

# Socio-Economic Impacts of Landmines in Southern Kurdistan



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in Southern Kurdistan

By

Almas Heshmati and Nabaz T. Khayyat

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P U B L I S H I N G

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To the Victims of Landmines and Unexploded Ordnances  
in Southern Kurdistan.

To our beloved:

Emma-Shirin, Sara-Shilan and Lisa-Sharmin Heshmati,  
and Awaz, Hamma, Naz and Baz Khayyat.



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## LIST OF ABBREVIATIONS

ADO	Aras Demining Organization
AP	Anti-personnel mines
AT	Anti-tank mines
AV	Anti-vehicle mines
BIC	Bayesian Information Criterion
CBMRE	Community Based Mine Risk Education
CMA	Cranfield Mine Action
DMA	Directorate of Mine Action
ENRP	Electrical Network Rehabilitation Project
EOD	Landmines and Unexploded Ordnance Disposal
ERW	Explosive Remnants of War
EU	European Union
GDMA	General Directorate for Mine Action
GDSV	Governorate, District, Sub District, and Villages
GIC	Geneva International Centre for Humanitarian Demining
GICHD	Geneva International Center for Humanitarian Demining
GIS	Geographic Information System
GOI	Government of Iraq
HI	Handicap International
HMA	Humanitarian Mine Action
HO	Head Office
ICBL	International Campaign to Ban Landmines
ICRC	international Committee of Red Cross
IDP	Internally Displaced Person
IKMAA	Iraqi Kurdistan Mine Action Authority
IKMAC	Iraqi Kurdistan Mine Action Centre
ILIS	Iraq's Landmine Impact Survey
IMAS	International Mine Action Standards
iMMAP	Information Management Mine Action Programs
IMSMA	Information Management System for Mine Action
KDP	Kurdistan Democratic Party
KRG	Kurdistan Regional Government
LIS	Landmine Impact Survey
MCO	Mine Coordination Office
ME	Ministry of Environment

MA	Mine Awareness
MAG	Mines Advisory Group
MAG-DB	Mine Advisory Group Database
MAIS	Mine Action Information System
MAP	Mine Action Programme
MCT	Manual Clearance Teams
MDD	Mine Detection Dogs
MENA	Middle East and North Africa
MoPDC	Ministry of Planning and Direct Cooperation
MRE	Mine Risk Education
MVA	Mine Victim Assistance
NGO	Non-Governmental Organization
NMAA	National Mine Action Authority
NPA	Norwegian People's Aid
NSAG	Non-State Armed Group
OASIS	Operational Activity Security Information System
OCHA	Office for the Coordination of Humanitarian Affairs
OIP	UN Office of the Iraq Program (OIP)
OPS	Operations
PCIA	Post clearance impact assessment
PDO	Pirmam Demining Organization
PIA	Post Impact Assessment
PLANS-DB	Plans database
PUK	Kurdistan Patriotic Union
QA	Quality Assurance
QAM	Quality Assurance Monitor
QC	Quality Control
RMAC	Regional Mine Action Centers
SL1	Survey Level One
STATA	Statistical Software package
SUMMIT	Spatial Management Information Tool
SWG	Survey Working Group
TDO	Tiroj Demining Organization
TNT	Trinitrotoluene
TV	Television
UN	United Nations
UNAMI	UN Assistance Mission for Iraq
UNDP	United National Development Program
UNHCR	UN High Commissioner for Refugees
UNICEF	United Nation Children's Fund
UNIDR	United Nations Institute for Disarmament Research

UNMAS	UN mine coordination offices
UNOIP	United Nations Office of the Iraq Program
UNOPS	UN Office for Project Services
UNOPS-MAP	United Nations Office for Project Services Mine Action Program
UNOPS-MAIS	UNOPS Mine Action Information System
USA	United States of America
UXO	Unexploded ordnance
VA	Victim Assistance
VIF	Variance Inflation Factors
VVAF	Vietnam Veterans of America Foundation
WHO	World Health Organization

