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Environmental and Social Impact Assessment for Clearing for Results (CFR) Phase III Project

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List of Acronyms

APMBT	Anti-Personnel Mine Ban Treaty
ASEAN	Association of South-East Asian Nations
CFR	Clearing for Results
CIA	Cumulative Impact Assessment
CMAA	Cambodian Mine Action and Victim Assistance Authority
CMAC	Cambodian Mine Action Center
CMAS	Cambodian Mine Action Standards
CSHD	Cambodian Self Help Demining
CSO	Civil Society Organization
DOE	Department of Environment
ERW	Explosive Remnants of War
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GHG	Greenhouse Gas
GIS	Geographic Information System
GICHD	Geneva International Center for Humanitarian Demining
GRM	Grievance Redress Mechanism
HALO	The Halo Trust
IMAS	International Mine Action Standards
IMSMA	Information Management System for Mine Action
MAG	Mines Action Group
MAPU	Mine Actions Planning Unit
NGO	Non-Governmental Organization
NMAS	National Mine Action Strategy
NPMEC	National Center for Peacekeeping Forces, Mines and ERW
NPA	Norwegian People's Aid
NSDP	National Strategic Development Plan
PMAC	Provincial Mine Action Committee
QA/QC	Quality Assurance and Quality Control
RCAF	Royal Cambodian Armed Forces
RGC	Royal Government of Cambodia
SES	Social and Environmental Standards
SESP	Social and Environmental Screening Procedures
SEIA	Strategic Environmental Impact Assessment
SRM	Stakeholder Response Mechanism
UNDP	United Nations Development Program
UN-REDD	United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation

1 Executive Summary

Given the severity of Cambodia's landmine contamination, following decades of national and regional conflict, mine action (the broad set of efforts to address the problems caused by mines and explosive remnants of war) is recognized as an essential part of Cambodia's development. The contribution of the United Nations Development Program (UNDP) to mine action in Cambodia through it's Clearing for Results (CFR) projects, and the efforts of both national and international mine action operators, donors and the Royal Government of Cambodia (RGC) have been pivotal in raising Cambodia's economic status to lower middle-income country in 2016.

In addition to its obligations to the Anti Personnel Mine Ban Convention (APMBC), Cambodia has renewed its obligation to mine clearance through the Maputo +15 declaration, which aims for complete clearance of all landmine contamination by 2025. Although much has been accomplished, there is much that remains to be done and the sector faces not only the challenge of a vast area remaining to be cleared, with a high level of poverty in the most affected northwestern provinces where contamination is most dense, but also the additional challenge of shrinking official development assistance (ODA).

Furthermore, Cambodia is at a critical juncture in terms of reforming its national policies in regards to its natural resource management, to encompass important environmental and social safeguards, and is making pivotal decisions in regards to protecting its forests and in terms of land tenure security. Much has been written recently in regards to the rapid rate of deforestation, with tree cover loss accelerating faster than any other country in the world. This high rate of deforestation will have wide-ranging impacts on Cambodia's future development in terms of agricultural productivity (the cornerstone of the economy) and its overall vulnerability to climate change, which is considered the highest in the world. Furthermore, amidst a alarming trend of forced evictions and land grabs, Cambodia has recently come under increasing international scrutiny in terms of land tenure security, signaling the need for a more coordinated and rights-based approach to land management.

Cambodia is also in the process of re-writing its National Mine Action Strategy (NMAS), seeking to encompass both its renewed commitment to full clearance by 2025, as well as better alignment of the NMAS with other national and sub-national policies. Cambodia is already recognized globally as a leader in mine action in terms of planning, technical knowledge and innovation. Furthermore the Cambodian Mine Action and Victim Assistance Authority (CMAA), UNDP's implementing partner for CFR, has emerged as a competent actor in managing and regulating mine action, and has placed increasing and much-needed emphasis on information management, bottom up planning and prioritization of minefields to be cleared, post-clearance

monitoring and gender mainstreaming in mine action. Given the maturity of mine action in Cambodia, and the level of national development achieved, the sector in Cambodia has started taking a more nuanced and directed approach, moving way from the emergency phase to more strategically integrating sustainable development goals into mine action. This is an ideal time for Cambodia to become a leader in also integrating environmental sustainability and human rights into mine action.

There are ample opportunities for better linking mine action with humanitarian outcomes, and a deeper understanding is required among actors as to the interactions of mine action with development indicators, as well as a range of related and sometimes negative environmental and social impacts. Although some of these impacts are currently being mitigated to different degrees through the existing planning, monitoring and quality control systems in place, it is evident that there are gaps in policies and processes and that an unacceptable level of residual risk remains, while not adequately linking mine action to well-defined outcomes benefitting the most vulnerable. UNDP's CFR III: Mine Action for Human Development project aims to address these issues by focusing its assistance to the CMAA on three key deliverables:

1) Mine action policies and strategic frameworks are aligned to national and sub-national sectorial policies and planning strategies

2) A CMAA mine action programme performance monitoring system exists that delivers quality evidence on sustainable development outcome/impact

3) A minimum of 27km^2 of the total mine/ERW contaminated areas located in the most affected and poorest provinces are impact-free

In parallel, there is increased recognition at the global scale of the often unintended and unanticipated environmental and social impacts of humanitarian interventions, displayed by increased efforts at the global scale by UNDP in mainstreaming environmental and social safeguards into its projects at an early stage. In the mine action sector in particular, there have also been considerable efforts by the Geneva Center for Humanitarian Demining (GICHD) to look at more complex interactions of mine action with land rights, and more recently the biophysical environment. This is reflected by the current efforts by GICHD to update the IMAS standard pertaining to the environment (IMAS 10.7) and by several recent studies, both globally and in the Cambodian context, on mine action and land tenure security. Furthermore UNDP recently launched its Social and Environmental Standards (SES). The project-level standards are framed by three over-arching principles, which include mainstreaming gender, environmental sustainability and human rights into all UNDP projects. Though applicable to all projects, UNDP's related Social and Environment Screening Procedure (SESP) deemed CFR III as a high-risk project, requiring a comprehensive Environmental and Social Impact Assessment (ESIA), the findings of which are presented in this report. Since the CFR III project touches on national policy, the creation of a performance monitoring system that will be used by CMAA to track the

performance of the sector as a whole, as well as clearance activities, this ESIA takes the form of a strategic assessment. That is, while focused on the CFR III target provinces, it looks not only at possible site level impacts of CFR III clearance, but on the broader environmental and social impacts of CMAA policy and its coordination of the mine action sector as a whole.

It is important to situate mine action in Cambodia within its legislative context. In addition to Cambodia's international obligations to the Anti Personal Mine Ban Treaty (APMBT) and the Maputo +15 Declaration, as well as the normative reference to the International Mine Action Standards (IMAS) that provide guidance on good practice in mine clearance operations, Cambodia is also committed to several international conventions, which protect the environment, human rights and cultural heritage. These include the Sustainable Development Goals (SDGs), the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention to Combat Desertification (UNCCD), and the Convention on the International Trade of Endangered Species of Wild Fauna and Flora (CITES). It is also party to the Convention Concerning the Protection of the World Cultural and National Heritage as well as the International Covenant on Economic, Social and Cultural Rights, which respectively protect areas of archaeological & cultural importance and the human rights to water & land.

Furthermore, these international conventions all have correlates at the national level that codify Cambodia's commitment to environmental and social safeguards. These national policies include the National Environmental Action Plan and closely aligned Environment Code, the National Protected Area Strategic Management Plan and the National Biodiversity Strategy and Action plan which both aim to support the commitment of the CBD and CITES, the Cambodia Climate Change plan, which operationalizes the national implementation of the UNFCCC, and finally the National Program to Combat Land Degradation which in turn operationalizes the national implement of the UNCCD. Also of note is the recently drafted Law on Environmental Impact Assessment. That is, the National Mine Action Strategy and mine action in Cambodia more generally should be aligned not only with the international obligations that directly address mine clearance, but should also account for its broader impacts by addressing those conventions and national strategies and laws that cover environmental and social obligations.

In order to understand the crucial importance of embedding environmental and social safeguards into mine action, it is important to understand Cambodia's unique context, particularly in terms of its natural resources and socio-political constraints. Cambodia is located in the Indo-Burmese hotspot and has many species, which are either endangered or vulnerable to extinction, and given Cambodia's extensive contamination, this means that mine clearance is often carried out in environmentally sensitive areas. Furthermore, many protected areas, such as Samlot Multiple Use Area and Banteay Chhmar Protected Landscape occur in areas of high contamination, which are also CFR III project target areas. Some of the areas of highest contamination, such as the K5 mine belt, along the Thai-Cambodia border are crucial

to maintaining biological corridors between trans-boundary protected areas and remain some of the last forested tracts in areas of high agricultural encroachment and rapid deforestation. Due to Cambodia's history and other development constraints, biodiversity is many areas, particularly among the protected areas in the northwest, are greatly understudied and information of species presence, distribution and abundance is severely lacking. Cambodia was recently assessed to have both the highest rate of deforestation in the world, as well as the world's highest degree of climate change vulnerability. The regional effects of climate change were observed throughout the CFR III study area, with beneficiaries reporting low crop yields, longer and hotter dry seasons with an increased incidence of drought, and more extreme rains during the rainy season. Both biodiversity loss and climate change vulnerability are directly tied to forest cover loess, and it is undeniable that mine action in Cambodia, by interacting with the main drivers of deforestation, particularly infringement of protected areas, agricultural expansion and road construction, has a profound impact on the environment. These conditions are the perfect storm for mine action presenting significant risks for environmental sustainability, which if not properly considered, can do irreversible damage.

Socio-economically, the communities found in the highly landmine contaminated northwest of Cambodia, are among the nation's most vulnerable and as the CFR III project target beneficiaries, have been described extensively in the recently conducted Impact Assessment and Final Evaluation of CFR II. The vast majority of beneficiaries depend almost exclusively on agriculture for their livelihoods and the poorest beneficiaries are often those without land. Many of the most vulnerable beneficiaries in CFR III project areas also depend on income from agricultural labour in Thailand, and some do not have the necessary capital to invest in cleared land. Unsustainable agricultural practices are common and there is increased migration into areas that were previously avoided due to the level of risk, and clearance affects these migration dynamics. Furthermore, insecure land tenure, a legacy of conflict and complex power dynamics, and a recent trend towards granting Economic Land Concessions (ELCs) for agro-industrial plantations has led to a recent rash of land grabs and forced evictions. Furthermore, Cambodia is globally renowned for its cultural heritage and has a plethora of sites of archaeological importance, many of which remain unidentified and unstudied. This social context makes the management of social impacts in mine action of urgent and central importance.

The CFR III project, and more broadly mine action in Cambodia as coordinated by CMAA, was found to have many direct and indirect environmental and social impacts. From the impacts of overarching policy on the direction of the sector, to the activities of survey to clearance and ultimately land release, there are both local and widespread impacts, which touch on almost all the UNDP's project level standard to some degree. Direct impacts derive from the activities related to clearance including: 1) Technical survey for which, due to the nature of the terrain in Cambodia's mine affected areas, in most cases a considerable amount of vegetation needs to be removed and 2) Clearance, where both vegetation and soil are removed for threat excavation (anti-personnel land mines, anti-tank mines and unexploded ordnances)

and in-situ destruction. Indirect impacts are derived from both general operations and the temporary housing facilities used by mine action operators. Some of the most significant adverse direct impacts occur from land release itself, which allows access to land that may previously have been inaccessible (or to which people had limited accessibility) acting as an unintended driver of deforestation and land degradation. Land release also increases the value of land, which may in some cases increase the vulnerability of beneficiaries to land grabs.

Due to factors such as the intensity of the impacts, their spatial scale and duration, as well as the success of current mitigation measures, the impacts described above range from low significance to high significance. The impacts that were found to be of highest significance and in immediate need of both mitigation and a more strategic coordinated approach to management were on 1) Biodiversity (fauna and flora), and sustainable natural resource management, arising primarily from the fact that mine action is a driver of deforestation (by allowing agricultural expansion, encouraging road construction and clearing vegetation), and the fact that clearance in Cambodia often takes place in environmentally sensitive areas and in proximity to protected areas of which boundaries are unclear and which are greatly understudied 2) Climate Change Risk, arising primary from the fact that technical survey and clearance involves significant removal of vegetation, soil structure disruption and increased vulnerability to soil erosion in conjunction with driving deforestation, all of which contribute to climate change vulnerability and 3) Cultural Heritage, arising from the fact that there is extensive and greatly understudied sites of archaeological importance in Cambodia and the capacity of operators to recognize and manage impacts through coordination and chance find procedures is currently low. The impacts on 4) Displacement and Resettlement, were also found to be of high negative significance, given that forced evictions and land grabs have occurred on cleared land and that the systems currently in place do not systematically or adequately address the risk, nor do they provide mitigation measures, or a stakeholder grievance mechanism.

