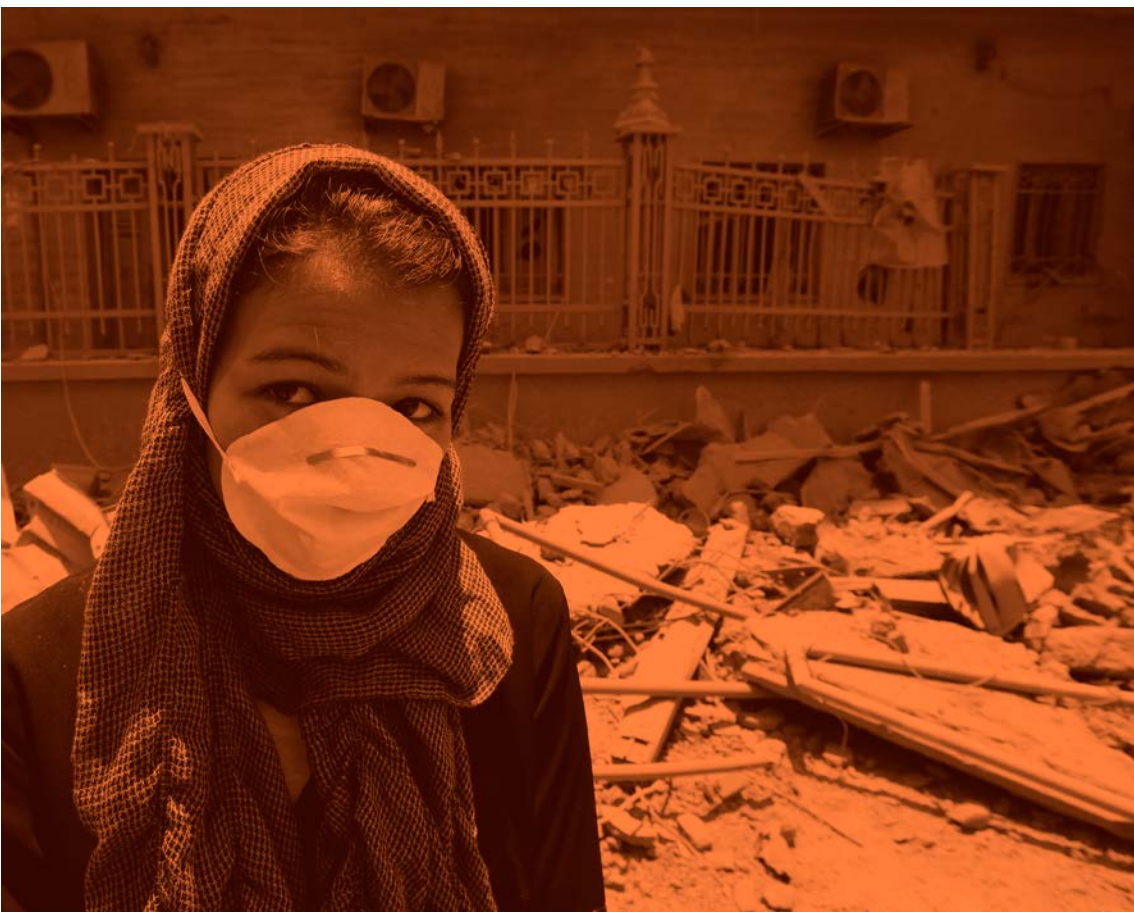




# **POLLUTION POLITICS: POWER, ACCOUNTABILITY AND TOXIC REMNANTS OF WAR**





**POLLUTION POLITICS:  
POWER, ACCOUNTABILITY  
AND TOXIC REMNANTS OF WAR**

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### **ABOUT**

There is growing acceptance that certain military materials and practices can cause environmental damage with the potential to affect civilian health and interfere with post-conflict recovery. While the impact of explosive remnants of war is comparatively well documented, and increasingly well managed, less attention has been focused on toxic materials released during military activities. The Toxic Remnants of War Project was launched to consider, and quantify, the detrimental impact of these materials and activities on the environment and human health. As part of this process, the project is also reviewing gaps in existing state obligations for reducing the humanitarian and environmental harm from military-origin toxics, and examining parallel systems of protection based on environmental and human rights law and peacetime regulatory frameworks. Our website and reports are intended as a resource for policy makers, civil society and members of the public concerned with reducing the impact of conflict on communities and the environment. The project was launched in 2012 by the International Coalition to Ban Uranium Weapons (ICBUW) and PAX and is financed by the Royal Norwegian Ministry of Foreign Affairs.

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### **COVER PICTURE**

A Libyan woman covers her face as she walks past Wenzrik hotel which, according to the owner of the hotel, was damaged by coalition air strikes, in Tripoli. Credit: Ahmed Jadallah/Reuters. Date: 16.06.2011

### **DESIGN**

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### **PDF DOWNLOAD**

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# ACRONYMS

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CBD	Congenital birth defects
CF	Coalition Forces
CPA	Coalition Provisional Authority
DoD	Department of Defence (US)
DU	Depleted uranium
EDC	Ethylene dichloride
ENMOD	Environmental Modification Techniques Convention
EPA	Environment Public Authority (Kuwait)
EPID	Environmental Protection and Improvement Directorate (Iraq)
EU	European Union
GOI	Government of Iraq
HRL	Human Rights Law
IAC	International armed conflict
ICRC	International Committee of the Red Cross
ICJ	International Court of Justice
ICTY	International Criminal Tribunal for the former Yugoslavia
IEL	International Environmental Law
IHL	International Humanitarian Law
ILC	International Law Commission
IOM	Institute of Medicine (US)
ITF	Iraq Trust Fund
JEAP	Joint Environmental Assessment Procedure
LOAC	Law of Armed Conflict
MEA	Multilateral Environmental Agreements
MoD	Ministry of Defence (Iraq)
MoE	Ministry of the Environment (Iraq)
MoH	Ministry of Health (Iraq)
MoST	Ministry of Science and Technology (Iraq)

NATO	North Atlantic Treaty Organisation
NGO	Non-governmental organisation
NIAC	Non-international Armed Conflict
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethylene
PCEA	Post-conflict environmental assessment
PMSC	Private military security contractors
RDX	Research department explosive
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RPC	Radiation Protection Center (Iraq)
SOFA	Status of Forces Agreements
TCDD	Tetrachlorodibenzodioxin
TCE	Trichloroethylene
TNT	Trinitrotoluene
TRW	Toxic remnants of war
UK	United Kingdom
UN	United Nations
UNCC	United Nations Compensation Commission
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNGA	United Nations General Assembly
UNHRC	United Nations Human Rights Council
UNSC	United Nations Security Council
US	United States of America
UXO	Unexploded Ordnance
VCM	Vinyl chloride monomer
WHO	World Health Organisation

# PREFACE

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Toxic remnants of war (TRW) represent a profound challenge for the protection of public health and the restoration of the environment in countries affected by conflict. Although a detailed analysis of the TRW-related determinants of health remains to be conducted, the specific impacts of toxic contaminants on local populations and their habitats are slowly being documented and further information has been obtained through interviews and observations. Research has demonstrated that hazardous toxic chemicals from military waste, such as heavy metals, fuel hydrocarbons, radioactive materials, unexploded ordnance waste, and endocrine disrupting compounds, may have long-term effects on civilian health and wellbeing. It is believed that TRW may likely be associated with the risk of birth defects, the risk of developing certain forms of cancer, or may adversely affect the neurological development of children and the reproductive processes of humans and animals. They may also impair the function of the respiratory and immune systems, thereby compromising the ability to respond to pathogens and other harmful organisms.

Across the world, the lack of accountability for the harm to the environment and public health caused by conflict and military activities undermines global efforts to help fragile countries recover from armed conflicts. Lack of accountability weakens the environmental and health rights of citizens; it damages peace-building and reconciliation initiatives; impedes the implementation of global health policies; leads to the loss of ecosystems and biodiversity; and weakens democracy, justice, human rights, and international security.

In recent years, academics, policy-makers, and experts have raised the question of the applicability of peacetime environmental law in times of armed conflict. In this context, this report is timely as it offers an assessment of conflict pollution, the current accountability mechanisms, and how to improve them. It creates a foundation for the development of new mechanisms that can properly evaluate the execution of military operations with respect to environmental and health considerations.

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I commend *'Pollution Politics: power, accountability and toxic remnants of war'* as an important contribution to debate over how states, UN agencies, NGOs, and other stakeholders can work together to reduce the devastating health and environmental burdens linked to armed conflicts. The proposed approach requires insights from military researchers, epidemiologists, public health practitioners, human rights activists, clinicians, environmentalists, and biologists, and uniquely combines networking and research from various disciplines relevant to military practices, public health policy, and environmental regulations. We hope that this publication will encourage the international community to collaboratively and efficiently solve this long-neglected problem.

Dr. Widad Akrawi  
*Global Health Expert and Peace Advocate*

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# 1.0 EXECUTIVE SUMMARY AND RECOMMENDATIONS

## INTRODUCTION

Humanity's dependency on the environment is unquestionable. Clean air, water and food are essential to survival, therefore civilian protection during and after armed conflict require the effective protection of the environment.

Yet this field remains underdeveloped:

*“Naturally, humanitarian organizations, non-governmental organizations and media tend to focus on and respond to these immediate consequences; for example, the killing of civilians, mistreatment of prisoners, rightly received widespread media attention... although the effects might not be as shocking and immediate, the release of toxic products during armed conflict has grave and long-term impacts on the enjoyment of human rights.”<sup>1</sup>*

Greater attention is needed on the impact of conflict on people and the environment, and on the legal system that would hold those responsible for damage to account. This report examines:

- ▶ military practices and conflict pollution,
- ▶ the relevance and applicability of current legal regimes,
- ▶ existing accountability mechanisms and the power dynamics between polluters and the polluted, and,
- ▶ impacts on affected states and the protection of civilians and the environment.

## WHAT ARE TOXIC REMNANTS OF WAR?

There is growing recognition by states, militaries and international organisations of the environmental impact of conflict and military practices. The term ‘toxic remnants of war’ (TRW) has been coined to facilitate greater scrutiny of the subject.

TRW can be defined as: ‘Any toxic or radiological substance resulting from military activities that forms a hazard to humans and ecosystems.’

In this report, TRW have been categorised as direct or indirect. Direct TRW are an immediate result of military activity. For example, pollution from targeting industrial infrastructure or toxic residue from munitions use.

Indirect TRW result from sequences of events or conditions connected to conflict or instability. For example, during the 2003 invasion of Iraq a number of industrial sites were damaged by conflict or simply abandoned. These derelict sites were left unsecured and were subsequently looted, exposing people to highly toxic substances.

## INTERNATIONAL LAW, ENVIRONMENTAL PROTECTION AND THE CONFLICT CYCLE

International Humanitarian Law's (IHL) current inability to prevent most wartime environmental damage is widely acknowledged.<sup>2</sup> Many scholars, together with the United Nations Environment Programme (UNEP), argue that IHL's provisions for environmental protection in conflict need clarifying and strengthening. The inapplicability of much IHL in respect to non-international conflict is an additional barrier, particularly given the prevalence of internal and transnational conflict.<sup>3</sup>

1. United Nations Special Rapporteur Okechukwu Ibeanu (2007:24)
2. Bothe et al. (2010), Hulme (2004), Das (2013), Austin and Bruch (2000)
3. ‘Transnational conflict’ describe situations in which “a non state armed group is engaged in

protracted armed violence with a state and is operating from across an international border” Rule of Law in Armed Conflict Project, Qualification of armed conflicts. [http://www.geneva-academy.ch/RULAC/qualification\\_of\\_armed\\_conflict.php](http://www.geneva-academy.ch/RULAC/qualification_of_armed_conflict.php)

A focus on the rights of individuals rather than the regulation of war means that Human Rights Law (HRL) could provide more robust protection for civilians and the environment. HRL can assist in clarifying obligations for clean-up and the assistance of TRW casualties. In addition, a human rights based approach would make no distinction between types of conflict.

International Environmental Law (IEL) provides norms and standards that militaries should be held accountable to throughout the conflict cycle. It was established in 2008 that armed conflict: “*does not necessarily terminate or suspend the operation of [environmental] treaties*”<sup>4</sup> between belligerents, or between belligerents and neutral parties. Analysis is ongoing on what the continued applicability of IEL during conflict means in practice.

An international mechanism is needed to ensure that principles enshrined within IHL, IEL and HRL can be upheld, and to ensure that civilians and the environment they depend on are better protected.

### **MILITARY PRACTICE AND TOXIC REMNANTS OF WAR** \_\_\_\_\_

Military practices are central to the generation of TRW before, during and after conflict.

While environmental awareness within the military is slowly increasing, mission success still takes precedence. Because environmental protection within international law is poorly defined and enforced, stronger regulation is needed to ensure military necessity does not trump environmental and humanitarian concerns.

Significant environmental mismanagement by the United States (US) army during the occupation stage of the Iraq War<sup>5</sup> (2003–2011) reveals that environmental damage is not restricted to harm deemed necessary by operational requirements. It is also the consequence of a systemically poor regard for environmental protection.

After conflict, mismanaged military waste poses a considerable threat to public health. Belligerent states are not currently obliged to assist the post-conflict clean-up of TRW, and assistance has only been provided when it has been considered strategically or diplomatically useful. The question of whether polluters should be held accountable for post-conflict toxic waste, and land remediation efforts under the Polluter Pays principle should be explored.

Some progress is being made in reducing military pollution in peacetime and in limiting the exposure of military personnel. However the impact of military toxics on civilians and the environment in conflict settings remains under-researched.

### **THE POLITICS OF ACCOUNTABILITY** \_\_\_\_\_

A weak legal system with few obligations and a lack of effective implementation leads to an ad hoc approach to resolving TRW. Ad hoc approaches enable politically powerful actors to gain the advantage in bilateral agreements, in the enforcement of international law and in avoiding liabilities. Less powerful actors have difficulty in gaining access to reparations.

There is a greater risk of severe military pollution where uneven power dynamics make it difficult to hold polluters to account. Strong national environmental legislation and governance can shift this dynamic. Weaker or fragile states typically have less capacity and fewer resources for decontamination, yet it is these states that are often burdened with TRW.

Much TRW contamination, particularly indirect TRW, does not breach IHL. Polluters are difficult to identify and environmental mismanagement can have a larger role to play in the likelihood of human exposure to TRW. Any mechanism designed to protect civilians and the environment must consider conflict-related pollution incidents that may not be deemed illegal, but nevertheless require assessment, accountability and assistance.

### **AFFECTED STATE CAPACITY** \_\_\_\_\_

There are no obligations to assist states affected by TRW in IHL, unless a state can be proven to have acted unlawfully. In most cases, affected states manage TRW with little support.

TRW can be technically challenging and expensive to resolve. Money and expertise are often lacking in post-conflict states. Infrastructure damage and political instability also impact the ability to manage TRW.

International assistance is needed to support capacity building work and to offer expertise when appropriate. The enormity of the task outweighs the assistance currently available. This is a gap in the humanitarian field that non-governmental organisations (NGOs) and international agencies could fill working alongside national agencies.

4. International Law Commission in UNEP (2009:46)

5. Mosher (2008)



There is an urgent need for funding to ensure that TRW are adequately managed. A fixed mechanism that utilises the Polluter Pays principle would help clarify obligations. Militaries must be transparent and forthcoming with the information needed for clearance work.

Much can be learnt from Kuwait's 'prepare the environment for war' initiative.<sup>6</sup> In preparation for the 2003 US led invasion of Iraq, Kuwait equipped institutions, bolstered infrastructure with international assistance, and prepared the public for a potential environmental crisis.

### **RECOGNITION AND ASSISTANCE OF TOXIC REMNANTS OF WAR CASUALTIES**

Conflict leads to a range of public health problems, which environmental pollution and degradation play a role in, and TRW often remain unresolved, leaving communities at risk. The international community and post-conflict peacebuilding organisations must recognise the long-term public health legacy of toxic warfare.

There is an urgent need to document harm, assess risk and monitor the health of vulnerable populations. The politicised nature of conflict pollution can prevent rapid assessment and risk prevention methods that could save lives.<sup>7</sup>

The 'presumptive disease' approach, used by the US government to recognise US veterans suffering from exposure to Agent Orange,<sup>8</sup> proves that there are means to create policy on casualty identification and assistance, even in the face of scientific uncertainty and data gaps. Presumptive disease models could be of use in recognising and assisting civilian casualties of TRW.

There is a need to develop obligations for recording TRW casualties. Without improved recording any assistance provided will be unfairly distributed. Governments should assess environmental impacts on human rights, make environmental information public, provide access to effective remedies and facilitate participation in environmental decision-making.

### **CONCLUSION**

Conflict pollution can devastate the well-being of people and the environment long after wars' end. Contaminated environments add to the vulnerability of already fragile post-conflict communities and states.

Alongside advocating for improvement to existing international law, this report argues that a strong enforcement mechanism is also essential. Without a mechanism to hold polluters to account there is little incentive for militaries to avoid environmentally destructive practices. The lack of an accountability mechanism has also meant that assistance for clean-up, compensation, or enforced reparations have been heavily influenced by powerful global actors. Less politically powerful states and communities should not have to bear the brunt of toxic wars.

Humanitarian agencies and NGOs must pay greater attention to TRW during peacebuilding operations. Capacity building work, hazard awareness, environmental monitoring, assessment and remediation of sites of harm, and health monitoring of at-risk populations must be conducted in the aftermath of conflict.

While the toxicity of weapons and other military materials is increasingly being considered, militaries need to go further. Fundamental human and environmental rights should be properly regarded in military decision making. States should be transparent with targeting information and in particular, record and make available data on the use of weapons in populated or environmentally sensitive areas.

TRW remediation is expensive. A mechanism that required polluters to financially assist the resolution of TRW would enable affected states some access to justice. Determining responsibility may still be difficult in many cases and assistance in managing TRW will be required from the international community.

There is a need to recognise TRW casualties as casualties of war. Scientific uncertainty will undoubtedly be used by powerful actors to abdicate responsibility. However the 'presumptive disease' approach could be utilised to ensure that those impacted by conflict pollution are assisted.

6. Kuwait Prepares Environment for War, Wikileaks reference: 03KUWAIT920, 3 Mar 2003. <http://wikileaks.org/cable/2003/03/03KUWAIT920.html>

7. The Huffington Post, Iraq: Politics and Science in Post Conflict Health Research, 15 Oct 2013. [http://www.huffingtonpost.co.uk/nee/mani/iraq-politics-and-science\\_b\\_4098231.html](http://www.huffingtonpost.co.uk/nee/mani/iraq-politics-and-science_b_4098231.html)

8. US Department of Veteran Affairs, Veterans' Diseases Associated with Agent Orange. <http://www.publichealth.va.gov/exposures/agentorange/conditions/index.asp>

## RECOMMENDATIONS

### 1 **Civilian protection requires environmental protection.**

Greater acknowledgement is needed of the critical links between environmental health and public health, between environmental degradation and human wellbeing and survival.

Environmental harm from conflict and military activities has direct humanitarian consequences, consequences that often last well beyond the end of hostilities. More recognition is required of this legacy as a first step towards improving systems of assistance, strengthening post-conflict public health monitoring and focusing help on the most vulnerable populations. Protection for the environment during and after conflict should no longer be viewed as distinct from the protection of civilians.

### 2 **Minimise and regulate polluting practices.**

It is clear that particular military practices, materials or tactics can have an unacceptable environmental impact, with consequences for human health and wellbeing. A lack of understanding as to this impact should not absolve parties from taking precautions or avoiding such practices. This applies as much to the targeting of industrial sites as it does to the dispersal of toxic munitions constituents or waste management practices.

