability is manifestly lower than for those in the other two governorates. For all three governorates, the spread of these probabilities is fairly continuous over the entire range; only Erbil has some outliers7. The community living most dangerously, as far as landmines and UXO is concerned, has an estimated 99.9 percent chance to suffer one or several incidents. At the other extreme, the probability of some incident within two years is only 0.016.

[7] Noticed as points set off from the whiskers of the boxplot. The value for the upper whisker in a boxplot is commonly set equal to the last ordered value smaller than the sum of the 75-percentile value plus 1.5 times the interquartile range. Analogously for the lower whisker value.

Table 81: Community Incident Probabilities

	Communities with Incident Probabilities That Are									
	Very Low		Moderate			Elevated			Very High	
Community	**Kani Sur**	**Gla Zarda**	**Lewzha**	**Bargka**	**Gulany Haji Faraj**	**Alkishk**	**Mnin**	**Nawanda**	**Bngird**	**Parwezkhan**
Province	Erbil	Sulay-maniyah	Sulay-maniyah	Erbil	Sulay-maniyah	Duhok	Duhok	Erbil	Sulay-maniyah	Sulay-maniyah
District	Koysin	Sulay-maniyah	Pshdar	Soran	Darban	Amedi	Zakho	Choman	Cham-chamal	Kalar
Predicted Probability Some Incident 2-Year Period	0.016	0.027	0.294	0.306	0.308	0.550	0.561	0.635	0.998	0.999
Case Study Community	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Recent Victims	0	0	0	0	5	0	0	2	0	0
Old Victims	1	5	0	0	11	2	0	36	5	6
Impact Score	5	5	6	4	19	6	4	13	5	6
Impact Category	Low	Low	Med.	Low	High	Med.	Low	High	Low	Med.
Year Last Emplacement	1991	1987	1982	1975	1988	1987	2002	Unk.	1991	1988
Year Last Conflict	1997	1991	2003	2000	1996	1997	2002	2001	2003	1991
Distinct SHA	2	1	7	3	6	6	3	21	2	3
Total Est. SHA (sq km)	9.10	3.00	0.24	0.10	0.36	0.71	0.57	9.49	0.03	5.04
Nearest Border	Internal	Internal	Iran	Iran	Iran	Turkey	Turkey	Iran	Internal	Iran
Distance from Nearest Border (km)	32.8	47.9	16.0	19.6	19.5	10.2	9.2	10.1	0.3	0.0
Has AP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Has UXO	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Has Abandoned Stockpile	No	No	No	No	No	No	No	yes	No	No
Pasture Impacted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rain-fed Cropland Impacted	No	Yes	No	No	Yes	Yes	No	No	No	Yes
Irrigated Cropland Impacted	No	No	No	No	Yes	No	No	Yes	No	No
Roads impacted	No	No	No	No	No	No	No	No	No	No
Current Population	4	250	188	150	170	210	20	2000	150	180

COMMUNITY ADAPTATION

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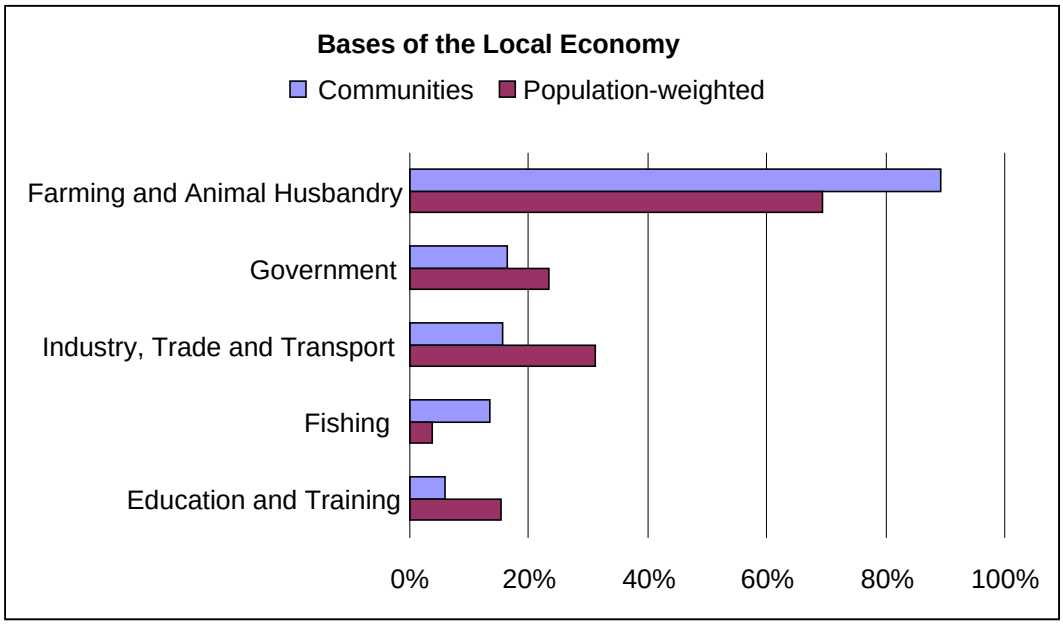
In some landmine-affected countries other than Iraq, considerable social change has occurred since local communities became contaminated, and has continued since the conflict ended. For example, a large part of the population may currently be commuting to urban centers; and many families meet or significantly supplement their household budgets with remittances from relatives working in cities or internationally. These changes have reduced the risk of landmine incidents by reducing contact with the land, particularly such land as has become agriculturally marginal due to increased competition by foreign suppliers of farm produce.

In Iraq, due to economic stagnation since the outbreak of the war with Iran in 1980, the sanctions regime following the Gulf War, and continued insecurity after the war of 2003, this diversification away from the land has at most been limited to particular regions. For the remainder of the country, one would assume a reverse development, a kind of deindustrialization that obliged populations to eke out survival means from greater, rather than smaller, contact with the land. This is not documented for the communities that this survey covered, but it makes it all the more important to examine local livelihoods in order to gauge adaptability to landmine and UXO contamination.

In the absence of household interviews, the survey measured livelihoods in summary ways. Interviewer teams asked local key informants to nominate as many as three sectors from a list of principal income sources. The list included agriculture, husbandry, fishing, industry, tourism, government employment, aid, remittances, trade, transport (e.g. taxis), teaching and education, and “other”. In the following graph some of the responses have been grouped, and very rare types of economic mainstays were left out.

Figure 27: Economic Bases



Two estimates are given, the first being the simple percentage of communities that chose one of the five sectors, and the second weighting their choices by the relative size of their resident populations. This second measure gives more influence to the larger communities. On average, community informants enumerated 1.5 among the five tabulated sectors as mainstays of their local economy.

In both measures, agriculture, government employment and business are dominant economic bases for a high portion of the affected communities. When larger communities exercise a heavier weight, agriculture loses 20 percentage points, yet remains one of the principal bases in close to 70% of the affected communities. Note that in the population-weighted model, no fewer than 15% of the affected communities gave education and training as one of their economic mainstays although it is not possible to infer the exact employment share from this data.

SERVICES AND FACILITIES

As outlined above, communities with more complex institutions should possess more of the skills required to reduce the hazard, to develop alternatives to using contaminated land, and to deal with risk factors in more sophisticated ways in general. The institutional complexity available to affected communities in southern Iraq was measured through the presence or absence of certain services and facilities. Those used in the construction of a services and facilities index are given in this table, in descending frequency:

Table 82: Institutional Complexity Indicators

Community Trait	Percent Reporting
Electricity - All Households	87%
Fuel Available - Less Than 8 km From Center	49%
Primary School	46%
Piped Water Supply - All Households	31%
Telephone - Some Connection	25%
Higher Administrative Status	20%
Health Care Facility	12%

Higher administrative status refers to the fact that a community is not an ordinary village or town, but serves as a sub-district, district or governorate (provincial) center for neighboring communities. The resulting index is formed, not as a

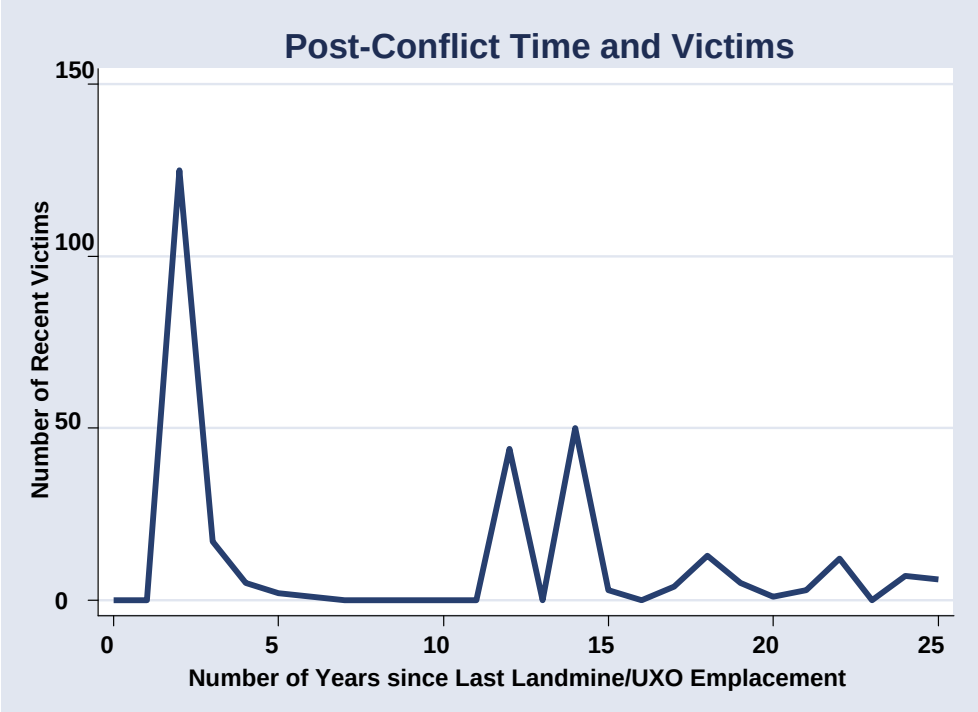
count of traits present, but as a score on a common underlying dimension. All traits except fuel availability are strongly associated with this statistical measure. As one would expect, larger communities tend to score higher on institutional complexity, but the association between this measure and the population magnitude is relatively modest and is largely mediated through the settlement type. Urban and suburban communities, on average, have larger populations and more services and facilities than their rural counterparts.

THE LEGACY OF CONFLICT

The particular characteristics of the armed conflicts and the risk structure that they created in local communities are not easy to capture in a very small number of common variables. But a few of them may have more or less universal validity for the effort that it will take the communities to come to terms with the contamination and to be able to live without, or at least with fewer, incidents. The magnitude of the contaminated area belongs here. The estimates that the key informants work out together with the interviewers of the area that they believe to be contaminated with landmines and UXO is an indicator of the seriousness of the problem, even though they may deviate greatly from the true hazard area that later technical surveys and clearance operations may establish.

Another important indicator used to gauge community adaptation is the number of years that have passed since landmines or UXO were last emplaced or employed in the community. The assumption is that the more time has passed since the various devices were used, the more time the community has had to become familiar with the locations of the landmines and UXO and to find ways around them, as well as to develop alternatives to blocked resources. In the following graph, recent victims were totaled over the years their communities had been living without reported fresh contamination. This lets the reader see to what degree communities with longer and shorter adaptation periods have managed to avoid incidents during the most recent time frame.

Figure 28: Conflict and Victimization



The peak to the left represents 103 affected communities, with 125 recent victims total, that experienced the most recent contamination during the war of 2003. The central peak is an oddity – it is caused by the 44 victims that the village of Jurf Al Meleh in the Shatt Al-Arab District of Basrah suffered in the two years prior to the survey. This village, specializing in landmine and UXO collection (see case study), reported that its territory had last seen fresh contamination in 1993. Immediately to the right of this peak is another – created by 64 communities that were contaminated last in 1991. Between them, 50 persons came to harm in landmine and UXO incidents of the last two years.

Also, it has been thought that the intensity of armed conflict is spatially concentrated and that this extends to the density of mining or UXO contamination. The assumption is that the more intense the conflict, the greater density of landmines or UXO in a region. Therefore it is possible to reason that incidents in one community may predict incidents in neighboring communities. This measure may be approximated by the distance to the nearest community with recent incident victims. Typically, communities that had some recent victims were about 4.0 kilometers from the nearest other such community; other communities, without recent victims, were 6.5 kilometers apart from the nearest that had some8.