In regards to 5) Community Health and Safety the impacts were found to be of high positive significance, decreasing injuries and casualties in beneficiary communities as well as decreasing the considerable psychological toll of living in proximity to, and cultivating land that is suspected of mine contamination. The impacts on working conditions were found to be of medium negative significance, given the danger of working as a deminer, but mitigated considerably by excellent safety procedures leading to the fact that accidents among deminers in Cambodia is quite low. In regards to 6) Pollution Prevention and Resource Efficiency the impacts were found to be of medium negative significance due to resource use and emissions to the environment, and though the current level of mitigation is importantly lacking, it is relatively straightforward to put the necessary systems in place, and in many cases policies already exist. The impact on 7) Indigenous people was not found to be significance at the current time, due to the fact that the CFR III project is concentrated in the northwest region of Cambodia, where there is very little presence of indigenous people. Regardless, due to the fact that considerable ERW contamination exists

throughout the northeast, where there is a significant presence of Indigenous people, it is suggested that UNDP, and the CMAA take a proactive approach to how it will deal with clearance and management of operators in these areas in the future, which due to time constraints and geographic focus was outside the scope of the present assessment.

In order to mitigate the negative environmental and social impacts of mine action and to maximize its benefits to communities it is essential that the CMAA and operators work together to implement mitigation measures which address both direct site-level impacts as well as the most pressing direct strategic impacts such deforestation, biodiversity, land degradation, climate change vulnerability, threats to cultural resources and land tenure. An Environmental Management Framework has been provided accordingly, which gives mitigation measures related to each of the project level standards also specifying responsibility and suggested timeframe. Many mitigation measures are straightforward and should be implemented immediately, whereas some will require capacity building and information sharing and analysis, which will take more time to implement. In some cases the policy and procedures already exist in the form of an operator level environmental policy, in which case those policies should be updated and then emphasis put on the necessary capacity building, resources and other measures required for their actual implementation. It was found however that even when operator policy did exist, non-compliance with existing policy was found among all operators, in regards to both operating in environmentally sensitive areas, as well as site level soil, water and waste management measures found in IMAS 10.7, which should be immediately rectified. Those operators without an environmentally policy in place should take a lead from other operators, and share environmental SOPs, available in the Khmer language, that have already been developed.

In order for all stakeholders to manage the impacts described in the ESIA, the first step is to adopt the mitigation measures described for each impact in the Environmental and Social Management Framework. In regards to Biodiversity impacts, the utmost care should be taken to avoid clearance in protected areas and within proximity of protected areas. Clearance encourages agricultural encroachment and makes the already difficult exercise of setting protected area boundaries more difficult. Mine action stakeholders should also consider alternative clearance methods in environmentally sensitive areas and understand the importance of undergrowth in addition to large trees. MAPU should account for the fact that road infrastructure contributes directly to forest fragmentation and deforestation and this should be taken into account in prioritization based on development priorities. UNDP and CMAA should also raise awareness among beneficiaries and operators on endangered and vulnerable species found in contaminated areas, and should discourage illegal logging and poaching in the areas, which it clears and should also encourage the sustainable use of fuel wood. Surveys should be carried out and boundaries delineated in protected areas prior to carrying out any clearance in adjacent communities. The border area between Thailand and Cambodia should be recognized as an environmentally sensitive area and clearance

in these areas should be managed carefully to avoid further encroachment, and to minimize trans-boundary environmental impacts, by allowing for migration corridors and strengthening controls on illegal trade.

In regards to land degradation impacts, it is essential that an emphasis be placed on the release of land through non-technical survey rather than technical survey, as this is infinitely less environmentally invasive. The criteria for selection of minefield should be reviewed to avoid unnecessary clearance, and this is especially pressing in light of the fact that it was noted in the Final Evaluation of CFR II, as well as the Mine Sector Review that there is a large number of sites released (which amounted to 25% of sites in 2015 though full technical survey and full clearance) with no items found. This is unacceptable from an environmental management point of view and causes significant disturbance to the environment as well as the needless use of resources with no proportional impact. Mechanical demining should be kept to a strict minimum due to the intensity of its impact on soil degradation.

In regards to impacts on areas of cultural heritage importance, all mine action operators should be made aware of chance find procedures and CMAA should work closely with both Apsara Authority and well as the Ministry of Culture to map areas where sites of archaeological importance are more likely to be found. This information should be systematically shared among mine action stakeholders and incorporated into QA/QC procedures.

The risks to the CFR III project and to the broader mine action sector in terms of displacement and resettlement impacts is particularly high. There have been cases of forced evictions on demined land and although this is symptom of a larger problem and complex socio-political context where land rights violations are common, it is all the more important for mine action stakeholders to be aware of the issues and to deal with them proactively. Both UNDP and the CMAA should support awareness raising in land tenure security and make greater, more comprehensive efforts to track the use of land post clearance in order to ensure that land is being used as intended, and that beneficiaries do not become vulnerable to forced evictions and land grabs. There should be a grievance mechanisms put in place to deal with cases of land conflict or environmental problems so that these issues can be dealt with in an effective and integrated manner. Both CMAA and Operators should partner with human rights NGOs such as Licadho and Adhoc for third party monitoring of sites post clearance.

Special attention should be paid to resource use and efficiency and pollution prevention by following IMAS 10.7 and by systematically collecting information on resource use, setting targets and consistently reporting resource use data to CMAA. Operators should consider implementing innovative solutions to energy generation and waste management, which enhance local development, such as installing solar panels at temporary accommodations.

In order to take a comprehensive and cohesive approach to managing environmental and social risk however, UNDP and CMAA must take the lead, by following four key

steps: 1) Create an enabling environment for environmental and social management within the mine action sector by raising awareness among all mine action stakeholders 2) Implement the appropriate policy by reflecting environmental and social considerations in both the NMAS and the CMAS 3) Implement processes which reflect this policy by adopting the mitigation measures described in the Environmental and Social Management Framework, and adjusting existing processes such as procurement, accreditation, planning and prioritization, post clearance monitoring, and QA/QC. CMAA should also incorporate environmental and social indicators into its performance monitoring system and use the system as the implementation structure of the environmental management plan and 4) Pursue value added partnerships (and encourage operators to do so) in order to best incorporate environmental and social safeguards into mine action, by partnering with conservation, rural development and human rights NGOs for specialized expertise and third party monitoring.

In regards to creating an enabling environment for mainstreaming environmental sustainability and human rights into mine action, the conditions are currently ideal in the Cambodian context, however considerable effort will be required to gain buy-in and adequate awareness among stakeholders. The completion of an ESIA is an important and largely unprecedented step in mainstreaming environmental sustainability and human rights into mine action. Dissemination of the results of the ESIA, as well as the related training is the first step in creating an enabling environment. This is particularly important given that the level of understanding of adverse environmental and social impacts among mine action stakeholders from the village level, through operators, MAPU and CMAA was found to be somewhat limited. Promisingly however there is willingness to look critically at practices and for improvement.

In regards to policy related to environmental and social management in mine action, although a mine action standard for the environment (IMAS 10.7) already exists, the results of this assessment show that it is not well known (or in some cases at all known), nor applied, in Cambodia in any meaningful way. The first key step for adjusting policy should be to refer to environmental and social safeguards in the Cambodian Mine Action Standard (CMAS) by adopting IMAS 10.7 and then to roll out SOPs for this standard. This should also be a part of the accreditation process and operators already accredited should retroactively, and going forward, be checked for compliance. Furthermore, it is essential that environmental and social considerations should be reflected in the newly drafted NMAS, in order to enshrine environmental and social safeguards into the overarching strategic framework of the mine action sector. UNDP must also incorporate environmental and social safeguards in its procurement process by requiring operators to have an up-to-date and functioning environmental management system in place in order to win clearance contracts.

In regards to the process of implementing an environmental and social management plan, it is essential to use existing entry points, most importantly integrating environmental and social indicators into the performance monitoring system.

Existing processes used by the CMAA, which are already relatively robust, should also be used to mitigate risks and maximize benefits to beneficiaries. Firstly, planning and prioritization can be adjusted to improve the efficiency and results of the sector, in regards to environmental and social considerations, particularly by avoiding full clearance when possible and avoiding environmentally sensitive areas. Post clearance monitoring should also be adjusted to account for changes in landuse, environmental incidents and possible land conflicts, which can only be adequately captured if monitoring extends beyond the 6-12 month mark. Dedicated personnel should be assigned within CMAA to take responsibility for environmental and social management. Environmental and social management SOPs should not only be integrated into the operational processes of all operators, but also into the quality management process of CMAA. In order to ensure that this is done effectively, capacity building around environmental management should be carried out for CMAA staff, operators and MAPU staff. It is important that knowledge sharing between actors both at the local level (at district integration meetings) and at the national level (at the technical working group meetings) occurs, and that a robust stakeholder response grievance mechanism is put in place. A technical working group should be established for environmental and human rights mainstreaming.

It is essential that all mine action actors involved in CFR III and broadly, in the mine action sector are aware of the risks and impacts described herein, and the measures, both operational and strategic, required to mitigate these impacts. This includes UNDP, other donors, the CMAA, government officials (including Provincial Mine Action Committees (PMACs), Mine Action Planning Units (MAPUs), commune, district and village level authorities), Operators (including CMAC, Halo Trust, MAG, NPA, NPMEC and RCAF), secondary stakeholders such as human rights and conservation organizations and of course the beneficiaries themselves. Given the importance of land mine contamination and clearance in Cambodia, all stakeholders have a responsibility and vested interest to be aware of, and account for, the *integrated* impacts of mine action. Taking a limited view of progress in the sector, simply in terms of square meters cleared, or focusing exclusively on the goals of the Maputo +15 declaration without consideration of Cambodia's other international obligations, will ultimately harm rather than help beneficiaries. UNDP is taking these considerations seriously, and should support CMAA to take a proactive lead on managing these issues for the sector as a whole.

The completion of this ESIA on the CFR III project and the examination of the strategic impacts of mine action is one of the first of its kind. The ESIA hopes to serve as an example of good practice for mine actions programs around the world. Specifically, Cambodia should use the results of this study and the implementation of an environmental and social management system, to raise awareness of these issues in countries with similar challenges in regards to mine action. The results are particularly relevant in countries with a high level of contamination, coupled with high biodiversity and vegetation cover, as well as similarities in socio-political context, including Angola, Columbia, Laos, and Myanmar.

As noted in the sector review, impact assessment and the final evaluation of the CFR II project, UNDP's CFR III project must invest in understanding the most affected communities and people, and on making an impact in terms of risk reduction its dominant value. The ESIA has emphasized that this risk reduction should be both in terms of immediate risks in terms of injury and casualty, but also long-term risks to communities in terms of land rights and environmental vulnerability. Donors have a role to play here in incentivizing operators around qualitative indicators that measure outcomes for people, and which aim to diminish risks to beneficiaries and the environment on which they depend, and not on quantitative indicators, such as meters squared released. The overarching goal of this ESIA, and future mainstreaming of environmental sustainability and human rights in mine action based on the assessment of impacts and management framework, is to benefit both beneficiary communities and the nation as a whole. In this light, incorporating environmental and social safeguards into mine action should not be seen as an additional activity, but rather essential to its purpose, in helping communities to not just survive, but to thrive.

2 Introduction

2.1 Context: Mine Action for Human Development

Given the severity of Cambodia's landmine contamination, following over three decades of national and regional conflict, Mine Action is recognized as an essential part of Cambodia's development. Cambodia is among one of the countries in the world most heavily affected by landmines and explosive remnants of war (ERW), and although over 50% of Cambodian minefields have been cleared, their presence remains one of the greatest challenges to development in the country, by hindering access to land, water sources and infrastructure and imposing hardship on families of survivors. The contributions of UNDP, both national and international mine action operators, donors, and the Royal Government of Cambodia (RGC), have been pivotal in facing this challenge and in so doing, raising Cambodia's economic status to lower middle-income country in 2016.

Concerted efforts at mine clearance, supporting Cambodia's commitment to the Anti-Personal Mine Ban Convention (APMBC), have made significant progress, with mine action programs supported by a range of international actors and now coordinated by the Cambodian Mine Action and Victim Assistance Authority (CMAA). The CMAA ensures the holistic planning of Cambodian mine action strategy and coordination with the goals of the National Strategic Development Plan (NSDP). In this context, the UNDP's Clearing for Results Programme (CFR) is aimed at both clearing contaminated areas, and at technically assisting CMAA to plan, prioritize and procure clearance activities, in line with the National Mine Action Strategy (NMAS), which is in turn aligned with the NDSP.

The first phases of UNDP's CFR project supported the CMAA in making considerable advancements in efficiency and the targeting of land release resources towards development priorities. The project carried out extensive capacity development, prioritized clearance based on community needs, supported the development of the first NMAS (2010-2019) and released 83 km^2 of land between 2006-2013 in the most heavily contaminated northwestern provinces of Battambang, Banteay Meanchey and Pailin.

Given the continued need for mine action in Cambodia, a third phase of the project from 2016-2019 has commenced, which will continue to support mine action policies and land release in the most affected provinces, and also aims to create a mine action programme performance monitoring system for CMAA, that delivers evidence on sustainable development outcomes and impacts. That is, the CFR III project: Mine Action for Human Development has been designed around three key deliverables:

1) Mine action policies and strategic frameworks are aligned to national and sub-national sectorial policies and planning strategies

2) A CMAA mine action programme performance monitoring system exists that delivers quality evidence on sustainable development outcome/impact.