Judgements over the acceptability of polluting military practices or materials should not rest solely with the military. Practices and materials that can generate toxic remnants of war that place civilians and the environment at risk should be open to greater independent scrutiny and, where necessary, regulation. Dealing with pollutants at source remains the most cost-effective technique for preventing harm.

### 3 **Environmental assessment is a prerequisite for accountability.**

This report has found that accountability for conflict pollution is often wholly absent. Comprehensive environmental assessment is a key first step in determining accountability but this will require the diversification of the number of actors capable of undertaking assessments.

UNEP's post-conflict environmental assessments provide a useful model but barriers remain for other actors, particularly in relation to designing and financing assessment work. International agencies, NGOs, the mine

action community and citizen observatories may be well placed to undertake work in collaboration with national authorities, and in doing so help develop domestic capacity.

Communities have a right to access to information that may impact the enjoyment of their fundamental human rights and this knowledge can contribute to improved health protection, environmental justice and ultimately to constraining the behaviour of polluters.

### 4 **A new mechanism for environmental and civilian protection is needed.**

Improving the collection of data on environmental harm and its humanitarian consequences will help improve conditions locally and target assistance to where it is most needed. Yet without an effective mechanism that defines the obligations on belligerent and affected states to protect and assist communities, which minimises and remedies environmental harm, and which can monitor and resolve infringements, the current inequitable system will continue.

Left unchallenged, the status quo will see citizens and consumers better protected than civilians during and after conflict; it will ensure that those responsible for environmental damage are not held to account; it will leave public health and environmental protection at the mercy of imbalanced power relationships and it will do nothing to reduce environmental damage in future conflicts.

International Humanitarian Law's provisions for the protection of the environment have been shown to be unfit for purpose. Yet principles enshrined in Environmental and Human Rights Law – and which are widely applied during peacetime – could and should, guide the development of a new international mechanism.

# 2.0 INTRODUCTION

The environment is the silent victim of conflict. Be it through highly visible incidents, such as the use of the herbicide Agent Orange in Viet Nam, Cambodia and Laos, or through more subtle or localised contamination, many military practices can release significant levels of toxic substances into the air, soil and water.

Human dependency on the environment is an unquestionable reality. Clean air, water and food are essential to our survival, therefore civilian protection during and after armed conflict requires the effective protection of the environment.

Yet, and as noted by UN Special Rapporteur Okechukwu Ibeanu in a report on armed conflict and toxic waste, this field remains underdeveloped:

*“Naturally, humanitarian organizations, non-governmental organizations and media tend to focus on and respond to these immediate consequences; for example, the killing of civilians, mistreatment of prisoners, rightly received widespread media attention... although the effects might not be as shocking and immediate, the release of toxic products during armed conflict has grave and long-term impacts on the enjoyment of human rights.”<sup>9</sup>*

There is a need for greater attention on the impact of conflict on people and the environment, and on the legal system that would hold those responsible for civilian protection to account. To further this aim, this report examines military practices and conflict pollution; the relevance and applicability of current legal regimes; existing accountability mechanisms (or the lack thereof) and the power dynamics between the polluters and the polluted, and what this means for affected states and the protection of civilians and the environment.

However, to begin with three central ideas that form the basis of this report will be explored:

- ▶ war is environmentally destructive
- ▶ environmental contamination is an issue of public health
- ▶ legal systems need strengthening

## 2.1 WAR IS ENVIRONMENTALLY DESTRUCTIVE

Whilst the environmentally destructive nature of war has a long history, the potential for the generation of pollution has increased over the last century. Conflict has moved from the battlefield into the areas where people live, work and play. The use of hazardous substances in military hardware, industry and building materials has grown. Population pressures and poverty force people to live closer to sources of potential harm.<sup>10</sup>

The environment suffers directly and indirectly from conflict. Direct impacts include the use of toxic substances in munitions, such as heavy metals, explosives, obscurants and defoliants, or the targeting of industrial sites. Indirect impacts are often generated by the breakdown of institutions and infrastructure during instability and conflict. To illustrate, in 2003 four sewage treatment plants were active in Baghdad, by 2009 none remained operational.<sup>11</sup> This turned sewage disposal into a significant post-conflict public health and environmental problem.

9. Ibeanu (2007:24)

10. One example is the stockpile explosion that occurred in March 2012 in Brazzaville, Congo. One of the factors that made this explosion so deadly was the proximity of residential areas to the site. Since the explosion, residents have moved back to the affected area, despite the potential risk posed by toxic munitions residues

in the soil and drinking water. UNDAC Environmental Emergency Assessment, Ammunitions Depot Explosions, Brazzaville, Congo, Mar 2012. [https://docs.unocha.org/sites/dms/Documents/Congo\\_UNDAC\\_Environment\\_Emerg\\_Assmt%20Final.pdf](https://docs.unocha.org/sites/dms/Documents/Congo_UNDAC_Environment_Emerg_Assmt%20Final.pdf)

11. Briggs and Weisbecker (2012)

Pollution can be caused by highly visible events, such as the infamous Iraqi oil-well fires and oil spills during the 1991 Gulf War. But less visible and more mundane issues also collectively contribute to pollution problems in post-conflict environments. As United Nations Environment Programme (UNEP) post-conflict environmental assessments (PCEA)<sup>12</sup> have shown, hazardous waste from battlefield debris, damaged or abandoned industrial sites left publicly accessible and demolition waste from urban bombing pose significant risks. These all have a range of implications for public and environmental health protection.

Whilst many environmental problems are long-term, actions taken in the hours and days immediately after an environmentally damaging event can make a significant difference to its long-term impact. Lessons can and should be learned from the rapid civil responses to environmental incidents in peacetime. Nevertheless, security problems and a lack of capacity often contribute towards transforming emergencies into long-term problems, which become increasingly difficult to resolve as time passes.

Military activities before and after conflict also have implications for the environment. As recent research into military toxics has shown,<sup>13</sup> contamination from heavy metals, fuels, lubricants, solvents and energetic materials such as RDX and TNT and propellants (such as perchlorate) have left high levels of contamination on military bases and ranges worldwide. Little is known about the levels of hazardous munitions residues created during conflict or the risks they may pose to human health and the environment.

When assessing conflict harm and assistance it is important to acknowledge issues of environmental justice. Political and financial power influence why pollution incidents happen, where they happen, and the remedy and assistance provided to those who are impacted. This can be seen in peacetime incidents such as the illegal dumping of toxic waste in low income countries.<sup>14</sup> A similar pattern can be seen when comparing the environmental condition of former US military bases in Panama,<sup>15</sup> South Korea<sup>16</sup> and Germany<sup>17</sup> (see section 6.2).

Economically deprived communities are often forced to live in close proximity to industry, experience the highest levels of industrial pollution, and may be most at risk of harm when sites are attacked during military operations. These communities often also have the least access to medical treatment, education and political voice. States that are less strategically important to world powers may receive less assistance, and while the rise in humanitarian-centred aid is altering this pattern,<sup>18</sup> this political dimension to harm and assistance must be acknowledged and challenged.

## 2.2 ENVIRONMENTAL CONTAMINATION IS AN ISSUE OF PUBLIC HEALTH

There is a long history of debate around public health and environmental hazards. Numerous substances used in civilian products have been regulated and banned from use due to concern over their impact on human health and ecosystems. However, this has been a fraught history given the difficulty of assigning causality, which is further complicated by the interests of powerful political-economic actors.<sup>19</sup>

The complexity of biological and ecological systems, and the multiple factors involved in the origin of health problems, means that cause–effect relationships are not always clear. For example, diet, exercise, stress, unhealthy habits such as smoking and drinking all affect our susceptibility to ill health. However, environmental factors such as exposure to asbestos, benzene or leaded petrol can also increase the chance of negative health impacts.

Within the sphere of conflict politics a similar pattern is emerging. Unlike explosive violence where cause–effect relationships are clear and the resulting health impacts easy to attribute, war induced environmental contamination is not as easily accepted as a contributor to ill health within civilian populations and military personnel. The varied nature of pollution and exposure poses a challenge to epidemiological research, research that is already difficult to undertake in post-conflict settings.<sup>20</sup>

Whilst there are complex processes at play “*the decisive question is whether the frequency of the undesirable event B will be influenced by a change in the environmental feature A*”.<sup>21</sup> Can the release of additional toxic substances into the environment in the knowledge that they may increase the risk of ill health be justified?

12. UNEP in Iraq (2007), UNEP Lebanon Report (2007), UNEP Gaza Report (2009), UNEP DU Bosnia and Herzegovina (2003), UNEP DU Kosovo (2001), UNEP DU Serbia and Montenegro (2002)

13. Warsta (2013)

14. UN News Centre, *Toxic waste sites in Côte d'Ivoire still not cleaned up, UN rights expert says*, 8 Aug 2008. [http://www.un.org/apps/news/story.asp?NewsID=27649&Cr=ivoire&Cr1=#.UvzSJ2\\_s9U](http://www.un.org/apps/news/story.asp?NewsID=27649&Cr=ivoire&Cr1=#.UvzSJ2_s9U)

15. Lindsey-Poland (2003)

16. Chae (2010)

17. Weiner (1992), BICC (1995)

18. The political nature of post-conflict demining work has been examined in the work of Matthew Bolton

‘Foreign aid and landmine clearance: governance, politics and security in Afghanistan, Bosnia and Sudan’ (2010). This work explores two approaches to demining work; ‘strategic-commercial complexes’ and ‘human security-civil society complexes’. The former shaped by the interests of powerful states prioritise military or strategic objective in demining work, the latter shaped by middle power states, multi-lateral agencies and NGOs prioritise humanitarian need.

19. Late lessons from early warnings: science, precaution, innovation, European Environment Agency Report No 1/2013. <http://www.eea.europa.eu/publications/late-lessons-2>

20. Toxic Remnants of War Project (2013)

21. Hill (1965:295)

In the case of benzene, asbestos, and leaded petrol, debates raged on between industry, policymakers, civil society and the scientific community for many years. With one side stating that there was a ‘need for proof’ and the other that ‘uncertainty should not equal inaction’. However, it was ultimately decided that the risks to public health were not justified. These substances are now either tightly regulated or have been phased out of use. A similar approach is needed for toxic substances used in conflict. The military should not be exempt from peacetime standards and norms.

In any debate on health risk, it is important to remember that vulnerable populations, such as fetuses, babies, young children, pregnant women and the elderly are particularly susceptible to pollutants. People who are genetically susceptible, or who have pre-existing conditions, for example asthmatics, may also suffer more than others as a result of toxic exposures. There is also a small amount of evidence of increased susceptibility to toxic exposures as a result of psychological stress,<sup>22</sup> a common factor in conflict zones.

Peacetime environmental regulation can provide guidance for an approach on conflict pollutants and the necessity for action in the face of uncertainty. As noted by David Gee of the European Environment Agency: “*The limitations of scientific knowledge imply moral courage in taking precautionary action in time to avert harm*”.<sup>23</sup>

Ill health as a result of conflict pollution has been recognised and compensated for in the case of US veterans exposed to Agent Orange in Viet Nam (see section 8.0). However this recognition by the US government has not included affected Vietnamese, Laotian or Cambodian people. More needs to be done to ensure that the casualties of war-induced toxic environments are recognised as casualties of war.

## 2.3 LEGAL SYSTEMS NEED STRENGTHENING

The need for improved environmental protection during armed conflict has been recognised by a number of international organisations.

In 2009, UNEP conducted an inventory and analysis of international law in respect to protection of the environment during times of armed conflict.<sup>24</sup> Their conclusions highlighted that, while a number of International Humanitarian Law (IHL) provisions directly and indirectly protect the environment during armed conflict, there is no effective implementation and enforcement. This is in part due to inadequacies within the provisions themselves that make them difficult, if not

impossible, to implement, as well as the lack of a mechanism or permanent body that monitors violations and addresses the issue of compensation.<sup>25</sup>

The 31st International Conference of the Red Cross and Red Crescent on strengthening legal protection for victims of armed conflict saw the inclusion of the ‘protection of the natural environment’ as one of its four chosen areas of concern. A report to the ICRC conference<sup>26</sup> shared UNEP’s view and proposed a new system to monitor infringements, new norms on international cooperation for restoring environmental damage and victim assistance. The report suggested that it could be based on rules created for dealing with the legacy of landmines and other explosive remnants of war.<sup>27</sup>

Other international bodies that are currently reviewing environmental protection during armed conflict are the International Law Commission (ILC)<sup>28</sup> and the United Nations Human Rights Council (UNHRC). In 2012 the UNHRC appointed Prof. John Knox<sup>29</sup> as an independent expert to investigate the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment.<sup>30</sup> This mandate includes human rights obligations during armed conflict.<sup>31</sup>

The ILC is at a similar review stage. At its 65<sup>th</sup> session in 2013 the commission decided to include ‘Protection of the environment in relation to armed conflicts’ in its programme of work and appointed Special Rapporteur, Dr. Marie G Jacobsson, to investigate the topic.<sup>32</sup>

22. Clougherty and Kubzansky (2009)

23. Gee (2013:655)

24. UNEP (2009)

25. UNEP (2009:53)

26. ICRC (2011)

27. ICRC (2011:15)

28. International Law Commission, *Protection of the environment in relation to armed conflicts*. [http://legal.un.org/ilc/summaries/8\\_7.htm](http://legal.un.org/ilc/summaries/8_7.htm)

29. The United Nations Office at Geneva, News and Media, *Council names independent expert on the environment and members of fact-finding mission on Israeli settlements*, 6 Jul 2012. [www.unog.ch/80256EDD006B9C2E/\(httpNewsByYear\\_en\)/AFB769AC2D976C4EC1257A33004CDA6D?OpenDocument](http://www.unog.ch/80256EDD006B9C2E/(httpNewsByYear_en)/AFB769AC2D976C4EC1257A33004CDA6D?OpenDocument)

30. Human Rights Council resolution 19/10, adopted on 22 Mar 2012. <http://environment.org/wp-content/uploads/2013/05/1910-PDF.pdf>

31. UNHRC 22nd Session Report of the Independent Expert on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, John H. Knox. 24 December 2012 A/HRC/22/43 <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G12/189/72/PDF/G1218972.pdf?OpenElement>

32. International Law Commission, 65th session (first part), *Provisional summary record of the 3171st meeting, 28 May 2013*. [http://legal.un.org/ilc/documentation/english/a\\_cn4\\_sr3171.pdf](http://legal.un.org/ilc/documentation/english/a_cn4_sr3171.pdf)

Alongside international recognition of the limitations of international law, states also recognise the shortcomings in the current system of state accountability for environmental harm. The following extract is taken from a study by a US government funded think tank:

*“...our findings generally suggest that the Army faces only limited legal restrictions... in the international legal arena, the thresholds for violating the law are high, and there is little ability for other states to enforce their laws against the United States, so even if the United States were accused of violations, it is unlikely that any international or national forum would be able to adjudicate and enforce the claim. Even where they are not legally binding, however, environmental laws establish an **aspirational standard** that the U.S. military may want to meet, for a **host of operational and diplomatic reasons**”.*<sup>33</sup>

As highlighted in this extract, the weak legal system means that environmental regulations are respected for operational and diplomatic reasons. If states are permitted to mediate their actions and provide assistance solely on an ad hoc basis, an inequitable approach to environmental protection will result. This means that states and communities that have less political influence and economic power are more likely to suffer the legacy of conflict-related pollution and have less access to environmental management expertise and health assistance.

There is an urgent need for improvements in international law and its enforcement to ensure that states work to a common standard that prioritises public and environmental health protection, as opposed to the current ‘ad hoc’ approach to the prevention, remediation and compensation of environmental pollution.

The inadequacy of the legal system in regard to holding states to account in international armed conflict (IAC) also raises serious concerns regarding the accountability of state and non-state actors<sup>34</sup> in non-international armed conflict (NIAC), and in hybrid or transnational conflicts.<sup>35</sup> The majority of IHL regulates IAC, far fewer provisions regulate NIAC.<sup>36</sup> Conflict is increasingly characterised by the involvement of non-state actors and is becoming transnational nature. This trend is challenging the distinction between NIAC and IAC, which poses difficulties for the application of IHL.<sup>37</sup> The changing nature of war and the ageing nature of IHL make environmental protection in armed conflict even more complex but no less necessary.

33. Mosher (2008:148) Emphasis added.
34. Non-state actors can include armed groups, multinational corporations and private military security contractors (PMSC) and non-governmental organisations (NGOs).
35. The term ‘transnational conflict’ can be defined as a situation in which “a non-state armed group is engaged in protracted armed violence with a state and is operating from across an international border” Rule of Law in Armed Conflict Project, *Qualification of armed conflicts*. [http://www.geneva-academy.ch/RULAC/qualification\\_of\\_armed\\_conflict.php](http://www.geneva-academy.ch/RULAC/qualification_of_armed_conflict.php)
36. Rule of Law in Armed Conflict Project, *Qualification of armed conflicts*. [http://www.geneva-academy.ch/RULAC/qualification\\_of\\_armed\\_conflict.php](http://www.geneva-academy.ch/RULAC/qualification_of_armed_conflict.php)
37. ICRC, *International Review of the Red Cross, 2009, No. 873 – Typology of armed conflicts*. <http://www.icrc.org/eng/resources/international-review/review-873-typology-conflicts/index.jsp>





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▲ Woman in front of discarded military scrap metal in Iraq. People living among this debris are at risk of exposure to toxic military waste.

Philip Reynaers / Greenpeace  
01.06.2003

## 3.0 WHAT ARE TOXIC REMNANTS OF WAR?

There is growing recognition by states, militaries and international organisations of the environmental impact of military materials and practices. This is in part due to a greater understanding of the risks posed by the toxic constituents of munitions, an awareness driven mainly by the increased civil environmental regulation of munitions manufacturing, testing and disposal. However munitions residues are just one of a range of pollutants generated by military activities, before, during and after conflict. The term 'toxic remnants of war' (TRW) has been coined in order to facilitate greater scrutiny of the toxic impact of warfare.

TRW can be defined as: *'Any toxic or radiological substance resulting from military activities that forms a hazard to humans and ecosystems.'*

In this report TRW have been categorised as either *direct* or *indirect*. See Tables 1 and 2 illustrating this categorisation.