## PREFACE

The first use of landmines was in the middle of the eighteenth century, initially in the form of anti-tanks to subdue this new invention. In order to prevent cleaning the fields of anti-tanks, anti-personnel mines were developed and sown throughout anti-tank minefields to deter enemy soldiers from entering. Landmines are usually very simple devices in terms of technology and readily manufactured anywhere. Although mines were made mainly from metal, plastic and ceramic, wooden landmines were also designed to make their detection difficult. The unique characteristic of a mine is in its time-delayed explosive function, allowing it to remain inactive until hit by a victim. This unique and inexpensive property has led mines to be used intensively during conflicts to block enemies and opposition forces from accessing large pieces of land. Landmines are victim-activated and indiscriminate in their targets and impact—whoever triggers a mine, whether an animal, a child, a farmer, or a soldier, becomes its victim.

Worldwide landmine contamination is considered a serious and hazardous issue to humankind. There is an estimated 100 million anti-personnel mines underground and another 100 million stockpiled around the globe. Evidence shows that if the use of mines were to be stopped immediately, it would take another one hundred years and an enormous cost to clear the existing landmines in use. The existence of mines is considered a vital socio-economic and environmental problem facing many countries exposed to their use. Despite significant action, landmines still cause displacement, significant threats and barriers to economic and social development in many parts of the world, and severe poverty and underdevelopment to the affected regions. The additional significant medical, psychosocial, political and economic impacts of landmines are many. Mines prevent the return of normal and productive life to rural areas and maintain economic, social and political pressures on urban life.

Landmines have strong negative effects on the process of societies' reintegration following a situation of political instability. The Kurdistan region, for example, was subject to those phenomena due to continuous conflict and wars, with the civilians forced into dangerous mined areas in order to access basic resources to satisfy their daily lives. Injuries caused by mines affect the life of survivors and their families as well as the

medical infrastructure of the mine-affected community. The concept of human rights covers mostly the political, civil and economic aspects while the concept of human security focuses on the viewpoints of individuals to protect them from threats to their lives, livelihoods and dignity and to utilize their full potentials. The economic impact of landmines can be seen as one of the determinant factors of economic security as it prevents people in the affected areas from working, and victims with disabilities face difficulties in finding employment and remain dependent.

Several security aspects are vital for humanity. For example, food security ensures that individuals have access to physical and basic economic foodstuffs. Health security ensures a minimum level of providing basic health services and protection. Environmental security aims to protect people from the threats of nature. Personal security aims to protect people from physical violence and crime. Community security aims at protecting people from loss of traditional values and relations of violence. In general, threats and injuries from landmines drastically impact the wellbeing of individual and societies.

The Kurdistan region of Iraq is fatally contaminated by mines and unexploded ordnances (UXOs) due to different armed conflicts in different time periods. Landmines and UXOs have caused more than 12,800 victims in the region since the early 1970s, of which more than 10,500 were killed. Landmines constitute a substantial barrier to rehabilitation and development activities in the region. The impacts of landmine contamination and related accidents can be categorized in terms of its socio-economic effects in three categories: impact on human life, blockage of access to necessary resources and the distortion of human attitude for various reasons. The outcome of mine action in Kurdistan can be improved by using more resources, better techniques and taking advantage of experience locally and internationally. Mine action refers to activities aimed at reducing the social, economic and environmental impacts of landmines. The objective is to reduce the landmine risk to the extent that people can live safely, free from constraints.

Resources refer to the mine action organizations, capacity, responsibility and resource availability. After political agreement on the federal system of Iraq, the responsibility of mine action was transferred from international organizations and local agencies to the central mine action agency. From the Kurds perspective, the transfer of responsibility to a central mine action agency to plan and implement demining is a major step backwards. This is evidence of a lack of awareness of the regional government to the mine issue. This action is not appropriate considering the Iraqi government's crime against the Kurds, including mass destruction and systematic

minelaying in the Kurdistan region. The collected information might be misused by the Iraqi army and security forces in future conflicts. The regional government should actively promote local capacity and force the central government to allocate a special budget to clean up their remains and to rehabilitate the victims of their crime.