3) A minimum of 27km^2 of the total mine/ERW contaminated areas located in the most affected and poorest provinces are impact-free

In other words, with the lessons learned from the first two phases, UNDP is putting greater focus on linking mine action with human development and inclusive growth in the geographical areas with the highest levels of multi-dimensional poverty and an ID poor, while keeping land release as a central project goal. On this third phase of UNDP support to mine action, clearance and post-clearance policies will be the driver to address remaining challenges, and the project also aims to help strengthen data-gathering on land use after it has been released, as well as more detailed information collection that will be pertinent in land use planning. Finally, together with the government and partners, UNDP will continue to support operations to release at least 27 km^2 of the total mine and ERW contaminated areas located in the most affected and poorest provinces.

In parallel with these efforts at the national level, the UNDP has recently globally launched the Social and Environmental Standards (SES), guided by the overarching principles of mainstreaming a human rights based approach and environmental sustainability into projects and programmes, while also improving gender equality and women's empowerment. These overarching principles are supported by project level standards, which relate to the following areas:

1) Biodiversity Conservation and Sustainable Natural Resource Management
2) Climate Change Mitigation and Adaptation
3) Community Health, Safety and Working Conditions

4) Cultural Heritage
5) Displacement and Resettlement
6) Indigenous Peoples
7) Pollution Prevention and Resource Efficiency

The standards require the application of the Social and Environmental Screening Procedure (SESP) at an initial stage of project development. The purpose of the SESP is to identify potential social and environmental risks and their significance and determine the project's risk category at an early stage. Accordingly, the SESP was carried out for the CFR III project during the project preparation phase, and the project's risk category was deemed to be high. The SESP identified 30 potential environmental and social risks, spanning those related to human rights, gender and environmental sustainability. These 30 risks included potential threats to biodiversity, increased vulnerability to climate change, the possibility of displacement, threats to community health and safety and pollutant release.

In the case of all high risk projects, UNDP requires that a comprehensive Environmental and Social Impact Assessment (ESIA) be carried out in order to analyse these potential adverse impacts and risks and to define a set of social and environmental mitigation and management measures to be taken during the implementation of the project to enhance positive social and environmental opportunities and to avoid, minimize, or manage risks and adverse environmental and social impacts. For this purpose the services of an ESIA expert were engaged by the Cambodia Country Office to conduct the ESIA in close collaboration with the CFR III project team at UNDP and the implementation partner, the CMAA.

Conducting an ESIA on UNDP's contribution to mine action in Cambodia, through the lens of the CFR III project, is not only pivotal to achieving the stated goals of the project, but is also very timely. There is increased recognition at the global scale of the often unintended and unanticipated environmental and social impacts of humanitarian interventions, displayed by increased efforts not only by UNDP but also UNEP, OCHA to proactively manage these impacts. In the mine action sector in particular, there have also been considerable efforts by the Geneva Center for Humanitarian Demining to look at more complex interactions of mine action with land rights, and more recently the biophysical environment. This is reflected by the current efforts by GICHD to update the IMAS standard pertaining to the environment (IMAS 10.7) and by several recent studies, both globally and in the Cambodian context, on mine action and land tenure security[1,2].

Although it is beyond question that landmines cause unacceptable harm to communities and hamper development efforts, while sometimes themselves directly affecting the environment in negative ways through degradation and pollutant release, land mine clearance also has the potential to harm the very environment,

[1] (GICHD, 2010)
[2] (GICHD, 2013)

which it seeks to restore, reducing its value both to local beneficiaries and to national actors. Furthermore, given the complex socio-political context in most countries that have been affected significantly by war, and are in the process of post-conflict recovery, land clearance and release may also infringe on the rights of communities that it seeks to support, often simply by raising the value of the land and making it more prone to expropriation. That is, mine action undertaken without systematic consideration of its direct as well as broader environmental and social impacts, may have unintended consequences on both the integrity of the ecosystem and the livelihoods of project recipients. Given the humanitarian principle of 'Do no harm' and the emphasis on strong development outcomes from mine action in general, and in particular for the CFR III project, and taking into consideration UNDP's overarching Social and Environmental Standards, the need to mainstream human rights, environmental sustainability and gender considerations into the mine action program is immediate, and begins with the completion of an Environmental and Social Impact Assessment (ESIA).

This study could not come at a better time in the Cambodian context. Cambodia is a critical juncture in terms of reforming its national policies to encompass important environmental and social safeguards, and is making pivotal decisions in regards to protecting its forests and in terms of land tenure security. Much has been written recently in regards to the rapid rate of deforestation, with tree cover loss accelerating faster than any other country in the world, and the impacts this will have on Cambodia future development in terms of agricultural productivity and climate change vulnerability. Furthermore, amidst a trend of forced evictions and land grabs, Cambodia has recently come under increasing international scrutiny in terms of land tenure security[3], signaling the need for a more coordinated approach and rights-based approach to land management.

Cambodia is also currently in the process of re-writing its National Mine Action Strategy (NMAS), seeking it encompass both its renewed commitment to full clearance by 2025, as well as better align it with other national and sub-national policies. The Cambodian Mine Action and Victim Assistance Authority (CMAA), which has emerged as competent actor in managing and regulating mine action is taking the lead on the revision of the NMAS, in close collaboration with other stakeholders. Cambodia is already recognized globally as a leader in mine action in terms of planning, technical knowledge and innovation[4] and the CMAA has already placed increasing and much-needed emphasis on information management, bottom up planning and prioritization minefields to be cleared, post-clearance monitoring and gender mainstreaming in mine action. Given these facts, the relative maturity of mine action in Cambodia, the level of national development achieved, and the fact that the sector has already started taking a more nuanced and directed approach, (moving way from the emergency phase to more strategically integrating development goals into mine action), the Cambodian mine action sector is in an ideal position to

[3] (Amnesty International, 2008)
[4] (GICHD, 2016)

incorporate environmental and social safeguards into mine action, and in so doing, act as a leader in the mainstreaming of gender, environmental sustainability and human rights in mine action globally.

2.2 Objectives of the ESIA

The goal of the present Environmental and Social Impact Assessment (ESIA) is to look at UNDP's contribution to mine action in Cambodia through an environmental and social lens, in order to minimize adverse impacts and maximize development impacts in the long and short terms. The ESIA does so by first describing the CFR III project components in order to identify the various ways in which environmental and social risks may arise, the most relevant stakeholders as well as the entry points for mitigation and management. The ESIA then goes on to situate mine action within the broader context of Cambodia's international obligations to the environment and human rights as well as its national strategies regarding these commitments. The ESIA then provides a biophysical and socio-economic baseline for the ESIA impact area in order to understand the backdrop upon which the CFR III project takes place. The report then identifies the positive and negative impacts of mine action, focusing on unintended negative impacts, which should be mitigated in order to enhance the positive impacts of the sector. It delineates the impacts according to the UNDP social and environmental standards, gives an indication of the relative significance of impacts and then outlines a series of mitigation measures to attenuate the effects of these impacts. These mitigation measures are the backbone of an Environmental and Social Management Framework (ESMF), which should be adopted to manage risks. The report also outlines how these mitigation measures should fit into a broader environmental and social management plan (ESMP).

The conclusions and recommendations are aimed at strategic priorities for UNDP, donors and CMAA and the importance of the sector-wide recognition of the 'Do No Harm' approach to mine action. By identifying the negative impacts of mine action and proposing mitigation measures to lessen these impacts, the hope is to shape the national mine action strategy and standards, and in so doing, act as an example for other mine impacted countries with similar environmental and social concerns, while also supporting the larger process at the global level to better account for the integration of humanitarian and environmental goals. Implementing of the recommendations of this report will place Cambodia in a leading role in terms of mainstreaming environmental sustainability and a human-rights based approach to mine action globally.

Specifically the objectives of the ESIA are to:

1) Strengthen the social and environmental outcomes of the CFR III Project
2) Help align the NMAS, the CMAS more closely with the IMAS standards
3) Raise awareness of the legislative, bio-physical and socio-economic context relevant to the mine action sector among stakeholders

4) Conduct an ESIA to identify the adverse impacts to people and the environment
5) Propose a ESMF to minimize, mitigate, and manage adverse impacts where avoidance is not possible
6) Strengthen UNDP and partner capacities for managing social and environmental risks at the project level through the presentation of results and by delivering as associated training
7) Ensure full and effective stakeholder engagement through extensive consultation

3 Project Description

3.1 Clearing for Results Phase III

In order to understand the environmental and social impacts of the CFR III project it is important to understand the broad-ranging ways in which this project interacts with the overall mine action sector in Cambodia. That is, CFR III supports not only clearance activities, which of course have a direct impact on the environment, but in supporting the CMAA as the national coordinator of mine action in shaping policy frameworks and regulating the sector, it has broader impacts which touch most mine action activities in Cambodia as a whole. The components of the project, which have been assessed in the ESIA, with reference to the three key deliverables of the project, are described in more detail below.

1) Mine Action policies and strategic frameworks

The CMAA takes the lead in ensuring that the National Mine Action Strategy (NMAS), which is the framework for the implementation of mine action in Cambodia, is able to guide the sector in developing and monitoring the implementation of mine/ERW work plans[5]. The NMAS is not only a tool to report on the international obligations under the Anti-Personnel Mine Ban Treaty (APMBT) but also to advocate for increased resources from development partners and the government. The UNDP project documents states that the revision of the NMAS (2017-2025) should not only align efforts to the Maputo +15 declaration, obliging Cambodia to complete clearance by 2025, but should also take into consideration socio-economic and environmental aspects impacted by the mine action sector. Furthermore, the CMAA is responsible for developing the Cambodian Mine Action Standards (CMAS), which guide demining organization in technical matters from management to mitigation. The ESIA therefore will look at the way these policy frameworks impact the mine action sector, are aligned with broader national strategic frameworks pertaining to the environment, and also how they can be used as entry points for improving environmental and social management within the sector as a whole.

[5] (CMAA)

2) Performance Monitoring System linked to development impacts

Establishing a Performance Monitoring System is a central goal of the CFR III project. The aim of the system is to link mine action to human development in a systematic manner and ensure that gender disaggregated and poverty related indicators are factored in. Although the system has not yet been designed or put in place, many elements of the system already exist and the existing functions of CMAA place the organization in an ideal position to set the logical framework for such a system, and to collect and administer data through the customized use of the Information Management System for Mine Action (IMSMA) to manage the sector. Furthermore, existing planning and data collection processes, managed by the CMAA, such as the planning and prioritization administered by the Mine Action Planning Units (MAPUs), and well as the pre-clearance and post clearance assessments, should be used to collect data on set indicators and to subsequently check performance against these indicators. This coordination system in place, as well as the detailed mechanism for planning and post-clearance monitoring, have been described in some detail in various reports, including most recently the Final Evaluation of the CFR II project[6] and the Mine Action Sector Review conducted by the GICHD[7].

Both aforementioned assessments, affirm that the system in place is sophisticated compared to many other national mine action planning systems and that there are many safeguards in place to encourage the effective use of mine-cleared land. As a matter of fact, the participatory system in place arose from the recognized need for safeguards, particularly in regards to the tenure of released land, and the realization that cleared land might be misappropriated[8]. CMAA designed a system to establish a bottom-up land use–planning process that involved all concerned agencies, including provincial authorities, demining operators, relevant ministries, and international donors. The key agencies in this process are the Provincial Mine Action Committees (PMACs) and the Mine Action Planning Units (MAPUs). PMAC is a committee composed of provincial representatives, including officials from relevant ministries, demining operators, and donors. The committee approves the annual Provincial Mine Clearance Work Plan, which prioritizes communes for clearance in the next year, in line with national and provincial development plans. The MAPUs are the operational units of PMAC, and are tasked with coordinating mine-affected communities and demining and development agencies[9]. Although the current process has much strength and is structured in such as way as to encourage participation of all stakeholders, in practice there are elements that can be improved to ensure this participation. Suggestions for improvement, which can help to mitigate the risks related to the UNDP project level standards discussed below, are included in the mitigation measures and recommendations of this report.

[6] (Davies, 2015)
[7] (GICHD, 2016)
[8] ibid.
[9] (Shimoyachi-Yuzawa, 2012)

3) Land clearance and release

In order to understand the environmental and social impacts of CFR III, it is also important to understand the physical process of survey and mine clearance. The mine clearance activities of CFR III are focused on three northwestern provinces, with the aim of focusing on the poorest and most vulnerable mine-affected communities. The CFR III project provinces are Battambang, Banteay Meanchey and Pailin. The land classification, survey, clearance and release process however is applied in a more or less standard manner throughout Cambodia. The process begins with classification of mine contaminated land, referred to as the Baseline Survey (BLS), which assigns areas (polygons) of suspected contamination a label based on hazard level (density and type of contamination). This information comes primarily from community member's estimation of what is in the ground, the history of the conflicts that have occurred in the area, as well as history of casualties and injuries. This classification is followed by a more focused non-technical which verifies information on the ground, or technical survey which involves using mine detection equipment to identify locations of Anti-personnel landmine (APM), Anti-tank mines (ATM) and Explosive Remnants of War (ERW). At this point, following non-technical survey or technical survey, the land can either be cancelled, which means deemed free of hazard and thereby released to the community. Alternatively, if the polygon is deemed a priority for full clearance, this activity involves invasive procedures including the removal of vegetation and soil. Technical survey, or estimations of actual hazard locations can take place with dogs or humans. Human survey is the dominant method due to accuracy considerations, but both the sensors used by humans as well as dogs (who use their sense of smell) need more or less clear ground to work accurately, and hence in Cambodia, it is notable that most vegetation much be cleared just for technical survey.