▼ TABLE 1 – Direct toxic remnants of war

	WEAPONS RESEARCH, DEVELOPMENT AND MANUFACTURING	STOCKPILE MANAGEMENT AND DEMILITARISATION	MILITARY BASES
PEACETIME	<p><b>Salto di Quirra, Sardinia, Italy – weapons testing range</b> This facility has come under scrutiny due to reports of pollution resulting from the test firing and disposal of munitions, and a reported rise of cancers and birth defects in the local population.<sup>38</sup></p> <p><b>Colonie, New York, US – depleted uranium (DU) processing plant</b> This plant, active from 1958–84 processed DU rods for use in weapons. Negligent practices led to high levels of localised DU pollution, which continue to present a significant health risk to the public.<sup>39</sup></p>	<p><b>Brazzaville, Republic of the Congo – stockpile explosion March 2012</b> This incident killed 220 people, injured 2,300 and left unexploded ordnance (UXO) scattered across a densely populated area. Concern was raised over toxic munitions residues left from the explosion and a UN Disaster and Coordination Team were deployed to investigate. While the initial assessment did not find levels of pollution that presented an immediate risk to health, further research and monitoring once the UXO has been removed has been recommended.<sup>40</sup></p>	<p><b>US military bases in South Korea</b> The US has a number of military bases in South Korea. In 2007 23 of the 31 sites due to be returned to South Korean control were found to be contaminated. Toxic substances present included benzene, arsenic, trichloroethylene (TCE), tetrachloroethylene (PCE), lead, zinc, nickel, copper and cadmium.<sup>41</sup></p>
DURING CONFLICT	<p><b>Pancevo, Serbia – industrial site bombing</b> NATO airstrikes during the Kosovo conflict in 1999, caused the release of vast quantities of toxic industrial chemicals into the air, the Danube River and surrounding soil.<sup>42</sup></p> <p><b>Iraq – oil pipeline sabotage</b> During the Iraq War (2003–2011) a number of insurgent attacks were made on oil pipelines, causing localised environmental harm.</p> <p><b>Urban bombing</b> Targeting urban areas can lead to a risk of civilian exposure to toxic substances from weapons residues, harmful household chemicals, medical waste and building materials (e.g. asbestos) that contaminate demolition waste, and can put civilian health at risk.</p>	<p>The residue of munitions such as Agent Orange, DU, white phosphorous and common constituents such as TNT, RDX, lead and mercury can pose a hazard to human and ecosystem health through their use in conflict.<sup>43</sup></p>	<p><b>US bases in Iraq and Afghanistan – use of burn pits</b> Burn pits are widely used for the disposal of wastes at military bases, including US bases during the recent Iraq and Afghanistan conflicts. Reports have revealed that prohibited substances have been regularly burned including, plastics, creating harmful air pollution and placing army personnel and site workers at risk of ill health.<sup>44</sup></p>



POST-CONFLICT	MUNITIONS AND MATERIALS (INC.UXO) DISPOSAL	POST-CONFLICT WASTE MANAGEMENT
	<p><b>Astana, Afghanistan – abandoned military materials</b> An ex-Soviet helicopter base used during the 1980s was identified by Afghan organisations as a site of concern in 2005. An assessment by UNEP recorded a number of ageing surface to air missiles, toxic or hazardous liquid rocket propellants and warheads, some of which had degraded casings and were leaking harmful substances into the ground.<sup>45</sup></p> <p><b>Iraq – munitions disposal and UXO disposal</b> In 2005 it was estimated that between 60,000 and 1 million tonnes of ex-regime arms were stockpiled in Iraq. Ageing stockpiles pose an environmental risk through degraded casings leading to toxic substance leaks. Disposal methods usually involve controlled explosion or burning. While environmentally problematic, there is no safe and economically viable alternative. UNEP considered contamination of sites inevitable.<sup>47</sup></p>	<p><b>Gaza – demolition waste disposal</b> Operation Cast Lead (2008–9) in which Gaza was severely bombed by Israeli forces created a vast quantity of demolition waste. This waste was contaminated by hazardous materials, particularly asbestos. Fires resulting from bombing contaminated buildings and the resulting rubble with PAHs, dioxins and furans, all of which are hazardous. Clearance has been hampered by a lack of equipment such as high reach cranes and specialist hazardous waste disposal facilities.<sup>46</sup></p> <p><b>Iraq – military scrap metal disposal</b> The safe clearance of destroyed Iraqi tanks and military equipment has been a key issue since 2003. Many destroyed tanks resided in urban centres for months and years after the end of initial hostilities.<sup>48</sup> Some military scrap was found mixed with civilian scrap at scrap metal yards. A number of highly toxic substances are likely to be found in destroyed military vehicles including PCBs, CFCs, DU residue, heavy metals, energetic materials, asbestos and mineral oils.<sup>49</sup></p>

Direct TRW are toxic remnants that are an immediate result of military activity. For example pollution resulting from the deliberate targeting of industrial infrastructure, as was the case in the 2006 Israel – Hezbollah War. During the conflict tanks containing oil at the Jiyeh Power Plant caught fire after having been targeted by the Israeli Air Force, the tanks burnt for 27 days releasing highly toxic pollutants into the atmosphere.<sup>50</sup> The attack also caused the release of 10,000 – 15,000 tonnes of oil into the Mediterranean Sea.<sup>51</sup>

38. Cristaldi et al. (2013)

39. Testimony of Prof. Randall Parrish for the Subcommittee on Investigations and Oversight of the Committee for Science and Technology, US House of Representatives, Washington, 12 Mar 2009.

40. UNDAC Environmental Emergency Assessment, Ammunitions Depot Explosions, Brazzaville, Congo, Mar 2012. [https://docs.unocha.org/sites/dms/Documents/Congo\\_UNDAC\\_Environment\\_Emerg\\_Assmt%20Final.pdf](https://docs.unocha.org/sites/dms/Documents/Congo_UNDAC_Environment_Emerg_Assmt%20Final.pdf)

41. Chae (2010:10078)

42. UNEP and UNCHS Kosovo Report (1999)

43. Toxic Remnants of War Project (2013)

44. GAO Report (2010)

45. UNEP Astana (2006)

46. UNEP Gaza Report (2009:27)

47. UNEP Hotspots (2005:49-50)

48. IKV Pax Christi (2013)

49. UNEP Hotspots (2005)

50. UNEP Lebanon Report (2007:46)

51. UNHRC Lebanon Report (2006)

52. Warsta (2013)

53. Vidosavljević et al. (2013)

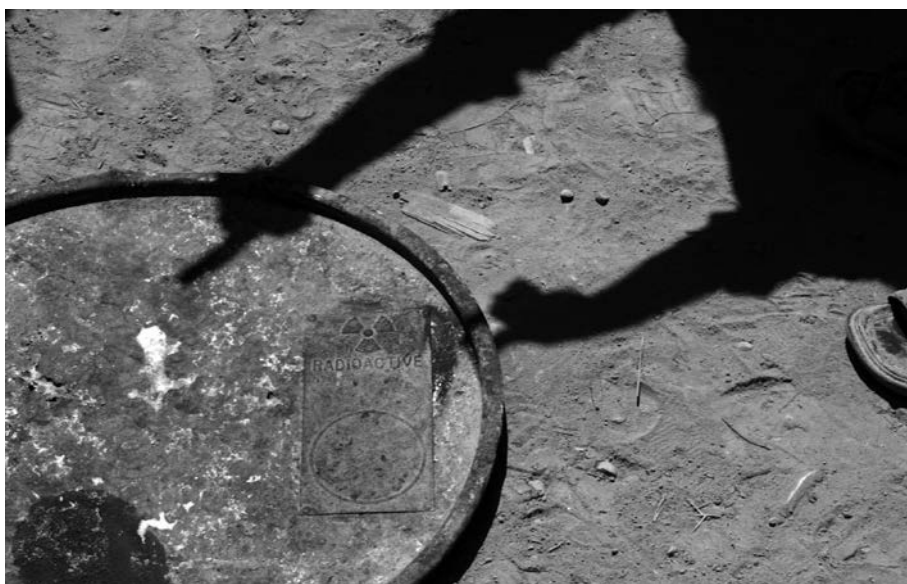
N.B. Footnotes continue onto the next page.

Other less well documented examples of TRW include the toxic residue resulting from munitions use, in towns, cities and rural areas that have experienced heavy fighting. These include heavy metals such as tungsten, depleted uranium (DU) and lead, as well as energetic materials (present in explosives) such as RDX and TNT. Whilst there is much research on the presence and fate of military toxics on military bases<sup>52</sup> and training areas, there remain few studies in post-conflict areas.<sup>53</sup>

▼ TABLE 2 – Indirect toxic remnants of war

ARMED CONFLICT/INTERNAL TENSION LEADS TO..	WEAK GOVERNANCE	HARMFUL ACTIVITY	CASES
	Loss of territorial control to armed groups.	Increase in illicit trade, movement and dumping of toxic waste.	Somalia – since the 1980s and throughout the civil war, large shipments of illegal nuclear and toxic waste were dumped off the Somali coastline in exchange for weapons and money. The 2004 Indian Ocean tsunami stirred up waste and spread contamination. <sup>54</sup>
	Loss of control over borders.		
	Limited/no waste disposal services (domestic and specialist hazardous waste services).	Illegal burning and dumping of domestic waste, large quantities of hazardous demolition waste, including asbestos, left unresolved and publically accessible.	Iraq – illegal burning and dumping of domestic waste key issue since 1991 Gulf War, through economic sanctions in 1990s and exacerbated by 2003 US invasion. <sup>55</sup>
	Limited/no security on sites containing hazardous substances.	Looting of industrial sites causing dispersal and civilian exposure to harmful substances.	Iraq post 2003 – UNEP identified hundreds of industrial sites left unsecured and accessible to the public. <sup>56</sup> Repeated looting was a key issue, in one case barrels containing uranium oxide were looted and used as food and water storage containers by local people. <sup>57</sup>
No environmental regulation/ability to enforce existing regulation.	Environmentally harmful practices within industry (legal and illegal).	Chechnya – former scientific and industrial laboratories looted for radioactive materials. <sup>58</sup>	
		Chechnya – large numbers of unregulated illegal oil refineries following decades of instability and wars leading to high levels of air, ground and water pollution. <sup>59</sup>	

Indirect TRW are toxic remnants that result from sequences of events or conditions connected to conflict or instability. As Table 2 shows, armed conflict and internal tension leads to the weakening of state authority, which impacts the regulation and governance of potentially hazardous activities.



▲  
A frightened villager shows the lid of a barrel that contained 'yellowcake' (uranium oxides) taken from the Tuwaitha nuclear facility Iraq. The family used this radioactive barrel to store water and are complaining of rashes and skin problems. The nuclear facility was left unsecured by occupying forces after the fall of Saddam Hussein's regime. This illustrates the humanitarian impact of indirect TRW.

Philip Reynaers / Greenpeace  
22.06.2003

To illustrate, during the invasion stage of the 2003 Iraq War and in its aftermath, a number of industrial sites were damaged by the conflict or simply abandoned. The chaos of conflict meant that hazardous sites were not properly secured and were left accessible to the public. In a number of cases, the sites were subjected to repeated looting, exposing people to highly toxic substances.

In this report the term 'complex polluted environments' will at times be used to describe environments affected by conflict. The term describes conflict pollution composed of a mixture of contaminants, often from multiple sources. This pollution is varied in space and concentration, with the potential to lead to either acute or chronic exposures to toxic substances.

Complex polluted environments are important to the framing of TRW. In the examination of environmental protection and international law much attention has been paid to large-scale one-off contamination events such as the North Atlantic Treaty Organisation (NATO) bombing of Pancevo, Serbia (see Table 1). However the impact of multiple pollution incidents or polluting activities is also of concern. During the 2003 Iraq War, numerous direct and indirect TRW contributed to an environment in which people continue to be placed at risk of harmful exposure (see Appendix A).

In terms of responsibility for complex polluted environments the picture is not clear. There may not be an obvious 'polluter' rather a combination of polluters and inadequate management practices that exacerbate risk. IHL may not be best placed to ensure accountability, yet there is a need to ensure civilian protection. International Environmental Law (IEL) and Human Rights Law (HRL) may be of more use in enforcing responsibility for the prevention and clearance of these forms of pollution (see section 4.0).

The analysis of TRW has taken a lifecycle approach to military toxics, which includes examining contamination during peacetime, conflict and in the post-conflict stage. For the purposes of this report, the term 'conflict cycle' is used to encompass military activity across all three stages. For further detail please refer to Table 1.

- 54. Ibeanu (2007)
- 55. UNEP Iraq Desk Study (2003), UNEP Iraq Progress Report (2003)
- 56. UNEP Hotspots (2005)
- 57. UNEP Iraq Progress Report (2003)
- 58. Environment News Service (2005) *Chechnya's Ticking Radiation Bomb*, 27 Jan 2005. <http://www.ens-newswire.com/ens/jan2005/2005-01-27-01.asp>
- 59. BBC News (2004) *War racketeers plague Chechnya*, 14 Dec 2004. <http://news.bbc.co.uk/1/hi/world/europe/4091635.stm>

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# 4.0 INTERNATIONAL LAW, ENVIRONMENTAL PROTECTION AND THE CONFLICT CYCLE

## KEY FINDINGS

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- 1** International Humanitarian Law provisions for environmental protection in conflict need clarifying and strengthening.
- 2** A human rights framework can assist in clarifying obligations for clean-up and TRW casualty assistance.
- 3** Environmental law provides norms and standards that militaries should be held accountable to throughout the conflict cycle.
- 4** There is a strong need for a mechanism that monitors and compensates violations of the law regarding environmental damage.

International law has been developed to protect the environment and people during and after conflict. Relevant legal bodies are IHL, IEL and HRL. This section will explore these legal regimes, their applicability to the environment and conflict and their effectiveness.

## 4.1 INTERNATIONAL HUMANITARIAN LAW

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IHL, or the Law of Armed Conflict (LOAC) is the body of law that seeks to regulate war in the interests of humanitarian values. It is primarily comprised of conventions and treaties, the most well know of which are the Geneva and Hague Conventions and more recent agreements such as the 1997 Mine Ban Treaty and the 2008 Convention on Cluster Munitions.

Customary IHL derives from “a general practice accepted as law”<sup>60</sup> and exists independent of treaty law. While much treaty law is accepted as customary, there exist customary laws that are not found in treaties and that can be useful to address deficiencies.

Within IHL there are direct and indirect means by which the environment is protected. Direct protection can be found in Articles 35(3) and 55(1) of Additional Protocol 1 (1977), in which methods or means of warfare that will cause widespread, long-term and severe damage are prohibited, and care is called for to prevent this level of environmental harm. Direct protection is also found in the Environmental Modifications Techniques Convention (ENMOD) (1977), which seeks to prevent the environment being modified for use as a weapon of war. This convention, drawn up in the aftermath of the Viet Nam War and the use of Agent Orange, sought to prevent what some have termed ‘geophysical warfare’, manipulating environmental systems such as weather patterns for use in attack. In customary IHL, the ICRC’s Rule 44 insists that due regard for the environment is taken in an attack.<sup>61</sup> This provision also specifically mentions that scientific uncertainty should not absolve the military from taking precautions to minimise harm.

Indirect protection for the environment is found within provisions providing protection for civilians. As the environment can be considered a civilian object, it is afforded protection. Indirect provisions include the principle of distinction, proportionality and the prohibition on unnecessary suffering.<sup>62</sup> To illustrate, environmental damage in a military attack, if regarded excessive in relation to the military advantage gained, would be in contravention of the principle of proportionality.

60. ICRC, Customary IHL. <http://www.icrc.org/eng/war-and-law/treaties-customary-law/customary-law/>

61. ICRC, Customary IHL, Rule 44. *Due Regard for the Natural Environment in Military Operations* [http://www.icrc.org/customary-ihl/eng/docs/v1\\_cha\\_chapter14\\_rule44](http://www.icrc.org/customary-ihl/eng/docs/v1_cha_chapter14_rule44)

62. Hulme (2004)

While IHL contains a number of provisions in customary and non-customary law that seek to protect the environment in war, the vast majority of environmentally damaging military activities are not deemed unlawful. As Bothe et al (2010) argued, there are three key reasons for this:

Firstly, the direct protection provided for the environment by Articles 35(3) and 55(1) is undermined by what many legal scholars deem an unreasonably high threshold of harm: widespread, long-term and severe. In Hulme's 2004 assessment of wartime environmental damage, of six cases of severe wartime environmental harm studied, no cases were found to have passed the threshold, with two cases being dependent on the extent of use of the weapons in question.<sup>63</sup> An additional problem is that the terms widespread, long-term and severe are undefined and open to interpretation. UNEP's 2009 analysis<sup>64</sup> called for a clear definition of the three terms.

Secondly, while the environment is provided some protection as a civilian object, it can be redefined as a military object if direct military advantage would be gained in targeting it. This could have been argued by the US if they had been taken to court over the use of Agent Orange in Viet Nam. There was a direct military advantage to be gained by defoliating forests which gave their enemy cover. This however leaves the environment without protection.

Thirdly, if the environment is damaged collaterally, harm can still be deemed lawful if it is proportional to the advantage gained in attack. For example in the case of the NATO industrial site bombing in Pancevo, Serbia, the action caused extensive damage to the environment, yet as the site was described by the military as strategically 'very, very' important<sup>65</sup> it was considered a legitimate target by NATO (for more detail see section 6.1). The problem lies with who decides how to measure proportionality. Without greater clarity, much collateral damage can be easily argued as permissible by powerful actors.<sup>66</sup>

Many scholars<sup>67</sup> alongside UNEP have recommended more clearly defining key terms within IHL. A recommendation to strengthen IHL provisions was also in a report to the 31<sup>st</sup> ICRC conference. A legal system open to interpretation will better serve the interests of those with most influence, contributing to an unjust system of law.

Another key issue highlighted by UNEP and the ICRC 31<sup>st</sup> conference study is the inapplicability of provisions that protect the environment in respect to internal conflict. This legal vacuum is a major problem given that the majority of conflict is non-international.<sup>68</sup> HRL and IEL may be able to address this issue.

Finally, much IHL relating to environmental protection has not been tested in the courts. There is a significant gap in the implementation and enforcement of the provisions that IHL provide. A suggested solution by UNEP and the report to the ICRC conference is the consideration of a mechanism that would monitor military induced environmental damage and address issues of compensation.

## 4.2 HUMAN RIGHTS LAW

Customary and non customary international HRL is the product of a number of declarations and treaty agreements between states, generated over the last fifty years.<sup>69</sup> According to these treaties and declarations, all humans have a right to life, a right to health, a right to adequate food, a right to work, a right to information and a right to remedy. See Table 3 for more on HRL and its relevance to TRW.

▼ TABLE 3 – Human rights and toxic remnants of war

RIGHT	CONVENTION	OBLIGATION AND RELEVANCE TO TRW
Right to life	Article 3 of Universal Declaration of Human Rights (UDHR) and Article 6 of Covenant on Civil and Political Rights (ICCPR)	The state or those in control over a territory must take all possible measures to ensure the safety of local population; including evacuation, assessment, clean-up and remediation.
Right to highest attainable standard of health	Article 25 of UDHR as part of the right to an adequate standard of living and Article 12 of International Covenant on Economic, Social and Cultural Rights (ICESCR)	States are required to "take all appropriate measures to limit human exposure to toxic products released during an armed conflict". <sup>70</sup>
Right to adequate food	Article 25 of UDHR as part of the right to an adequate standard of living, Article 11 ICESCR and Optional Protocol to the ICESCR	States are required to take "immediate action to provide food to those who no longer have access to their crops, as well as longer-term measures such as thorough cleanup of contaminated lands and, if necessary, regular assessments of the level of contaminates in crops and in the soil in order to determine if the food grown is suitable for human consumption". <sup>71</sup> The relevance of this right depends on whether soil, air and water contamination created by each TRW source is bioavailable.

63. The cases studied by Hulme (2004) were: Iraqi Oil-Well Fires and Sea Pollution, Attacking Industrial Facilities at Pancevo, Chemical Warfare by Iraq, Depleted Uranium Ammunition in Kosovo 1999, Cluster Weapons, Dangerous Remnants of War in the 1990-1991 Gulf Conflict.

64. UNEP (2009)

65. Das (2013:171)

66. Bothe et al. (2010)

67. Bothe et al. (2010), Hulme (2004), Das (2013)

68. UNEP (2009:51)

69. The most influential of which have been International Covenant on Civil and Political Rights (ICCPR) 1966, International Covenant on Economic, Social and Cultural Rights (ICESCR) 1996 and the Universal Declaration of Human Rights (UDHR) 1948.