FACTORS INFLUENCING THE PROBABILITY OF LANDMINE/UXO INCIDENTS

As noted previously, 85 of the 335 affected communities suffered one or more incidents with UXO or landmines in the two years prior to the survey. There were a total of 307 victims. The number of victims in a particular incident depends upon situational factors and is not likely correlated with the social structure of the community. The key informants may not reliably know the number of landmine/UXO incidents. Therefore, this analysis is limited to investigating the association of risk factors with the number of recent victims, but not the number of separate incidents in which they came to harm.

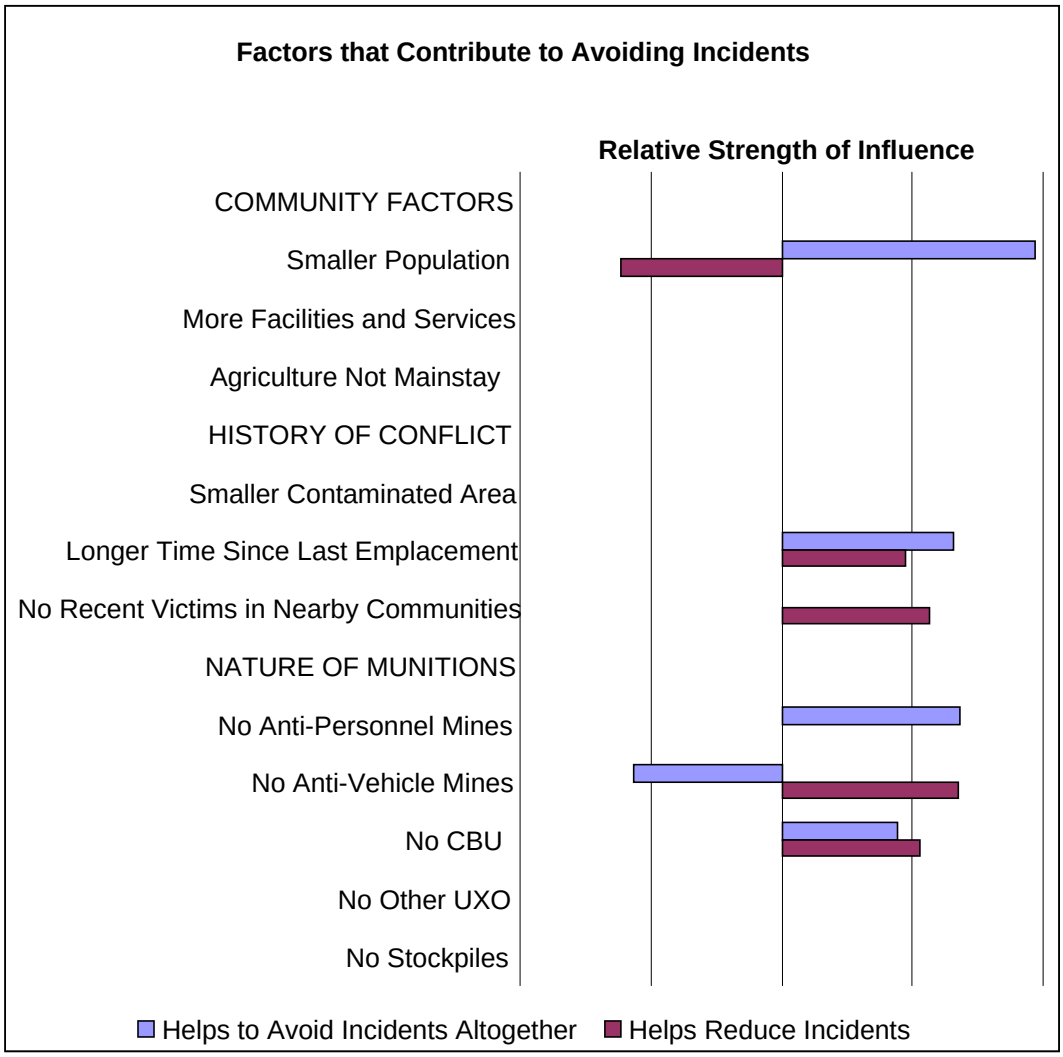
Figure 29 portrays the relative strength of factors helping to reduce landmine and UXO incidents. The factors are grouped into community structure, history of conflict, and nature of munitions bundles. Only those that are statistically significant are shown9.

Southern Iraqi villagers during a landmine survey interview in southern Iraq.

[8] These are the median distances for those two groups. Overall the distances ranged from 270 meters to 153 kilometers.

[9] The length of the bars is proportionate to the z-score for the test that b = 0. This metric strikes a compromise between two desirables – effect size and certainty.

Figure 29: Factors Contributing to Avoiding Landmine/UXO Incidents



Some of the effects illustrated on landmine/UXO incidents are expected. Others surprise, and a few may be statistical aberrations. In broad summary, the community structure is less important for these outcomes than the history of the conflict; and this in turn is trumped by the strength that the mix of munitions yields. Within each of those areas, however, there are significant as well as insignificant contributors.

Smaller communities have found it easier to come to terms with the contamination, avoiding incidents altogether. But among those communities that did have some incidents in the last two years, smaller ones, paradoxically, tended to suffer more. We cannot explain this contrast, all the less so because agriculture as an economic mainstay (which was reported more often by smaller communities – villages and small towns) has no effect in either direction. This is a surprising outcome.

As for institutional complexity, it very narrowly failed to achieve statistical significance. Had it done so, it would be apparent that communities with larger numbers of facilities and services had more numerous recent victims. This is not surprising and reflects a pattern found in other countries as well – places with strong institutional endowments are among those most strongly defended and fought over, with attendant higher landmine and UXO contamination and ultimately more incidents.

All variables arranged under the history-of-conflict heading are influential. The magnitude of Suspected Hazard Areas is important. But once the types of munitions are introduced into the model, area loses its statistical significance. In

other words, the mix of munitions determines the size, or the size perception, of Suspected Hazard Areas, to the point where size is less influential than the composition of explosives contaminating them.

Time elapsed since last emplacement of landmines or UXO has the expected effects: Communities that have seen more recent contamination – particularly in 2003 – have tended to have more recent victims; communities contaminated in a more distant past not only have fewer victims, but find it easier to come to an accommodation without incidents at all.

The regional clustering factor also plays its expected part. Affected communities whose neighboring communities reported no recent victims tend to have fewer such victims themselves. In Iraq, however, the fine details of this effect are difficult to grasp: if looked at in isolation, recent victims fall dramatically within the first kilometer of this distance, and then continue decreasing slowly. However when taken into account with all other factors simultaneously, the effect materializes beyond a threshold. Communities whose nearest neighbors with some recent victims are more than two kilometers away receive a stronger hazard discount.

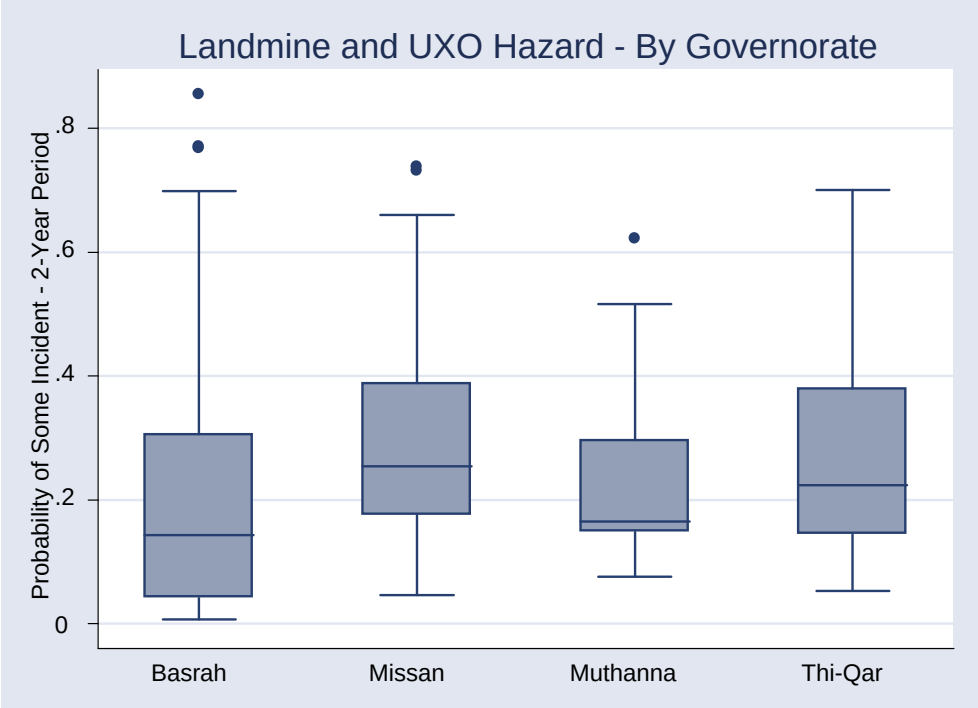
The nature of munitions reportedly present in the Suspected Hazard Areas is of such importance that it obscured the effects of some of the other factors. When anti-personnel landmines are not reported, chances are better that the community has not suffered any recent victims at all. The effect of anti-vehicle landmines, however, is paradoxical and hard to interpret. Their absence is associated with fewer victims, but also with greater difficulty to come to a completely incident-free accommodation. This may well be a statistical artifact.

The presence of Cluster Bomb Units (CBU) sends victim numbers up and chances to move to an incident-free state down. Interestingly, the presence or not of other UXO or of abandoned munitions stockpiles has no significant effects. However, stockpiles miss the mark very narrowly – outside the range of significance, stockpiles make it more likely that a community will in fact have suffered some incident during the previous two years.

PREDICTED HAZARD IN A TWO-YEAR PERIOD

For each of the 323 communities with complete data to estimate the aforementioned. model, the probability of at least one incident happening in a two-year period can be computed. The mean probability is small, 0.25 – in other words, three quarters of all affected communities should remain incident-free during this period of time.

Figure 30: Landmine/UXO Hazard by Governorate



However, the range is very wide. The community living most dangerously, as far as landmines and UXO is concerned, has an 86% chance of suffering one or several incidents. At the other extreme, the probability of some incident within two years is only 0.007. Moreover, the distributions of these probabilities differ from governorate to governorate. Basrah Governorate has the lowest median probability for its affected communities – 0.14 – as seen in the line cutting its box in the above graph. The boxes bracket the 25 and 75 percentile values of the provincial distributions, covering values below and above with their whiskers. Values removed by more and 1.5 x the box height are shown as individual outlier points. This way, it is conspicuous that Basrah also has two high-probability outliers – marked by points that are above the 0.75 level. For the other three governorates, chances to suffer some incident vary less. Typically (looking at the median lines), in Missan and Thi-Qar they are stronger than in Basrah and Muthanna.

Some of the future beneficiaries of increased Humantiarian Mine Action response in southern Iraq.

COMMUNITY PROFILES

Four community profiles, selected from the extremes of high and low incident probabilities10, and ensuring that they are from more than one governorate, are presented in the table below. These cases are from Basrah and Missan. Their profiles span a variety of conditions, noticeable in several variables, except for the uniformly present UXO and for the 2003 hostilities, to which all of them were exposed. The four communities are distinct notably in population size, SHA surface and closeness to communities with recent victims. Note in particular that the two low-incident probability instances did not report any fresh contamination from the 2003 war.

[10] The selection was from those communities for which incident probabilities could be estimated. This group does not include the village that had 44 recent victims. One would expect, intuitively, that this village would have been assigned a higher probability than the largest in this table, but there is no proof for this.