The adoption of the land release process in Cambodia, which allows land to be deemed safe to use without a full technical survey or alternatively without full clearance (if these activities are deemed unnecessary) has been a breakthrough for the efficiency of the sector and has important implications for environmental management. Regardless, this process can also be further improved as the sector review conducted by GICHD found that nearly 50% of the polygons cleared in 2015 contained no or a very limited number of mines. Necessary adjustments to the land release process in order to mitigate environmental and social impacts are also discussed in the recommendations of this report.

3.2 ESIA Scope and Study Area

Given the above, it is clear that the present ESIA is wide ranging in scope, as it is based on all three key deliverables of CFR III. In focusing on policy interventions and the coordination role of CMAA through the performance monitoring system (PMS), as well as the clearance activities funded through the project, this ESIA takes on the form of a strategic level impact assessment. It is the aim of the ESIA therefore to inform currently and future processes for policy revision, in particular the revision of the

National Mine Action Strategy (NMAS) and the Cambodian Mine Action Standards (CMAS). It is also hoped that an awareness of the broader integrated impacts of mine action will be incorporated into the PMS. Again it is worth noting that the PMS is not meant to monitor the performance of just the land cleared by CFR III, but rather gathers information from all operators in order to measure the performance of the sector as a whole. Hence, this environmental and social impact assessment, though focused on the three CFR III project provinces of Battambang, Banteay Meanchey and Pailin, is also applicable to all operators, as well as the MAPUs of the provinces that are not specifically targeted by CFR III. Furthermore since the UNDP has an open bidding process for contracts awarded under CFR, all operators were assessed in terms of their current environmental and social policy framework, and their compliance in terms of the environmental and social safeguards found in the IMAS 10.7 on the environment. Regardless, given the geographic focus of CFR III, as well as the limited time allowed for a study of this scope, particularly the field work and interviews (which were limited to 15 working days), the direct impact study area was limited to the three provinces of Battambang, Pailin and Banteay Meanchey and analysis used available data, as well as the results of the interviews and field visits. The biological baseline and socio-economic baseline also focused on CFR III project target provinces and on existing data, though the lack of up-to-date and comprehensive quantitative data in these areas is worth noting. Conducting a baseline survey in order to measure the performance of the sector should be a priority for CMAA.

3.3 Methodology for Assessment of Impacts

As discussed above the methods used for the preparation of the present ESIA are those of a Strategic Environmental and Social Impact Assessment, which focus not only on operational impacts related to mine clerance in the CFR III targets provinces, but also strategic level impacts of the Cambodian Mine Action and Victim Assistance Authority's (CMAA) coordination of the sector. The ESIA began with thorough review of project documents as well as existing literature on mine action in Cambodia, the environmental and social impacts of mine action more generally, as well as related issues on the environmental and social trends within the Cambodia context. This initial review included a through consideration of the recently completed Impact Assessment [10] and the Final Evaluation of the CFR II project [11], as well as the Cambodian Mine Action Sector Review [12] completed by the Geneva Center for Humanitarian Demining (GICHD). This review, as well as the Social and Environmental Risk screening that was carried out by the UNDP, was used to scope the issues most relevant to the impact assessment. Accordingly an emphasis was placed on issues of the highest risk, including impacts on biodiversity and land rights. The format of the ESIA follows international best practice, as well as UNDP guidelines

[10] (Rajabova, 2015)
[11] (Davies, 2015)
[12] (GICHD, 2016)

and begins with a description of the project in order to identify interactions with environmental and social components. It then goes on describe the legislative context of both mine action in Cambodia and environmental and social legislation. Given that considerations of environmental and social safeguards is relatively new in mine action, this section is also given emphasis, considering that this document forms a basis of justification to relevant stakeholders as to why mine action should be situated within the broader context of both national and international obligations. The assessment of impacts of mine actions focuses on UNDP's seven project level standards[13]:

1) Biodiversity Conservation and Sustainable Natural Resource Management
2) Climate Change Mitigation and Adaptation
3) Community Health, Safety and Working Conditions
4) Cultural Heritage
5) Displacement and Resettlement
6) Indigenous Peoples
7) Pollution Prevention and Resource Efficiency

The Social and Environmental Standards (SES) Screening exercise, as well as the scoping recognized that all of the above project-level standards were impacted to different degrees by the CFR III project, with the exception of Standard 6 on Indigenous People. This is due to the fact that there is very little presence of Indigenous People in the CFR III target provinces, and hence impacts in this regard are, for the present, negligible. For all of the other projects level standards, a description of the impacts of mine action is given, as well as the mitigation measures that should be put in place to manage these impacts. That is, any project activity that modifies environments (both bio-physical and socio-economic components) falls into three broad categories:

1) Direct impacts
2) Indirect impacts
3) Cumulative impacts

These groups of impacts can be further broken down according to whether they are:

- Positive or negative
- Local or widespread
- Short term, long term or irreversible

Direct impacts are those caused by the activities, which make up mine action itself, which in this case includes survey and clearance. As mentioned above, the process of survey and clearance involves in almost all cases in Cambodia, the removal of vegetation. In many cases it can also involve the removal of topsoil and gravel (in the

[13] (UNDP, 2014)

case of mechanical demining). In these cases the land is directly impacted with the activities of land mine clearance. In general direct impacts are much easier to inventory, assess and control then indirect impacts, since the cause-effect relationship in usually obvious.

Indirect impacts are linked closely with mine clearance and may have more profound consequence on the environment than direct impacts. Cumulative impacts are those that contribute to existing drivers, adding significantly to other trends, which modify baseline conditions. As in many sectors, indirect and cumulative impacts are more difficult to measure but can ultimately be more important. Over time, they usually affect a larger geographic area of the environmental and social spheres than anticipated (not limited to clearance sites). Examples of this type of impact in mine clearance are 1) Land release and how it interacts with larger processes such as agricultural activities, deforestation, land value and land tenure, as well as 2) the temporary accommodations set up for mine clearance units, often geographically close to the clearance site and sometimes by necessity in nearby village or area where it is easier to establish a camp. The direct and indirect impacts on each of the project level standards are then assigned a significance level, in order to inform stakeholders of the importance of the impact and to shape future management and policy interventions. The significance level is determined by assigning an intensity level of the impact based on expert judgment and informed by both baseline data, current literature and interviews with stakeholders, as well as factors such as the spatial extent of the impact, its duration, whether it is reversible or irreversible and finally the level of mitigation that is already in place. This is summarized in the Table 1 below.

Intensity	Extent	Duration	Significance
Low	Site-Specific	Short-term	Very Low
	Local-Regional	Long-term	Medium
Medium	Site-Specific	Short-term	Low
	Local-Regional	Long-term	High
High	Site-Specific	Short-term	Medium
	Local-Regional	Long-term	Very High

The mitigation measures outlined for the impacts on each project level standard, forms the basis of the Environmental and Social Management Framework (ESMF). This is tied into the broader consideration on how to establish an Environmental and Social Management Plan (ESMP) in the particular context of the mine action sector in Cambodia. This includes creating an enabling environment, along with necessary policy adjustments, how to modify existing processes, as well as required partnerships for the implementation of an effective system.

4 Legal and Institutional Framework

Cambodia is party to a range of International Conventions, which guide its obligations in regards to both mine action and environmental and social protection. Cambodia has committed to remove all of its remaining landmines by 2025 in accordance with the Anti Personal Mine Ban Treaty (APMBT) and the Maputo +15 declaration, described below. In addition to Cambodia's international obligations to APMBT and the Maputo +15 Declaration, as well as the normative reference to the International Mine Action Standards (IMAS), which provide guidance on good practice in mine clearance operations, Cambodia is also committed to several international conventions, which protect the environment and human rights. These include the Sustainable Development Goals (SDGs), the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention to Combat Desertification (UNCCD), and the Convention on the International Trade of Endangered Species of Wild Fauna and Flora (CITES). It is also party to the Convention Concerning the Protection of the World Cultural and National Heritage as well as the International Covenant on Economic, Social and Cultural Rights, which protect areas of archaeological & cultural importance and the human rights to water & land respectively. Each of these international conventions is described in more detail below. The section then goes on to describe the national level correlates of each of these international agreements.

The purpose of this section is to situate mine action within a broader integrated development context. Awareness of this legislation by mine action stakeholders is fundamental to understanding that mine action cannot be carried out with a narrow focus or in isolation from larger processes and efforts towards sustainable development. This is particularly relevant given that the focus of the CFR III project is to integrate mine action with human development, as espoused by the SDGs. Finally, an awareness of the broader legislative framework in Cambodia, should demonstrate to stakeholders that mine action touches on many areas and that it is in the ultimate interest of CMAA, UNDP, donors and operators to take broader considerations into account, so as to not undermine national goals, as well as the ultimate goal of humanitarian mine action, which is to improve the lives of beneficiaries. That is, stakeholders should understand that there is no inherent conflict between a humanitarian demining considerations and environmental and social considerations. Rather these considerations should be integrated to reflect sustainable development needs in an integrated manner that respects all international and national legislative obligations.

4.1 International Agreements

Anti-Personnel Mine Ban Convention and Maputo +15 Declaration

The Anti-Personnel Mine Ban Convention (APMBC) is the overarching legislation which guides mine action in Cambodia and aims at eliminating all anti-personnel mine contamination nationally. Cambodia ratified the convention in 1999, adopting

national legislation banning anti-personnel mines and reports regularly on progress towards this goal according to the rules of the convention. Due to the high level of contamination, Cambodia was unable to meet agreed upon ten-year deadline and secured a ten-year extension until 2019. More recently however, Cambodia endorsed the Maputo+15 declaration, reaffirming its commitment to full clearance and an intensification of efforts to reach this goal, setting a more realistic target date of 2025.

International Mine Action Standards

The International Mine Action Standards (IMAS) is the current normative framework for guiding mine action operations around the world. The IMAS standards form the basis of nationally adopted mine action standards, which in this case is the Cambodian Mine Action Standard (CMAS) referenced below. A subsection of the standard, IMAS 10.7 deals specifically with protection of the environment during demining operations. The standard recognizes that demining activities may have potential negative impacts on the environment and outlines a range of measures that operators should adopt in order to demine land safely and efficiently, while leaving the environment in a state that is similar to or better than before demining operations commenced. Most importantly the standard aims to encourage operators to leave land in a state that permits the intended use of the cleared land. According to the standard, national authorities should document their environmental management policy in the national standards and in accordance with this national policy; demining operations should be checked, to ensure compliance with the national standards. It also notes that in the absence of such a standard on the environment, which is currently the case in Cambodia, the national authority should check operators for compliance with the IMAS 10.7 standard. The ESIA study confirmed that the compliance to the IMAS 10.7 is not currently checked by the CMAA and that awareness of the standard is low both among CMAA personnel as well as among demining operators.

The standard emphasizes the "Do No Harm" principle in relation to occupational health and environmental considerations. It requires, for instance, that "demining operations should be carried out without damaging property or infrastructure, in a manner that minimizes the impact on the environment", and that "planning for demining operations shall take into account the effects of those operations, and any supporting activities, on the environment, and any possible damage to property or infrastructure, or harm to personnel"[14]. It further details the responsibilities and obligations of national authorities and mine action organizations. Recent recognition that the standard should be updated and broader in scope have led to its revision, which was underway at the time of writing. The revision emphasizes the need for environmental impact assessment, the need for environmental management systems in line with ISO 14000, as well as a stronger, more hands on focus on the environment.[15]

[14] (UNMAS, 2007)
[15] (Maspoli, 2016)

Sustainable Development Goals

The Sustainable Development Goals, spearheaded by the UN and agreed upon by member states, sets the post 2015 development agenda. The intergovernmental agreement proposes 17 goals covering a range of sustainable development issues including poverty, health and education. Due to the important role of eliminating land mine contamination for development purposes in Cambodia, the RGC and UNDP have proposed an additional SDG for the national context: **SDG 18** End The Negative Impact of Mine/ERW and Promote Victim assistance. In addition to this additional SGD, other SDGs, which should also be taken into account, are: **SDG 13 Climate Action** Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy and **SDG 15 Life on Land** Protect, restore and promote sustainable use of terrestrial ecosystems sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss.[16]

The Convention on Biological Diversity (CBD)

The world community adopted the Convention on Biological Diversity (CBD) in 1992 to reduce the global loss of genetic resources of species of fauna and flora and the diversity of natural ecosystems. By signing and ratifying the Convention, Cambodia has committed to adopt measures to promote conservation and sustainable use of biological diversity, and identify and use the components of this biodiversity in a sustainable manner.