Two important principles of the international humanitarian law related to the use of certain conventional weapons like landmines are military necessity and the proportionality and adaptation of the use of such weapons. The above principles refer only to the use of landmines but not to production and supply. It is clear that the international humanitarian laws are not effective or sufficient. In order to curb these violations, there must be a specific mechanism to investigate them. Considering the Kurdistan region, we suggest that an institute is to be established to conduct research on landmines and to analyze collected and statistical data. Such an institute may have a major role in coordinating research related to different aspects of landmines such as information, prevention, training, disability, rehabilitation and the labour market. In addition, it makes it possible to gather evidences on the crimes committed to support the regional government in its efforts to follow up the landmine issue for matters of prevention, reduction of impacts, victim compensation and bringing the landmine producers, distributors and users to justice. We hope this book helps to bring positive changes to the landmine situation and conditions of the Kurdish people.

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Almas Heshmati (Korea University and Soran University)  
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Nabaz T. Khayyat was born in 1971 in Erbil, received a BSc in Mathematics (1993) from the University of Salahaddin Erbil, a High Diploma (1994) in Artificial Intelligence and Database Design from the University of Technology, Baghdad, and an MSc. in IT Engineering (2010) from the Seoul National University in South Korea. He worked for the UN for five years and different international organizations, and recently held a position with KRG as an Information Management Advisor in the Ministry of Agriculture and Water Resources. Currently he is studying for a Ph.D. in engineering at the Seoul National University in South Korea, and also studies for a Ph.D. in Economics at the Swiss Management University in Switzerland. His research is mainly on the adoption of mobile telephony, consumer service satisfaction, science and technology parks, technological capability, the effects of ICT on costs, water resources, Energy consumption, and landmine fatalities.

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# CHAPTER ONE

## INTRODUCTION: BACKGROUND AND HISTORY OF LANDMINES

Landmines were first used during the American Civil War in the nineteenth century and were referred to as "Land Torpedoes." However, mines as they are known today were originally developed during World War I. Following the introduction of tanks to break the impasse of trench warfare, anti-tank mines were developed as an outcome of this new invention. Given the size of anti-tank mines, it was relatively easy for the enemy troops to enter minefields and remove the mines for their own use. This led to the emergence of the anti-personnel mine, a much smaller, delayed-action explosive device that was sown throughout anti-tank minefields to deter enemy soldiers from entering. It was first used to protect the more valuable anti-tank mines, but the anti-personnel mine has taken on a life of its own.

The landmine first became a prevalent weapon on the battlefield during World War II, during which it was estimated that around three hundred million anti-tank mines filled with trinitrotoluene (TNT) were deployed. One of the most effective anti-personnel landmines during this time was the German-made "bouncing betty" which was designed to jump from the ground to hip-height when activated and to propel hundreds of steel fragments within a wide range.

It should be noted that the main characteristic of a mine unlike other systems is its time explosive delay function. Mines are not been designed for immediate effect, and can stay inactive almost for an unlimited time, until triggered. This unique and inexpensive property therefore meant that mines were used intensively during the wars between nations and internal conflicts as offensive weapons to block access of the opposition forces to large piece of land.

During the time between the two World Wars, mines became easier to access and their design was modified. The Chinese and other nations manufactured mines at lower costs. Although they were made mainly from

metal, plastic, ceramic and wooden landmines were also designed to be harder to detect.

## **1. Mines and Minefields**

Mines can be defined as munitions to be placed under, on or near the ground or other surface area, and to be exploded by the presence, proximity or contact of a person or a vehicle. Landmines are usually very simple devices in terms of technology and readily manufactured anywhere. They are victim-activated and indiscriminate in their targets and impacts. Mines emplaced during a conflict against enemy forces may kill or injure civilians many decades later. There are two basic types of mines (King 1996): anti vehicle or anti-tank (AT) mines and anti-personnel (AP) mines. AT mines are munitions designed to explode from the presence, proximity, or contact of a vehicle as opposed to a person. They are comparatively large (consisting of 0.8 to 4.0 kg of explosive), often laid in unsealed roads or potholes, and detonate when a vehicle drives over them. They are typically activated by force (more than 100 kg weight), magnetic influence, or remote control. AP mines are munitions designed to explode from the presence, proximity, or contact of a person. AP mines are much smaller (80 to 250 g of explosive) and are usually activated by much lower force (only 3.0 to 7.0 kg weight) or tripwires.<sup>1</sup>