70. Ibeanu (2007:15)

71. Ibeanu (2007:16)

RIGHT	CONVENTION	OBLIGATION AND RELEVANCE TO TRW
Right to work	Article 23 of UDHR and Article 6 of ICESCR	States are required to “ <i>establish a compensation mechanism for loss of employment and adopt measures to counter unemployment</i> ”. <sup>72</sup> The relevance of this right depends on whether soil, air and water contamination has impacted the ability to work on land, at sea or on waterways. Impacted industries include fishing, farming and tourism. Businesses that have been impacted by stigmatisation due to contact with toxic military residues, for example factories <sup>73</sup> or scrap metal yards processing contaminated military origin metal, may also fall within a breach of their rights.
Right to information and participation	The right to receive information is included in Article 19 of ICCPR	The Aarhus Convention on Access to Information, Public Participation in Decision Making and access to Justice in Environmental Matters more fully enshrines the right to information and participation. This environmental convention has fewer signatories than the ICCPR. Despite this, these rights requires that “ <i>in the event of imminent threat to human health or the environment, all information held by authorities which could enable the public to take measures to mitigate potential adverse effects, should be immediately disseminated to the public</i> ”. <sup>74</sup>
Right to a remedy	Article 2, paragraph 3(a) of ICCPR	This right guarantees victims of human rights violations an “ <i>effective remedy</i> ”. It involves both access to justice and substantive redress. This right requires the existence of independent and impartial bodies that have the capacity to afford redress. This entitlement is available at both national and international levels and entitles reparation.

International bodies have stated that unless any specific exemption applies, HRL is applicable in armed conflict. The 1970 UN General Assembly stated that:

*“Fundamental human rights, as accepted in international law and laid down in international instruments, continue to apply fully in situations of armed conflict.”*<sup>75</sup>

If applied in conflict settings, HRL may provide the environment and civilians with a more comprehensive protection during conflict than IHL. This is due to its primary focus being on the rights of individuals, rather than regulating the activity of war, which is the focus of IHL. From a civilian protection perspective, a focus on rights offers more robust provisions. However, the question that remains is, how can HRL be implemented in conflict settings and what might this entail in practice?

HRL treaties bind the states that ratify them to uphold rights irrespective of where the responsibility lies for those rights being denied in the first place. This is important from a TRW perspective as, in contrast to IHL, the ‘duty bearer’ of human rights obligations is easier to identify, this being the state or group who holds authority over a territory. It is easier to prove a human rights obligation has not been fulfilled than prove a belligerent has acted in a wrongful manner.<sup>76</sup>

According to UNHRC Special Rapporteur Okechukwu Ibeanu, this makes HRL of particular use in post-conflict settings; while IHL seeks to regulate war, and, in Okechukwu Ibeanu’s words, “*to prevent the cause of contamination... human rights law will address its effects*”.<sup>77</sup>

While clarity about the duty bearer is useful in international and internal conflict, this only remains so to the extent that there is a mechanism that can hold duty bearers to account, and ideally promote international assistance. Nevertheless it remains problematic if those that cause pollution and any associated harm fail to be held directly accountable.

Given the challenges faced by post-conflict states, key questions remain concerning the ability to uphold basic human rights for their citizens (see section 7.0). Alongside international assistance, transparency is essential, for example over targeting data or the short-term environmental measures undertaken by militaries following conflict that may be crucial to designing effective remediation plans.

Beyond international treaties, regional and national human rights instruments are important, particularly where enforcement opportunities are provided by regional and national judicial bodies.<sup>78</sup> Though these facilities are often underused, there is a need for more cases to be brought before regional and national courts over environmental human rights violations during conflict, to set precedents and contribute to refining law.

An additional benefit of following a human rights-based approach is the availability of assistance from UN and regional human rights organs, without having to prove belligerent parties have breached IHL, and war crimes proceedings.<sup>79</sup>

72. Ibeanu (2007:17)

73. See TRZ Hadizici site case study in ICBUW (2010:9)

74. Ibeanu (2007:17)

75. General Assembly Resolution 2675 (XXV), *Basic Principles for the Protection of Civilian Populations in Armed Conflict*, 9 December 1970.

76. Ibeanu (2007:23)

77. Ibeanu (2007:23)

78. UNEP (2009)

79. UNEP (2009)



This again shows scope for HRL being able to provide new and useful ways to approach the problem of environmental harm and civilian protection in conflict and post-conflict settings. However, while a human rights approach provides a useful framework, what is needed is an international process or mechanism by which principles enshrined within it can be upheld.

#### 4.3 INTERNATIONAL ENVIRONMENTAL LAW

IEL is a relatively new and growing body of law in comparison to IHL and HRL. It is made up of Multilateral Environmental Agreements (MEAs) between states (see Appendix B), principles such as the Trail Smelter principle, Precautionary principle, customary IEL and soft law instruments such as the 1972 Stockholm Declaration, 1992 Rio Declaration and various UN General Assembly (UNGA) resolutions. It is a complex and diverse body of law.

In 2008 it was established by the ILC that armed conflict: “*does not necessarily terminate or suspend the operation of [environmental] treaties*”<sup>80</sup> between belligerents or between belligerents and neutral parties. Recognising that IEL can apply during conflict is a significant and important step. However, more clarity is urgently needed on when and how IEL treaties and principles operate in armed conflict to ensure that IEL continues to be applied.

Some MEAs directly or indirectly mention the form of their applicability during armed conflict, others specifically mention their termination during armed conflict. However, the vast majority make no mention of armed conflict at all.<sup>81</sup>

Soft law<sup>82</sup> is not binding unless it becomes accepted as customary law. There are questions around whether the Trail Smelter and Precautionary principles, given their notable presence in environmental law, can be regarded as customary<sup>83</sup> (see Box 1). The acceptance of these principles into customary law would strengthen their use in legal cases. In particular the Trail Smelter principle would support the case of neutral states impacted by conflict pollution to gain compensation.<sup>84</sup> The Precautionary principle may be of particular use in peacetime settings through supporting strong regulation of hazardous substances in new and existing weapons.

##### ▼ BOX 1 – Trail Smelter and Precautionary principles

###### Trail Smelter principle

This principle is comprised of two key elements: (1) the state has a duty to prevent trans-boundary harm, and (2) the “polluter pays” principle, which holds that the polluting state should pay compensation for the trans-boundary harm it has caused.

###### Precautionary principle

This principle enables rapid response in the face of a possible danger to human, animal or plant health, or to protect the environment. In particular, where scientific data do not permit a complete evaluation of the risk, recourse to this principle may, for example, be used to stop distribution or order withdrawal from the market of products likely to be hazardous.<sup>85</sup>

Regional and domestic environmental legislation and norms may also have the potential to indirectly prevent conflict pollution. One of the drivers of increased research into munitions toxicity in the US is the European Union’s REACH (Registration, Evaluation, Authorisation and restriction of Chemicals) legislation, which was intended to protect human and environmental health from chemicals in consumer products. This will be further explored in section 5.3.

IEL agreements may also be of particular use in internal conflicts, as IEL has the potential to be applied to all situations regardless of the type of conflict. The majority of provisions within IHL are only applicable to international conflicts.

A key issue in examining the applicability of MEAs during wartime is the negotiation of their continued applicability in the face of arguments based on military necessity. Militaries will stress that mission success should not be undermined, and as military necessity becomes more vital, IHL should supersede IEL. Some scholars argue that if there are no specific exclusions IEL must remain fully applicable through conflict.<sup>86</sup>

While as yet there is no definitive guidance on this issue, it must be questioned why peacetime environmental laws which protect civilians would not be applicable in wartime. Are civilians in wartime less in need of protection than citizens during peace? In a majority of cases the opposite is true.

It is also argued by some scholars that as fundamental human rights that protect the interests of a whole community of states cannot be disregarded in war, there are some environmental agreements that also protect the community of states

80. UNEP (2009:46)

81. UNEP (2009), Bothe et al. (2010)

82. Soft law are principles, guidelines and opinions that are not legally binding, but remain legally significant.

83. Bothe et al. (2010)

84. Bothe et al. (2010:585)

85. Europa: Summaries of EU legislation, *the precautionary principle*. [http://europa.eu/legislation\\_summaries/consumers/consumer\\_safety/132042\\_en.htm](http://europa.eu/legislation_summaries/consumers/consumer_safety/132042_en.htm)

86. Bothe et al. (2010:587–9)

(such as the United Nations Framework Convention on Climate Change) and that should also be considered fundamental and non-negotiable.<sup>87</sup>

While it is clear that IHL as it stands cannot provide adequate protection, approaches and principles within IEL have much to offer; for example, the United Nations Compensation Commission (UNCC) borrowed peacetime principles on environmental valuation to award compensation following the Iraqi oil-well fires and oil spills in 1991. However there is need for greater clarity on the implementation and enforcement of MEAs and principles of IEL, and a discussion around fundamental environmental rights. Given that all people have the right to a clean and safe environment, to health and to life, environmental treaties that protect these rights must be upheld throughout conflict.

The protection offered by different bodies of law may be more or less relevant at different points in the conflict cycle. It has been identified that HRL may be of particular use in post-conflict settings, through providing clear direction on who is obliged to ensure the right to health and a clean environment. IEL has been of use in the pre-conflict regulation of military substances of concern and there is great potential in exploring other points of convergence.

It is also clear in regard to the implementation of all three bodies of international law that there is a lack of case law and no enforcement mechanism. Without case law or enforcement mechanisms the usefulness of many of the provisions is questionable.

Cases in which individuals have been held responsible for environmental war crimes are also lacking. This issue will be further explored in section 6.1.



▲  
Water cannons used to extinguish  
oil fires in Kuwait.  
Kuwait Oil Company  
Circa 1991

87. Voneky (2000)

# 5.0 MILITARY PRACTICE AND TOXIC REMNANTS OF WAR

## KEY FINDINGS

- 1** Military practices are central to the generation of TRW.
- 2** Militaries prioritise mission success over environmental health considerations.
- 3** Some militaries have a poor 'operational culture' in regard to environmental behaviour.
- 4** Progress is being made by military research into munitions toxics in peacetime, however, most of this work will not change the reality of toxic harm for civilians during wartime.
- 5** Stronger regulation is needed to ensure military necessity does not trump environmental and humanitarian concerns.

The generation of 'direct TRW' (see Table 1) is the immediate result of military activity throughout the conflict cycle. Given the central importance of military

behaviour in the generation of TRW, it is important to understand the drivers that influence it.

Militaries and armed groups across the world are diverse and have differing attitudes to environmental protection. Due to the accessibility to the author of information on this topic, our analysis is based on the experience of North American and European militaries.

The prioritisation of TRW issues by militaries will differ in peacetime, during conflict and occupation and in the post-conflict phase. These phases will be examined separately.

### 5.1 MILITARY PRACTICE AND THE ENVIRONMENT DURING CONFLICT

During conflict, practices key to the generation of TRW include: the targeting decisions of military commanders, including the targeting of industrial sites, weapons caches and power stations; choices in the use of conventional weapons, targeting locations and intensity of use; and the waste management and pollution control practices at military bases and installations (see Table 1).

An examination of legal guidance and field manuals can inform our understanding of the military's prioritisation of environmental considerations in wartime.

ICRC guidelines for incorporating environmental protection into military manuals were drawn up following existing international law.<sup>88</sup> As explored earlier, IHL is weak in regard to environmental protection. The manuals state that IEL is applicable only to the extent that its provisions are not inconsistent with IHL, and that precedence is given to military necessity over environmental protection in most cases.<sup>89</sup> The document attracted criticism from both sides, with Bothe et al. taking the position that: "*These guidelines ... did not constitute any significant progress for better protection of the environment during armed conflict, and even this modest document received a somewhat hostile reception at the UN. The UN General Assembly politely buried it in 1994*".<sup>90</sup>

88. ICRC (1996) *Guidelines for Military Manuals and Instructions on the Protection of the Environment in Times of Armed Conflict, International Review of the Red Cross*, No. 311. 30 Apr 1996. <http://www.icrc.org/eng/resources/documents/misc/57jn38.htm>

89. ICRC (1996) *Guidelines for Military Manuals and*

*Instructions on the Protection of the Environment in Times of Armed Conflict, International Review of the Red Cross*, No. 311. 30 Apr 1996. <http://www.icrc.org/eng/resources/documents/misc/57jn38.htm>

90. Bothe et al. (2010:573)



Field Manual 3-100.4, 'Environmental Considerations in Military Operations'<sup>91</sup> is a US military manual drawn up in the wake of the controversial NATO bombardment of industrial facilities in Serbia in 1999. While the manual emphasises greater consideration of environmental issues in military decision making, ultimately, mission success takes priority.

In recent years, following the long and controversial US occupation of Iraq, a US think tank has reassessed the environmental due diligence of militaries. In particular, guidance has been provided on the environmental and health impact of military bases, waste management culture and widening awareness of the importance of environmental considerations in wartime.<sup>92</sup> The RAND Corporation's examination of US military operations showed that: "*Although numerous presidential directives, DoD [Department of Defence] policies, and Army regulations and doctrine address environmental issues at installations in the United States and permanent facilities overseas, they almost universally exclude contingency operations explicitly*".<sup>93</sup>

While there is a greater awareness within some parts of the military of environmental concerns, the underlying ethic of military practice is that in the heat of war, (almost) anything goes. Although there is some protection provided for by international law, it is poorly defined and enforced. Without clear legal guidelines, a stronger position on fundamental environmental rights and a robust monitoring and enforcement mechanism, military behaviour is unlikely to change.

#### **Military practice and the environment during occupation: US in Iraq post 2003**

During the US occupation of Iraq, TRW generating activity included: military base waste disposal, oil infrastructure sabotage, munitions disposal (including UXO) and conflict waste disposal (see Appendix A).

Responsibility around the generation and resolution of TRW was complex and is shared between a number of actors ranging from the Coalition Forces, private contractors, the Coalition Provisional Authority (2003–4) and the Iraqi government (2004 – present day). This section will solely focus on how Coalition Forces' militaries, in particular the US army, managed TRW issues.

In an 'occupation' setting, military necessity is less important than other operational concerns such as maintaining good relations with the local population and host country. During this stage 'operational culture' is highlighted by Quinn et al. as an important factor.<sup>94</sup>

While numerous policies and guidelines existed for the US army prior to the Iraq War, in practice environmental mismanagement was still a significant problem.

Some of the more contentious issues have been around waste management at US bases.<sup>95</sup>

An investigation by the RAND Corporation into environmental considerations during military operations found that during its occupation of Iraq the army had 'no comprehensive approach to environmental considerations in contingencies, especially in the post-conflict phase'.<sup>96</sup> In particular it is noted that: "*There is a chronic lack of training and awareness across much of the Army about environmental considerations, even among those who are supposed to be responsible for environmental issues*".<sup>97</sup>

Problems arose from the lack of priority given to environmental considerations, which meant that many army personnel assumed environmental issues were someone else's job to resolve. Researchers found that due to their lack of understanding, commanders did not adequately consider environmental issues in decision making and soldiers were found to not follow proper procedures around hazardous waste disposal. It is reported that their attitude was either: "*We are in the desert, what does it matter?*" '*The locals don't care, so why should we?*' or '*We are just passing through and don't have the time.*' *These soldiers seemed to have little, if any, environmental awareness, training, or accountability*".<sup>98</sup>

A key phenomenon during the Iraq War was the rise in the use of private companies to run logistics around US bases and work on reconstruction projects. The RAND report found that "*environmental considerations are not being addressed sufficiently at any step in the contracting process*".<sup>99</sup> Environmental considerations were not written into contracts and there was insufficient regulatory oversight.<sup>100</sup>

91. Field Manual 3-100.4 (2000) *Environmental Considerations in Military Operations*. Marine Corps Reference Publication 4-11B, Headquarters US Marine Corps, Washington DC.

92. Mosher (2008), NATO Standardization Agency (2008) *Joint NATO doctrine for environmental protection during NATO led military activities*, Ref: NSA(JOINT)1060(2006)EP/7141. 20 Dec 2006 (Edition 4)

93. Mosher (2008:128)

94. Quinn et al. express the importance of environmental guidance for military commanders, and the need for "*assimilation of an environmental protection ethic into the Navy's operational culture, which will result in the maximum environmental protection consistent with mission accomplishment*." Quinn et al. (2000:162)

95. One of the waste management practices that has gained considerable attention has been the widespread use of burn pits on US bases as a means of waste disposal. Reports have revealed that numerous prohibited items such as plastics and medical waste have been burnt (GAO Report, 2010). A number of veterans have reported ill health on return from service from Iraq and Afghanistan, illnesses believed to be connected to burn pits.

96. Mosher (2008:128)

97. Mosher (2008:120)

98. Mosher (2008:103)

99. Mosher (2008:106–7)

100. IKV Pax Christi (2013)

There is a need to strengthen environmental policy in internal military guidelines and in contracted logistical work. There is also a significant gap between existing policy and practice, and therefore a need to increase accountability for following environmental guidelines.

Importantly, this case also illustrates that environmental damage is not restricted to harm deemed necessary by operational requirements; instead it is the consequence of a systemically poor regard for environmental protection. This systemic environmental deficit has in turn consequences for public trust in military planners' calculations over the necessity of a range of policies and strategies, such as targeting decisions likely to result in significant harm.

## 5.2 MILITARY PRACTICE AND THE ENVIRONMENT IN POST-CONFLICT SETTINGS

Within the post-conflict setting, TRW are generated by military wastes, such as battlefield debris and military scrap metal, demolition waste resulting from urban bombing and munitions disposal. As well as direct TRW, indirect TRW (see Tables 1 and 2) also pose a considerable threat to public health.

Following conflict, the host or affected state is commonly understood to bear responsibility for post-conflict clean-up. In a number of cases, though not comprehensively, the international community has provided assistance in environmental monitoring, post-conflict rebuilding work and environmental remediation. Although assistance is typically constrained by the funds available and whether affected states have invited the assistance.

Belligerent states and their militaries are not currently obligated to assist in post-conflict clean-up. Belligerents have provided assistance in some cases. However, these are typically situations in which assistance has been considered strategically or diplomatically useful.

However the question of whether belligerents should be held accountable for the post-conflict handling of conflict-related toxic waste, and land remediation efforts under the Polluter Pays principle is certainly worth exploring. Obligations for the post-conflict clearance of explosive remnants of war have developed through the adoption of the 1997 Mine Ban Treaty and 2008 Cluster Munitions Convention. Many, including the 31<sup>st</sup> ICRC conference have argued that a similar mechanism should be adopted to help restore the environment and protect its inhabitants after armed conflict.

## 5.3 MILITARY PRACTICE AND THE ENVIRONMENT IN PEACETIME SETTINGS

Within peacetime settings, TRW are generated through weapons manufacturing, testing, research and use during training, disposal and from poorly managed stockpiles (see Table 1). This section will focus on the prioritisation of environmental issues through munitions development and use in training.

It is widely recognised by North American and European militaries that the use of munitions leads to the release of toxic substances into water, soil and air.<sup>101</sup> Historically, little attention has been paid towards this aspect prior to weapons development. It is only in the last decade or two, and due to increasing environmental awareness and civil legislation, that military research and development institutes have paid closer attention to weapons residues left on live firing ranges.

In the US, Department of Defence (DoD) environmental programmes are pursuing research into assessing and managing the risks posed by substances used by the military as part of environmental restoration programmes at formerly used defence sites (FUDS).<sup>102</sup> This work has provided valuable insights into environmental clean-up strategies and the means through which toxic risks related to military substances can be reduced.

There are a number of drivers behind the DoD work on military toxics, including the need to maintain 'military readiness'. Civil regulatory frameworks such as the European Union's REACH system are becoming increasingly restrictive on manufacturers. REACH is intended to improve data collection on thousands of chemicals and to ultimately restrict or ban those deemed most hazardous for human health and the environment. Given the global nature of supply chains, the US DoD has recognised that this legislation will impact the development and sales of weapons and equipment.<sup>103</sup> To maintain 'military readiness' research programmes are investigating 'green' less toxic substances to counter any negative regulatory effects posed by REACH. It is positive that when military activities come into contact with peacetime regulatory frameworks which protect

101. Warsta (2013)

102. Programmes include: DoD Environmental, Safety and Occupational Health Network and Information Exchange (DENIX) <http://www.denix.osd.mil/cmrd/ECMR/ECProgramBasics.cfm>, SERDP and ESTCP Munitions Response Program <http://www.serdp.org/Program-Areas/Munitions-Response>,

DENIX, Defence Environmental Restoration Program <http://www.denix.osd.mil/derp>

103. The Under Secretary of Defence, Managing Chemicals, Materials, and Impacts to Readiness from REACH: A Strategic Plan, 8 Jul 2010. [http://www.denix.osd.mil/cmrd/upload/REACH\\_Strat\\_Plan\\_Signed.pdf](http://www.denix.osd.mil/cmrd/upload/REACH_Strat_Plan_Signed.pdf)

environmental and public health they are forced to modify their behaviour. Other drivers include the need to manage range sustainability, negative publicity and liabilities from exposed personnel and the avoidance of clean-up liabilities.