The United Nations Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change (UNFCCC) was developed in 1992 at the Rio Earth summit to and entered into force in 1994. It aims to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Kyoto protocol then went on to set emissions targets for developed countries, which are binding under international law. Most recently in 2015, the Paris Agreement was adopted by consensus by all 197 parties to the convention, which aims at limiting global warming to less than two degrees Celsius and encourages efforts to limit the rise to 1.5 degrees Celsius. Cambodia is a signatory to the UNFCCC, and has announced its intention to ratify the Paris agreement. Furthermore, Cambodia has already submitted its new climate action plan, including intended national determined contribution to emissions reductions to the UNFCCC.

The United Nations Convention to Combat Desertification (UNCCD)

The United Nations Convention to Combat Desertification (UNCCD) is a binding international agreement, which links environment and development to sustainable

[16] (UN DESA, 2016)

land management. The goals of the convention are to forge a global partnership to reverse and prevent desertification / land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability. The convention focuses its effort on restoring land and soil productivity, and mitigating the effects of drought through a bottom-up approach that encourages the participation of local people in combating desertification and land degradation. It also recognizes that the dynamics of land, climate and biodiversity are intimately connected, and hence closely collaborates with the other two Rio Conventions described above (the Convention on Biological Diversity and the United Framework Convention on Climate Change) in order to forge an integrated approach to natural resource management.

The Convention on International Trades in Endangered Species of Wild Fauna and Flora (CITES)

The Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement, which aims to ensure that the international trade in specimens of wild animals and plants does not threaten their survival. It is legally binding and provides a framework for related domestic legislation. The management authority of the convention is the Ministry of Agriculture, Forestry and Fisheries and it is enforced through the Forest Crime Monitoring and Reporting Unit.

Convention Concerning the Protection of the World Cultural and National Heritage

The Convention on World Heritage notes that cultural and natural heritage is increasingly threatened not only by decay but also changing economic and social conditions and considers this deterioration and disappearance harmful to the heritage of all the countries of the world. It also notes that the protection of such heritage may be incomplete at the national level due to insufficient resources and affirms that safeguarding unique and irreplaceable property is of outstanding interest to mankind as a whole. The convention considers monuments, including architectural works and sculpture as well as sites of archaeological interest from a historical and anthropological point of view. Parties to this convention, including Cambodia, recognize the duty to ensure the identification, protection, conservation and transmission to future generations of cultural and natural heritage sites. Provisions of the convention encourage parties to endeavor to develop scientific and technical studies and research that can help the state counteract the dangers that threaten its cultural and natural heritage as well as not to undertake any deliberate measures which might damage directly or indirectly its cultural heritage.

International Covenant on Economic Social and Cultural Rights

The International Covenant on Economic, Social and Cultural Rights, signed by Cambodia in 1980 but not ratified until 1992, is a one of the core international human

rights instruments. The first article of the covenant states that all people should be free to pursue their economic social and cultural development and that in no case should they de deprived of their means of subsistence. It goes on to enshrine the right to safe and healthy working conditions as well as to an adequate standard of living, including food and housing. Although the covenant does not explicit mention the right to water, it has been widely interpreted to implicitly refer to the right to water by mentioning the adequate right to food.

4.2 Cambodian Legal Context

Cambodian Mine Action and Victim Assistance Authority (CMAA) led policy

The Cambodian Mine Action and Victim Assistance Authority is UNDP's implementation partner on the CFR III project and the government agency responsible for regulating, monitoring and coordinating the sector. The CMAA, since its creation in 2000, has been working on the policy guidelines and the development of the strategic plan for mine action, specifically the Cambodian Mine Action Standards and the National Mine Action Strategy (NMAS)[17].

National Mine Action Strategy (NMAS)

The NMAS is the key policy process framework for the mine action sector, which aligns the sector with the Nation Strategic Development Plan and international obligations, and sets out the strategic framework in terms of principles, objectives, an analysis of the current situation and overall strategy. At the time of writing, the National Mine Action Strategy for 2017-2025 is in the process of being drafted and finalized. One of the main goals of the new NMAS is to align Cambodia to the Maputo +15 declaration and in addition, the UNDP CFR III project document also states that the NMAS strategy should take into considerations all aspects that are impacted by the mine action sector, including socio-economic and environment considerations. In drafting this strategy, CMAA is in a key position to influence the national dialogue in Cambodia around mainstreaming environmental and social safeguards into mine action, as it has recently done with gender. It is imperative therefore that the NMAS revision contains appropriate environmental and social indicators in line with UNDP and international obligations. Furthermore, the incorporation of such safeguards into a national policy documents would put Cambodia in an ideal position to influence the regional and international dialogue on the subject.

Cambodian Mine Action Standards (CMAS)

The Cambodian Mine Action Standards is a set of technical standards that guide demining organizations in Cambodia, covering aspects from management to operations. The CMAS are based on the International Mine Action Standards (IMAS) described above, while being grounded in the national context. The CMAS is the basis

[17] (CMAA)

for demining organizations to comply with and develop their standard operating procedures (SOPs). The Cambodian Mine Action Standards does not currently reflect the IMAS in terms of environmental safeguards and does not have a corresponding standard to the IMAS 10.7[18]. This update should be an immediate priority for CMAA is order to align the sector with international best practice in this regard.

Regulation, Monitoring and Land Release

The CMAA sets up the process and procedures in accreditation and licensing to national and international organizations, as well as to private agencies, which conduct mine, action activities in Cambodia. That is, no demining organization is allowed to operate in Cambodia without obtaining accreditation and licensing from CMAA. The accredited organizations in Cambodia include national demining organizations such as the Cambodian Mine Action Centre (CMAC) and the National Center for Peacekeeping Forces and ERW Clearance (NPMEC), international humanitarian demining organizations such as HALO Trust, and Mines Advisory Group (MAG), as well and the local organization the Cambodian Self-Help Demining Group (CSHD). The CMAA also regulates private, for profit demining companies. The current accreditation process run by the CMAA does not include verification of environmental management systems and SOPs, but should do so going forward in order to align the process with the international standards.

Quality Assurance

The quality assurance management team of the CMAA is responsible for making sure that operators follow their standard operating procedures. CMAA's quality assurance (QA) teams ensure on a daily basis that accredited demining organizations are applying their approved management processes and operational procedures in a manner that will result in the safe, effective and efficient clearance of land. The quality assurance teams review the operators' Standard Operating Procedures and verify their compliance with the Cambodian Mine Action Standards (CMAS). In addition to addressing clearance requirements and worksite safety, the CMAS is updated to cover new technologies or innovation as they are introduced, such as the Baseline Survey and Land Release methods. As mentioned above, due to the absence of a national mine action standard on the environment, the QA team does not currently check for environmental and social compliance. It will be important to build the capacity of the QA/QC team of CMAA to be able to carry out this function once the CMAS and NMAS are updated.

National Environmental Action Plan

Cambodia's National Environmental Action Plan (NEAP) recognizes that in the face of rapid population growth, economic growth and increasing climate change impacts, natural resource planning and management must be strengthened and better

[18] (Pannarith, 2016)

coordinated. It emphasizes the need for resource use efficiency and waste and pollution prevention. It renews the RGCs commitment to combating the unsustainable management of economic land concessions, and illegal logging and to address the limited awareness of the vulnerability of the country's natural capital. The strategy has recently been drafted in conjunction with the Environment Code of Cambodia (both in 2016).

Environment Code of Cambodia

The Environment Code of Cambodia sets out several principles of action to guide national actors across sectors. Three articles of importance to the mine action sector include:

Article 5 of the code promotes the precautionary principle, that in situations where the environment may be faced with threats of serious or irreversible damage, the lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Article 6 of the code promotes the prevention principle, urging that negative impacts to the environment should be stopped before they occur. In applying this principle, action should be taken at an early stage to reduce or prevent environmental damage rather than wait for potentially irreversible effects to occur. The prevention principle is based on the idea that it is better, and often more cost effective, to prevent harm than employ measures to restore the environment after harm has occurred.

Article 11 of the code promotes the principle of integration, which states that environmental protection and sustainable development objectives must be integrated into the development planning and decision-making process. It posits that there must be integration of environmental protection, economic development, and environmental rights at the conceptual level as well as the implementation stage of policies and laws.

The Environment Code also contains titles on Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA), requiring all development projects and activities that have an impact on the environment or society to undertake some form of environmental assessment. The code states that the level of assessment will be determined according to the potential impact on the environment or society. The code also contains Titles on Disaster Risk Management, Climate Change Adaptation and Mitigation which argue that ecosystems contribute to reducing disaster risk in two important ways: 1) ecosystems, such as wetlands, forests and coastal systems, can reduce physical exposure to natural hazards by serving as natural protective barriers or buffers and thus mitigating hazard impacts and 2) well-managed ecosystems can provide natural protection against common natural hazards, such as landslides, flooding, avalanches, storm surges, wildfires and drought. It is important for mine action actors to be aware of these titles of the Environment Code in order to understand that mine clearance undertaken without

due consideration of irreversible impacts, which may make beneficiaries more vulnerable to disaster and climate change risk, is not in line with broader national goals, but most importantly, not in the interest of beneficiaries.

National Protected Area Strategic Management Plan (NPASMP)

The National Protected Area Strategic Plan is in the process of being updated for the period 2016-2030. Falling under the purview of the Ministry of Environment, it recognizes that protected areas play a critical role in conserving biodiversity and promoting sustainable development. It also recognizes that protected areas are one the most efficient and effective strategies for alleviating poverty while adapting to and mitigating climate change. Protected Areas also maintain key ecosystem services, such as genetic plant and animal diversity, provide pollination services, maintain irrigation services, and provide clean water and buffering against drought, flooding, disease and natural disasters. Overall the strategy emphasizes that protected areas are not only useful in providing habitat for endangered wildlife, but are also able to contribute to livelihoods for local communities, may generate tourism revenues and play a key role in mitigation and adaptation to climate change.

Cambodia Climate Change Strategic Plan

Cambodia's climate change strategic plan operationalizes its international commitment to the UNFCCC, and recognizes the essential role of managing deforestation and maintaining forest cover for managing the impacts of climate change. The plan is a keystone in Cambodia's development strategy, considering the fact that the Cambodian economy is heavily dependent on rain-fed agriculture, making it particularly vulnerable to climate change. The plan includes the following strategies:

1. Improve law enforcement to combat illegal logging
2. Regulate and control land uses (ELCs, and SLCs)
3. Improve land use planning, zonation, demarcation, registration
4. Conserve and protect forests
5. Promote reforestation and regeneration of forests
6. Promote community based tenure (CF, CPAs and Co-management)

The support the goals of the protected area management plan, by emphasizing the need to conserve protected forests and to combat illegal logging and agricultural encroachment.

National Biodiversity Strategy and Action Plan

The National Biodiversity Strategy and Action Plan (NBSAP) is the national implementation instrument for the Convention on Biological Diversity. As a requirement of the convention, the NBSAP was first drafted in 2002 and a recently revised in 2016. The plan contains four strategic objectives and is in line with the

environmental quality objective of the National Sustainable Development Strategy. Strategic objectives touch on a range of themes including, but not limited to protected areas, threatened species, landuse, biodiversity and climate change, and water resources. In support of the plan, the Inter-ministerial Technical Working Group has also defined time bound national biodiversity targets with accompanying indicators.

National Program to Combat Land Degradation

The National Program to Combat Land Degradation recognizes that desertification and degradation are mong the most important global challenges, negatively impacting the environment, and agricultural production so as to impact food security, social and economic development, and the quality of life. The strategy recognizes that the process of land degradation is driven by forest cover loss, which causes soil erosion, particularly when rainfall erodes fertile topsoil, as well as high sedimentation rates of rocks and sand caused by water run-off, leading to low-productivity.

5 Baseline Data

5.1 Bio-physical Baseline

Biodiversity and Forest Cover

Cambodia is endowed with rich natural resources and it's range of landscapes and habitats are exceptionally high in biodiversity, from the Tonle Sap Basin at its center, to the Eastern Plains Landscape in the east and the Cardamom Mountains to the west. Cambodia is bordered by Thailand in the northwest, Lao PDR in the northeast, Vietnam in the east/southeast and the gulf of Thailand in the southwest, Explosive remnants of war can be found throughout the country, including a range of anti-personnel landmines (APM), anti-tank mines (ATM), and unexploded ordnances (UXO), in varying density and combinations due to the history and stage of the conflict, but the heaviest land mine contamination is found in the northwest, concentrated in high-density along the Cambodia-Thai border, known as the K5 mine belt. The CFR III project concentrates on the poorest, most mine-affected provinces in the northwest bordering Thailand, which include Pailin, Battambang and Banteay Meanchey, throughout which important agricultural areas, as well as forested areas and protected areas can be found.