Table 83: Community Incident Probabilities

	Communities with Incident Probabilities That Are			
	High	High	Very Low	Very Low
Community	**Az-Zerajy**	**Al-Mari'e**	**Al-Shatra**	**Hoz Sa'ad Meziyad**
Province	Basrah	Missan	Missan	Basrah
District	Shatt Al-Arab	Qal'at Saleh	Al-Maimouna	Fao
Predicted Probability Some Incident 2-Year Period	0.856	0.738	0.047	0.007
Recent Victims	5	5	0	0
Old Victims	5	0	0	0
Impact Score	17	15	4	5
Year Landmine/UXO Problem Began	1991	1985	1984	1980
Year Last Emplacement	2003	2003	1984	1981
Year Last Conflict	2003	2003	2003	2003
Total Estimated SHA (sq km)	100	5.2	1	0.2
Distance to Nearest Other Community with Some Recent Victims	2.3	11.6	19.6	42.1
Has AP	Yes	Yes	No	Yes
Has AT	Yes	No	No	Yes
Has UXO	Yes	Yes	Yes	Yes
Has CBU	Yes	Yes	No	No
Has Abandoned Stockpile	Yes	No	No	No
Irrigated Cropland Impacted	Yes	Yes	Yes	Yes
Water Points Impacted	Yes	No	No	No
Pasture Impacted	Yes	Yes	Yes	Yes
Current Residents	12000	1200	500	8
Pre-War Population	7000	1600	400	80
Principal Bases of Local Economy:				
Agriculture	Yes	No	Yes	Yes
Government Employment	Yes	Yes	No	No
Trade, transport, Industry	Yes	No	No	Yes
Fishing	No	No	No	Yes

BACKGROUND AND METHODOLOGY

TEAM LEADER'S REPORT

I would like to express my appreciation for the constant support, interest and good will of the mine action experts at the Office of Weapons Removal and Abatement (PM/WRA), U.S. Department of State, UNDP Iraq, and the iMMAP team in Washington DC. Their unwavering and positive support for this difficult effort was appreciated by all of the members our national team. Finally, and as always, my sincerest and deepest thanks go to my colleagues, our exceptional national staff in northern and southern Iraq to whom the greatest credit is due for the success of this project.

BACKGROUND

Funding

The Iraq Landmine Impact Survey aimed to conduct a national, comprehensive survey of all communities in Iraq and to document contamination and/or impact by landmines or unexploded ordnance (UXO) where it existed, according to international standards. The majority of the survey costs such as operational activities (to include national staff salaries) were funded though iMMAP under a grant from PM/.WRA, U.S. Department of State. The European Community, UNDP-Iraq and the Government of Italy funded the position of Senior Technical Advisor (STA) for the period April, 2004 through end March, 2006.

Management

The Iraq Landmine Impact Survey was conducted in a context and an environment as challenging as any other such survey has faced. Another way of expressing this is that the complex challenges faced by the Iraq survey were qualitatively different than those faced by any other similar effort.

The Iraq project was the first national Landmine Impact Survey for which only one expatriate technical advisor (the STA) was provided. The survey relied heavily on the highly competent Iraqi national managers and team members who were recruited.

During the Landmine Impact Survey two regional survey groups operated in parallel: one in the north and one in the south. The survey effort in each of these two areas was comparable to an independent national survey. Thus, the project required the training and managing of two independent regional survey groups and coordination of heir efforts at the national level.

SUMMARY OF ACHIEVEMENTS (THE IRAQ LIS)

The Iraq Landmine Impact Survey provides a crucial resource for post-war Iraq planning. It documents the distribution of contamination and its impact among Iraqi communities. In summary, it has:

- Surveyed 13 of Iraq's 18 governorates;
- Completed the survey of three of Iraq's four Humanitarian Mine Action regions (North, South and South Center);
- Populated the Landmine Impact Survey of the Information Management System for Mine Action (IMSMA) database with all of the collected data;
- Developed the most accurate and comprehensive community location information (gazetteer) available in Iraq in the areas of operation;
- Provided the first comprehensive statistical data for contamination and its impact available to donors and to HMA organizations and authorities operating in Iraq;
- Visited more than 12,000 Iraqi communities in order to locate those suffering from areas contaminated by landmines and/or UXO; every visit was documented to include location information;
- Documented contamination in nearly 2,100 communities;
- Implemented an international standard (though locally adapted) Landmine Impact Survey questionnaire (with community, victim and Suspected Hazard Area modules) in more than 1,600 communities and recorded more than 3,600 SHAs among these communities;
- In Iraqi Kurdistan surveyed 336 impacted and contaminated communities unknown to the HMA agencies working there;

- Identified and documented an additional 234 communities that share one SHA with communities that were surveyed; 201 of these impacted communities were unknown to the existing databases for the north;
- Identified and documented 1,225 SHAs that were not recorded in the existing databases in the north;
- Documented that 315 SHAs recorded by existing databases in the north as still dangerous have in fact been cleared; that 161 others are connected to abandoned communities; and that 17 SHAs from those original databases do no exist at all;
- Documented nearly 600 recent victims and more than 4,000 SHAs according to international mine action standards;
- The United Nations Mine Action Service (UNMAS) Quality Assurance Monitor (QAM) determined that the work of the Iraq Landmine Impact Survey in these three regions met international standards; the QAM has recommended to the United Nations Certification Committee that the Iraq survey be internationally certified.

LESSONS LEARNED

Conducting a Landmine Impact Survey in an Insecure Environment

The most important and challenging environmental constraint for the conduct of the Iraq Landmine Impact Survey was the security environment. Security was most permissive in the far north (Iraqi Kurdistan where expatriates could visit villages without security escort) and was most difficult in the Sunni areas of Ta'meem (Kirkuk), Salahuddin (Tikrit) and Diyala Governorates late in the survey process. In the nine governorates surveyed south of Baghdad, the security environment shifted from relatively permissive (for national staff, but not for expatriates) early on to very dangerous at specific times, primarily in response to Coalition Military Activities. We were lucky that our work finished in this area in May 2006. There is no way that, during the July-August 2006 period of widespread sectarian tensions and killings that we could have operated as freely as we did previously.

It turned out that the most dangerous place for our staff was on the road and the least dangerous (aside from being in the current Forward Operating Base at night) was to be in the village. Thirteen governorates were surveyed without serious incident, to include the demographically mixed (Kurdish/Sunni) governorate of Ta'meem (Kirkuk), but two incidents in Salahuddin (Tikrit) during a short period of time in May 2006 forced the survey to suspend operations there, and in Diyala, our fourteenth and fifteenth governorates.

The survey made an early commitment to minimizing risk. We captured our attitude in two sayings:

1) "The three most important operational considerations are security, security and security."
2) "No piece of information is worth the loss of equipment or risking life or limb."

The survey actively worked to reduce distrust and increase access into rural communities by using paid and unpaid "guides" from the Department of Statistics of the Ministry of Rural Development. Constant and close relationships were developed with government officials in each governorate where survey work was conducted and we followed their advice about areas or communities that were typically insecure.

We also implemented a sequence of revisits in the important governorate of Basrah to build trust in communities. In Kirkuk, Tikrit and Diyala we recruited and trained Field Supervisors from the Ministry of Health in those governorates. We ensured that we had health officials who were known to, and knew all of the villages in the area where they were to work in order to eliminate suspicion and to increase personal security (outsiders would have found it difficult to work in that environment). This reduced the risk to the Data Collectors and increased the chances that the required information could be collected. In Ta'meem (Kirkuk) this model worked very well, the entire governorate, both Kurdish and Arab areas were surveyed. It is worth noting that the survey of Salahuddin (Tikrit) and Diyala was suspended not because of problems in the village (the Data Collectors visited more than 100 villages prior to the suspension with no problems), but because of violence between insurgents and coalition forces along the roads.

On Being a Learning Organization

The UNMAS Quality Assurance Monitor told Survey Group North in December 2005 that in his view the survey was a "learning organization". We did not know that at the time, but this compliment supported the team's operational approach.

We did know that we faced enormous constraints in the conduct of our job, one of the most important being environmental uncertainty, and we had to operate in a fashion that allowed for maximum flexibility in the face of

changing circumstances while still maintaining a clear-eyed and objective commitment to the protocols that governed our work, and the principles of good survey practice and the goals toward which we aimed.

Survey Group North Data Collectors dealing with one of many challenges encountered throughout the Iraq Landmine Impact Survey.

There was the ever-present uncertainty about the security situation. There was the inescapable uncertainty about what communities were on the ground and where. There were constant obstacles and problems that arose in unpredictable forms and at unpredicted times. One principle we learned early – or decided to commit ourselves to – was the proposition that very rarely does anyone make a mistake (in the sense of "you should have known better", "why didn't you think first!?") even though very often things do not turn out the way that we had hoped.

By avoiding the language of mistake and error and focusing instead upon fixing the things that did not go as well as we wished or expected, we could focus on adapting to each new set of circumstances.

We depended on, we believed in, we worked in such a fashion so as to sustain the good will of all, and the commitment of all to doing as professional a job as the circumstances allowed. And we did this in a very simple way: because we had good people (we focused very strongly upon solid recruitment) we could easily treat them as full partners in the project, we empowered them to make judgments and we insured that they knew where judgments were demanded and in light of what principles they should be made. Then, when things did not go as we had hoped, we never, ever talked in terms of mistakes, but set about deciding what to do next.

So we adapted to the difficulties and uncertainties of Iraq by focusing upon process and not personality but most importantly by developing the organizational capacity for adaptation. We were a ”learning organization” long before we knew that there were such things!

Coverage: Sampling Versus Census

The social geography of northern Iraq presented a number of challenges to the achievement of the survey's overall objective of complete coverage (don't miss any contaminated community) – but less so in the south. Of course there were problems with insecure and (relatively) inaccessible communities, but the survey also had to solve the problems that the following community types presented:

- Abandoned communities (more on abandoned communities below);
- Newly re-occupied communities;
- Newly established (but not legally recognized) communities;
- Seasonal communities and abandoned communities where the land-owners "commute" to work their fields;
- Collective villages created by the government by forced displacement years earlier.

International protocols for the conduct of Landmine Impact Surveys assume that it is possible to distinguish communities in two groups relatively easily, though not with any certainty: those where it is likely that contamination will be found, and those where it is unlikely that contamination will be found. Again, by international protocol, those in the first group are visited to confirm contamination; the communities in the second group are sampled to insure that the initial categorization is not far wrong. Visiting all existing communities is not recommended, but that is what this survey did.

The problem for the survey is that we did not know with any reliability what communities were in fact on the ground. Unreliable community lists were filled with duplicate, abandoned, and non-existent community names. In fact, they were unreliable in two ways: names on the list were not "on the ground" and existing communities "on the ground" were not named on the list. We were thus forced to work closely with sub-district and district leaders in order to build working lists of communities, but crucially also to collect neighboring village lists in each community we visited to expand that first working list to include communities unknown even to the authorities, communities newly re-occupied, and newly established communities, some of which were contaminated.

It was our judgment on the ground that if we wanted to take the Landmine Impact Survey coverage goal seriously (minimize the risk that contaminated communities are missed) we had to shift to a full census of communities which meant to visit all communities, rather than only those that were considered possibly contaminated and then sampling the rest.

The Pilot Survey in Mergasur District of Erbil Governorate had an explicit goal to determine if the existing gazetteers were completely unreliable as the basis for planning survey operations. We decided at the end of the Pilot Survey to conduct a census of villages to find which were contaminated and not to depend on the knowledge available at district and higher levels concerning what communities they might think were contaminated – we learned that though their information was more reliable than existing gazetteers (such as the one from the United Nations Humanitarian Information Center), it was inadequate to meet the survey goal. In the south this decision was even more justified because: much of the contamination was new (from the 2003 war); large population movements that had occurred after the fall of the Hussein government; and, the replacement of government officials after the occupation of the country by coalition forces.

The decision to visit every community resulted in every visit being documented and creating an opportunity to document non-contamination and develop a full picture of the distribution of contamination and non-contamination by situating contaminated communities in the context of all communities. In the north, this allowed us to do one more thing that perhaps no previous survey had ever accomplished: we documented communities which had been previously contaminated but were now no longer contaminated. That means we could generate a measure of success of demining efforts in Iraqi Kurdistan. We found hundreds of communities which had been previously reported contaminated but when we arrived had been cleared – the majority of them through spontaneous demining.

Table 84: Survey Coverage

Survey Coverage	Total	North	South
Number of Communities Physically Visited	**12,010**	5,026	6,984
Communities Documented as Not Affected	**9886**	3,857	6,531
Communities with Documented Contamination*	**2117**	1,169	453

Table 81 above shows that in all, the survey visited more than 12,000 communities, 58% of which are in the nine southern governorates that were surveyed. In nearly 9,900 communities, the survey collected non-contamination forms signed by the village leader and two elders attesting to their grounded belief that the community was not affected by landmines or UXO.