In 2013, a European conference hosted by the Finnish Ministry of Defence was the first of its kind to share information across European and North American defence organisations on the issue of range sustainability<sup>104</sup>. The conference presentations revealed the complexity of risk assessment and risk mitigation on firing ranges.

Solutions to the problem of toxic substance release into the environment included: plastic liners around firing points and targets to prevent groundwater contamination, bullet catchers, igloo type buildings that capture the residue of detonations, the development of 'greener' less toxic substances for use in munitions, water control and treatment and bio-remedial measures such as using fungi to treat contaminated soil. Solutions to contamination problems were not always available. Within the discussion of contamination abatement measures, competing priorities included cost effectiveness and practicality considerations.

Efforts by military organisations to reduce contamination at firing ranges are useful in promoting a fuller awareness of the toxicity of munitions and the risks they pose to humans and the environment. However, while environmental concerns are gaining higher priority, it is important to recognise that this is primarily being driven by operational factors as opposed to humanitarian ones.

Whilst efforts are being made to prevent contamination on firing ranges in Western Europe and North America, what efforts are being taken on ranges or battlefields in other parts of the world, where capacity, finances and the competing and very immediate post-conflict humanitarian concerns take precedence? In addition, all current work investigating munitions residues is confined to military ranges. At present, due to a lack of research, there is no conclusive answer on the toxic risks posed to civilians from the conflict use of munitions in populated areas.

It is of course unrealistic to place plastic liners on battlefields, though perhaps measures such as banning particularly toxic substances, developing less toxic munitions, more comprehensive environmental assessment, funding bioremediation work on contaminated land, water treatment measures, improved recording of the use of weapons in urban areas, information sharing with post-conflict authorities and international organisations and health monitoring of at-risk populations could be practices that polluters are obliged to take to prevent harm.

Work on military toxics is being driven by operational concerns, not humanitarian or environmental considerations. Whilst these developments are useful, they cannot be relied upon to solve the problem of toxic harm in conflict.

104. Warsta (2013) *European Conference of Defence and the Environment* – States contributing research to the conference include the US, Canada, Netherlands, Finland, Norway, Germany and Sweden.



▲  
Regimental Combat Team 6, watches over the civilian firefighters at the burn pit as smoke and flames rise into the night sky behind him in Camp Fallujah, Iraq.  
U.S. Marine Corps / Cpl. Samuel D. Corum  
01.06.2007



▶  
Divers survey damaged caused by an oil spill resulting from the aerial bombardment of Jiyeh power station, Lebanon, in July 2006. The spill has caused damage to endangered species and fragile coastal ecosystems.  
Marco Care/Greenpeace  
19.09.2006

# 6.0 THE POLITICS OF ACCOUNTABILITY

## KEY FINDINGS

- 1** A weak legal system with few obligations and a lack of effective implementation currently leads to an ad hoc approach to resolving TRW problems.
- 2** Ad hoc approaches enable politically powerful states to gain the advantage in bilateral agreements and in the enforcement of international law and avoid liabilities.
- 3** Weak national environmental legislation and governance encourages military polluters and limits accountability.
- 4** In the vast majority of cases, less powerful states and their citizens are left to deal with TRW problems alone.

Environmental protection provisions within IHL are weak; alongside the high threshold of harm required to breach legal principles and the loophole of military necessity, there is also a lack of effective monitoring and enforcement mechanisms. While IEL and HRL do provide additional protection, some development

in law is needed to allow either to function well. Without additional regulation, militaries will continue to prioritise operational concerns over humanitarian and environmental issues throughout the conflict cycle.

The key question is: what does this mean in terms of accountability for TRW, be it assistance with environmental remediation work or compensation and support for TRW casualties? What mechanisms are in place to provide access to justice or reparations?

Accountability for TRW has been sought through existing international processes, for example taking cases of wartime environmental damage to the International Court of Justice (ICJ). This form of seeking forced reparations will be categorised as *involuntary*, as attempts are made to force the polluter to pay. Accountability for TRW can also be categorised as *voluntary*, for example through bilateral agreements between states. These are situations in which environmental clean-up liabilities are negotiated and agreed. Both of these accountability dynamics will be explored in this section to understand whether they are fit for purpose.

## 6.1 INVOLUNTARY ACCOUNTABILITY AND THE EXISTING INTERNATIONAL PROCESSES

Whilst the majority of TRW go unnoticed by the international community, when major ecological disasters have occurred as a result of international armed conflict, states have looked to existing legal regimes for remedy.

Three cases in which forced reparations have been sought for are: Iraq triggering oil-well fires and oil spills in Kuwait during the Gulf War (1991), environmental damage caused by NATO industrial site bombing and the use of DU weapons in Serbia (1999), and the Jiyeh power station bombing by Israel in its conflict with Hezbollah (2006). These cases will be explored with a view to reflecting on the ability of existing mechanisms to adequately provide accountability and remedy.

Table 4 outlines the details surrounding each incident, including: environmental harms, international laws breached by the incidents, and the action taken to resolve them.

105. See Appendix B for list of IEL conventions.

106. Hulme (2004:164)

107. Hulme (2004:164)

108. UNEP Iraq Desk Study (2003:65)

109. UNEP Iraq Desk Study (2003:65)

110. UNEP Iraq Desk Study (2003:65)

111. UNEP Iraq Desk Study (2003:67)

112. See Hulme (2004:169–70) for further discussion

113. UNEP Kosovo Report (1999:32)

114. UNEP Kosovo Report (1999:32)

115. UNEP Kosovo Report (1999:34–5)

116. UNEP Kosovo Report (1999:34–5)

▼ **TABLE 4 – Comparison of the applicable law and accountability pathways for TRW incidents in Kuwait, Serbia and Lebanon**

INCIDENT	INCIDENT DETAILS	ENVIRONMENTAL HARM	IHL BREACH	PEACETIME IEL <sup>105</sup>	HRL BREACH	ACTION TAKEN
IRAQI OIL-Well FIRES AND OIL SPILLS (1991)	<p><b>23rd Jan 1991</b> Iraqi forces release approximately six million barrels of oil into the Persian Gulf.<sup>106</sup></p> <p><b>21st Feb 1991</b> Iraqi forces set approximately 650 oil wells alight.<sup>107</sup> Oil wells burn for over a month.<sup>108</sup></p>	<p>Toxic substances released into the sea: mercury, benzene, toluene, ethylbenzene, xylenes (BTEX) and polyaromatic hydrocarbons (PAHs).<sup>109</sup></p> <p>Toxic substances released into the air: sulphur dioxide, carbon monoxide, soot, benzopyrene, PAHs, dioxins. Approximately 500,000 metric tons of toxic substances were released per day.<sup>110</sup> Total CO<sub>2</sub> emissions estimated to be 3x10<sup>8</sup> tonnes.<sup>111</sup></p>	<p>According to Hulme (2004), neither incident fulfilled the high threshold of long term, widespread and severe harm necessary to breach the direct environmental protection provided for by IHL. Nor did the incident breach the 1977 ENMOD convention. The incidents can be argued to breach the prohibition on wanton destruction Article 6(b) of 1945 Nuremberg Charter and Article 147 of 4th Geneva Convention.</p>	<p>Relevant conventions include: OILPOL Convention, MARPOL Convention, Kuwait Convention, UNCLOS Article 194 obligation to protect and preserve the marine environment, London Convention, Breach of the customary Trail Smelter principle and the principle of reducing greenhouse gases including carbon dioxide found within UNFCCC.<sup>112</sup></p>	<p>Right to life, highest attainable standard of health, adequate food and work (due to impact on fisheries, cattle grazing, agricultural land and tourism in other parts of the Gulf).</p>	<p>United Nations Security Council (UNSC) passed Resolution 687 (3 April 1991) in which Iraq was liable for 'any direct loss, damage, including environmental damage, and the depletion of natural resources, or injury to foreign Governments, nationals and corporations, as a result of Iraq's unlawful invasion and occupation of Kuwait.'</p>
PANCEVO INDUSTRIAL SITE BOMBARDMENT, SERBIA (1999)	<p><b>17th – 18th Apr 1999</b> Two air strikes on the HIP Petrohemija Pancevo petrochemical complex and the HIP Azotara fertiliser plant.<sup>113</sup></p> <p><b>Apr – Jun 1999</b> Seven attacks on the 'NIS' oil refinery.<sup>114</sup></p>	<p>Petrochemical plant: 2,100 tonnes of ethylene-dichloride (EDC) leaked into soil and a wastewater canal, 8 tonnes of metallic mercury leaked into canal, 460 tonnes of vinyl chloride monomer (VCM) burned releasing dioxins, hydrochloric acid, carbon monoxide, PAHs and possibly phosgene into the air.</p> <p>Fertiliser plant: 250 tonnes of liquid ammonia released into canal potentially responsible for fish kills reported in the Danube 30 km downstream.<sup>115</sup></p> <p>Oil refinery: estimated 80,000 tonnes of oil and oil products burnt, releasing sulphur dioxide, nitrogen dioxide, carbon monoxide, PAHs and lead.<sup>116</sup></p>	<p>The Pancevo bombings did not fulfil the high threshold of long term, widespread and severe harm necessary to breach direct environmental protection provided for by IHL.<sup>117</sup> Debate on whether the incident could be considered proportional to the military advantaged gained.</p>	<p>Relevant conventions include: 1994 Danube River Protection Convention, LRTAP Convention, Bern Convention, 1992 Biodiversity Convention, Ramsar Convention.<sup>118</sup></p>	<p>Right to life, highest attainable standard of health, adequate food and work (due to impact on the Danube river, and adjacent agricultural land).</p>	<p>The Federal Republic of Yugoslavia filed complaints to the ICJ and the International Criminal Tribunal for the Former Yugoslavia (ICTY) in 1999 against ten NATO countries.</p>
JIYYEH POWER PLANT BOMBARDMENT LEBANON (2006)	<p><b>13th, 15th July 2006</b> Israeli air strikes destroyed fuel storage tanks and caused oil fires and spills into the Mediterranean sea. Fires burned for 27 days.<sup>119</sup></p>	<p>10,000 – 15,000 tons of heavy fuel oil was spilt into the sea, impacting marine ecosystems along 150 km of Lebanese coastline and some parts of the Syrian coastline. Air pollution due to oil fires was thought to be one of the most serious environmental impacts of the conflict, however due to the absence of primary data this cannot be verified. Other risks identified include groundwater pollution and poor hazardous waste management during clean-up.<sup>120</sup></p>	<p>A UNHRC inquiry found that: "The failure of IDF to take the necessary precautionary measures violated Israel's international law, international humanitarian law, and human rights obligations to protect the natural environment and the right to health."<sup>121</sup> The opinion of the report is that the military advantage was not proportional to risks.<sup>122</sup> This finding is yet to be tested by an international court.</p>	<p>Relevant conventions include: OILPOL Convention, UNCLOS Article 194 – obligation to protect and preserve the marine environment, London Convention, OPRC Convention, Barcelona Convention, UNFCCC.</p>	<p>Right to highest attainable standard of health, adequate food and work (due to impact on fishing and tourist industry).<sup>123</sup></p>	<p>There have been eight UNGA resolutions calling for Israel to assume responsibility and provide compensation for the bombing and oil spill.</p>

N.B. Footnotes begin on the previous page and continue onto the next.



In each case, significant environmental damage occurred and human and ecosystem health was endangered as a result of military action. In both the Iraqi and Serbian cases, legal scholars did not find that the direct protection provided by IHL was breached (see section 4.1). The Lebanese case was not assessed by legal scholars. However, a UNHRC<sup>124</sup> inquiry into the human rights situation in Lebanon following the Israeli attacks, noted the IHL provisions for the protection of the environment in its summation, which found Israel to have violated its international legal obligations.<sup>125</sup> It is unclear whether they therefore found Israel to have breached the high threshold of harm that is central to IHL's direct provisions. In all cases, peacetime environmental law and human rights law were breached. A significant point is that none of the cases were tested in an international court.

Iraq remains the only state to have been held to account and forced to pay reparations for environmental damage in wartime. This is largely due to the will of the UN Security Council (UNSC), which passed resolution 687 in April 1991, in which it was stated that Iraq was liable for: *'...any direct loss, damage, including environmental damage, and the depletion of natural resources, or injury to foreign Governments, nationals and corporations, as a result of Iraq's unlawful invasion and occupation of Kuwait'*.<sup>126</sup>

This binding resolution led to the establishment of the UNCC, which adjudicated compensation claims in relation to the Iraq's invasion of Kuwait. Claims categories ranged from individual claims for loss of relatives, personal injury, and damage claims to corporations and governments claiming for economic losses and environmental damage. This enforcement of the Polluter Pays principle was possible due to the ability of Iraq to pay successful claimants, as a substantial percentage of Iraq's oil revenues were diverted to enable payments.<sup>127</sup>

The UNCC set a useful precedent for enforcing wartime environmental liabilities. Not only were the procedural aspects of assessing claims and placing a valuation on environmental loss a valuable exercise, it also established that the UNSC has the ability, and willingness, to hold states to account for major environmental wartime damage.

However there are important criticisms over the legal aspects of the UNSC decision, which centre on the failure of the UNSC to specify the environmental provisions violated.<sup>128</sup> It seems that the UNSC had based its judgment on Iraq on its reasons for going to war – the unlawful invasion, as opposed to its actions in war – the setting of oil-well fires. Thus the opportunity to set a legal precedent for enforcing responsibility for environmental damage during conflict was lost.<sup>129</sup>

The political context of this decision was that the 1991 Gulf War ended with Iraq on the losing side. Key states within the Coalition Forces sat on the UNSC and there was international condemnation of the actions of Saddam Hussein.

Of the three cases, the Serbian case was the only one that attempted to use international judicial systems to gain access to justice. In 1999, Yugoslavia<sup>130</sup> filed complaints against 10 NATO countries at the ICJ and the International Criminal Tribunal for the Former Yugoslavia (ICTY).

The ICJ found that it was unable to consider the case against the US and Spain as they did not recognise the jurisdiction of the court. The court further found that it did not have prima facie jurisdiction *"as the applicant (Serbia and Montenegro) 'had no access to court'"*<sup>131</sup> thus cases against the remaining eight were dropped.

Yugoslavia's attempt to hold individuals responsible for war crimes through the ICTY was also unsuccessful. The case was reviewed but it was concluded that: *"the available evidence and the status of existing international law did not allow a judgment on the merits"*.<sup>132</sup> The difficulty of assessing the case revolved around arguments of whether the attack was militarily important, and whether the environmental damage was proportional to the advantage gained. Unanswered questions remained on what information was held by NATO on the nature of the targeted industrial facilities and the extent to which subsequent environmental damage could have been predicted. While it seems obvious that the bombardment of an oil-refinery and petrochemical and fertiliser plants situated adjacent to an international waterway and a population centre would be bound to cause significant environmental damage and risks to human health, the lack of NATO information led to the case being dismissed.

It has also been suggested in relation to the ICTY case that it would have been politically difficult for the court to hold individual NATO state leaders to account. As argued by Das (2013): *"one of the reasons could be 'it is unlikely that the court*

117. Hulme (2004)

118. See Hulme (2004:190-4) for further discussion.

119. UNEP Lebanon Report (2007)

120. UNEP Lebanon Report, (2007)

121. UNHRC Lebanon Report (2006:72)

122. UNHRC Lebanon Report (2006:53)

123. Greenpeace (2007)

124. The UNHRC is the body which oversees human rights treaties; it is not a legally binding court.

125. UNHRC Lebanon Report (2006:53)

126. Das (2013:154)

127. UNCC, Introduction. <http://www.uncc.ch/introduc.htm>

128. Das (2013:155)

129. Das (2013:155)

130. At the time Yugoslavia comprised of the republics of Serbia and Montenegro.

131. UNEP (2009:25)

132. UNEP (2009:27)

is willing to face the repercussions of indicting a high level NATO official,”<sup>133</sup> particularly given the involvement of NATO states in establishing and funding the ICJ and ICTY.<sup>134</sup>

The cases brought by Yugoslavia are two of a handful of cases brought before international courts concerning conflict-induced environmental damage. Given the difficulty of gaining recourse to justice within international courts, where else can states go to hold other states to account for environmental damage during wartime?

Since the 2006 Lebanon conflict, repeated UN General Assembly (UNGA) resolutions have called for compensation to be awarded to Lebanon.<sup>135</sup> Resolutions note the Polluter Pays principle enshrined in the Rio Declaration in 1992 and the example set by the UNCC as justification for Israel assuming: “responsibility for prompt and adequate compensation to the Government of Lebanon and other countries directly affected by the oil slick”.<sup>136</sup>

In its call for Israel to be held liable, Lebanon has the support of a majority of states within the UNGA, as well as the UNHRC. Unsurprisingly, Israel has not responded to the UNGA resolutions with offers of compensation, and UNGA resolutions are non-binding.

Neither Lebanon nor Israel has recognised the jurisdiction of the ICJ, thus limiting the fora in which Lebanon can pursue accountability, and thus far Israel has not been legally bound to take on responsibility for the damage caused.

This comparison has sought to illuminate three different means by which liability for wartime environmental damage has been called for following international armed conflict. While all three cases saw severe damage to the environment that would have breached peacetime environmental laws, and entailed the loss of human rights, in each case it is debatable whether the actions can be deemed to have breached IHL’s environmental provisions.

133. Das (2013:177)

134. Das (2013:177)

135. UNGA resolutions: 61/194 of 20 December 2006, 62/188 of 19 December 2007, 63/211 of 19 December 2008, 64/195 of 21 December 2009, 65/147 of 20 December 2010, 66/192 of 22 December 2011, 67/201 of 21 December 2012 and 68/206 of 20 December 2013 on the oil slick on Lebanese shores.

136. UNGA A/RES/67/201 Oil slick on Lebanese shores, 21 December 2012



▲ Devastation around the destroyed tanks of the Jiyeh power station, Lebanon.

Pierre Gleizes / Greenpeace  
19.09.2006



These cases clearly demonstrate that the direct provisions for the environment under IHL that require the damage to be widespread, severe and long-term, are thresholds set too high to be of any meaningful use. The thresholds therefore require further clarification and definition. In terms of indirect protection provided by IHL, the loophole of military necessity and the ambiguity surrounding the principle of proportionality makes it difficult to hold belligerents to account. The Iraqi case was the only incident in which there was a clear breach of the prohibition on wanton destruction.

In terms of enforcement, the ICJ has limited jurisdiction; this limitation would need to be overcome for it to be of more use in providing accountability for TRW. In terms of individual responsibility, political sensitivities make it very difficult to hold any state officials, particularly those from powerful states, to account.

While of all three examples the Iraqi case would have been easiest to argue a legal breach of environmental provisions in IHL, this was also the only case in which a decision was not made on an assessment of these provisions. It is also interesting that while IHL's environmental provisions were not assessed in the resolution that held Iraq liable, they were vigorously assessed by the ICTY in Yugoslavia's case against NATO officials.