Cambodia has the highest remaining forest cover of any country in Southeast Asia including rainforest, tropical moist deciduous forest and tropical dry forest[19]. The tropical forests in Cambodia are thought to be among the most biologically diverse in the world, exceeding the diversity of the Brazilian Amazon, making Cambodia

[19] (Wildlife Conservation Society, 2004)

extremely rich in biodiversity[20]. In fact the entirety of Cambodia falls within the Indo-Burmese biodiversity hotspot, one of only 34 such hotspots in the world, which together cover only 2.3% of the earth's land surface but which contain over 50 % of the world's plant species and 42 % of all terrestrial vertebrate species which are endemic to only those areas[21]. This means that once they are lost from that location, they are lost forever. Furthermore, biodiversity hotspots are designated not only on the basis of exceptionally high biodiversity, but also for the fact that they have lost of 70% of their original vegetation and are under extreme threat and Conservation International has listed the Indo-Burma hotspot as the worlds most threatened. This is particularly pressing given the fact that over the last four decades Cambodia has lost a staggering 20% of its forest cover, and according to a recent study by the University of Maryland, is experiencing the highest acceleration in deforestation in the world[22]. Deforestation or habitat loss is therefore undoubtedly the biggest threat to the regions biodiversity. Additionally, Cambodia's complex hydrological system provides one of the most productive fresh water fisheries in the world[23], and the Tonle Sap basin is also under increasing cumulative pressure from agricultural expansion and population growth exponentially increasing run off, a series of dam projects on the Mekong River and rampant overfishing.

Endangered Species

Cambodian forests provide crucial habitats for a range of species, many of which are considered either vulnerable or endangered according to International Union for the Conservation of Nature (IUCN) red list. Cambodia is still home to many mammal species that were found widely distributed throughout the forests of Southeast Asia. The Lower Mekong Dry Forests Eco-region of the north and northeast, holds globally significant populations of several wild cattle and deer species as well as such iconic species as the globally endangered Indochinese Tiger and Asian Elephant[24]. Unfortunately, recent efforts to estimate the remaining populations of several species have resulted in two iconic species being declared regionally extinct. The World Wildlife Fund (WWF) declared that there were no remaining tigers in Cambodia and initiated, in 2016, a project to reintroduce the animals into the wild in Mondulkiri province[25]. Additionally, Cambodia's national animal, the Kouprey has also not been identified in the wild within national boundaries since 2007, and other species of wild cattle are among the most endangered including Guar, Banteng and the Wild Water Buffalo[26]. Other mammals of conservation interest, which are either classified as critically endangered, endangered or vulnerable by the IUCN[27], include the Asian

[20] (FAO, 2009)
[21] (Conservation International, 2011)
[22] (The Cambodia Daily, 2015)
[23] (Conservation International, 2008)
[24] (WWF, 2016)
[25] (AFP, 2016)
[26] (Timmins, 2011)
[27] (IUCN, 2016)

Elephant (of which the largest regional concentration is thought to be in Cambodia), a species of globally endangered wild dog known as Dhole, two species of Bear including the Asiatic Black Bear and the Sun Bear, several species in the Pantera family, including the Clouded Leopard and the Fishing Cat, and Primates include the Silver Langur, the Pygmy Slow Loris, the Red-shanked and Black-shanked Doucs and the Yellow-Cheek Crested Gibbon. Finally, Cambodia also has endangered populations of two rare Asian Deer species, the Eld's Deer and Hog Deer and is home to the Sunda Pangolin, a popular victim in illegal cross-border trade due to its demand in traditional medicine.

In terms of endangered flora, a highly valuable species of rosewood has been logged to near extinction in Cambodia, pushing illegal loggers to risk their lives crossing the border into Thailand in search of the wood, which is highly prized in the luxury furniture market in China, and which can be found on the CITES index prohibiting its trade[28]. Thousands of cubic meters of the wood are traded from Cambodia to China each year, though the volume exported has declined considerably as stocks dry up. The diminishing supplies are pushing Cambodian loggers into Thailand, and this type of illegal cross border trade in endangered wood and endangered animal species also has a role to play in risk-taking behavior in the highly contaminated areas along the border.

Protected Areas

In response to the emergence from years of conflict, recognizing the growing pressures on natural resources and environmentally sensitive areas, a number of protected areas were created by royal decree in 1993 to protect both ecologically and culturally important places. This protected area network was then backed by more detailed guidelines on management with the 2008 Protected Areas Law, which is being further refined by the current update of the National Protected Area Strategic Management Plan described above. Although these initiatives are essential in recognizing the pivotal role of forests and ecologically sensitive landscapes in Cambodia's future development, both in terms of ecosystem services, resilience in the face of climate change and the preservation of irreplaceable biodiversity, in practice the management of these areas remains a complex challenge and enforcement is importantly lacking, and often victim to competing and contradictory government interests. Regardless, it is essential that mine action actors are aware of the protected areas and environmentally sensitive areas throughout the mine affected areas.

The protected areas that are found in the CFR III project provinces of Pailin, Battambang and Banteay Meanchey include Samlot Protected Area (also classified as a Multiple Use Area), Roniem Daum Sam Wildlife Sanctuary, Banteay Chhmar Protected Landscape, the Tonle Sap Biosphere Reserve (also classified as a Multiple Use Area) and Sarun Crane Sanctuary. Although efforts are underway by several international conservation organizations to collect species distribution and

[28] (Boyle, 2013)

concentration data, there remains an important lack of up-to-date, comprehensive biological surveys in most of Cambodia's environmentally sensitive areas and within its protected areas. Biodiversity research often involves several ministries, given that until recently the protected areas were managed both by the Ministry of Environment as well as the Ministry of Agriculture, Fisheries and Forests[29]. A lack of coordination and data exchange between both Ministries and international organizations means that much of what little data is available is spread among organizations and not easily accessible. Furthermore the situation is further compounded by the fact that conservation measures to prevent further decline of habitats and protected areas are themselves greatly hampered by the lack of sufficient biodiversity information. Given that protected areas in the CFR III project areas are significantly understudied, an estimation of species presence is based mostly on studies conducted in adjacent parks, for which some biodiversity data exists and which can be used as a proxy indicator for presence in the park in question.

Banteay Chhmar Protected Landscape was created in 1993 by royal decree and is located in the northernmost part of Banteay Meanchey, also extending into Oddar Meanchey to the east and contiguous with Ta Phraya National Park in Thailand. Ta Phraya national park in Thailand has confirmed presence of endangered Eld's Deer, Asian Black Bears and Sun Bears, as well as Fishing Cats, Bantengs, Guars, Langurs and Gibbons[30]. Banteay Chhamar Protected Landscape is also home to Banteay Chhamar Temple Complex described below.

The Samlot Protected area, not to be confused with Samlot district in Battambang province is officially classified as multiple use area that straddles both Pailin and Battambang provinces and also borders Thailand. Samlot was first declared a protected area by royal decree in 1993 spanning 60,000 ha, and is one of the last remaining tropical rainforests in northwest Cambodia. Samlot is contiguous with the northernmost portion of the Cardamoms Mountains, home to the Phnom Samkos Wildlife Sanctuary, which is one of the most species rich and intact natural habitants in the region, and which has confirmed presence of Asian Elephant, Gibbons, Sun Bears, Guars, Bentangs, Clouded Leopards, Dholes and Pangolins, in addition to being the home to more than 450 species of bird, and a huge variety of reptiles and amphibians[31]. Due to a lack of government resources and support in wildlife enforcement and conservation, since 2003 the management of the park is principally done through the support of the Maddox Jolie-Pitt (MJP) Foundation. In 2009, MJP joined efforts with Cambodian and Thai park officials to create a Transboundary Peace Park between Samlot and two Thai border parks (Namtok Khlong Kaew National Park and Kahlong Kreua Wai Wildlife Sanctuary). The three protected areas combined cover nearly 110,000 hectares.

[29] (WWF Cambodia, 2004)
[30] (TAT, 2015)
[31] (Boonratana, 2016)

The most current research into biodiversity in this park system has been carried out in Thailand. The existing protected area complex contains three main vegetation types: dry evergreen forest, mixed deciduous forest, and dry dipterocarp forest. Among this vegetation 288 tree species have been identified, along with at least 49 mammal species, 145 birds, 30 reptiles and 13 amphibians. Studies within the protected area complex have also noted that many larger animals such as Elephants, Banteng, and Crocodile, Eld's deer, Kouprey and Tiger are found close to the border with Cambodia, making transboundary efforts particularly important[32]. Officials from MJP Foundations reported that deforestation at park boundaries is occurring rapidly and they face many changes in maintaining the area including lack of resources, staff, ranger habitation and unclear boundaries[33]. The Director the Pailin Environment Department indicated that forest patrol were extremely challenging due to a lack of resources and the fact that it is common for villagers to track forestry patrol teams, and wait for an opportunities to harvest natural resources unobserved and during field visit many smaller routes were observed cut into the forest by local residents for the purpose of logging. The area is not only a key area for illegal logging but also for illegal poaching. Maddox Jolie-Pitt Foundation officials also indicated that Samlot's area has already been reduced to less than 20,000 ha[34] and early in 2016 the Phnom Penh Post reported that another 60 hectares of forest have been illegally and that between 80 and 100 hectares are cleared in the protected area each year[35].

There is very little public information available regarding Battambang's Roniem Daum Sam Wildlife Sanctuary. Also created under royal decree in 1993, the sanctuary originally spanned over 170,000 ha in Battambang into Banteay Meanchey. A road was built through the sanctuary in 1997 and rapid agricultural encroachment and deforestation ensued, with the number of settlers in the area rapidly increasing. In 2003 the sanctuary area was reduced to 40,000 ha by government decree in order to accommodate settlers and in 2005 a further 10,000 ha was cleared for social land concession purposes. In 2011 a further 15,000 ha area of land in sanctuary was reclassified for residential housing and agricultural development purposes[36]. Interviews with Department of Environment officials revealed the sanctuary was now all but defunct.

The Tonle Sap Lake is the largest freshwater Lake in South East Asia, covering over 1.6 million ha and the surrounding biosphere reserve is the biggest continuous area of savannah swamp forest and flooded forest in Asia. The Tonle Sap Multiple Use Area, which extends into significant portions of both Battambang and Banteay Meanchey, was also created by royal decree in 1993 and since then has also been placed on WWF's global 200 list of significant areas of critical conservation importance and contains two internationally protected Ramsar wetland sites. The flooded forest area

[32] (Bhumpakphan, 2012)
[33] (MJP, 2016)
[34] ibid
[35] (Seangly, 2015)
[36] (Battambang Province's Land Use and Allocation Commitee, 2011)

of the reserve provides a vital breeding ground and forage area for fish migrating to the Mekong River in the rice production in the Tonle Sap floodplain account for 12% of Cambodia's harvest[37]. Over a million people live in the reserve (including all provinces), mostly in the buffer zone and transition areas and although fishing is the main economic activity there is also significant agriculture with vegetables grown in addition to rice. In addition to possessing one of the highest levels of biodiversity among fish stocks in the world, the area is also home to over 100 water bird species, including a dozen of international significance. Other species of particular conservation importance include the endangered Siamese Crocodile, Turtles, Macaques, Capped Langurs and Water Snakes[38].

5.2 Socio-Economic baseline

Cultural Heritage

Cambodia's prehistory is not well known, but caves in northwestern Cambodia indicate that people may have lived there as early as 4000BC and that rice, still a staple of the Cambodia diet, and grown throughout Battambang province today, may have been cultivated well before the 1st century AD[39]. The region's early kingdoms were influenced by Indian culture including language, art, architecture and religion (both Hinduism and Buddhism). Modern Cambodia culture has its roots in the 1st to 6th century, the period in which the Khmer language evolved, known as the Funan Empire by the Chinese. This Pre-Angkorian period gave way to the Angkor Empire with the rise of the King Jayavarman II in the 9th century, which saw 600 years of rule by Khmer monarchs over much of present day South East Asia including Myanmar and Laos[40]. It was during this period that the Angkor temple complex was built. Angkor Wat, known globally as a symbol of Cambodia, is the world's largest religious monument and Cambodia's main tourist draw, attracting over 2 million visitors a year.

Banteay Chhamar Temple and its nine satellite temples, found within the Banteay Chhamar Protected Landscape in Banteay Meanchey, form one the largest temple complexes from the Angkorian era. The temple, along with its satellite shrines and reservoir comprises one of the most important and least understood archaeological complexes in the world[41]. Because of its remote location and its proximity to the Thai border, the complex has been subjected to severe looting, and has been listed by the World Monuments Fund as one of the top one hundred most endangered sites in the world[42]. Banteay Chhmar Temple is currently undergoing a multi-year conservation project by Global Heritage Fund (GHF) and the Cambodian government is in efforts

[37] (Ministry of Environment, 2007)
[38] ibid
[39] (Tourism Cambodia, 2016)
[40] ibid.
[41] (O'Reillly, 2007)
[42] ibid.

to have Banteay Chhmar listed as a UNESCO World Heritage Site. In addition to Angkor Wat and Banteay Chhmar temple complex, archaeologists estimate that there are over 4000 pre-Angkorian and Angkorian sites throughout the country[43], many of which can be found in the northwest.

Legacy of Conflict

The decline of the Angkor Empire was followed by a period characterized by various regional struggles for power including invasion by Thai and Vietnamese forces and by the end of the 19th century France had expanded it's colonial penetration of Indochina, imposing a protectorate over the weakened Kingdom with invitation from the king in 1863. Cambodia gained independence in 1953 and was led shortly thereafter by King Sihanouk, who abdicated the throne act as political leader. The 1950's saw the cold war escalate with foreign powers vying for influence and tension rising in neighboring Vietnam between the communist regime in the north and the pro-western regime in the south. In the 1960's Sihanouk broke off diplomatic relation with the US and allowed Vietnamese communists to set up bases on Cambodia soil and despite a renewal of relations 1960 saw heavy American bombing on Cambodian soil in an effort to destroy Vietnamese Communist sanctuaries there and the legacy is this bombing is still present throughout Northern Cambodia, in the form of unexploded ordnance and explosive remnants of war. The country entered three decades of internal and regional conflict, reaching its height under the brutal occupation by Khmer Rouge forces between 1975 and 1979 resulting in the deaths of 1.7 million people. By the time the Paris Agreements were signed in 1991, marking the official end of war and the establishment of the United Nation Transitional Authority in Cambodia in 1992, Cambodia had become one of the poorest, and most landmine afflicted countries in the world.