## **2. Impacts of Landmines**

Worldwide landmine contamination problems can be considered a serious and hazardous issue for humankind. There is an estimation of one hundred million anti-personnel mines in the ground, and another one hundred million stockpiled around the world in spite of efforts made by various projects of the United Nations,<sup>2</sup> where more than forty-one million stockpiled anti-personnel mines have been destroyed, and their production, sale and transfer have been stopped.<sup>3</sup> Moreover, according to United Nations reports, if the use of mines were to be stopped immediately, it would take another one hundred years and the cost of more than \$33 billion dollars to clear the existing landmines in use (ICRC 1997). The estimated cost measured in today's quantity in ground and price is actually much higher than those given above.

The existence of mines is considered a vital socio-economic and environmental problem facing many countries exposed to their use. Landmines and unexploded ordnance disposal (EOD) are considered significant threats and barriers to economic and social development in

many parts of the world that face or engage in internal and external conflicts.

Prevention of access to the land for agriculture use, transportation, and water blockages have caused the displacement of people in many countries. Mines also cause the lack or low level of basic development infrastructure in those affected places. Beside the socio-economic impact, mines cause land and soil degradation, loss of biodiversity, and limits agriculture productivity (Berhe 2007). Solution to these problems and reduction of their impacts and consequences are the main purpose of the Mine Action activities.

Landmines pose a great risk of death and injury to civilians and wilds. The affected lands become virtually unusable for agriculture, transportation and socio-economic development. Landmines cause severe poverty and underdevelopment as landmines will, in general, block access to and limit most socio-economic activities in rural areas.

The effects of landmines on our lives are massive. They impede the ability of communities to recover fully from conflicts after the end of wars and conflicts. Beside the direct effects on life, landmines impose a heavy economic burden on these communities. For example, it costs an average of \$600 to remove one mine, and around \$1,500 to provide an artificial limb to survivors from mine accidents.

Other significant medical, psychosocial, political and economic impacts of landmines are many. For example, mines typically maim or kill the most productive members of a community's workforce, and prevent refugees and internally displaced persons from returning to their homes after the cessation of conflicts. As such, mines prevent a return of normal and productive life to rural areas and maintain economic, social and political pressures on urban life.

The effects of anti-personnel landmines disproportionately affect the poor and undeveloped countries. Poor rural inhabitants are often trying to grow crops on lands that are known or suspected to be landmine affected. They are forced to clear these lands from mines by themselves despite the lack of training skills and necessary equipment for that. They also lack from medical services such as first aid, prostheses if they become victims of those landmines.

### **3. Mine Action**

The term "mine action" is used to describe:

... all activities geared towards addressing the problems faced by populations as a result of landmine contamination. It is not so much about

mines as it is about people and their interactions with a mine-infected environment. Its aim is not merely technical (to survey, mark and eradicate landmines) but humanitarian and developmental. The objective is to recreate an environment in which people can live safely, in which economic, social and health development can occur free from the constraints imposed by landmine contamination, and in which the victims' needs are addressed.<sup>4</sup>

The mine action process involves those functions and activities that focus on preventing the future use of landmines, reducing the risk of injury from existing mines and other ERW (Explosive Remnants of War) and assisting individuals' who have already been injured by mines and ERW. The prevention of the future use of landmines is carried out through advocacy to stigmatizing the use of landmines, spearheaded through the international campaign to ban landmines and through the process of mine stockpile destruction. Reducing the risk of injury for people in communities already contaminated with landmines and unexploded ordnance (UXO) is conducted through mine risk education (MRE) and demining programs which includes survey, mapping, marking, fencing and clearing. Victim assistance is the provision of assistance for survivors of landmine incidents, and includes rehabilitation and reintegration into their communities.

A significant part of this book will be devoted to Mine Action, a process concerned with "... reducing the social, economic and environmental impacts of mines and UXO with the intention of fostering subsequent human development" (Harrisonburg 2002). The action can be undertaken by national, international or non-governmental organizations. Severity of the situation determines the composition and cooperation among the organizations and the extent of their activities.