The main benefit of the sampling approach is efficiency – you have to visit fewer communities to achieve your survey coverage aims. But efficiency need not be surrendered as a goal in a full census survey, as there are ways to operate that can increase the efficiency of the effort dramatically (make all Data Collector teams mobile and allocate them to Team Leader duties when they are not conducting surveys is one way). The benefits that are achievable relate importantly to the fraction of contaminated communities in the survey work area; the Iraq Landmine Impact Survey developed a set of field operational principles that helped to achieve greater efficiencies by taking that into account. This may be one distinct contribution of the survey: how to think about doing surveys when you conduct a census of communities, rather than depending so heavily upon sampling to achieve survey coverage aims.

Do Victim Counts Inflate Community Impact Scores?

It has been long contended that, where Landmine Impact Surveys and resulting impact scoring are concerned, High Impact communities are often "created" by high victim numbers, rather than by other components of the impact score

(socio-economic, livelihood blockages). We did see examples of this in northern Iraq where the death of four boys in one landmine incident catapulted their village from a Low Impact community to High Impact. To address the policy implications of High Impact scores being potentially driven by large numbers of victims, perhaps in the same incident has been offered in other contexts: score incidents (no matter how many victims were involved) rather than individual victims; or, score one victim with two points, but establish a limit (no matter how many victims).

Establishing the Extent of Local Clearance

In the contaminated communities we recorded whether or not there had ever been any local clearance (spontaneous demining, self-demining), and if there had ever been any formal demining (by organizations).

In the previously contaminated communities we recorded how the community was cleared (or cleaned of Explosive Remnants of War [ERW]). Using this information we learned a number of surprising things:

- Among all contaminated communities, local demining was more widespread than formal;
- Among all previously contaminated communities, almost as many communities cleared themselves as were cleared by formal organizations;
- Local and formal demining are more common among all High Impact communities than among medium or low;
- Communities more often report that their situation is better now than before in all communities where any demining has occurred, it is highest in communities where both local demining and formal demining has occurred, but less often in communities where only formal demining has occurred

The vast majority of the attempts to clear landmines and UXO among communities failed in the sense that complete mined areas were not cleared, but in a minority of communities, roads and trails were cleared and in some cases full mined areas, but this amounted to only 49 communities,.

It is possible that landmine/UXO victims in these communities were less likely than in other communities which did not engage in clearance, but further investigation is needed to determine this.

Shared Suspected Hazard Areas

The Landmine Impact Survey documented contamination and/or impact in more than 2,100 communities. This number is the sum of three others and represents the three ways in which the survey documented contamination and impact:

- A community is contaminated to such an extent that victimization is possible and it suffers socio-economic (livelihood) blockages of various sorts; these communities are surveyed with the Landmine Impact Survey instrument;
- A community is suffers from socio-economic blockages due to a Suspected Hazard Area which it shares with one or more other communities, but was not itself surveyed; a shared SHA form was used here;
- A community suffers from localized, surface UXO contamination, but no socio-economic blockages; a UXO Spot Report is recorded here.

The "ideal" community for Landmine Impact Survey purposes would be one with clear and undisputed boundaries and whose Suspected Hazard Areas are all on community property within those boundaries. However, the real world does not fit this ideal cleanly, even though the survey questionnaire and the database constructed for it by international standard seems built upon these kinds of assumptions. However, the fact is that land is shared among communities, land that can be contaminated, and if the contamination blocks use of that land, then more than one community will be affected. However, according to Landmine Impact Survey protocols, each SHA documented can only be assigned to one and only one community, and the impact scores that derive from the blockages that the communities suffer from can only be assigned to one community. If you follow existing Landmine Impact Survey protocols, these impacted and endangered communities would be ignored by the very survey whose primary function it is to identify them and the impacts they suffer from. In northern Iraq, they numbered in the hundreds. The Iraq Landmine Impact Survey adapted its field protocols and the methods of documentation deployed to these on-the-ground facts.

Documenting Unknown Contamination: Abandoned Communities

Contamination is significantly under-reported along the Iraqi borders with Iran and Turkey. There are large areas of Iraq which were formerly inhabited but which are now abandoned. Areas in Erbil, Dahuk and Sulaymaniyah

Governorates along the borders with Turkey and Iran have many abandoned communities. The same is true in the southeastern Governorates of Wassit, Messan and Basrah. There is massive, extensive contamination in these areas, but there are no communities to speak about its existence and impact; therefore the Iraq Landmine Impact Survey could not collect information in these areas.

The result is that while we did a good job reporting on impact and contamination among communities that exist, the total amount of contamination that we have recorded understates the total amount in Iraq.

In northern Iraq there are "blank spaces" on the map – some, of course, are mountain ranges. But in the north center region of Iraqi Kurdistan lie Choman, Mergasur and Amedi Districts where large areas of land are almost completely abandoned. There are abandoned communities in Sulaymaniyah also, but the problem is less visible (at least it does not present itself as it does in Erbil and Dahuk as vast areas with no communities at all). Survey Group North collected data concerning more than 500 abandoned communities, many of them by physical visit. Hundreds, perhaps thousands more exist. Kurdish authorities say 5,000 communities were forcibly evacuated by the Ba'ath regime in the 1980's when Iraqi soldiers destroyed the structures and mined and booby-trapped the remains to deter anyone from returning.

In the south, Basrah Governorate has vast areas where date palm plantations once grew but which are now abandoned. One can easily see the very large areas the run from the Shatt al-Arab waterway (defined by the dense scatter of communities) to the east that are empty, abandoned. We found very, very few communities there, though we understand that this area was a very important date palm growing area in the past. During Iraq's war with Iran much of this area was destroyed and replaced with empty kilometers of denuded landscape, contaminated with landmines and corrugated with trench lines and firing positions.

All that being said, the survey did not completely ignore abandoned communities; in special cases some were surveyed; in other cases, location information was recorded if that could be safely done. In the survey protocols, we developed some distinctions among abandoned communities that assisted Team Leaders to make decisions about what actions were appropriate. These included:

- Abandoned villages worked by farmers, but not inhabited;
- Abandoned villages near occupied villages;
- Fully abandoned but accessible villages;
- Fully abandoned and inaccessible villages.

However, many extremely contaminated areas in Iraq (in much of which lie numerous abandoned communities) were not recorded in the Iraq Landmine Impact Survey.

The Difference between the Northern Database and LIS Database

The comparison of the existing landmine impact data with the new Landmine Impact Survey-provided data became an issue requiring painstaking documentation and research. The existing system was managed by the Iraqi Kurdistan Mine Action Center (IKMAC) and they were concerned that its data holdings be reconciled and accounted for, and not just replaced. IKMAC requested that the Landmine Impact Survey ensure that the project had not missed any of the contaminated areas recorded in the IKMAC database. While there is extensive important information in the IKMAC database (it contains the result of a very significant and massive effort to conduct technical-type surveys of the Suspected Hazard Areas that are recorded in the database), but the IKMAC database has a lot of outdated information and does not include a lot of the contamination and many contaminated communities that the Landmine Impact Survey has documented as existing on the ground.

During its survey work the Iraq Landmine Impact Survey visited all secure and accessible communities in Iraqi Kurdistan, nearly 4,300 of them, and recorded more than 3,000 SHAs in 1126 of those communities. Because the Landmine Impact Survey comprehensively visited every community in Iraqi Kurdistan and collected signed non-contamination forms in those communities whose leaders said were not contaminated and surveyed those where community meetings confirmed contamination and impact, the survey team felt very secure in the work that it had done (secure that it was very unlikely that we had missed SHAs on the ground). As a consequence of the field visits, survey staff determined that only four of the mined areas listed among 3203 in the IKMAC database had been missed by the Landmine Impact Survey Data Collectors; two of these areas were in remote locations and could not be safely

approached and viewed. All other contaminated areas were documented as already cleared, already recorded with other communities, etc.

Reporting

Tracking Survey Productivity : ILIS developed an operational accounting system that connected the daily productivity of every staff member (Team Leader, Data Collector, etc.) and connected them to a set of reporting themes and key indicators. These were tracked on a daily, weekly, monthly basis and provided an important input to monthly reports. Previous LIS organizations reported a bare minimum of indicators of work done, like numbers of communities surveyed. That is important, but there is no way to infer from that kind of bare reporting what progress is being made or how efficient the work is. The Reporting Themes and Key Indicator accounting of work done (and documented) is a signal contribution to survey management more generally. An example of an ILIS Monthly Report which is includes the Key Indicator tables for all work done in the country during the reporting month (June 2005) is found in appendices.

In progress First-Cut Statistical Reporting: After the completion of the survey of the southern four governorates (where mine action is managed out of RMAC-S) it was possible to do some limited descriptive statistics with the data that had been collected. Providing Donors and National Organizations an initial description of survey findings was very the distribution of contamination and its socio-economic impact.

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KEY PARTICIPANTS

Office of Weapons Removal and Abatement (PM/WRA), U.S. Department of State provided substantial funding to the project, channeling resources both directly to iMMAP, and support resources through RONCO Consulting Corporation. PM.WRA provided, both directly and through RONCO, extensive operational and technical support to the overall survey effort.

European Union (EU) provided the majority of funding to the Senior Technical Advisor (STA) position for the Landmine Impact Survey.

Government of Italy provided a portion of the funding to the STA position for the Landmine Impact Survey.

United Nations Development Program (UNDP) served as an advisory/contracting agency on behalf of the EU and Government of Italy contributions to this project, and provided extensive technical and operational support to the survey effort.

The Iraq National Mine Action Authority (NMAA), Ministry of Planning and Development Cooperation, was the primary national level body through which the Landmine Impact Survey team coordinated its activities. NMAA provided extensive advice and guidance regarding the start points for both Survey Groups North and South. Local governmental guides for the survey teams were enabled through close cooperation with, and formal recognition by NMAA,

RONCO Consulting Corporation, through funding supplied by PM/WRA, provided extensive material and facilities support to the Landmine Impact Survey project. This support including housing Landmine Impact Survey personnel in facilities in Basrah, Baghdad and Erbil, security support when necessary, and a node for coordination with various national and international-level stakeholders.

Geneva International Center for Humanitarian De-Mining (GICHD) provided Information Management System for Mine Action (IMSMA) software to this project, through its provision of IMSMA to NMAA.

United Nations Mine Action Service (UNMAS) has responsibility for ensuring the quality of any Landmine Impact Survey seeking international certification. UNMAS provided the Quality Assurance Monitor (QAM) to this project. The QAM visited the Iraq survey project twice. His recommendations were incorporated into the operational and methodological planning and execution, as appropriate.

Iraq Ministry of Public Health provided guides to access some areas in the survey areas of both Survey Groups North and South. In some cases, through coordination with the governorate-level Departments of Public Health, local doctors were employed as survey Team Leaders in order to ensure ease of cooperation with local residents, and to allow the survey project to benefit from their extensive area expertise.

Mines Advisory Group (MAG) is one of the implementing stakeholders in Iraq, and has operated consistently in northern Iraq since the early 1990's. MAG indirectly supplied many of the members of the Survey Group North team as they were hired upon completion of the Emergency Mine Action Survey (EMAS) that was implemented by MAG and iMMAP on behalf of the United Nations Office for Project Services (UNOPS) in 2003 and early 2004.

Regional and local authorities in Iraq are, or will be the custodians of information in relation to contaminated and/or Suspected Hazard Areas. In the absence of a formal Local Expert Opinion Collection element to the Iraq Landmine Impact Survey, local and regional authorities provided extensive advice, reports of areas suffering from contamination, and in some cases, government guides to act as verification of the official endorsement of the survey process, and to ensure the safety of the survey teams in some locations. Close collaboration with Governorate-level offices and community leaders is a key to a successful and comprehensive Landmine Impact Survey in any region or country. Government authorities were quite helpful and committed to the sound implementation of the survey process and a valuable partner in terms of necessary data concerning potential areas of contamination.

SURVEY METHODOLOGY

The comprehensive national Landmine Impact Survey of Iraq was informed by three primary objectives:

- Achieve proper survey coverage at each administrative level and locate the contaminated communities in each administrative area;
- Conduct a proper, international standard, locally adapted Landmine Impact Survey in each community identified; and,
- Operate, document work, and accurately record information in an IMSMA database in such a way so as to be certified by the United Nations.