The aftermath of the genocide and its dismantling of social and economic structures was profound and left a country in which much infrastructure and many institutions had been destroyed. The post-conflict rebuilding period, though characterized by heavy dependence on foreign aid, has seen steady economic growth and Cambodia's per capita GDP has risen ten-fold over the last two decades, increasing achieving impressive reductions in poverty rates, and culminating in its recent upgrade in status from lower income country to lower middle income country in 2016[44]. The long legacy of war remains however, with intense mine and ERW contamination continuing to cause an unacceptable number of casualties and injuries, and hampering national development by blocking land from productive uses such as agriculture and infrastructure (including schools, health centers and roads). Although much progress has been made, much remains to be done and clearance of contaminated land remains an important goal of the National Strategic Development Plan (NSDP). Many of the areas where mines and ERW are still located coincide with some of the most highly populated and poorest provinces, including Pailin,

[43] (Carter, 2008)
[44] (Schulte, 2014)

Battambang and Banteay Meanchey, which collectively account for 40-50% of all reported casualties, making them the focus of UNDP's CFR projects.

Agriculture and Land Tenure

Although textiles and tourism are important industrial contributors to the Cambodian economy, the vast majority of people living in rural areas, (including in the CFR III project provinces) practice agriculture as their main source of income. This heavy dependence on rain-fed agriculture, coupled with low soil productivity and rapid deforestation makes Cambodia one of the countries in the world most vulnerable to the impacts of climate change[45]. That is, while Cambodia's sustained economic growth has resulted in gradual increases in Cambodia's living standards and reductions of poverty, it has come also come with great costs and increasing risks, both environmental and social. The expansion of agricultural areas through the granting of large tracts of by the government as Economic Land Concessions (ELCs) for agro-industrial expansion have not only increased deforestation, but have caused a rash of land grabs and forced evictions, which have drawn international attention to the violation of people's right to land and adequate housing, while exacerbating inequality by further marginalizing the most vulnerable[46]. Additionally, Cambodia's rapid development has contributed to land degradation, and degradation of the country's extremely valuable inland aquatic resources. Unmitigated agricultural expansion, without focusing on sustainable practices and without enforcing Cambodia's protected area network, not only has implications for biodiversity, but also impacts livelihoods, given that forested areas are central to rural livelihood strategies with many communities make use of non-timber forest products such a resin, bamboo, rattan, fruits and vegetables, and honey[47]. The forest also provides potential for the development of ecotourism, which is still in its most nascent stages, but gaining increasing popularity.

It is also worth noting that socio-economic pressures often force members of mine affected communities to engage in high-risk activities, such that not all contaminated land is avoided, but rather the most highly contaminated land, and the most vulnerable people often cultivate in suspected areas, as well as forage in forests or tamper with UXO[48]. The GICHD Mine Sector Review reported that many villagers questioned during the field mission confirmed that they know that some areas may represent a danger, but they are ready to take the risk for livelihood purposes. This is particularly true in the northwest of the country, along the Cambodian-Thai border, where the population often knows about the mine/ERW danger and is not authorized to penetrate in high-risk areas. It is the poorest people that are willing to take risks, because they lack alternatives to sustain their livelihood and therefore they still go to mine/ERW contaminated forests and mountains to collect wood for charcoal,

[45] (Morton, 2014)
[46] (Neef, 2016)
[47] (WWF Cambodia, 2012)
[48] (Davies, 2015)

mushrooms or natural construction materials and in some cases may even to try to clear a small plot of land for agricultural activity. That is there is a process of agricultural encroachment into the few remaining forested areas outside the national park system in the northwest, where individuals are clearing land close to heavily mined K5 belt.

It should also be noted that population in the northwest is quite mobile, and that the poorest community members rarely own their own land. It has been noted in several previous reports including the Impacts Assessment and Final Evaluation of CFR II, that although the goal of the CFR projects is to target the poorest and most vulnerable beneficiaries, clearance most often benefits middle class landowners that have the capital to both buy and cultivate land[49]. The poorest community members are landless and often work as casual workers on larger farms and plantations, or migrate seasonally to Thailand for labour. The final evaluation of CFR II also notes that the process of integration of former Khmer Rouge soldiers "has allowed the opening up of a 'new frontier' in lightly populated, heavily forested areas which had been militarized and fought over for much of the previous 20 years", transforming areas of Pailin, Battambang and Banteay Meanchey thorough clearance of forests for agricultural land, informal and then formal mine action to reduce the risks, and the development of infrastructure. That is, mine action has an important role to play in opening up new, previously forested land for agriculture.

6 Impact Assessment

6.1 Overview of Environmental and Social Impacts of Mine Action

Anti-personnel landmine contamination, along with anti-tank mines, and other explosive remnants of war, cause unquestionable harm to communities and are one of the biggest impediments to post-conflict recovery. A disproportionate number of children are affected by landmine contamination, and injuries and casualties continue to cause immense pressure on often-inadequate medical infrastructure, as well as presenting barriers agricultural activity and infrastructure development, such as roads, schools and health centers, that support the nation as a whole. Furthermore, the economic development of the most vulnerable populations in Cambodia are hampered, in addition to the immeasurable psychological trauma of living in fear of death and injury while practicing basic livelihood activities, such as agricultural cultivation.

The imperative then of mine action has historically been focused on the urgent task of mine removal, and given the extent of the problem globally, and the high level of contamination in many nations including Cambodia, this imperative has largely been driven by quantitative indicators such a number of mines removed, or number of meter squared cleared. Unfortunately, although such indicators may incentivize

[49] (Rajabova, 2015)

clearance to be completed as quickly and efficiently as possible, it has the potential of losing sight of the ultimate goal of mine action, which is both to reduce casualties and injuries, but ultimately to allow those impacted communities and the environment on which they depend, to recover and to thrive. In order to achieve this goal, the environmental impact of mine action must be addressed from a broader humanitarian perspective, which recognizes that humanitarian responses may, through accelerated deforestation, land degradation and water pollution, generate negative environmental impacts, which may unintentionally hamper longer-term recovery[50]. For this reason, it is indispensable to conduct survey, clearance and land release in a manner that prevents over-exploitation of resources during and after clearance, prevents pollution and soil degradation, accounts for the potential of land rights violations post-clearance and secures the life-supporting functions of the environment. That is, mine action is indispensable to peace-building and economic recovery, insofar as it does not ultimately damage the land it seeks to restore.

The environmental and social impacts of mine action are both direct and indirect. Mine clearance operators impact the biological and physical components of the environments in which minefields occur, as well as the communities that live in proximity to these areas, both positively and negatively. Clearance and demolition of landmines and ERW removes the danger of death and dismemberment for community members, which is a direct positive impact of mine action. On the other hand, physical clearance and demolition may involve removal of vegetation and topsoil affecting biodiversity and soil quality, and have the potential to release pollutants which may affect the health of both ecosystem components and community residents, both of which are direct negative impacts[51].

In addition to these, there are a host of other impacts from mine action, both positive and negative. While previously inaccessible land released to communities can be invaluable in developing livelihoods and generating economic returns in rural communities, which largely depend on agriculture (a positive impact), this change in landuse may in turn threaten biodiversity and encourage further removal of vegetation, which inadvertently leads to land degradation (a negative impact) affecting those very communities in the long term. To further complicate matters, land release intended to benefit local communities, may then be vulnerable to land grabs, and under this scenario, the development impact of mine clearance for project beneficiaries is not only undermined, but their human rights may also risk being violated through forced evictions[52]. In general, although the ultimate goal of mine clearance is to allow people to use the land in a safe and effective manner, the very fact that the land is now being used, rather than avoided, can lead to habitat degradation and further vulnerability of beneficiaries. This is illustrated in the Figure below[53].

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[50] (McLean, 2005)
[51] (Paktian, 2008)
[52] (GICHD, 2014)
[53] (GICHD, 2014)

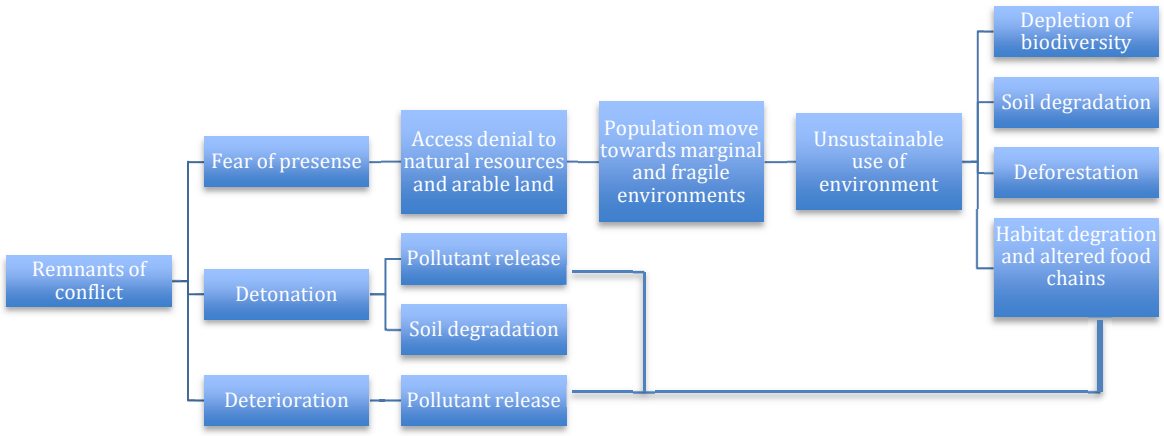

Figure 1: Mine Action and Habitat Degradation Dynamics

The issues described above, as well as the direct impacts caused by both manual and mechanical clearance of vegetation, the construction of temporary working sites for mine clearance, as well as impacts on water and soil quality from increased erosion, are among the most important impacts of mine action. The indirect impacts of habitat degradation on biodiversity, waste generation on community health and safety, and the associated increased vulnerability to climate change, are also key impacts. Finally the possible interactions of land release with the land rights of stakeholders, and the disproportionate impact on vulnerable groups (particularly the landless poor) is particularly important in the Cambodian economic and socio-political context[54]. These impacts are all described in more detail below, their significance is determined with reference to the intensity, extent and duration of the impact, and mitigation measures that can help to manage these impacts are described.

6.2 Biodiversity Conservation and Sustainable Natural Resource Management

Mine Action as a Driver of Deforestation

In order to understand the impact on mine action on forests, critical habitats and protected areas, it is first necessary to understand the dynamics and drivers of deforestation in Cambodia. Forest degradation and deforestation are complex processes that are influenced by a host of factors, both direct and indirect and none of these factors work in isolation from the other. Livelihoods of mine-affected communities often depend on activities which are themselves drivers of deforestation and therefore the impacts of mine action on the forests, critical habitats and protected areas arise not only from the ways in which mine action directly

[54] (OHCHR Cambodia)

removes forest habitat, but also from the very fact that it allows and facilitates communities to remove forest habitat themselves. This is an important point since agricultural activities, and in particular agricultural encroachment on critical habitats and protected areas, is the single biggest direct driver of deforestation in Cambodia. In fact, unlike many other countries that have experienced long periods of conflict, contributing to massive deforestation, most of the deforestation in Cambodia has occurred in the last 20 years, accelerating greatly with economic growth in the last 10 years, and the high level of contamination has served to protect the forest by hindering access. In fact, since the end of the conflict, the three most-mine affected target provinces of the CFR III project have also experienced the highest rates of deforestation (along with Kampong Cham), illustrated in the Figure 2 below[55]

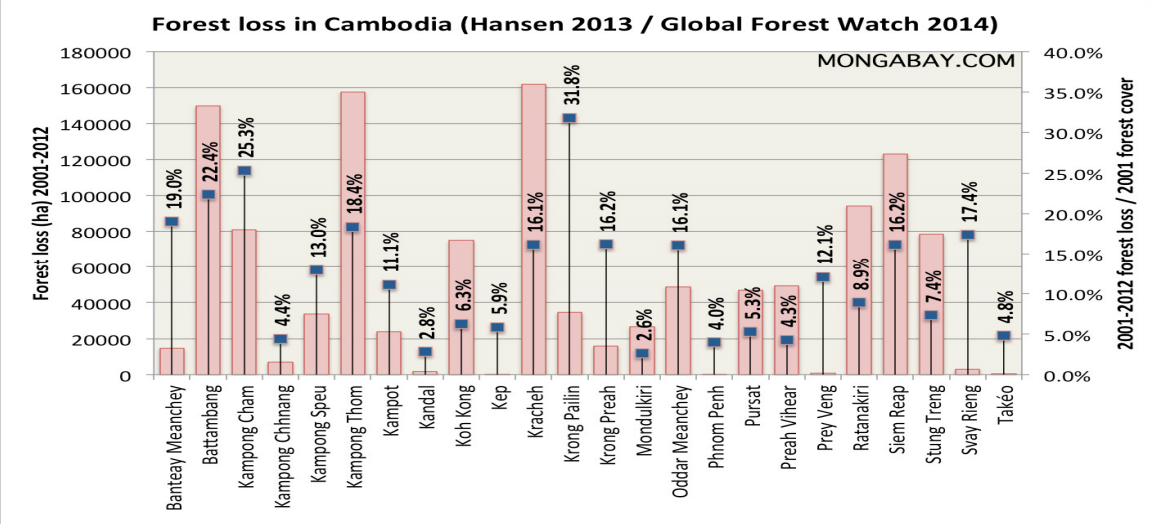

Figure 2: Forest Loss in Cambodia According to Province

It is also important to note that although the large-tracts of primary (undisturbed) forest may be rapidly decreasing in the most mine-affected northwest regions of Cambodia, the remaining tracts of forest and its associated undergrowth, as well as those forested areas contiguous with trans-boundary protected areas in Thailand, are still crucial to maintaining biodiversity and the broader ecosystems services described below. It is important to understand the importance of maintaining forested areas and protected areas, and the ways these contribute to resilience and development, as opposed to unmitigated conversion to agricultural land or the granting of economic land concessions for monoculture plantations.