It should be noted that mine action is not only about demining operations. It is a comprehensive operation with multidimensional aspects with emphasis on people and societies and how they are affected by landmine contamination and its impacts. The objective of mine action is to reduce the risk from landmines to a level where people can live safely and in which economic, social and health development can occur free from the constraints imposed by landmine contamination, and in which the victims' needs can be addressed adequately.

### **3.1 Mine Action Activities**

The mine action process comprises five complementary groups of activities: mine risk education; humanitarian demining or mine and UXO

disposal surveys; mapping, marking and clearing activities and victim assistance which include rehabilitation and reintegration; stockpile destruction, and; advocacy against the use of anti-personnel mines. A number of other enabling activities are required to support the successful implementation of the process: assessment and planning; mobilization and prioritization of resources; information management; human skills development and management of training programs, and; quality management and the application of effective, appropriate and safe equipment used in mine action.<sup>5</sup>

Regardless of the context in which mine action takes place, it is rarely a standalone activity. Mine action is normally one of many activities required to take place in a post conflict environment. However, it is often the foundation for subsequent humanitarian and developmental initiatives. As such, it must also be an integral component of strategies designed to rehabilitate health care, education, infrastructure, agriculture and other systems required by societies in recovery from violent conflicts. Mine action managers need to ensure that there is dialogue with different mine action participants from the wider humanitarian and development sectors as early as possible. This will ensure that the mine action program is properly focused on addressing the humanitarian and development challenges posed by mines and UXO.

Moreover, there are two types of demining activities: military and humanitarian. Military demining is the process undertaken by armies to clear a safe pathway to ease the soldiers' movement during conflicts, only clearing the land required for the troop's movement. Although the military lay the mines, humanitarian organizations with limited resources undertake the cleaning.

On the other hand, humanitarian demining aims to clear land for the sake of civilians in order to return to their lands and to perform their daily life activities without the threat of landmines and ERW. Once the land is cleared, a verification process should be undertaken in order to confirm the clearance of the land. Thus, the aim of humanitarian demining is to restore peace and security at the community level. In addition, humanitarian demining requires that the entire land area be free of mines. According to the UN mine clearance standard, a rate of 99.6% from the contaminated area should be cleared for humanitarian demining. It implies that for every one thousand mines removed from the ground, a maximum of four are missed which remain a threat to the civil population.

Humanitarian mine action operations face many complications on the ground. These include but are not limited to the following:

- Mines and UXO laid for many years may be decomposed, waterlogged, saturated with mud or dirt and can behave quite unpredictably. This will make it rather difficult to handle through normal demining processes.
- Stakes that carried fragmentation mines may have fallen over.
- Trip wires may be caught up in overgrown bushes, grass or roots.
- Wind gusts may sway bushes enough to pull a trip wire and detonate a nearby mine.
- Mines can be buried in deep ground to avoid discovery by metal detectors. Hitting a mine may simply dislodge dirt which allows mines to detonate the next time a person steps on it. Similarly, deeper mines may not detonate when the ground is hard, but rain may soften the ground to the point where even a child's footstep will set them off.

### **3.2 Humanitarian Demining Methods**

The humanitarian mine clearance applies different methods to perform clearance on contaminated land area such as the following:

- **Manual Demining:** this method is using skilled and trained demining personnel to use metal detectors tools and thin prodders to find and detect mines in the ground. The detected mines are then collected and destroyed by controlled explosion.
- **Mine Detection Dogs (MDD):** this method uses trained dogs to detect the presence of mines and ERW in the ground by smelling the ordinance. MDD can detect mines and ERW with low metal and no metal content and mines and ERW in areas with high metal contamination or background such as on railway lines.
- **Mechanical Clearance:** this method applies specific machines such as flail, rollers, vegetation cutters and excavators attached to armoured bulldozers as the primary clearance method to remove and/or destroy mines and ERW from a given area to the quality of clearance laid down by the International Mine Action Standards (IMAS). These machines can only be used in certain terrains, and are expensive to operate. In most situations they are also not 100% reliable, and the work needs to be checked and reconfirmed by other techniques.