Achieving survey coverage in Iraq, as in any community survey, requires the survey to work in such a way as to minimize the risk that contaminated and impacted communities will be missed. The most important decision in this regard was the decision of whether to attempt to gather Expert Opinion regarding the location of contaminated and impacted communities or to conduct a census of communities. The Iraq Landmine Impact Survey, based upon the results of the Pilot Survey, made the decision to conduct a census of villages in order to establish which communities required a survey data collection team be sent to its location. This decision and the consequences of it are discussed in the section below concerning the Pilot Survey. Other important elements of this part of the survey process include defining what a community is, and documenting non-contamination; previous contamination and spot contamination. Discussions about each of these issues can be found below.

As the survey worked comprehensively, other kinds of communities were brought into view: communities which shared Suspected Hazards Areas (SHA) with one or more other communities; abandoned communities that are farmed by their former inhabitants; seasonal communities; and vast areas of land populated by farming households (but where there are no formal communities as such). These important categories of human habitation and activity required adaptation of the survey work to different types of contaminated and impacted collectivities. These will also be discussed below.

Once a village has been identified as contaminated and impacted, a survey Team Leader makes an appointment with the village leadership for actual conduct of the Community Meeting. The second main survey goal of ensuring that a proper, international standard survey was conducted in each contaminated and impacted community depended upon good recruitment, proper training (at both the senior staff and Data Collector levels), proper adaptation of the survey questionnaire (instrument), proper conduct of the survey Pre-Test, and the development of detailed Data Collector protocol. All of these aspects of the preparation for, and conduct of the survey activities in the community are also described in this section.

A final aspect of survey methodology relates to quality control in general, and what happens to the information after it has been recorded in the community on the questionnaire. The success of the Iraq Landmine Impact Survey in achieving high levels of quality in all of its work, and in particular being able to ensure that all needed information was properly collected and then accurately entered in a properly-adapted IMSMA database were crucial to achieving the third primary objective: international certification of the work by the United Nations Mine Action Service (UNMAS)-managed Certification Committee. Specific issues relating to these tasks are again described below. In general however, if the survey could achieve the first objective (and properly document that achievement), and if the survey operated so as to achieve the second objective, then third objective was not difficult. In other words, if the teams found all communities that required survey, and if it conducted that survey properly in each of those communities, and accurately entered the information into the IMSMA database, certification would be achievable. However, getting from proper and complete data collection to accurate data entry, as with any survey, can be an enormously difficult task in-and-of itself, and involves proper field editing and quality assurance at all levels. In the sections that follow, we will describe the major steps taken during the course of the survey to achieve these ends.

One thing that makes the following information difficult to organize and to present is that many of the steps for preparing for the Iraq Landmine Impact Survey were completed twice, and in some cases, thrice. The Iraq survey conducted two regional surveys simultaneously, one in the three governorates of Iraqi Kurdistan and Kirkuk (with separate data collection teams operating in the Kurdish region versus the Arab areas of Ta'meem [Kirkuk]

Governorate), and another in the south that eventually surveyed all nine governorates south of Baghdad (generally considered to be predominantly Shi'a areas of Iraq). The survey trained senior staff and Data Collectors for the survey of Salahuddin (Tikrit), Diyala (Baquba) and senior staff for Ninewa (Mosul) Governorates before the survey projected was suspended due to insecurity in these areas. In this discussion we will concentrate primarily upon the conduct of the survey in northern Iraq and mention the other two as required.

This section of the report will address the following:

1. Finalizing the Questionnaire
2. Staff Recruitment
3. Senior Staff Training
4. Pre-Test
5. Data Collector's Training
6. The Pilot Survey
7. Team Leader Tasks
8. Community Meeting
9. Non-Contaminated Communities
10. Spot Reports
11. Farm Household and Cemetery Surveys
12. Seasonal Communities and Abandoned Communities
13. Collective Communities versus traditional villages
14. Field Editing and Quality Assurance
15. False negative sampling
16. Role of the UNMAS Quality Assurance Monitor

FINALIZING THE QUESTIONNAIRE

One of the most important early steps taken by the Iraq Landmine Impact Survey was to present the survey process to the senior staff of the Iraq National Mine Action Authority (NMAA) in Baghdad and to work with them to ensure that the questionnaire to be used in Iraq would include any specific information requirements they considered important but at the same time to remain consistent with international standards. This was achieved through meetings and discussions with NMAA early in 2004.

STAFF RECRUITMENT

The Iraq Landmine Impact Survey was fortunate to inherit a core group of surveyors and managers from the Mines Advisory Group (MAG)/iMMAP implemented Emergency Mine Action Survey (EMAS) of northern Iraq. Though the instrument that they used was not a true questionnaire, but a form, and though the survey teams did not conduct true community surveys, these personnel knew how to operate in the Kurdish areas, as well as how to establish Forward Operating Bases (FOB) away from their home areas. The core EMAS staff became the senior staff for Survey Group North of the Landmine Impact Survey, established in the spring of 2004. At almost the same time, the survey team was able to recruit a highly competent Senior Operations Officer for the entire survey in Baghdad. By mid-summer 2004, when the survey team was prepared to commence recruitment and training in Basrah, the Operations Officer became a central figure in that recruitment and training of a second cohort of senior staff and Data Collectors.

A third phase of recruitment occurred in the autumn of 2005 as the survey was completing the survey of Iraqi Kurdistan and prepared to reconfigure itself for the survey of Ta'meem (Kirkuk) Governorate. This required the recruitment of non-Kurdish surveyors to integrate with the largely Kurdish personnel comprising Survey Group North at the time. Such integration of the survey teams ensured that the Data Collectors would be well received in the villages of Ta'meem, and that security threats would be reduced.

By the spring of 2006, with the survey of the southern nine governorates nearing completion, new survey field staff and Data Collectors were recruited in separate groups from their home governorates of Diyala, Salahuddin and Ninewa. Throughout the survey, Survey Groups North and South faced staff periodic staff attrition and a requirement to recruit to replace them. One further fact deserves special mention: the Iraq Landmine Impact Survey was very fortunate during its survey of Sulaymaniyah to have an agreement with the Regional Mine Action Center (RMAC) there to bring

in Mine Risk Education (MRE) specialists who the survey was able to retrain as Data Collectors and thereby made it very easier to recover from early staff losses in the north.

SENIOR STAFF TRAINING

The first wave of Senior Staff Training was conducted in northern Iraq without external support or assistance. The main output of the training was a workable draft field protocol and a clear understanding of the questionnaire. That was reinforced during the Pre-Test of the questionnaire and the participation of all senior staff in the data collector's training.

PRE-TEST

The survey conducted its first Pre-Test of the Iraqi version of the international Landmine Impact Survey questionnaire along the "Green Line" in Iraqi Kurdistan. Lessons learned from that work allowed the survey team to clarify difficult areas and to make accommodations to facts on the ground that were different from those assumed by the questionnaire, its questions or its answers. The Pre-Test involved all staff in some capacity so that all of senior staff knew how to properly conduct the survey, from community meeting to visual verification. Some of the issues highlighted during the Pre-Test became obvious even then. A second Pre-Test was conducted in Basrah because the southern survey instrument was in Arabic and not Kurdish, but most importantly because the topography and social organization in the south were sufficiently different from the north that it was important to make sure that the questionnaire, already adapted to the north would 'fit' the south as well. The survey staff began at this time to develop the Data Collector protocol so it could be translated for use.

DATA COLLECTOR TRAINING

Data Collector training lasted two weeks. It included classroom and practical training concerning the basic skills required: use of the satellite telephone, compass, and global positioning system (GPS); proper execution of the contaminated area sketch; and, conduct of the community meeting. The senior staff assisted in the training either as students or as training assistants. Given that the creation of the Iraq Landmine Impact Survey team was an effort of truly building a team from scratch, the group essentially “boot-straped” its way to competence. When the regional survey staff in the south were ready for senior staff training, this training was conducted in the north and the northern senior staff played a central role (along with the Survey Operations Officer) in accomplishing that training. In turn, the senior staff of Survey Group South and the Survey Operations Officer and STA conducted the training in the south. Over the duration of the Landmine Impact Survey process, each survey group became responsible for training of newly recruited Data Collectors and overseeing their transition into the organization and the work. Senior staff training was conducted three more times, and Data Collector training three more times: for the Ta’meem (Kirkuk), Diyala, Salahuddin (Tikrit) and Ninewa (Mosul) Governorate survey teams. National staff from the Iraq survey even took responsibility for training the senior staff and Data Collectors for the national Landmine Impact Survey conducted in Armenia. One of the signal achievements of the survey was the production of a Data Collector handbook, translated into Kurdish and Arabic.

THE PILOT SURVEY

Survey Group North of the Iraq Landmine Impact Survey deployed to Soran District of Erbil Governorate to conduct a Pilot Survey. The Pilot Survey was a test of the group's ability to operate, and implement the survey process in a field environment; it was arranged in such a manner as to stress all logistical, operational command and control, and communications capabilities. The Iraq Landmine Impact Survey was fortunate to be able to use the former British fortress in the town of Soran as office space: accommodations were established in Soran, with one house for the male team members and one for the females team members. From Soran, the districts of Mergasur, Choman and Soran were accessible and were surveyed.

A very important goal of the survey from the beginning was to establish the reliability of three sources of information: 1) District and Sub-District leaders reports concerning the existence of communities in their administrative areas; 2) The reliability of the existing gazetteer (official community lists); and, 3) The reliability of the existing mine action database information (derived from previous surveys organized by the United Nations office for Project Services [UNOPS] and others) as an indication of what communities might be contaminated. Answers to these questions would determine how the survey was to be conducted.

- We learned that sub-district leaders were the best source of information regarding existing communities, but they were not highly, and certainly not perfectly reliable, though that varied from sub-district to sub-district.

We would continue to supplement their information through the entire survey with neighboring village information collected in each community to ensure that we did not miss communities;

- We learned that the gazetteer existing at that time was enormously unreliable: hundreds of names in the gazetteer were not on the ground (or were duplicates or were names of things other than communities) and many communities on the ground were not on the list;
- Finally, we learned that using the mine action database information was only of limited assistance. Hundreds of the communities that the database said were contaminated are either abandoned or no longer contaminated. The survey found literally hundreds of contaminated communities on the ground that were not in the database. However, the list was useful in one important way: by the end of the survey we had accounted, one way or another for every Suspected Hazard Area (reported as "mined areas") in that database and we could say which of them still existed and which of them did not. In addition the survey found more than 1000 SHAs which were not in the database.

Two important outcomes of the Pilot Survey were a confidence in the survey field protocols as lessons learned were incorporated into it, and a strong conviction that in order to achieve the survey coverage goal the survey would have to conduct a census of communities rather than through implementation of Expert Opinion Collection which engages in a combination of visit and sample.

A short Pilot Survey was conducted in the south, but conditions were different. By the time the survey was started in the south, the northern survey had fully tested the Iraq Landmine Impact Survey field protocols, the southern senior staff had been trained in the north, and because the survey headquarters itself was established in the city of Basrah (rather than as an FOB in one of the other governorates), it was decided to deploy from the town during the first phase of the southern survey. Security considerations also influenced this decision.

TEAM LEADER TASKS

Since the survey was committed to visiting all communities, the role of the survey Team Leaders was of crucial importance. They had to work thoroughly and well to ensure survey coverage and identify contaminated communities, and they had to document their work clearly so that survey coverage claims could be defended. However, their primary task was to keep the survey teams productively employed. In some governorates that was not difficult, as the proportion of contaminated communities was very high. In other governorates it was lower and when it was, instead of letting Data Collectors sit underutilized at the FOB, they were trained to go to the field and confirm non-contamination in villages.

The fact that there were communities that shared SHAs also made the job of the Team Leader more difficult, because by survey protocol the Team Leader took the lead in deciding which of the communities that shared a single SHA would be surveyed and to facilitate getting members of the several communities to that one meeting. There came a time when the work load was so great that the survey promoted one Data Collector to become a third full-time Team Leader (for eight Data Collector teams) to share the work.

The Team Leaders were also the main staff members authorized to make decisions about whether the contamination in a community reached the level of danger and impact required for a full Landmine Impact Survey community meeting to be held. If it did not, it was the Team Leader's responsibility to record limited, surface contamination that endangered but did not impact communities on UXO Spot Reports. It was also the responsibility of the Team Leaders to collect neighboring community lists in each community and to check that against the working gazetteer to ensure that the survey did not miss existing communities on the ground.