What a comparison of these three cases demonstrates is that within a weak legal system the response to environmental harm is heavily influenced by realpolitik. While: "...*politics and diplomacy can get in the way of environmental protection in armed conflict,*"<sup>137</sup> it can also be an important part of why accountability is enforced. The playing field is not level; actors with greater power and influence will be in a stronger position to demand responsibility when it serves their interests. Actors with less power and influence are likely to have more difficulty in gaining access to reparations.

From a humanitarian perspective, this is unacceptable. All people have equal right to a clean environment and good health (see Table 3). This further supports an argument for a strengthening of international law and enforcement mechanisms so as to ensure all parties to a conflict respect the environment and all those dependent on it.

However, it is also important to remember that not all TRW contamination incidents are large scale one-off events that occur in international conflict. Many are small scale incidents (see Appendix A) that combine to create complex polluted environments in post-conflict zones in both internal and international armed conflicts.

A key issue is the ability of international and national processes to assess, provide assistance and assign responsibility for these scenarios, particularly given that IHL is ill-suited to provide for this sort of contamination. Any mechanism to protect civilians and the environment through addressing TRW must consider conflict-related pollution incidents that would not be deemed illegal through IHL, but nevertheless still require some level of assessment, accountability and assistance.

## 6.2 VOLUNTARY ASSISTANCE AND BILATERAL AGREEMENTS \_\_\_\_\_

As well as efforts to hold belligerents accountable for TRW during international armed conflict, voluntary assistance is sometimes offered for the resolution of TRW problems at other points in the conflict cycle. One example is bilateral agreements made between states to set the terms of military conduct for the use of ranges or facilities. The environmental footprint of past and current military installations is a global issue and an examination of Status of Forces Agreements (SOFA) between the US and Germany, and the US and South Korea highlights the way in which power relations impact upon accountability for TRW.

Two general provisions found in SOFAs and that impact negotiations around liability for environmental contamination at overseas military bases are:

- ▶ Residual value agreements – these are clauses that ensure the visiting state is reimbursed for site improvements such as buildings and facilities.
- ▶ Specific agreements on the environmental condition that the base is left in and the processes used to remediate the site.

These two provisions have acted together to form the basis of negotiations in each country. Historically most SOFAs did not have specific environmental or residual value clauses. The US expectation was that bases would be returned without conducting clean-up or demanding reimbursement for improvements. The logic being that the US would consider that the value added to the site from improvements would cover the cost of any environmental clean-up.<sup>138</sup>

However, with increased awareness of environmental issues and the growth of environmental laws, this assumption has become more contentious. US agreements with South Korea and Germany are the focus of comparison for three

137. Das (2013:181)

138. Weiner (1992)

reasons: both countries have seen a major withdrawal of US presence since the end of the Cold War, both countries have strong environmental movements, and there are differing power dynamics between Germany-US and South Korea-US.

### US military bases in Germany

After the fall of the Berlin Wall, a large US force in the former West Germany was no longer required and, between 1990 and 1995, 54,385 acres of land were returned.<sup>139</sup> The military bases were bound by NATO-SOFAs. NATO statutes agreed in 1949 governing the stationing of foreign troops in allied countries required the US to return bases in the same condition that they were provided.

Unlike most other SOFAs, the US-German agreements had specific clauses relating to residual value and the environmental condition of returned bases. *“Both German and US government policies require the United States to clean all contamination at the facilities for which it is responsible and to return the land in the same condition it was found”*.<sup>140</sup> The cost of clean-up, conducted by either side, is deducted from the residual value of the base for which the US requires compensation.<sup>141</sup>

There is flexibility around who does the clean-up work, if the contamination is considered low level the Germans prefer to undertake work. If contamination is more substantial due to, for example, the site having been previously used as an ammunition dump, the US is required to decontaminate. There has been some contention over to whose standard the clean-up is conducted.<sup>142</sup>

Amongst all the countries that have SOFAs with the US, Germany has some of the strictest environmental legislation<sup>143</sup> due to a history of national concern over environmental issues and vocal environmental protest movements. In particular, the reliance on shallow aquifers for drinking water means that groundwater protection is emphasised in German environmental law.<sup>144</sup> This is significant because of the environmental impact that munitions or other military pollutants can have on groundwater.<sup>145</sup>

### US military bases in South Korea

The original US – South Korea SOFAs were drawn up in 1966, and contained no environmental clean-up provisions. This was a time in which Cold War concerns around security were strong, visiting forces were viewed favourably and environmental provisions were of little concern to either party.

The history of US involvement in South Korea has been intertwined with the ongoing tension between North and South Korea. For strategic reasons South Korea has historically placed great value on US military support which has meant

that: *“the United States has dominated the bilateral relationship with South Korea since the Korean War.”*<sup>146</sup>

In 2001, an additional memorandum was drawn up in which the US established a policy for remedying contamination that presented ‘known imminent and substantial endangerment’ (KISE). Since this time, there have been ongoing negotiations over the environmental condition of returned bases. South Korean environmental organisations have been vocal in arguing for decontamination to levels acceptable under Korean environmental law.

The key issue in negotiations has been the fact that the meaning of KISE is open to interpretation. There has been a gap in understanding between the two parties and the US has denied responsibility, stating the absence of clear agreements as justification. The US has also argued that because the Korean government is not required to compensate the US for the value of site improvements, the costs of clean-up are offset.<sup>147</sup>

While negotiations were deadlocked for a number of years, in 2007 the Korean government reluctantly agreed for bases to be returned under the US interpretation of KISE. Soil and groundwater at 23 of the 31 returned sites were found to be contaminated above levels set in Korean law<sup>148</sup> and toxic substances present included benzene, arsenic, TCE, PCE, lead, zinc, nickel, copper and cadmium.<sup>149</sup> In 2009, the cost of clean-up of returned bases was estimated by the South Korean government at US\$162m<sup>150</sup>.

Some South Koreans argue that the US has made use of the ‘security priority atmosphere’ to bolster their dominance in the bilateral relationship.<sup>151</sup> The stronger environmental provisions in US-German SOFAs were also raised by South Korean critics, with the US being accused of double standards.<sup>152</sup>

139. BICC (1995)

140. BICC (1995:46)

141. BICC (1995)

142. Personal conversation with Ira May, Chief Geologist (rtd), U.S. Army Environmental Centre.

143. Weiner (1992)

144. Weiner (1992)

145. Warsta (2013) European Conference of Defence and the Environment

146. Chae (2010:10094)

147. Koo (2011:111)

148. Chae (2010:10096)

149. Chae (2010:10078)

150. Chae (2010:10090)

151. Chae (2010)

152. Koo (2011)

Since 2009, the new US administration has agreed a Joint Environmental Assessment Procedure (JEAP) with the Korean government. JEAPs give Koreans more control over environmental assessment procedures prior to base returns and have been seen as a positive step. However, as pointed out by Chae (2010), through accepting JEAP, the Korean government has fully accepted the KISE agreement, which does not bind the US to decontaminating returned bases to Korean environmental standards. The new US administration has used ‘smart power’ of which JEAP agreements are a part, to maintain a harmonious bilateral relationship whilst not meeting Korean demands.

As shown in the previous section, an assessment of these cases reveals that the issue of environmental protection is political. Actors, such as Germany and the US, who have greater political influence will demand, and refuse accountability, in a way that suits their interests. Given the absence of common agreements that are applicable to all US bases, whether domestic or overseas, environmental best practice differs depending on the power relationships between states.

There is a greater risk of severe military pollution in cases in which uneven power dynamics make it difficult to hold polluters to account, such as in the South Korean case. Higher levels of pollution are more expensive to resolve and have greater humanitarian and environmental impact. In addition, some less politically powerful states may have less capacity and resources for decontamination.

This highlights the urgent need for a stronger regulatory approach to the resolution of TRW. The power dynamics of international relations should not dictate whether or not lives are put at risk from military pollution.



▲ A masked South Korean protester performs during an anti-U.S. rally downtown of Seoul July 27, 2000. The protesters demanded a revision on the SOFA (Status of Forces Agreement) saying the agreement allow excessive privileges to U.S Forces in Korea (USFK). Tensions between Korean citizens and the U.S. military have been rising since USFK dumped 20 gallons of formaldehyde into Seoul's main river in February 2000. The poster reads “Huge share of military expenses” in relation to the millions of dollars paid by the South Korean government for the maintenance and operation of the USFK annually.

Reuters  
27.07.2000

# 7.0 AFFECTED STATE CAPACITY

## KEY FINDINGS

- 1** There are a lack of clear obligations to assist states affected by TRW.
- 2** TRW problems can be technically challenging and expensive to resolve and money and expertise are often lacking in post-conflict states. Infrastructure damage and political instability also impact the ability to manage TRW.
- 3** There is some growth in humanitarian-centred international support for the resolution of TRW issues.
- 4** A fixed mechanism that utilises the Polluter Pays principle would help clarify obligations.
- 5** Much can be learnt from Kuwait's 'prepare the environment for war' initiative.

With the exception of landmines and UXO clearance, there is no requirement within existing IHL that mandates the post-conflict clean-up of war remnants. And unless it can be proven that a state has acted unlawfully, there is no recourse to reparations for post-war environmental contamination. This means affected states are forced to manage the majority of TRW issues alone.

Environmental remediation can be technically challenging and expensive. The weakened state of post-conflict nations means that there remain vast capacity, expertise and priority issues that prevent the adequate management of TRW. The difficulties in managing TRW increase the likelihood of public health problems and persistent environmental damage.

In this section the experiences of Iraq, the Gaza Strip, and Kuwait, will be explored to understand some key issues in the adequate management of TRW issues.

### 7.1 IRAQ POST 2003 COALITION FORCES INVASION

Iraq's environment and people have suffered several conflicts over the last three decades. From the use of chemical weapons in the 1980s, to the oil fires and military and industrial site bombing during the 1991 Gulf War, economic sanctions during the 1990s, the 2003 Iraq War and instability since 2003, the Iraqi people have been exposed to substances that pose high levels of toxic and radiological risk (see Appendix A).

After the 2003 invasion, Iraqi capacity to manage TRW was heavily impacted by conflict. Key organisations that managed environmental issues in Iraq were physically impacted by war. The Iraqi Environmental Protection and Improvement Directorate (EPID) offices were extensively looted in Baghdad during the 2003 invasion, leaving the directorate without essential equipment or adequate office space.<sup>153</sup>

The toppling of the old regime and transition to the current federal democratic Islamic republic also meant that governing institutions had to adjust to new governance structures. The new Iraqi Ministry of the Environment (MoE), which was established with international assistance, faced internal political difficulties during the rebuilding process (see Box 2).

153. UNEP Iraq Progress Report (2003:31)

### ▼ BOX 2 – The system is new, but the mentality is old

Institutional development driven by external actors, as has been the case in Iraq and Afghanistan, is challenging. In the case of Iraq, Narmin Othman, former Minister for the Environment from 2004 to 2011, had an uphill battle coordinating with existing ministries. A key issue was that: “*everything linked to the environment is new in Iraq*”,<sup>154</sup> therefore bringing environmental priorities to the attention of other ministries has been difficult. Alongside this, ‘old ministries’ were reluctant to make space for the ‘new’ MoE:

*“...the Ministry of Agriculture still thinks it has lead for National Parks, the Ministry of Water Resources continues to do water quality monitoring, even the new Ministry of Science and Technology believes it should have responsibility for nuclear clean-up...”*<sup>155</sup>

Additional factors identified were the issue of funding, and competition for control over project management:

*“Demining is presently a MoEnv[MoE] responsibility, but the Ministry of Defence continues to encroach on this mission...I think it is a corruption issue – the MoD wants all of the money for training and mine clean-up operations for themselves”*.<sup>156</sup>

Internal political tension can obstruct the ability of institutions to function in the timely and effective manner necessary to reduce harm from TRW. This highlights the importance of external support to make dedicated efforts to work alongside existing systems, as opposed to imposing new systems, developing institutions at a pace that does not create internal tension.

Continuing instability and security concerns also made it difficult for foreign experts to work in Iraq and assist environmental assessment work.<sup>157</sup> The UN’s country team was relocated to Amman, Jordan, after the August 19th 2003 Canal Hotel bombing. UNEP eventually closed its Iraq field assistance programme in 2007 due to the deterioration in the security situation and has only been able to provide remote support since this time.<sup>158</sup>

The management of DU contaminated military scrap after the 2003 invasion reveals the difficulty affected states face in resolving TRW issues (see Box 3). Capacity, funding and institutional cooperation are all factors that impact the ability of states to handle TRW clean-up effectively.

### ▼ BOX 3 – Managing DU contamination in post 2003 Iraq

Following the invasion much battlefield debris was left in urban areas for months and years after the initial hostilities.<sup>159</sup> The scrap metal industry is a lucrative business in Iraq where employment opportunities are limited. This led to the uncontrolled movement of hazardous battlefield debris into civilian scrap metal yards, where adults and children frequently came into contact with numerous toxic and radioactive substances (see Appendix A).

Iraq’s capacity to resolve the issue was bolstered by UNEP conducting a capacity building programme specifically designed around assessing and monitoring DU contamination. This however was still reliant on the Swiss-based Spiez Laboratory where samples were analysed.<sup>160</sup>

A significant barrier to DU clearance, alongside capacity, is the high economic cost of assessments, monitoring, clean-up and storage of contaminated materials. Because of funding constraints, some clean-up projects were not undertaken in the safest and most effective manner: in some cases private contractors were hired to reduce costs.<sup>161</sup> These contractors did not receive specialist training and on one occasion it was reported that contaminated debris was simply dumped in an undisclosed location. The vast number of expected sites of contamination means that the cost of making the environment safe for civilians remains prohibitively high. Some experts claim the total cost of DU clean-up in Iraq has a ‘multi-billion price tag’.<sup>162</sup> This work is further frustrated by the refusal of the US to release its firing coordinates.

Alongside funding and capacity issues, there are a number of actors involved in DU clean-up including MoE, MoST, the MoE’s Radiation Protection Centre (RPC) and the MoD. Ministerial disputes over responsibilities and budget have hindered the effective management of DU contamination.<sup>163</sup>

154. Narmin Othman in *The Iraq Ministry Of Environment’s Evolving Role*, Wikileaks ref: 09BAGHDAD238, 29 Jan 2009, available online at: <http://cablegatesearch.net/cable.php?id=09BAGHDAD238&q=iraq%20unep>

155. *Environment Ministry Gets Boost From New Law*, Wikileaks ref: 08BAGHDAD3565 12 Nov 2008, available online at: <http://cablegatesearch.net/cable.php?id=08BAGHDAD3565&q=iraq%20ministry-of-environment>

156. *The Iraq Ministry Of Environment’s Evolving Role*, Wikileaks ref: 09BAGHDAD238, 29 Jan 2009,

available online at: <http://cablegatesearch.net/cable.php?id=09BAGHDAD238&q=iraq%20unep>

157. UNEP in Iraq (2007b:7)

158. Jensen (2013)

159. IKV Pax Christi (2013)

160. UNEP Depleted Uranium (2007)

161. IKV Pax Christi (2013)

162. IKV Pax Christi (2013)

163. IKV Pax Christi (2013)





▲ —————  
War debris litters the Iraqi landscape.  
Sung Nam Hung  
Circa post 2003



▶ —————  
A young boy plays in the rubble of his  
neighborhood in Khan Yunis, Gaza Strip  
Occupied Palestinian Territory.  
Zoriah – [www.zoriah.com](http://www.zoriah.com)  
13.05.2006

Iraq has received much international support, primarily through UNEP projects. Between 2003 and 2006 UNEP conducted a PCEA, and institutional and technical capacity building programmes. Their work alongside the MoE highlighted the potential risks posed by thousands of contamination hotspots at damaged or abandoned industrial sites across Iraq.<sup>164</sup> Following concerns raised over the risks of DU contamination (known to be used in urban areas)<sup>165</sup> UNEP conducted capacity building work to increase national expertise for DU monitoring and assessments. UNEP reports raised awareness of infrastructural breakdown issues and subsequent environmental impacts<sup>166</sup> which led to funding for rehabilitation programmes.<sup>167</sup>

However, what is most striking about Iraq's capacity to manage TRW post 2003, is that the scope of TRW problems vastly outweighed both Iraq's internal management capacity and the level of available external assistance. The UNEP Hotspot report<sup>168</sup> stated that several thousand contaminated sites were estimated to exist in Iraq. Not all were connected to the recent conflict, however, with many related to indirect TRW issues caused by institutional breakdown from past and recent conflicts. UNEP were able to assist the MoE in the clean-up of four of the five sites highlighted by their 2005 report, though the clean-up was described as incomplete by Narmin Othman according to US Wikileaks cables.<sup>169</sup> While this work was crucial, it remains extremely limited given the number of contaminated hotspots.

## 7.2 THE GAZA STRIP FOLLOWING 2008–9 ISRAELI BOMBARDMENT

The Gaza Strip is a self governing entity of the Occupied Palestinian Territories. Gaza has experienced various levels of conflict for decades, which has taken its toll on its environment and its ability to manage conflict pollution. Aggravating factors have included the blockade of Gaza, which has been in place since 2007 and has impacted both the economy and the availability of basic equipment needed for clearance work.

The focus of this section are TRW caused by the heavy bombardment of Gaza by Israeli forces between December 2008 and January 2009. Information has been made available through a UNEP PCEA.<sup>170</sup>

Demolition rubble resulting from aerial bombing was identified as a key TRW issue. While some demolition waste could be treated as non-hazardous waste, much had been contaminated with asbestos and hazardous household products. In addition, the building fires that followed bombardment left building material contaminated with polynuclear aromatic hydrocarbons (PAHs). The potential presence of highly toxic chlorinated compounds, dioxins and furans was also of concern.<sup>171</sup>

Additional problems identified in the PCEA included 'hanging rubble', which was the consequence of aerial attacks. The present of hanging rubble meant that many buildings remained unsafe to enter and contaminated rubble could not be cleared. In normal circumstances high-reach cranes would be used to fully demolish and clear rubble, however this equipment was not available in Gaza. Simple matters such as the availability of personal protective equipment also hampered clean-up work.

Alongside the issue of hazardous rubble, heavy metals and other toxic weapons residues were also identified as an issue of concern in Gaza following the bombardment.<sup>172</sup> However, little is known of risks posed by weapons residues due to the limited research conducted.

The UNEP PCEA identifies that although the levels of hazardous waste were not substantial, the lack of a dedicated facility to handle hazardous waste meant that it would be disposed of with non-hazardous waste, thus contaminating landfills and exacerbating the extent of toxic waste problems.

Alongside the lack of available facilities and equipment needed to manage hazardous waste, war has also impacted environmental protection agencies within Gaza. Two of the three agencies experienced physical damage to office buildings and assets, and staff experienced restricted movement preventing the ability to respond to crisis.<sup>173</sup>

UNEP's PCEA included an economic assessment of the costs of rehabilitation and restoration of environmental damage as a result of the hostilities. UNEP undertook two assessments, one of the costs of damage directly linked to the hostilities, and a wider assessment of the costs of remediating longer term environmental issues resulting from decades of conflict. Whilst there are limitations and constraints to undertaking an economic assessment, the results give an idea of the level of financial burden rehabilitating environmental problems entails.

164. UNEP Hotspots (2005)

165. UNEP Depleted Uranium (2007), IKV Pax Christi (2013)

166. UNEP Iraq Desk Study (2003), UNEP Iraq Progress Report (2003)

167. Jensen (2013)

168. UNEP Hotspots (2005)

169. *The Iraq Ministry Of Environment's Evolving*

Role, Wikileaks ref: 09BAGHDAD238, 29 Jan 2009. <http://cablegatesearch.net/cable.php?id=09BAGHDAD238&q=iraq%20unep>

170. UNEP Gaza Report (2009)

171. UNEP Gaza Report (2009:27)

172. Manduca et al. (2013)

173. UNEP Gaza Report (2009:69)

The cost of environmental damage directly linked to the hostilities was estimated at US\$44m. The cost of dealing with the safe removal of demolition rubble and asbestos alone was estimated at US\$17.49m. The cost of resolving longer term environmental issues that are the result of Gaza having experienced decades of conflict was estimated at more than US\$1.5bn.<sup>174</sup> Gaza's economy is in a poor state, is heavily reliant on foreign aid, and has been severely affected by Israel's blockade.