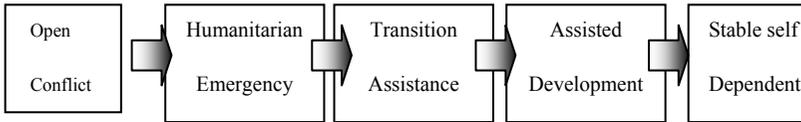
## **4. The Context in Which Mine Action Takes Place**

The threat from landmines and other explosive remnants of war exists as a result of conflicts between or within countries. Landmines are first and foremost a humanitarian concern, and as such must be addressed from this perspective. They are also an impediment to the rehabilitation and sustainable development of societies. The nature of a conflict and the circumstances which exist in its aftermath will depend on many factors, and the form and extent of the required humanitarian and developmental assistance will vary accordingly.

There are considerable international debates on the forms, extents and phases of humanitarian and development activities in the post conflict activities, and there is considerable overlap between the various aspects of a country's recovery. These aspects include peace building, repatriation of refugees, rehabilitations of communities, reconstruction and development. For planning purposes, five general stages can be identified between the extremes of open conflict and stable self-dependency (see Fig. 1.1 below). Indeed, it is possible for more than one of these aspects to coexist within the same geographic area at a given time. Under such circumstances, local conditions may enable one part of a country to progress rapidly to assisted development or stable self-dependency, while open conflict may continue elsewhere in preventing the progress.

During open conflicts, landmines and other explosive remnants of war may significantly constrain the freedom of movement of any peacekeeping forces and/or humanitarian personnel and restrict their activities. MRE can be conducted to raise awareness of the danger and to promote safe behaviour in affected areas which is particularly important for refugees and internally displaced persons (IDPs) on the move. Small-scale mine clearance activity may also be conducted where there is an immediate threat of injury or loss of life during peacekeeping operations or in support of humanitarian aid work. However, this will be localized and of expedient character. The provision of assistance to those injured by mines will probably be needed. It may be possible at such an early stage to conduct data collection in areas that are known to contain mines and UXO. The data collection and gained information will play a crucial role concerning preparation for planning and subsequent more wide ranging mine action activities when conditions are permitted.

Fig. 1.1. General stages of post conflict humanitarian and development activities



It is quite common that in the immediate aftermath of a conflict, often categorized as the humanitarian emergency phase, an effective governing authority may be absent and the conditions for stable and long lasting peace are therefore unlikely to be presented. The collapse of public and private organizations and subsequent ongoing civil unrest, a destroyed infrastructure, large numbers of displaced persons, deprivation and human suffering will attract international interests and the call for an urgent humanitarian response. Initially, mine action will focus on supporting emergency humanitarian and peacekeeping activities, rather than building indigenous capacity, although it may be helpful that in planning the former, the longer-term needs are to be taken into consideration. Although there may be much confusion and uncertainty at this early stage, it is vital that all forms of mine action activities are coordinated at the earliest opportunity. The scale and impact of the mine threat will become more apparent at this stage with an increasing demand for appropriate, effective and timely victim assistance together with a growing needs for mine risk education (in particular for displaced persons as they return to their homes in greater numbers). Therefore, survey and mapping of hazardous areas will be conducted and some areas may need to be marked and fenced.

A crucial period of transition exists between the humanitarian emergency and assisted development phases, during which the emphasis will shift from urgent humanitarian assistance to longer-term reconstruction and development activities. Projects may include the building of basic accommodation to shelter people, medical care and schooling and the rehabilitation of existing infrastructure. External assistance will still be needed for urgent reconstruction activities. However, during the transition phase emphasis will be placed on building an indigenous capacity to manage different needs that might be location specific. It is expected that the end of this period will be marked by the emergence of a recognized governing body demonstrating effective and democratic governance, and structures will be in place to provide sustainable funding for longer-term development programs. The mine action normally focuses on the development of an indigenous mine action authority, the collation and transfer of information and its management from various Non-Governmental Organizations (NGOs) and UN