COMMUNITY MEETING

After a village had been confirmed to be impacted and contaminated, and the Team Leader had made an appointment with the community leaders for the visit by the Data Collector team, a team was designated for the task and briefed by the Team Leader on location, best route, and any special issues or problems. The Data Collector teams were trained according to international protocols and best practices for community surveys. After training, they were afforded the opportunity to practice in communities, and were then tested and certified (by survey senior staff) before deployment.

The Team Leader emphasized the importance of having all of the different soco-economic roles in the community represented in their discussions with the village chiefs: from farmers to sheep herders, from housewives to militia

members, teachers and so on. The Team Leaders and the Data Collectors after them also encouraged women to participate in the meetings; this was more easily accomplished in the north than in the south. In the south, it was often not possible due to local cultural norms of interaction between the genders.

With Survey Group North, female team members were recruited (one woman on each team) and remained throughout the survey; in the village their presence invariably encouraged female participation. In the south, women were also initially recruited as Data Collectors, but once the survey deployed outside of Basrah Governorate to FOBs in other areas, all of the women left the survey due to concerns of security and propriety. From that point forward, the Survey Group South was fully male and participation by women in the community became even more difficult.

The community meeting, once underway, was conducted by international protocol and a community map was produced with assistance from the community. The map was a visual representation of the community and its relationship to nearby communities, major roads and features, and the SHA that impacted the community. Community-level information was collected, such as population estimates, facts about the history of conflict as it impacted on the community, but also about recent victims and information about each SHA. At the end of the meeting, village guides were sought who were expert regarding each SHA, and the Data Collectors walked with them to a safe viewing point from which the area could be observed. Location information was recorded, sketches were made and estimates of distances to the SHA from the viewing point and the dimensions of the SHA were recorded. All maps were photographed and digital copies are archived in the survey database, as are photographs of the SHAs themselves.

NON-CONTAMINATED COMMUNITIES

Documenting non-contamination was almost as important as documenting contamination in order to establish survey coverage. It was also important because hundreds of communities said to be contaminated by existing mine action databases in fact were not, and a special form was developed to acknowledge the fact that a community was once, but was no longer contaminated or impacted (and how said area was cleared – by local community efforts or by formal organized clearance from outside the community). The distinction between non-contaminated and previously-contaminated communities was much less important in the south, where there had been little or no organized Humanitarian Mine Action before the most recent war (though there was limited Explosive Ordnance Disposal [EOD] surface clearance work after the war). Collecting non-contamination forms was primarily the responsibility of the Team Leaders, or Data Collectors acting as Team Leaders; keeping track of all of this, along with the questionnaires and the UXO Spot Reports became the task of the Archvist, a position created after the Pilot Survey. Every form had the signatures of three community elders or leaders in a community, and on the basis of those signatures, and the collection of this form the survey concluded that its work in this community was complete. When the Team Leaders returned to the sub-district leaders with the lists of communities, those that they had confirmed as existing or not, and/or newly identified communities they had discovered, they also provided the leaders with information regarding which communities were contaminated and which were not.

UXO SPOT REPORTS

Completed survey questionnaires with the community level modules and the victim module and the SHA modules were the primary and central documents for recording contamination and its impacts among communities in Iraq. However, in many communities the contamination was limited and localized, and though it was dangerous, it did not impact the community in ways that could be captured by a socio-economic impact survey. Unless there were SHAs that impacted a given community with only localized contamination (such as a single bomb, or small stack of artillery shells), the UXO Spot Report was the only document collected.

FARM HOUSEHOLD AND CEMETERY SURVEYS

In Basrah, Najaf and Kerbala Governorates the survey encountered a challenge to normal survey methodology: how to capture contamination among thousands of farming households scattered over very large areas (120 square kilometers or more) where contamination existed (because of the most recent war), where people were endangered and to a degree impacted, but where there were no formal, administrative communities. The Landmine Impact Survey team decided to work through local farming organizations and a media campaign to identify farming households (or areas of farming households) which were contaminated (or where contamination was most likely). If the area was extensive, that was recorded on an IMSMA Dangerous Area form; if the contamination was limited in scope and impact, Landmine Impact Survey UXO Spot Reports were used. These kinds of habitations were not found in the north, but only in the south. The survey team felt that it had some obligation to document contamination among these

thousands of families, though the Landmine Impact Survey process is not normally configured to perform this activity effectively.

SEASONAL COMMUNITIES AND ABANDONED COMMUNITIES

In the north, the survey had to solve two major types of problems. The first was presented by seasonal communities. In the organization of this type of rural economy in the north, villagers spend between six and eight months in one village site and then between four and six months in the other. Either or both may be contaminated. Community dwellers can be impacted or endangered in either or both. However, when the survey first passed through an area, the village might be empty. By the time the villagers were back again, the survey might have long ago moved on to another district or governorate. Survey Group North made a commitment to these communities and over time tracked them down and confirmed their status (contaminated or not) and surveyed them as necessary.

A unique group of villages were those that were abandoned, but to which the former residents commuted from their current communities in order to farm. Thus the relationship of these men and women to their land was the same as if they lived next to their farm land as opposed to commuting to it. If such a community was contaminated and impacted, it was treated as if it was a normal village and a community meeting was held and the appropriate information was collected. By convention, the survey determined that such villages would have a population of zero, though it was possible to argue that the population that should have been recorded was the number of farmers who were endangered and constrained in their work on their own land in these abandoned communities.

It is perhaps worth discussing abandoned communities in general here. There are hundreds in the north; the survey collected location information regarding more than 500. There may be thousands more; there are some areas of northern Iraq which are completely empty or nearly empty of people, where large numbers of small rural communities once thrived. The same is true in the far south, along the border with Iran all the way up to the eastern center of the country in Wassit Governorate. Vast tracks of land are unused and unusable because of extensive minefields; abandoned communities abound. The survey of course could not gather information about these (except for location information if they were encountered during survey team work); the survey made the judgment that, except in the case above, former inhabitants would not be sought out for information. The reliability of the information gathered by the Landmine Impact Survey depends upon a proper community meeting being held; in addition the community participants in that meeting must include persons who have a recent and continuous relationship to the land. If those conditions could not be met, then the survey could not gather information. Thus, the special abandoned communities with their commuting farmers are the exception that proves the rule. Since they have a continuous and recent relationship with the land, they can be surveyed, otherwise they could not.

COLLECTIVE COMMUNITIES VERSUS TRADITIONAL VILLAGES

Many of the families that were driven from their villages in northern Iraq during the Anfal campaigns of the late-1980s were relocated to collective towns. Many other families fled to Turkey or Iran and stayed there for varying periods of time. While many Kurds have attempted to reestablish themselves in their home villages, others have remained in the towns to which they were relocated and “collected”. Some of these large communities are impacted and were surveyed. The community meeting in this case had a different character; it was held with a number of village leaders, or Muhktars, men who were still the nominal leaders of the groups of people in the collective communities that had come from the same former village. In most of these cases contamination was low, and though this was a departure from the normal manner of surveying a community, in these more urban towns this method was accepted.

FIELD EDITING AND QUALITY ASSURANCE

Field Editing is a crucial step in ensuring that the information entered into the database is complete and appropriate, and that the questionnaire has been properly completed. It does not determine the accuracy of entry or the reliability of the information, only whether the questionnaires are complete and internally consistent, but it is a crucial step in the quality assurance process. Survey Groups North and South both had full time Quality Assurance Officers that visited the communities with the Data Collectors or followed behind them and their Team Leaders to check their work and to ensure that the documents collected reflected the reality in the community. Between the Quality Assurance Officer and the Field Editors, the work of the Data Collectors was checked both internally and externally (against the reality in the villages). But it was also the responsibility of the Field Editors to ensure that the data entry staff accurately entered the information from the questionnaires. The survey used an internally created database report that mimicked the

questionnaire that showed exactly what had been entered for each question. That could be checked against the original questionnaire and discrepancies resolved.

FALSE NEGATIVE SAMPLING

The full-census approach taken to establishing which communities were landmine/UXO-affected obviated the need for False Negative sampling for survey coverage control. False Negative Sampling is part of the standard Landmine Impact Survey methodologies in country surveys that initially limit survey team visits to those communities which were specifically suspected to be contaminated during the Expert Opinion Collection phase; subsequently a systematic sample of non-suspected communities are visited for the detection of false negatives. In Iraq, all accessible communities, whether suspected or not, were visited by survey teams; those confirmed contaminated were then surveyed.

In fact, the visits to several hundred communities not listed in any community gazetteer – omitted despite the fact that the Kurdish portion of Iraq had benefited from the work of a United Nations-operated Humanitarian Information Center (HIC) for several years – almost turned the tables: Instead of struggling with the imperfect gazetteer of another, previous effort, the Landmine Impact Survey created an improved gazetteer and thus a strong sampling frame for community surveys that other organizations may want to conduct in the future.

ROLE OF THE UNMAS QUALITY ASSURANCE MONITOR

It is typical for the United Nations Mine Action Service (UNMAS) Quality Assurance Monitor (QAM) to spend time in the survey headquarters of an on-going Landmine Impact Survey, to visit in the field with its Data Collectors, and to get to know the survey from close observation while it works. That was not possible with the Iraq Landmine Impact Survey because of security constraints. What occurred instead was that the senior staff from Survey Group North met with the QAM for ten days in Amman, Jordan. During that meeting, the Quality Assurance Officer, Operations Officer, Field Editor, Archivist and Database Manager underwent intensive interviews and a documentary audit by the QAM. All procedures were explained by the staff; all documents were available to be reviewed; and the staff demonstrated how they had achieved survey goals. That occurred in early December, 2005. In early June, 2006, the process was repeated, except with the senior staff from Survey Group South who had completed their survey of the southern nine governorates at the end of April. At the end of each session, the QAM was satisfied with what he had observed, and he recommended to the United Nations Certification Committee that the Iraq Landmine Impact Survey of three of Iraq's mine action regions be considered for certification.

EXPLANATION OF SCORING, WEIGHTING, AND CLASSIFYING COMMUNITIES

THE LANDMINE IMPACT SCORE

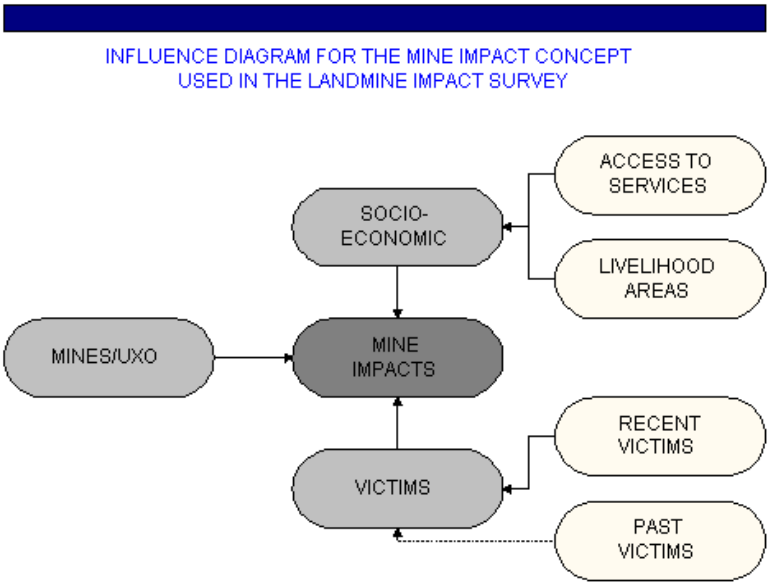
Scoring and classifying affected communities according to the severity of impacts is a central element of the Landmine Impact Survey. While the score's basic function — to aid a priority ordering of communities — is easy to understand, its technicalities may defy quick comprehension.

The landmine impact score is a property of the community, not of any or all of the Suspected Hazard Areas (SHAs) in or around the community, nor of the victims that have come to harm there. The score is indifferent to the number and size of the SHAs; it responds to three aspects of the local landmine/unexploded ordnance (UXO) problem, listed below and shown in the diagram on the next page.

- The nature of munitions;
- The types of livelihood and institutional areas to which landmines and UXO are blocking access;
- The number of recent victims.