Whilst Gaza is one example, and not all environmental issues identified by the financial assessment would class as TRW, this case still illustrates the potential for conflict pollution to be prohibitively expensive to resolve. Unless environmental damage is avoided and financial assistance and humanitarian aid is made available, the environment and civilians are left to bear the costs through ill health.

Importantly this case also shows that TRW issues can be exacerbated when funds, equipment and facilities are unavailable and where institutional capacity is impacted by conflict.

### 7.3 KUWAIT PREPARES FOR WARTIME ENVIRONMENTAL DAMAGE \_\_\_\_\_

Kuwait experienced extensive environmental damage as a result of the 1990–1991 Gulf War, in which Iraqi forces released large quantities of oil into the sea and started more than 600 oil well fires. As the 2003 Iraq War approached, Kuwaiti officials saw the need to make preparations in case Iraq's tactics were repeated.

Kuwait's contingency plans involved: establishing an Emergency Response Committee which co-ordinated preparation activities for emergencies relating to oil, air and water; the creation of 23 emergency rooms around the country and three larger emergency stations which collected baseline data, monitored changes and fed into an early warning system; the production of 5000 magazines titled 'Our Environment' which gave precautionary advice on chemical and biological weapons attacks; mock evacuation drills in private offices and government buildings; a 24 hour emergency hotline; building emergency shelters and training specialist fire fighter teams to deal with oil fires.<sup>175</sup>

Notable in this case was the international support Kuwait received. This included equipment from the US Coast Guard to contain oil spills and protection for Kuwaiti oil tankers from US and allied naval ships. Kuwait's Environment Public Authority (EPA) calculated that it could manage oil spills of between 7,000–10,000 barrels, and made arrangements with foreign agencies to clear those that exceeded local capacity. Some of this support was tied to the operational need for the US and Coalition Forces to maintain good relations with Kuwait in its offensive action against Iraq.

Past experience of managing the environmental emergency Kuwait faced after the 1990–1 Gulf War proved invaluable in designing 2003's contingency plans. Kuwait also benefited from being an oil rich nation that was not experiencing internal instability. Stable and effective national institutions allowed the Emergency Response Committee to take well coordinated precautionary action.

The Kuwaiti experience was one in which a clearly defined environmental emergency could be anticipated; the context was comparatively unusual but the principle was sound. Much can be learnt from Kuwait's proactive approach, particularly gathering baseline data and developing monitoring systems. Making contingency plans for situations where local capacity is expected to be exceeded by anticipated conflict related pollution events is critical to preventing long term environmental and public health crises.

International assistance and support for similar approaches should be made available.

### 7.4 WAYS FORWARD \_\_\_\_\_

It is clear that post-conflict states have many barriers to overcome to adequately deal with TRW. These include: internal instability impacting national agencies who ideally are best placed to respond to conflict pollution; the economic impact of war combined with the high expense of post-conflict damage making clean-up unaffordable; a lack of expertise, infrastructure and the facilities needed to deal with the specialist nature of many conflict related contaminants.

This clearly shows that international assistance is needed to continue to support capacity building work and to offer expertise when appropriate. Currently UNEP conducts PCEAs and some assistance with remediation work; however the enormity of the task outweighs the assistance currently available. This is a gap in the humanitarian field that NGOs and international agencies could fill.

However external assistance working alongside (or taking a lead from) national agencies is key to successful TRW resolution. In the landmine and UXO clearance sector NGOs, international agencies and private companies are coordinated by national mine action centres. Whilst environmental ministries and environmental

174. UNEP Gaza Report (2009)

175. *Kuwait Prepares Environment For War*, Wikileaks reference: 03KUWAIT920, 3 Mar 2003. <http://wikileaks.org/cable/2003/03/03KUWAIT920.html>



legislation in post-conflict countries may be in need of development, a long and slow process, the development of specific national agencies that coordinate TRW issues may be a useful approach in the interim.

There is an urgent need for funding to ensure adequate resolution to TRW issues. Following the Polluter Pays principle enshrined in IEL, perhaps a mechanism that enforces belligerents to assist and fund clean-up work is needed. Militaries must be transparent and forthcoming with the information needed for clearance work. Finally, it may be useful for states anticipating conflict and potential conflict pollution to develop preparedness plans, and be supported by the international community in doing so.

# 8.0 RECOGNITION AND ASSISTANCE OF TOXIC REMNANTS OF WAR CASUALTIES

## KEY FINDINGS

- 1** TRW issues often remain unresolved, leaving communities at risk.
- 2** Reports are emerging from post-conflict zones of public health problems.
- 3** There is an urgent need to document harm and assess risk.
- 4** Presumptive disease models could be of use in recognising and assisting civilian casualties of TRW.
- 5** There is a need to develop obligations for recording and assisting TRW casualties.

As has been shown in this report, a weak legal system, the poor regard for environmental best practice by militaries, the huge discrepancies between affected state capacity and TRW problems, mean that the majority of TRW incidents are

left unresolved. This is of great concern for civilians living in war zones.

A key issue is the need for those undertaking post-conflict peacebuilding work to recognise the public health legacy of toxic warfare: “*The indirect health effects of conflict on civilian populations may take years to manifest and may be missed in post-conflict needs assessments*”.<sup>176</sup> Better information, recognition, and assistance are vital to support vulnerable post-conflict communities.

### 8.1 DOCUMENTING POLLUTION, ASSESSING RISK AND MAINTAINING HEALTH RECORDS

The first step toward providing assistance to TRW casualties is data gathering. There is a need to conduct robust environmental assessments to identify pollutants, assess exposure pathways and identify vulnerable populations. There is also a need to monitor the health of ‘at risk’ populations. In both the case of Iraq and Viet Nam, data gathering has been problematic (see Box 4, page 82, and Box 5, page 84), both in terms of assessing environmental risk and in access to accurate health records.

In the case of Iraq, UNEP and the MoE worked to assess and clean-up conflict pollution (see section 7.1). However no epidemiological work assessing the health impacts of conflict pollution has been undertaken. There have been political difficulties around the gathering and presentation of health data on birth defects. This is largely to do with the lack of health registries, the complexity of post-conflict health monitoring and political opposition to data gathering (see Box 4).

In Viet Nam, it took three and a half decades before any meaningful environmental assessments were undertaken examining the extent of human exposure to dioxin from the use of Agent Orange. This is largely due to the political relations between Viet Nam, the US and the international community.

The politicised nature of conflict pollution has prevented the rapid assessment and risk prevention methods that could have saved lives. As suggested by Brigg and Weissman: “*Reliable data are one of the greatest challenges to successfully addressing environmental impacts and public health risks. During and after conflict, gathering data on mortality and morbidity is difficult because of the breakdown of infrastructure and health systems and political motivations in obscuring data or preventing access to the field*”.<sup>177</sup> Reliable data are crucial to reducing risk and providing the right assistance to affected people, however the Iraq case clearly

176. Briggs and Weissbecker (2012:112)

177. Briggs and Weissbecker (2010:127)

shows that even conducting this research is highly political and fraught with difficulties.

The effective protection of civilians from TRW requires that the generation and dispersal of hazardous materials be limited and clearer obligations be developed to ensure the post-conflict management of TRW.

#### ▼ BOX 4 – Gathering public health data in Iraq

The recently released ‘The State of Environment and Outlook report’ prepared by the Iraqi Government with support from UNEP and the United Nations Development Programme (UNDP) stated that: “*Years of conflict and violence resulted in chemical pollution and unexploded ordnances, which is affecting the safety and lives of an estimated 1.6 million Iraqis*”.<sup>178</sup> While the figure of 1.6 million people is largely gathered from the available mine and UXO datasets,<sup>179</sup> it is clear that there is concern for the considerable threat posed to the Iraqi population from conflict related chemical pollution.

The previous discussion and Appendix A both highlight the significant hazards posed by the uncontrolled release of highly toxic and radioactive substances. Materials such as sodium cyanide, arsenic, DU, PCBs, PAHs, have the potential to cause a number of adverse health impacts including cancer and congenital birth defects (CBDs).

Consistent reports from Iraqi doctors have detailed rising rates of cancer and birth defects in parts of Iraq that experienced heavy fighting.<sup>180</sup> According to Neel Mani, the director of the World Health Organisation's (WHO) programme in Iraq between 2001 and 2003: “*the WHO, together with other agencies, were aware of the reports of abnormal rates of health problems, such as cancers and birth defects, in southern Iraq*.”<sup>181</sup>

Part of the problem of recognising war related health impacts have been the lack of accurate public health records. In 2001 a high level of concern led the WHO to work with Iraqi Ministry of Health (MoH) officials to plan a research project that would include health surveillance of cancers, CBDs, renal diseases, and explore environmental risk factors including DU.<sup>182</sup>

The problem the WHO and Iraqi MoH faced was that the WHO budget for Iraq could not cover the costs of the project. Attempts were made to get funding from the ‘Oil for Food Programme’, which diverted Iraqi oil revenues to humanitarian projects during the sanctions regime following the 1991 Gulf War. However

Neel Mani has stated that: “*Frustratingly, any project that proposed to investigate abnormal rates of birth defects in southern Iraq and their relation, if any, to environmental contamination, never got through the Security Council's approval process*.”<sup>183</sup> The politicised nature of research into environmental contamination and health impacts was in part due to the high concern around the use of DU weapons at that time, in Iraq and internationally.

In 2010, politics still seemed to be getting in the way of a similar joint initiative by the WHO and Iraqi MoH. This time funding had been awarded through the UN Development Group Iraq Trust Fund (ITF). The project aimed to examine the trends in birth defects across six Iraqi governorates.<sup>184</sup> A second project would examine the underlying risk factors.

The publication of the study findings has been delayed by two years at the time of writing. An interim report was quietly released in September 2013. While the report was expected to find high rates of CBDs, in particular in areas of heavy fighting, it revealed the opposite, the CBD rates in Fallujah and Basrah were half the typical rates in high income countries. As such the interim report has been treated with suspicion, according to Neel Mani:

“*...the interim findings in the study run counter to the consistent reports of medical professionals across Iraq. They also stand in stark contrast to the views expressed by Ministry of Health officials interviewed by the BBC earlier this year. In their opinion, there was a clear link between areas subject to heavy fighting and an increased incidence of birth defects... A number of experts have now come forward*

178. UNEP News Centre, *Address by Achim Steiner at the Signing of the Strategic Cooperation Agreement Between the Government of Iraq and UNEP*, 26 Jan 2014. <http://www.unep.org/newscentre/Default.aspx?DocumentID=2760&ArticleID=10700&l=en#sthash.b0pYWKSm.2nTW7jdp.dpuf>

179. There is a notable shortage of information that would allow a true understanding of the number of Iraqi people at risk from conflict pollution.

180. The Guardian, *Huge rise in birth defects in Fallujah*, 13 Nov 2009. <http://www.guardian.co.uk/world/2009/nov/13/falluja-cancer-children-birth-defects?intcmp=239>

181. The Huffington Post, *Iraq: Politics and Science in Post-Conflict Health Research*, 15 Oct 2013.

[http://www.huffingtonpost.co.uk/neel-mani/iraq-politics-and-science\\_b\\_4098231.html](http://www.huffingtonpost.co.uk/neel-mani/iraq-politics-and-science_b_4098231.html)

182. *Notes for the Press Briefing on the latest WHO Mission to Iraq*, 14 Sept 2001. <http://www.casi.org.uk/info/undocs/whodu011207.html>

183. The Huffington Post, *Iraq: Politics and Science in Post-Conflict Health Research*, 15 Oct 2013. [http://www.huffingtonpost.co.uk/neel-mani/iraq-politics-and-science\\_b\\_4098231.html](http://www.huffingtonpost.co.uk/neel-mani/iraq-politics-and-science_b_4098231.html)

184. United Nations Development Programme, *Pilot Assessment of Congenital Birth Defects in Iraq in Six Governorates*. <http://mdtf.undp.org/document/download/6499>

*to question the study's methodology and the robustness of the peer-review process, most recently in the respected medical journal The Lancet*<sup>185, 186</sup>

Views expressed by Iraqi MoH researchers in a BBC report<sup>187</sup> drew parallels with the findings of a UNICEF commissioned, AusAID funded study of the prevalence of birth defects and environmental characteristics in Iraq. The study undertaken by Alborz (2013) suggested a correlation between military and non-military sources of contamination, and higher rates of birth defects. Alborz also highlighted the risk of contamination resulting from infrastructure damaged by armed conflict. Whilst a 'proven link' was difficult to ascertain, Alborz noted that the risks to public health are significant thus urgent action is required to address problems of environmental contamination.

## 8.2 RECOGNISING TOXIC REMNANT OF WAR CASUALTIES

As noted in the introduction, TRW casualties are often difficult to identify given the complexity of attributing specific health outcomes to environmental exposures. The history of regulatory science is filled with the proponents of particular substances or practices demanding 'hard evidence' or 'scientific proof of harm' before health problems are recognised and action is taken; smoking and lung cancer is a case in point.<sup>188</sup>

However, the 'presumptive disease' approach (see Box 5) proves that there are means to create a policy on casualty identification and assistance, even in the face of scientific uncertainty and data gaps. The approach has also been used to compensate individuals suffering illnesses after being caught in the dust cloud from the 9/11 attacks in New York.<sup>189</sup>

This approach could provide a useful model to ensure that all those suffering adverse health problems due to exposure to military toxics are recognised as TRW casualties, veterans and civilians alike.

### ▼ BOX 5 – Viet Nam, Agent Orange and changing relations with the US

Between 1962 and 1971, during the Viet Nam War, 72 million litres of chemical defoliants were sprayed in South Viet Nam; approximately 17 million people were exposed to the herbicide.<sup>190</sup> The production of the defoliant had been deliberately accelerated for use in war, the process left the herbicide contaminated with the extremely toxic dioxin 2,3,7,8-Tetrachlorodibenzodioxin (TCDD). The dioxin is an

endocrine disrupter, a carcinogen, and can have reproductive and developmental effects.

The health impact on Vietnamese civilians of chemical defoliant exposure has not been well recorded. After the war, US sanctions cut Viet Nam off from much of the world for two decades. This prevented Vietnamese access to international research on environmental management techniques and dioxins, and international researchers from conducting epidemiological work.<sup>191</sup>

The global visibility of the health impact of Agent Orange was driven by concern over the health of US veterans and decades of campaigning within the US. This resulted in the passing of the Agent Orange Act 1991 through which a recognition was made that certain 'presumptive diseases' veterans had suffered were due to their exposure to Agent Orange during the war. This presumption entitled them to compensation and health benefits.<sup>192</sup>

To manage the issue of scientific uncertainty, a framework was developed to provide enough evidence to guide government policy. The Institute of Medicine (IOM) is tasked with issuing reports every two years on the health effects of Agent Orange and similar herbicides. The reports assessed the risk of both cancer and non-cancer health effects. Each health effect is categorised on a scale of sufficient evidence of an association, to limited or suggestive evidence of no association.<sup>193</sup> The scale is used to decide which health impact would justify government benefits.

In Viet Nam, the government also recognised the health impacts from dioxin exposure and established the Agent Orange Central Payments Programme in 2000. The scheme makes payments to adults suffering spina bifida and related ailments. The monthly payments ranged between US\$3.40 and US\$7.14.<sup>194</sup>

185. The Lancet, *Questions raised over Iraq congenital birth defects study*, 1 Oct 2013. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(13\)61812-7/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(13)61812-7/fulltext)

186. The Huffington Post, *Iraq: Politics and Science in Post-Conflict Health Research*, 15 Oct 2013. [http://www.huffingtonpost.co.uk/neeel-mani/iraq-politics-and-science\\_b\\_4098231.html](http://www.huffingtonpost.co.uk/neeel-mani/iraq-politics-and-science_b_4098231.html)

187. BBC News, *Doctors in Basra report rise in birth defects*, 21 Mar 2013. <http://www.bbc.co.uk/news/world-middle-east-21873892>

188. Michaels (2008)

189. September 11th, Victim Compensation Fund, Frequently Asked Questions. <http://www.vcf.gov/faq.htm>

190. Briggs and Weissbecker (2012)

191. Briggs and Weissbecker (2012)

192. US Department of Veteran Affairs, *Veterans' Diseases Associated with Agent Orange*. <http://www.publichealth.va.gov/exposures/agentorange/conditions/index.asp>

193. American Cancer Society, *Agent Orange and Cancer*. <http://www.cancer.org/cancer/cancercauses/othercarcinogens/intheworkplace/agent-orange-and-cancer>

An estimated one to three million people are affected<sup>195</sup> and the programme funds are insufficient to provide the medical support needed.

The US has no equivalent recognition of the health impact of dioxin exposure to Vietnamese people in Viet Nam. This position is justified in a congressional report which states that:

*“...there is a concern in the United States that if the U.S. government were to seemingly accept some legal or moral responsibility for the Vietnamese ‘victims’ of Agent Orange, it could have undesirable implications for future military conflicts. In this view, for the U.S. government, it remains important that any and all assistance being provided to address the after effects of the use of Agent Orange in Vietnam be seen as a humanitarian act, and not an admission of culpability.”*<sup>196</sup>

*“...In addition, Cambodia and Laos may insist similar treatment for their purported Agent Orange ‘victims’ (given that parts of their nations were also sprayed during the Vietnam War), raising the potential overall cost and the administrative difficulties of addressing this war legacy issue. However, past and existing humanitarian aid programs in Vietnam, addressing victims of land mines and HIV/AIDS, demonstrate the provision of aid need not imply legal or moral responsibility”*

The context of US concern over Agent Orange was one in which the relations between the US and Viet Nam had been warming. After the end of the trade embargo in 1994, the US and Viet Nam established diplomatic relations. While a number of contentious issues were ironed out, one remaining cause for concern had been the issue of Agent Orange. This led to, over a number of years and long-running negotiations, the funding of environmental assessment and remediation work, alongside other international donors.<sup>197</sup> In time, Agent Orange remediation work came to be viewed as an important part of securing a positive bilateral relationship, with the US keen to extend its ‘soft power’ influence in Southeast Asia:

*“It has been postulated that the U.S. military interventions in Afghanistan and Iraq have undermined its global image, and that to restore its image, the United States should more actively engage in ‘soft power’ exercises, such as humanitarian assistance to Vietnam to address its ‘war legacy’ problems. In addition, relations between China and Vietnam since 1975 have ranged from hostile to cool, but more recently China has sought to foster more friendly ties with its neighbours. Increased U.S. assistance for Vietnam’s Agent Orange ‘victims’ could strengthen U.S. – Vietnam relations, and encourage Vietnam to be a stronger partner to the United States in other diplomatic and security areas.”*<sup>198</sup>

### 8.3 ASSISTING TOXIC REMNANT OF WAR CASUALTIES

What these case studies have clearly shown is that without a mechanism, or clear obligations on states for casualty recording and assistance, any assistance given will be unfairly distributed. In Viet Nam support for environmental assessments and some humanitarian aid followed the US’s need to create a positive bilateral relationship with Viet Nam.

It is clear that there is an ongoing unwillingness to be held liable for Agent Orange use in Viet Nam, as this would entail accepting liability for its use in Laos or Cambodia. By providing humanitarian aid as opposed to being obliged to pay compensation, the US protects its diplomatic interests, which may be of humanitarian benefit to some, but this is likely to only be available whilst positive bilateral relations are politically necessary or useful.