Technically, the score is a linear combination of two munitions variables (presence of landmines, presence of UXO), ten or more livelihood and institutional blockage variables, and of the number of recent victims. The first two groups hold binary variables, with values one and zero, to express statements of the kind: "Problem of type X does occur somewhere in the community — yes or no." The number of victims, by contrast, is their actual natural number counted over the past 24 months, not the truth value of the assertion that there had been some victims in that period. The coefficients are the weights that users can set in response to their preoccupations and country conditions, within the guidelines that the Survey Working Group has set in the interest of international consistency. The weights will be explained further on the following pages.

Figure 31: Landmine Impact Survey Influence Diagram



ELEMENTS OF THE SCORING MECHANISM

Four elements underlie the scores and classification: (1) the selection of variables (the indicators), (2) metrics (the way values are determined for the indicators and are passed to the scoring scheme), (3) weights (the relative influence given to the indicators), and (4) category bounds (the limits of numerical ranges of the scores corresponding to the categories).

Variables

In the database default configuration, the following are considered in the scoring:

- Landmine/UXO victims in the last 24 months
- The presence of landmines
- The presence of unexploded ordnance
- Access to crop land
- Access to pasture
- Access to water points
- Access to non-cultivated area
- Access to housing area
- Roads that are blocked
- Access to other infrastructure

Within cropland, pasture, water and roads, distinctions are made. Irrigated land is distinguished from rain-fed land. Fixed pasture is distinguished from migratory pasture, mostly used by nomads. Drinking water is distinguished from water used for other purposes.

Roads that lead to some administrative centers are distinguished from purely local roads and trails.

As shown in the regional reports, the following blockage types were reported (arranged here in descending frequency over the total number of surveyed communities):

Table 85: Blockage Types, by Region

Blockage Types	North	Kirkuk	South Center	South	All Regions
Fixed Pasture	55%	67%	86%	81%	63%
Migratory Pasture	66%	56%	30%	38%	57%
Non-agricultural Land	75%	70%	1%	5%	55%
Irrigated Crops	20%	14%	86%	88%	38%
Rain-fed Crops	41%	88%	2%	3%	32%
Water for Other Purposes	13%	5%	2%	8%	11%
Roads and Trails	12%	21%	0%	5%	10%
Drinking Water	8%	5%	0%	2%	6%
Housing	1%	0%	2%	2%	1%
Infrastructure, Other	1%	0%	1%	1%	1%
Affected Communities	**1,126**	**43**	**118**	**335**	**1,622**

Each of those subcategories contributes to the score if access to some element of it is found blocked.

With these distinctions, normally 14 different variables enter the scoring in the default configuration. However, the database used may be configured to include up to five user-definable variables to collect information regarding socio-economic blockage types. The Iraq survey did not make use of that facility. It passed 13 variables to the calculation (two types of munitions, the number of recent victims, and ten blockage types). In other words, the variables used in the scoring of affected communities were the same in all four survey regions of the country (with one minor technical

exception11). The same is true of the weights assigned to the variables; the weights for a given variable were the same in all regions.

The detailed list of the variables used for scoring affected communities in Iraq will be listed in the "weights" section. Here, it is important to note that the score is indifferent to the population or territory of the community and considers neither the number of distinct SHAs nor their surface or proximity to the center of the community.

Metrics

The scoring follows a weak metric approach. The indicators only say whether a certain type of livelihood or institutional area is blocked by landmines (or littered with UXO, including abandoned stockpiles). They do not say how much of it is blocked or how valuable the blocked area is. In other words, the existence of a problem is the criterion, not a threshold measured by size, value, population directly affected, or number of alternatives. Similarly, in the type-of-munitions area of the scoring, the scoring looks only at the presence of generic landmines and of UXO, not at numbers emplaced, sub-type, age, or origin, or whether the munitions were actively used (fired or expended) or not. The weak metric was chosen for a variety of consensus, validity and reliability reasons.

The victim part of the score has a stronger metric. The number of recent victims is a count variable. Although information is collected regarding the number of victims of less recent date, it does not affect the score. However, each recent victim contributes to the score. A victim of an incident within the 24 months immediately prior to the survey date is considered a recent victim.

Weights

Once the presence of a certain blockage or munition type has been assessed over all the distinct SHAs in a community, the community-level indicator value is passed to the scoring mechanism. As an example, if a community has three SHAs and two of them are blocking access to two distinct pieces of irrigated crop land, only the value: "In this community, some irrigated land is blocked " =TRUE is passed to the algorithm.

These values — expressed as 1 (TRUE) or 0 (FALSE) — are then multiplied with weights. The exception is the recent victims, for which not a binary, but the full count is passed and multiplied with its weight.

The weights used in the computation of the impact scores in Iraq are shown in the following table.

Country surveys can vary the weights for institutional and resource area blockages. The permissible variations have certain limits. The technicalities are described in the weights budget segment that follows. Different community classification outcomes in response to hypothetically different weight sets are also reported in this segment.

[11] In the south, any blocked roads or trails were treated as a road blockage triggering an addition to the impact score equal to the weight for this variable. In the other three regions, the IMSMA default handling of this variable was used; i.e. only blockages of roads to administrative centers mattered. The consequences are minor and are omitted in this note.

Table 86: Weights Used in the Computation of Impact Scores in Iraq

Variable	Weight
Number of recent victims	2
There were landmines	2
There was unexploded ordnance	1
Access to some irrigated crop land was blocked	1
Access to some rain-fed crop was blocked	1
Access to some fixed pasture was blocked	1
Access to some migratory pasture was blocked	1
Access to some drinking water points was blocked	1
Access to some water points for other uses was blocked	1
Access to some non-cultivated area was blocked	1
Access to some housing area was blocked	1
Some roads were blocked	1
Access to some other infrastructure was blocked	1

Category Bounds

The survey works with four impact categories: "no known landmine problem", "low impact", "medium impact", "high impact".

The category bounds are set as follows:

- No known landmine/UXO problem: Score = 0
- Low Impact: Score between one and five
- Medium Impact: Score between six and 10
- High Impact: Score 11 and above

THE "WEIGHTS BUDGET"

The weights used in this survey conform to the weight-setting rules as authorized by the Survey Working Group. Within this framework, the survey-implementing organization sets the country-specific weights after an internal discussion of country conditions. The weights respect certain limits, notably a "weights budget" that must not be exceeded. The limits help to safeguard against grade inflation, and also to keep the relative influence of the socio-economic, munitions, and victim components in proportion.

The rules allow country surveys to set weights for the following indicators:

- Access to some irrigated cropland was blocked
- Access to some rain-fed cropland was blocked
- Access to some fixed pasture was blocked
- Access to some migratory pasture was blocked
- Access to some drinking water points was blocked
- Access to some water points for other uses was blocked
- Access to some non-cultivated area was blocked
- Access to some housing area was blocked
- Some roads were blocked
- Access to some other infrastructure was blocked

As many as five user-definable socio-economic blockage types may be included in the weighting schema of standard Landmine Impact Survey processes. The Iraq survey chose not to use any of the definable fields in the scoring.

The weights are subject to the following rules:

1. Weights are one of the following integers: 0, 1, 2, or 3.
2. The sum of these weights equals 10.

3. The weight for access to migratory pasture is zero unless pastures essentially used by nomadic communities pose a landmine or UXO problem. In Iraq, this was assumed to be the case.

It is permissible to set a weight to zero for an indicator for which there are occurrences in some affected communities.

SENSITIVITY OF THE COMMUNITY CLASSIFICATION TO WEIGHT CHANGES

The numbers of communities classified as High, Medium, or Low Impact may differ with variations in weights assigned to socio-economic blockage indicators.

The regional offices that maintained the various Iraq survey databases (in Erbil, Baghdad and Basrah) set a weight of 1 uniformly for all institutional and livelihoods blockage types.

In addition to this baseline scenario, the classification of affected communities by the severity of impact was calculated using two different sets of weights.

In one scenario, the weights budget was distributed exclusively to land-based blockage types. In a contrasting approach, the second scenario allocated the entire budget to blockages that can be assumed to be of greater concern to urban communities. These include blocked access to water points (both drinking water and water for other uses), residential areas and other infrastructure, as well as blocked roads.

The following table shows the distribution of respective weights for both hypothetical scenarios (land-based versus urban concerns) contrasted with the baseline weights. As the total weights' budget is a constant, an increase in the weight for any indicator had to be made at the expense of some other indicator.

The lower portion of the table shows the effect of weight changes on the percentage of communities classified as High Impact12, by region. As mentioned, communities earning a score of 11 or above are thus classified.

[12] The impact on the percentages of Medium or Low Impact communities has been calculated as well, but for easy comparison, we use one indicator across regions and scenarios – the percentage of High Impact ones.

Table 87: Distribution of Weights

Scenario	Baseline	Land-based	Urban Concerns
Recent victims	2	2	2
There were mines [AT or AP]	2	2	2
There were unexploded ordnance or stockpiles	1	1	1
Access to some irrigated crop land was blocked	1	2	0
Access to some rain-fed crop land was blocked	1	2	0
Access to some fixed pasture was blocked	1	2	0
Access to some migratory pasture was blocked	1	2	0
Access to some drinking water points was blocked	1	0	2
Access to water points for other uses was blocked	1	0	2
Access to some non-cultivated area was blocked	1	2	0
Access to some housing area was blocked	1	0	2
Some roads or trails were blocked	1	0	2
Access to some other infrastructure was blocked	1	0	2
Total weight budget for blockages	*10*	*10*	*10*
Percent Communities Classified as High Impact:			
North (all affected communities: 1,126)	2%	16%	1%
Kirkuk Area (43)	5%	21%	2%
South Center (118)	9%	14%	6%
South (335)	9%	15%	6%
Total (1,622)	4%	15%	2%

It is evident from this exercise that when higher weights are accorded to land-based blockages, the percentage of High Impact communities increases dramatically in the two northern regions, and increases considerably in the two southern regions. This dramatic increase in the former is the direct result of the high frequency with which communities reported that access to some of their non-agricultural land and to some of their migratory pasture was blocked.

At the other end of the spectrum, assigning higher weights to indicators presumably more closely concerning urban communities, leads to a significant, if less than radical, shift in results of the impact classification. Such blockage types were reported to occur relatively rarely. In this "Urban Concerns" scenario, the number of communities rated High Impact falls by approximately one half compared to the baseline scenario.

This high sensitivity of the impact classifications to weight changes in the northern survey regions is related also to the low number of communities that had any recent victims (112 only out of 1,169 surveyed communities). This leads to a question frequently asked by users.

It concerns the relative contribution to the total score of an affected community from the three aspects of the landmine/UXO contamination measured, i.e. types of munitions, victims, and blocked access to services and livelihoods. For example, in the north, a total of 6,641 score points were shared among the 1,126 communities. In the baseline scenario, 2,747 points (41%) were earned for the presence of landmines and/or UXO, 594 (9%) for recent victims, and 3,300 points (50%) for resource blockages.

The following table gives a breakdown, for each of the four survey regions, of the contributions from each of the score point sources:

Table 88: Score Point Sources

Source of Score Points	North	Tameem/Kirkuk	South Center	South	All Regions
Munitions	41%	39%	23%	30%	37%
Recent Victims	9%	9%	34%	31%	15%
Resource Blockages	50%	51%	42%	39%	47%
Total	100%	100%	100%	100%	100%
Affected Communities	1,126	43	118	335	1,622

The often-heard assertion that the impact classification is essentially victim-driven, therefore, is even less correct here than in other surveyed regions and countries.

SCENARIOS AND USER INPUT

It is important to point out that due to ongoing and widespread insecurity and the ensuing difficulties in convening stakeholder meetings, these scenarios and their widely different results have not yet been discussed with the majority of Iraq survey users. Users may want to try other weighting schemes, depending upon the policy questions that they study. They can do so easily. The Information Management System for Mine Action (IMSMA) database recalculates the scores of all surveyed communities upon user input.

THE DATA COLLECTION PROCESS

THE COMMUNITY MEETING

Meetings were conducted by a Data Collector team of two persons. Prior to arrival of the Data Collector team, their Team Leader would visit villages assigned to him by the Survey Group Team Leader (SGTL). The Team Leader would assess villages for contamination, and would make appointments with the communities leaders of those villages claiming suspected contamination.. In general practice, the Data Collector team would visit the suspected community the following day in order to implement the Landmine Impact Survey process. The Data Collectors would provide a standard, rehearsed introduction and complete an attendance sheet. When a representative group was thought to be present, the Data Collectors started the interview.