Similarly in Iraq, given the controversy surrounding DU use, the United Kingdom (UK) and US governments are reluctant to investigate reports of war related health impacts. The importance of the US in the Iraq-US relationship is widely thought to impact the willingness of the Iraqi government to address the issue. A case in point is that it took until 2010 to prepare a pilot assessment of birth defects in Iraqi governorates, the full results of which are yet to be published at the time of writing.

Again, humanitarian principles dictate that all persons impacted by TRW should be provided full information about toxic hazards in order to prevent further risk. Targeted medical and financial assistance should be made available to casualties. In peacetime, environmental law under the Aarhus Convention gives the public the right to access environmental information held by public authorities, participation in environmental decision-making and access to justice.<sup>199</sup> These rights should be enshrined within any development of post-conflict obligations.

194. Briggs and Weissbecker (2012)

195. Vietnamese advocacy groups quote a figure of over 3 million people suffering the effects of Agent Orange. (Martin, 2009)

196. Martin (2009:31)

197. Agent Orange Record, *Spill over*. [http://www.agentorangerecord.com/impact\\_on\\_vietnam/environment/hot\\_spots/P1/](http://www.agentorangerecord.com/impact_on_vietnam/environment/hot_spots/P1/)

198. Martin (2009:31)

199. European Commission, *The Aarhus Convention*. <http://ec.europa.eu/environment/aarhus/>





▲  
Dr Samira Alaani has worked at Fallujah General Hospital since 1997 and has witnessed a developing health crisis. Concerned about the impact of war on the health of her patients, she has been documenting cases of congenital birth defects since 2006.  
Donna Mulhearn



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## 9.0 CONCLUSIONS

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Conflict pollution can have a devastating impact on the wellbeing of people and the environment, long after wars' end. Contaminated environments will only add to the vulnerability of already fragile communities and states recovering from conflict. This means that addressing TRW is essential to long lasting and sustainable peacebuilding. The United Nations has established that fundamental human rights continue to apply fully during conflict. The ILC has stated that environmental treaties can be applicable during conflict, whereas it is widely acknowledged that IHL provisions are insufficient to provide protection to the environment, particularly in NIAC. International agencies are currently reviewing international law in recognition of the need for improvement.

While advocating for improvement to existing law in terms of clarifying definitions, and establishing how various bodies of law are made applicable to conflict, this report has argued that the creation of a strong enforcement mechanism for remedying environmental damage is also essential for progress on the issue.

The current lack of an accountability mechanism has meant that any assistance for clean-up, compensation, or enforced reparations has been heavily influenced

by powerful global actors. Weak accountability mechanisms allow an ad hoc and inequitable approach to the resolution of TRW. Less politically powerful states and communities should not have to bear the brunt of toxic wars.

Alongside the need for improved laws and enforcement mechanisms, there is a crucial need for post-conflict humanitarian agencies and NGOs to pay greater attention to TRW issues during operations. Affected communities and states are in need of assistance and the range of actors engaged with environmental assessment work should be diversified. Action taken in the days and months following pollution incidents can make a significant difference to environmental and public health outcomes. Capacity building work, hazard awareness, environmental monitoring, assessment and remediation of sites of harm and health monitoring of at-risk populations are all essential work that needs to be conducted in the aftermath of conflict.

Some militaries have already begun to consider the toxicity of weapons and other military materials. While this work is useful, militaries need to go further. Targeting decisions during operations have major long-term consequences for civilians and the environment; fundamental human and environmental rights should be properly regarded in military decision making. Furthermore states should be encouraged to be transparent in regard to targeting data and the recording the use of weapons in populated areas.

Dealing with TRW is expensive. A mechanism that required polluters to financially assist the resolution of TRW, as is the norm during peacetime through the use of the Polluter Pays principle, would go some way to enabling those affected some access to justice. However, given the difficulty of assigning responsibility there is also the need to make additional funding available from the international community to ensure that affected communities are assisted. This is especially important in resolving complex polluted environments where the identification of polluters is less obvious.

Finally, there is a need to recognise TRW casualties as casualties of war. Whilst scientific uncertainty will undoubtedly be used by powerful actors to abdicate responsibility, the 'presumptive disease' approach should be recognised and utilised to ensure those impacted by conflict pollution are assisted.

# APPENDIX A – TRW INCIDENTS DURING IRAQ WAR 2003–2011

	TRW INCIDENT	PARTY(IES) RESPONSIBLE FOR CREATION OF TRW			PARTY(IES) RESPONSIBLE FOR MANAGEMENT OF TRW	TRW INCIDENT MANAGEMENT	WHO TOOK ACTION
MARCH – MAY 2003 INVASION STAGE	<b>Industrial site damage:</b> Industrial sites south of Baghdad including fertiliser and pharmaceutical facilities suffered collateral damage, and hazardous substance release was expected. Subsequent looting increased risk of civilian exposure to hazardous substances. <sup>200</sup>	Coalition Forces			Coalition Provisional Authority (CPA)(2003–2004), Government of Iraq (GOI) (2004 onwards).	See information below on TRW incident management of derelict industrial sites.	MoE and UNEP.
	<b>Targeted military industrial sites:</b> Some military industrial sites were damaged during the invasion. A site investigated by UNEP in partnership with MoE was Al Qadissaya. Highly toxic contaminants found at Al Qadissaya site included: sodium cyanide, sodium hydroxide, hexavalent chromium salts, hydrocarbon and chlorinated solvents. Sites including Al Qadissaya were consequently looted, significantly increasing risk of civilian exposure to harmful substances. <sup>201</sup>	Coalition Forces			CPA (2003–2004), GOI (2004 onwards).	See information below on TRW incident management of derelict industrial sites.	MoE and UNEP.
	<b>Oil well fires at Rumeila oil field:</b> Nine well-heads were set alight in the southern Rumailah oil fields on 20th March 2003 and extinguished on the 15th April 2003. Emissions resulting from oil fires included: carbon dioxide, carbon monoxide, sulphur dioxide, nitrogen oxides, volatile organic compounds, PAHs, hydrogen sulphide, acidic aerosols and soot. Soil and potential groundwater contamination may have resulted from unburned hydrocarbons, oil seepage and contaminated firewater. <sup>202</sup>	Iraqi military			N/A	Fires extinguished by Coalition Forces alongside contractors.	Coalition Forces and contractors. <sup>203</sup>
	<b>Oil trench fires around Baghdad:</b> 50 oil trench fires were started in Baghdad on 27th March and extinguished on the 17th April. Emissions resulting from oil fires included: carbon dioxide, carbon monoxide, sulphur dioxide, nitrogen oxides, volatile organic compounds, PAHs, hydrogen sulphide, acidic aerosols and soot. Soil and potential groundwater contamination may have resulted from unburned hydrocarbons, oil seepage and contaminated firewater. <sup>204</sup>	Iraqi military			N/A	Information unavailable.	Information unavailable.
	<b>Urban bombing:</b> While no environmental assessment of the impact of urban bombing has been undertaken, high levels of hazardous waste and air pollutants are to be expected. A UNEP PCEA of the Gaza Strip identified rubble and demolition waste contaminated with hazardous materials, particularly asbestos. <sup>205</sup> Fires resulting from bombing can contaminate buildings and/or the resulting rubble with PAHs, dioxins and furans, all of which are extremely toxic. In Iraq the additional risk of DU contamination exists alongside unknown quantities of more conventional munitions residues.	Coalition Forces and insurgent groups			CPA (2003–2004), GOI (2004 onwards).	Information unavailable.	Information unavailable.
	<b>Toxic weapons residue:</b> Weapon use will leave toxic residue on battlefields (see section 5.3). Very few studies have been done in Iraq assessing the presence of weapons residues in the environment, and potentially exposed populations. <sup>206</sup> Concern remains as studies in Croatia indicate an increased presence of heavy metals in populations living in areas of heavy fighting compared to populations in areas of moderate fighting. <sup>207</sup>	Coalition Forces, Iraqi military, insurgent groups.			CPA (2003–2004), GOI (2004 onwards)	Due to international concern over DU weapons, the UK MOD and UNEP have conducted DU monitoring and assessment programmes. <sup>208</sup> This work was limited by the refusal of the US to release targeting data, a lack of funding and the security situation. It has not led to environmental remediation. No work has been conducted to examining the toxicity and exposure risk presented by other weapons residues.	Remains unresolved.

N.B. Footnotes begin after the table.

	TRW INCIDENT	PARTY(IES) RESPONSIBLE FOR CREATION OF TRW			PARTY(IES) RESPONSIBLE FOR MANAGEMENT OF TRW	TRW INCIDENT MANAGEMENT	WHO TOOK ACTION
MAY 2003 – DECEMBER 2011 OCCUPATION STAGE	<b>Burn pits:</b> The US military has relied heavily on burn pits as its primary means of waste disposal at US military bases due to their 'expedience'. According to the US GAO burn pit operators were not complying with key guidance that restricts the burning of items, such as plastic, that produce harmful emissions. Burn pits were in operation at 52 US bases between 2003 – 2011. <sup>209</sup>	Burn pit contractors: KBR, Halliburton Company			Burn pit contractors: KBR, Halliburton Company	Some monitoring work has been conducted. Since US withdrawal in 2011 burn pits have not been in operation.	N/A
	<b>Oil pipeline sabotage:</b> At least nine attacks were made on oil pipelines between 12 June and 16 October 2003. UNEP note that significant local environmental damage was caused by oil spilt in these attacks. Ongoing pipeline attacks continued throughout the eight year conflict. <sup>210</sup>	Iraqi insurgency			CPA (2003–2004), GOI (2004 onwards)	Iraqi Ministry of Oil is responsible for pipeline repairs. Unclear whether any environmental remediation measures undertaken as a part of these repairs and by whom.	Information unavailable.
	<b>Stockpiles and munitions disposal sites:</b> In 2005 it was estimated that between 60,000 and 1 million tonnes of ex-regime arms were stockpiled in Iraq. Ageing stockpiles pose an environmental risk through degraded casing leading to toxic substance leaks, and unplanned explosions. A significant volume of these weapons have been disposed of through controlled explosion or burning. UNEP considered contamination of sites inevitable. <sup>211</sup> Contaminants include: heavy metals, TNT and RDX. The presence of UXO makes destruction sites costly and dangerous to remediate.	N/A			CPA (2003–2004), GOI (2004 onwards)	Iraqi MOD is responsible for munitions disposal. It is not known whether contamination issues presented by disposal have been assessed and resolved through improved practice.	Information unavailable.
	<b>Military origin scrap metal:</b> A number of highly toxic substances are likely to be found in destroyed military vehicles including PCBs, CFCs, DU residue, heavy metals, UXO, asbestos and mineral oils. <sup>212</sup> There are reports of military scrap having remained publically accessible in urban areas for a number of months and years after the end of initial hostilities in 2003. <sup>213</sup> Some military scrap has been found mixed with civilian scrap at publicly accessible scrap metal yards. <sup>214</sup>	N/A			CPA (2003–2004), GOI (2004 onwards)	The extent of removal operations is unclear. Iraqi authorities and the US military have removed most military scrap from urban to rural areas, <sup>215</sup> although some has been moved to sites near populated areas on the urban fringe. A recommended cost effective way of dealing with DU contaminated military scrap is burial, however capacity and monitoring equipment is unavailable. <sup>216</sup> It can be assumed that some metal that should be disposed of as low level radioactive waste may well remain on unsecured scrap yards, be transported across borders or reprocessed.	Remains unresolved.  MoE, RPC, MoST, MoD.  UNEP has provided assistance with management recommendations. US Army Corp undertook some debris removal.
	<b>UXO contamination:</b> The Iraq War and previous conflicts have left Iraq with a significant UXO legacy. A figure of 25 million mines still present in Iraq was quoted by MoE minister Narmin Othman in 2009. <sup>217</sup> As well as posing a direct threat to life and limb, UXO consist of toxic substances including RDX, TNT and heavy metals. Mines destroyed in situ have the potential to contaminate soils. Ageing and degraded UXO may leach contaminants into the ground, impacting the soil layer, surface water and ground water.	Coalition Forces, Iraqi military, insurgent groups.			Iraqi MOD, MoE, Iraqi MoST and various mine clearance contractors..	There is still much work to be done to clear Iraq of mines and UXOs. While information is limited it is clear that there is no requirement to minimise contamination or remediate land after mine and UXO clearance activities.	Remains unresolved.

N.B. Footnotes begin after the table.

	TRW INCIDENT	PARTY(IES) RESPONSIBLE FOR CREATION OF TRW			PARTY(IES) RESPONSIBLE FOR MANAGEMENT OF TRW	TRW INCIDENT MANAGEMENT	WHO TOOK ACTION
MAY 2003 – DECEMBER 2011 OCCUPATION STAGE	<b>Essential infrastructure disrupted:</b> Conflict and economic sanctions since 1990 have impacted essential infrastructure including electricity, water supply and waste disposal and sanitation. <sup>218</sup> This has led to the illegal dumping and burning of domestic waste, a lack of clean running water and inadequate sewage treatment facilities. <sup>219</sup>	N/A			CPA (2003–2004), GOI (2004 onwards).	A number of rehabilitation projects have been funded by the International Reconstruction Fund Facility for Iraq, including: 36 Water and Sanitation projects, US\$93m; 1 solid waste management project in the City of Kirkuk, US\$3,4m; 8 electricity rehabilitation projects, US\$138m; <sup>220</sup> Water Supply, Sanitation and Urban Reconstruction Project, US\$110m; <sup>221</sup> Electricity Reconstruction Project, US\$6m; <sup>222</sup> Baghdad Water Supply and Sanitation Project, US\$65m. <sup>223</sup>	UNDP, UN-HABITAT, UNOPS, WHO, UNICEF, UNESCO, UNIDO, Iraqi Ministry of Municipalities and Public Works, Iraqi Ministry of Electricity, Mayorality of Baghdad.
	<b>Derelict industrial sites looted:</b> <sup>224</sup> The decline of Iraq's industrial sector post 2003 led to extensive industrial site looting and the uncontrolled release of numerous hazardous substances into the environment. The full extent is unknown, however UNEP estimate 1000s of hazardous sites remain. The following example gives an idea of the health risk posed: Tuwaitha nuclear research facility was looted during between March and June 2003. 3000 drums, some containing 'yellow cake' (processed uranium oxide), were stolen; some were found being used as domestic water storage containers.	N/A			CPA (2003–2004), GOI (2004 onwards).	The majority of damaged and abandoned military and industrial sites have not been assessed, monitored or remediated. Five 'hotspots' were assessed by a joint UNEP and MoE project. <sup>225</sup> Of the five sites UNDG ITF financed the disposal of hazardous waste at two sites. The five sites identified were described as "the tip of the iceberg in terms of environmental hot spots" by UNEP.	MoE and UNEP.

200. UNEP in Iraq (2007:21)

201. UNEP Hotspots (2005:66)

202. UNEP Iraq Progress Report (2003:13–4)

203. UNEP in Iraq (2007:21)

204. UNEP Iraq Progress Report (2003:13–4)

205. UNEP Gaza Report (2009:27)

206. A number of studies have been undertaken by the Canadian, American and British governments to establish whether their soldiers have been exposed to DU. See CADU (2012:41).

207. Jergovic M et al. (2010) Cross-sectional Biomonitoring of Metals in Adult Populations in Post-war Eastern Croatian: Differences Between Areas of Moderate and Heavy Combat. *Croat Med J*, 2010; 51: 451–60208. Smith D. and Brown R. (2006) TA6 – Radiation Protection of the Public and the Environment. Radiological Assessment of Depleted Uranium Impact Locations in Iraq <http://www.colloquium.fr/06IRPA/CDROM/docs/P-210.pdf>209. Motley Rice, Burn Pit Locations, <http://www.motleyprice.com/occupational-disease/burn-pit-locations>210. UNEP in Iraq (2007:24) Cablegate search of 'oil-pipeline sabotage iraq' reveals attacks continued until at least 2008. <http://cablegate-research.net/search.php?q=oil-pipeline+sabotage+iraq&qo=0&qc=0&qto=2010-02-28>

211. UNEP Hotspots (2005:49–50)

212. UNEP Hotspots (2005:115)

213. IVK Pax Christi (2013)

214. UNEP Hotspots (2005:112–121)

215. US Army, *Scrap project beautifies Basra*, 11 Apr 2010. [www.army.mil/article/37224/Scrap\\_project\\_beautifies\\_Basra](http://www.army.mil/article/37224/Scrap_project_beautifies_Basra), Al-Shorfa, *Iraqi government starts collecting scrap metal*, 25 Apr 2011 [http://mawtani.al-shorfa.com/en\\_GB/articles/iii/features/iraqtoday/2011/04/25/feature-04](http://mawtani.al-shorfa.com/en_GB/articles/iii/features/iraqtoday/2011/04/25/feature-04)

216. IVK Pax Christi (2013)

217. *The Iraq Ministry Of Environment's Evolving Role* (2009) Wikileaks ref: 09BAGHDAD238 <http://cablegatesearch.net/cable.php?id=09BAGHDAD238&q=iraq%20unep>

218. UNEP Desk Study (2003:28–35)

219. *Environmental issues in Basrah*, Wikileaks ref: 06BASRAH107, 20 Jun 2006. <http://wikileaks.org/cable/2006/06/06BASRAH107.html>220. Jensen (2013:37), UNDG Iraqi Trust Fund, *Final list of approved projects*, 30 Sept 2010. <http://www.irffi.org/WBSITE/EXTERNAL/IRFFI/0,,contentMDK:21718000~pagePK:64168627~piK:64167475~theSitePK:491458,00.html>221. World Bank Iraq Trust Fund, *Water Supply, Sanitation and Urban Reconstruction Project*, Oct 2011. <http://siteresources.worldbank.org/IRFFI/Resources/PSSITFWaterSupplyOctober2011.pdf>222. World Bank Iraq Trust Fund, *Electricity Reconstruction Project*, Oct 2011. <http://siteresources.worldbank.org/IRFFI/Resources/PSSITFElectricityReconstructionOctober2011.pdf>223. World Bank Iraq Trust Fund, *Baghdad Water Supply and Sanitation Project*, Oct 2011. <http://siteresources.worldbank.org/IRFFI/Resources/PSSITFBaghdadOctober2011.pdf>

224. Accurate information on the extent is unavailable. General information presented gauged by UNEP teams on the ground. UNEP Hotspots (2005:36) UNEP Progress Report (2003:7–8)

225. UNEP Press Release, *Toxic Sites in Iraq to be Made Safe, UN Environment Helping Boost Iraq's Capacity to Handle Environmental Legacy of War, Conflict and Looting*, Geneva/Nairobi, 10 Nov 2005 <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=457&ArticleID=5023&l=en>

## APPENDIX B – INTERNATIONAL ENVIRONMENTAL LAW CONVENTIONS

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Barcelona Convention 1976	Barcelona Convention for Protection against Pollution in the Mediterranean Sea
Bern Convention 1979	Bern Convention on the Conservation of European Wildlife and Natural Habitats
DRPC 1994	Danube River Protection Convention
Kuwait Convention 1978	Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution
London Convention 1972	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
LRTAP Convention 1979	Convention on Long-Range Transboundary Air Pollution
OILPOL Convention 1954	International Convention for the Prevention of Pollution of the Sea by Oil
OPRC Convention 1990	International Convention on Oil Pollution Preparedness, Response and Co-operation
MARPOL Convention 1973	International Convention for the Prevention of Pollution by Ships
Ramsar Convention 1971	Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat
UNCLOS 1982	The United Nations Convention on the Law of the Sea
UNFCCC 1992	United Nations Framework Convention on Climate Change

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