Iraq LIS Community Interview

The team commenced the process with a community mapping exercise - drawn by the Data Collectors and community members on a large blank piece of graph or mapping paper, using large, colored markers. The community map was then displayed in a place that all participants could see and was used during the remainder of the interview to focus the participants on the interview and the particular Suspected Hazard Areas being discussed.

The collectors then worked through each of the questionnaire modules. These included one community module and each a mined area module for each SHA. Each recent victim was linked to the mined area where the incident occurred and a victim module completed for each victim (see explanation of the questionnaire modules below).

The length of time taken in each interview depended on the number of mined areas, the number of recent victims and the scope of general discussion generated. A typical interview lasted about two hours.

VISUAL VERIFICATION OF SUSPECTED HAZARD AREAS

After the interview the Data Collectors went with a knowledgeable member of the community to conduct visual verification of the SHAs from a safe viewing point or Bench Mark. A sketch map was also drawn, showing the distance and bearing of the contaminated area from the verification point. Photographs were taken, and the description and the area measurement of the SHA provided by the community was verified. In cases where the Data Collectors believed the interview was not sufficiently representative, they asked the leader to invite additional members of the community or went themselves to meet other residents.

Taking a compass azimth to a Suspected Hazard Area

The survey teams did not perform visual verification in the following cases:

- Where there is NO SAFE viewing point (especially in border areas), for example, because of cross-border shelling;
- Where there is no passable safe viewing, for example because of mountainous terrain without any paved or dirt path.

SURVEY DOCUMENTS

The questionnaire contains four modules that mirror the structure of the IMSMA database that stores the information. The modules are further subdivided into segments that anticipate the logical flow of conversation. The modular structure of the questionnaire appears in the Figure XX below, Modules and Segments of the Community Interview Questionnaire. The survey tools were adapted to the unique situation in Iraq using advice from a variety of sources. A draft version was distributed to the main survey stakeholders, including NMAA and international HMA NGOs operating in Iraq for feedback. The translation and back-translation was done by members of the Landmine Impact Survey team in both Survey Groups North as South, with extensive assistance provided by language professors from universities in Erbil and Basrah, as the questionnaire was developed in both Arabic and Kurdish language versions. The questionnaire was further modified following field testing during the Pre-Test and Pilot Survey.

THE MODULES AND SEGMENTS OF THE LIS QUESTIONNAIRE

Community-Level Module—Part 1

- Segment 1: Identification
- Segment 2: Certification
- Segment 3: List of attachments
- Segment 4: Background observations on the community
- Segment 5: Introduction (to the community interview)
- Segment 6: Community mapping and mined areas summary
- Segment 7: Historical Context (information)
- Segment 8: Total victim numbers

Mined-Area Module (One for each mined area)

- Segment 9: Reference point, description and size of this particular mined area
- Segment 10: Marking, terrain, suspected ordnance
- Segment 11: Impact
- Segment 12: Verification from a safe point

Individual Victim Module (One for each recent victim)

- Segment 13: Victim Descriptors
- Segment 14: Accident and consequences

Community-Level Module—Part 2

- Segment 15: Victims of less recent date
- Segment 16: Mine action
- Segment 17: End of the meeting
- Segment 18: Observations after the visit

Meeting Attendance Sheet

CODING SHEETS

The Iraq Landmine Impact Survey developed two documents that supported the transfer of the data from questionnaires to the database. First, in the Data Entry protocol, a special section specifies which questions of the questionnaire will be entered into the IMSMA database. Because the customization of the database could not allow for the sequential numbering of questions, this annex also helped the Data Entry Specialists with the questions to be entered with their corresponding fields in IMSMA.

Second, the Iraq Landmine Impact Survey team developed and used a special electronic translation sheet where the Field Editors provided the exact English translation of questions to be entered into the database. The Field Editor recorded all the narrative questions on the electronic sheet, which the Data Entry Specialist copied and pasted directly into the relevant IMSMA fields. When a questionnaire is fully entered into IMSMA the DES will print the data entry sheet for double-checking by FE.

PROTOCOLS

On the basis of Survey Working Group (SWG) protocols, and the Iraq Landmine Impact Survey Pre-Test and Pilot Survey results, the Iraq survey team developed several basic working documents which included more detailed information regarding the methodology of the project regarding these key processes:

- The *Iraq LIS Data Collection Protocol* was developed to give Data Collectors a more detailed explanation regarding how the questionnaire must be filled out;
- The *Iraq LIS Field Protocol* provides guidance for field operations regarding conduct of the Landmine Impact Survey of Iraq;
- The *Iraq LIS Data Entry Protocol* defines the main rules of data entry, checking, and data security;
- The *Iraq LIS Quality Assurance Protocol* contains information regarding the main principles and procedures of quality assurance (QA) for the survey in impacted communities. Principles, components, procedures, and reporting of the QA results are also introduced in this protocol.
- A Code of Conduct protocol was developed that enshrined how each member of the Landmine Impact Survey team should behave in the field. This protocol was developed in order to protect the team members, the interests of the survey project, and the local communities.

REPORTING FORMS

The Iraq Landmine Impact Survey developed six reporting forms for data collection and operational purposes:

- Data Collectors Mission Report: Containing observations made during the community interview and the visual verification, which would not fit into the questionnaire;
- Daily and weekly productivity reports were completed by Data Collectors and Team Leaders on a daily and weekly basis to report the number of villages visited and surveyed, and to allow survey management to ensure productivity levels were maintained;
- Field Editor Weekly Productivity Report Form: Stating the productivity of each of the Field Editors during the week;
- Data Entry Specialist Weekly Productivity Report Form: Giving the productivity of the Data Entry Specialist during the week;
- District Report and Table: Submitted by the Survey Group Leader and STA after the completion of the survey in each district. The reports include the table-type quantitative data regarding productivity of the survey teams in a particular district, as well as narrative description of the process of data collection, main results, and challenges faced and solutions enacted during the survey.
- In total, four QA forms were created. One for control revisits to each type of community: unaffected, formerly affected, and affected. The fourth form that was developed is a QA monitoring visit report form.

OTHER SUPPORTING SURVEY DOCUMENTS

The Iraq Landmine Impact Survey developed and used a UXO Spot Report form, Shared Mined Area form, and Unaffected Community Questionnaire.

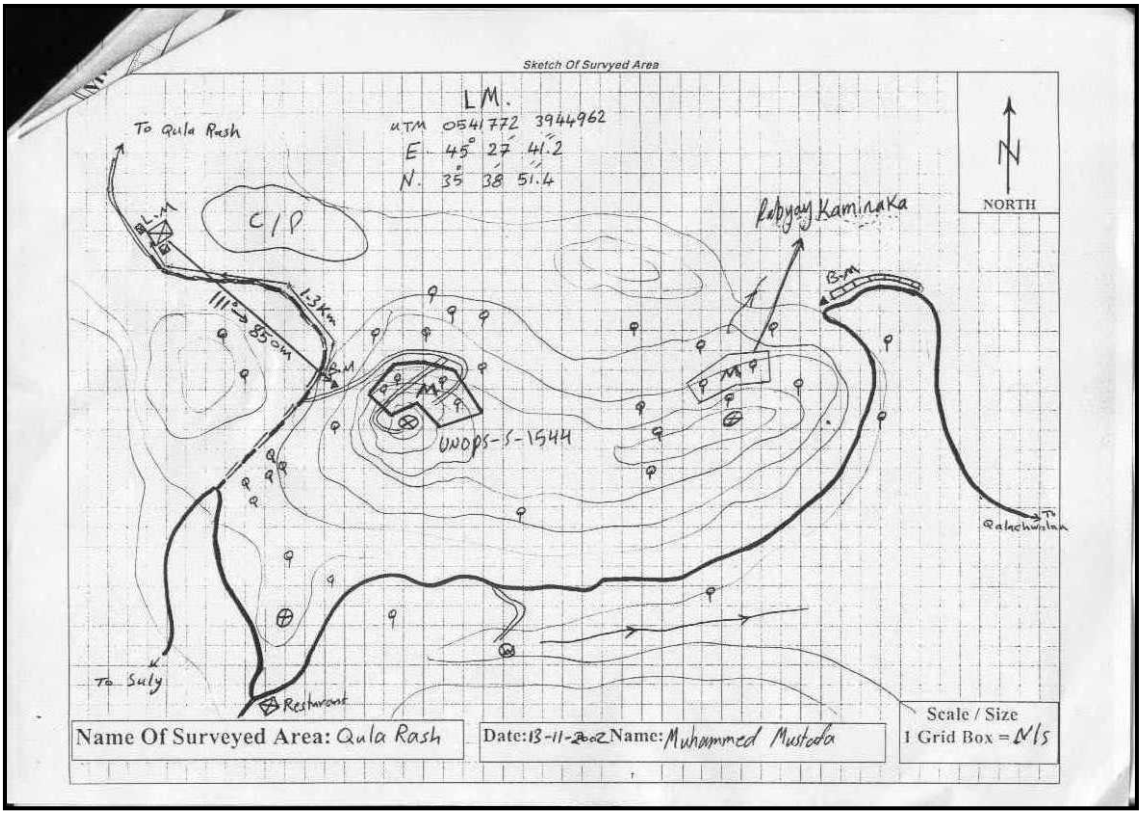
DATA PROCESSING AND DATA CHECKS

Once the interview process was completed, the Data Collectors rechecked the entered information and proceeded to the visual verification. Upon completion of the visual verification, and the team returned to the FOB, the Data Collectors once again rechecked all collected information, including the community map and the sketch of the SHA. Next, a daily mission report was prepared by the team with observations made during the community interview and the visual verification, which did not fit into the questionnaire.

After that the Data Collectors would turn over the collected information to the Field Editors. The Field Editors rechecked the file and addressed any inconsistencies or missing data, where necessary rechecking was carried out with the Data Collectors or the community leadership itself. Field Editors translated the data from Arabic or Kurdish (in which the questionnaire was filled out) into English. This translation-coding sheet enabled data quality checking and the fast, efficient entry of data into the English-language IMSMA. The experience of the Data Collectors, their observations and ideas regarding the communities and their problems were also summarized and entered as text into the questionnaire. The impact scoring system is further explained in a separate section of this report.

Once edited, the data was entered by the Data Entry Specialists into IMSMA and output was produced for further checking. If during the data entry some inconsistencies were found by the Data Entry Specialist, the community file would go back to Data Collectors and Field Editors. The final IMSMA output was once again checked by Data Collectors, Field Editors, the Data Entry Specialist and the Survey Group Team Leader.

A backup file was created in IMSMA after entering every single community into the system. Data Entry and verification was completed at the FOB, before the relocation of the survey team. Upon completion of data collection, editing, entry and verification in one governorate, all of the information on this particular region would be available for transfer to the NMAA or other HMA implementers.



SHA Sketch Map created by Survey Group North Data Collectors and villagers of Qula Rash, northern Iraq.

SEARCH FOR FALSE NEGATIVES

As already described in this report, due to the lack of accurate gazetteers or other, relevant administrative information concerning communities in Iraq, the Iraq Landmine Impact Survey took a "full census" approach. This entailed visiting every community in each Iraqi governorate, initially to determine which communities were experiencing some form of problem with contamination. This approach obviated the need for sampling for False Negatives in the Iraq Landmine Impact Survey process.

TOTAL VISIT AND SURVEY EFFORT

The extensive coverage of the Iraq Landmine Impact Survey, and the reasons for the unusually comprehensive scope of community visitation and documentation have already been discussed in detail throughout this report. However, it is worth reviewing the total survey effort throughout the survey process:

Table 89:Total Survey Effort, Republic of Iraq

Region	Governorates Surveyed	Communities Visited	Communities Found Affected and Surveyed
North	Duhok Erbil Sulaymaniyah	4,291	1,126
Kirkuk	Tameem (Kirkuk)	735	43
South-Center	Babylon Kerbala Najaf Qadissiya Wassit	3,795	118
South	Basrah Missan Thi-Qar Muthanna	3,189	335
Total		**12,010**	**1,622**

USE OF EXTERNAL DATA

The Iraq Landmine Impact Survey management team expended considerable time and energy obtaining and considering external socioeconomic data suitable for purposes that would improve the value of strategic planning. In seeking to ensure complete survey coverage, the Landmine Impact Survey team examined the results of other, previous surveys such as the EMAS conducted in 2003 and rapid humanitarian assessments implemented by the United Nations in 2003-4 and before.

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