A recent Center for Global Development meta-analysis of 117 studies identified the key factors that drive or deter deforestation[56]. Building roads and expanding agriculture in forested areas were the two biggest culprits for driving deforestation, whereas protected areas helped to deter it. It is undeniable then that mine action

[55] (Butler, 2014)
[56] (Busch, 2014)

contributes to deforestation in Cambodia, by virtue of opening access to previously inaccessible areas and influencing the dynamics of agricultural encroachment, while also facilitating road construction. Fieldwork for the ESIA verified clearance activities not only occurs in areas where complete conversion to agricultural land had already occurred, but also in areas where forested land still remains, particularly in protected areas such as Samlot and Banteay Chhamar, as well as on forested hilltops, escarpments and the heavily contaminated stretch of land along the Thai-Cambodian border known as the K5. This is further exacerbated by trends in internal migration characterized by increased risk-taking and the strong connection between internal migrations, the establishment of new settlements, and the associated expansion of agricultural land onto contaminated land (which was previously avoided), also accelerating forest loss. This is again compounded by road construction, most notably the recently constructed road along the Thai-Cambodia border, which will undoubtedly complicate forest protection by facilitating illegal poaching and logging activities, cross-border trade and encourage further settlement in forested areas. That is, one of the driving 'development related' factors used in the planning process for prioritization of minefields is often road construction[57], which along with agricultural encroachment, is a principle driver of deforestation.

Mine Clearance in Environmentally Sensitive Areas

Clearance also occurs in all three provinces in close proximity to, and in some cases directly within protected areas, including Samlot Protected Area, Banteay Chhmar Protected Landscape and the now all-but-defunct Roniem Daum Sam Wildlife Sanctuary. In fact an interview with the Director of the Department of Environment in Pailin revealed that clearance was currently taking place within an unauthorized section of Samlot protected area in Ba Huy village close to the border with Thailand, and that the selection of such sites, as well as handover to beneficiaries sometimes occurs without the involvement of the Department of Environment, despite protected areas being under their jurisdiction. Although the planning and prioritization process managed by the MAPU is designed to take into account the priorities of various departments through consultation at the district integration meetings, clearly this process is not fully functioning as intended.

Again, the impacts on these protected areas, and those throughout the country are not due solely to the demining activities associated with CFR III or those coordinated by CMAA in general. Other direct drivers of deforestation in Cambodia include an explosion in mining projects, infrastructure development (dams and roads) and logging, which further compound the effects of agricultural encroachment (both small scale and large-scale commercial plantations) and unsustainable use of forest products for fuel wood and charcoal. All of these direct drivers of deforestation are in turn driven by an array of indirect drivers, or underlying causes which include the national governance of the forest sector, global commodity prices, population growth and poverty in rural areas, as well as illegal activities such as poaching and logging.

[57] (Battambang, 2016)

Mine action however, and the activities associated with CFR III in particular, contribute to the *cumulative* impact on forests, critical habitats and protected areas (illustrated below in Figure 1).

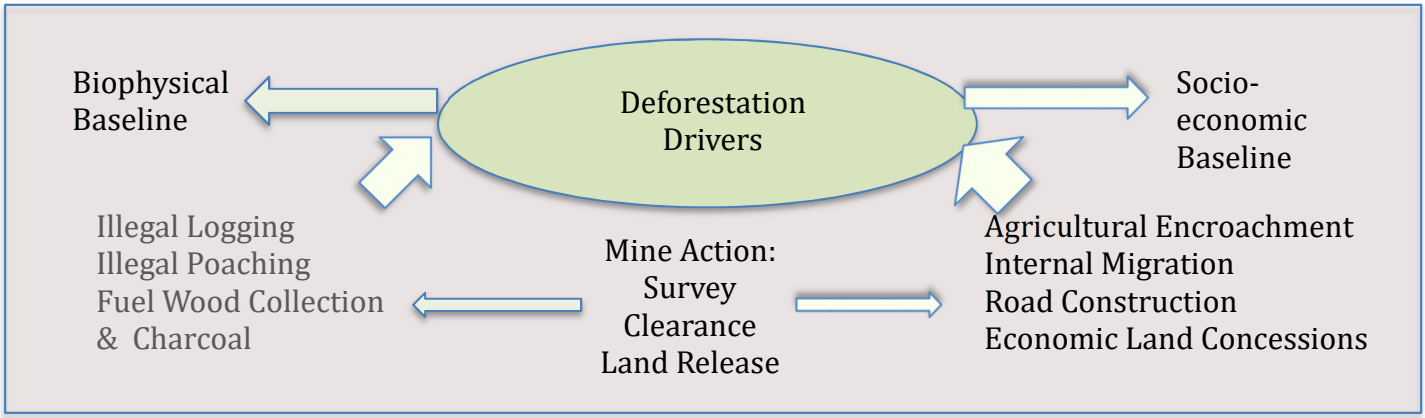

Figure 3: Mine Action Impacts on Drivers of Deforestation

In addition to the role of mine action is driving deforestation, which impacts biodiversity it is also crucial to recognize the impact of vegetation removal itself on biodiversity. Environmental biologist and mine action specialist Ian McLean notes that in Cambodia, where vegetation growth is prolific and "everything" has to be chopped before the deminer can go to work "everything" includes plants with important medicinal properties that require years of growth to reach maturity and/or do not reinvade easily into disturbed environments[58]. It was found during field work that most mine operators do not consider removal of vegetation a significant environment impact, and it is taken for granted that vegetation will reinvade easily, however vegetation is removed without any consideration of vegetation type or importance, and most vegetation is removed without any intention of reinvasion, but rather for cultivation through often unsustainable agriculture practices which compound the problem. This has cumulative impacts on biodiversity, and should therefore be modified to lessen this impact to the extent possible.

[58] (McLean, 2005)

In all of the mine clearance areas visited in the course of fieldwork, there were multiple accounts of declining biodiversity and species abundance. Communities that once relied on bush meat to supplement their diet of rice, vegetables, and protein sources including fish, chicken, pork, have almost completely ceased doing so "because there is nothing left." Villagers in the Tonle Sap Basin that once frequently spotted species such as the Fishing Cat, confirm that sightings are now extremely rare. Those closest to the forest still eat whatever bush meat they can still catch including several primate species, though as indicated this has greatly declined in the last 5-10 years due to forest encroachment. This decline, although good for remaining biodiversity, does not come from increased awareness or behavior change around restricting use of vulnerable or endangered species, but rather displays local levels impacts of habitat degradation from deforestation and forest degradation. The communities living closest to the forest, particularly in areas of Pailin and Battambang, adjacent to Samlot protected area and the border with Thailand, also still depend on other non-timber forest products (NTFP), including fruits, foraging for wild mushrooms and collecting honey to supplement their diet, as well as using resin and natural building materials such as bamboo and rattan to supplement their income.

It is essential to note that mine clearance activities close to protected areas has the direct impact of increasing access for illegal loggers and poachers, which is an issue critical importance within Samlot Protected Area. Residents living adjacent to the park, and increasingly within its boundaries, use traps and snares to catch a variety of animals, as MJP officials struggle with boundary delineation and enforcement. An interview with MJP officials revealed that within a week of the interview officials had caught poachers with two recently killed, highly endangered Guar, a mother and its calf. Unfortunately, clearance of land within park boundaries, adjacent to the park and along the border with Thailand, has the unintended consequence of facilitating these activities. The one possible positive impact on biodiversity (species abundance) in large mammals that has been noted in the past is the fact that some animals may themselves victims of landmines. Data on this topic is extremely difficult to quantify, not least given the low level of biodiversity and abundance data available in general. Given however the relative pressure of encroachment and clearing vs. the level of sophistication of mine clearance with regards to the environment, opening up the land to further agriculture development likely has a significantly higher impact then any casualties caused among wildlife populations.

Forests and surface vegetation provide a wealth of public and private services often known collectively as ecosystem services. Ecosystem services can be grouped into four broad categories including 1) Provisioning, such as the production of food and water as well as of timber and other non-timber forest products 2) Regulating, such as the control of climate, protection of water quality by mitigating runoff and through filtration, and regulation of disease 3) Supporting, such as nutrient cycles and crop pollination and 4) Cultural, such as spiritual, and recreational benefits, including the fact that some communities are slowly developing the potential for ecotourism. Recognizing the importance of mitigating mine action impacts on deforestation in

order to preserve biodiversity and the aforementioned ecosystem services is the key to sustainable resource management. A selection of concrete mitigation measures for managing these impacts is given below.

Given that the impacts described are of high intensity, are wide-ranging, and irreversible, and that the current level of mitigation is low, mine action was found to have a high negative impact Biodiversity Conservation and Sustainable Resource Management.

6.3 Climate Change Mitigation and Adaptation

Climate Change Vulnerability

The impact of mine action on climate change mitigation and adaptation arises from three sources: 1) the first impact is inextricably linked to the interaction of mine action with deforestation as described above. Deforestation is not only a source of emissions, but also renders mine affected communities more vulnerable to climate change impacts 2) the second impact stems from the impact of mine clearance activities on land degradation, which also increases vulnerability to climate change and 3) The operations of mine clearance organizations involves various sources of GHG emissions, including vegetation removal, the use of vehicles, clearance equipment (brush-cutter, mechanical demining machines) and generators at temporary accommodation sites. These impacts are described in more detail below.

Cambodia is highly vulnerable to climate change impacts. The credit ratings agency Standard & Poor recently ranked Cambodia's economy as the most vulnerable to the effects of climate change in the world, among 116 nations assessed[59]. The assessment took into account the share of Cambodia's population living in areas below five meters of altitude, as well as the percentage that agriculture contributes to the GDP. That is, given Cambodia's reliance on rain-fed agriculture, which is highly weather dependent, and it's rapid rate of deforestation, Cambodia is likely to disproportionately feel the impacts of climate change, including rising food insecurity from reduced agricultural crop yields triggered by changing rainfall conditions, as well as increased pressure on the government budget due to disaster recovery efforts. Given that climate change vulnerability is a direct consequence of both deforestation (because forests regulate climate and protect communities from extreme weather such as droughts and floods) and of agricultural dependence, mine action, as it contributes to both deforestation and agricultural expansion, also increases vulnerability to climate change.

Land Degradation

In addition to the cumulative impacts on forests and hence climate vulnerability described above (and in the section on Biodiversity impacts), the

[59] (Morton, 2014)

environmental/ecological impacts of demining as a contributor to land degradation have also been noted[60]. Land degradation is the process by which the value of the biophysical environment is diminished by human processes. Land degradation is significant in mine action operations through three principle processes: the deforestation described above, the vegetation that is removed which exposes the soil to erosion, and the impacts on the soil itself, through compaction and removal for technical survey and clearance purposes. Mechanical demining, in particular, which is the use of large machines to mill or grind the top layer of the soil (down to as much as half a meter), has a very significant negative impact on soil structure and vegetation[61]. Mechanical mine clearance has the most significant impact where the top-soil layer is thin (only a few cm) and is subject to erosion and especially where the retention of this topsoil depends on fragile plant life, which is the case of in most of Cambodia's agricultural regions. As observed during field visits, mechanical demining machine repeatedly strike the soil in cycles, creating shockwaves and grinding everything in its path (including vegetation, topsoil and the underlying gravel layer) through a giant metal rotating gear. While this method of clearance may be quick and effective for detecting and removing mines and unexploded ordnance, the harsh treatment of ground can severely alter soil structure and texture. The mixing of soil layers alters the physical and chemical properties of the soil in a way that impacts its fertility, rooting potential and water holding capacity, while further exacerbating erosion problems and leading to increased sediment load in the drainage system, by increasing water runoff. At worst, this type of demining can permanently destroy the agricultural capacity of the land and any irreversible damage to soil fertility can be devastating to local communities, as most mine action beneficiaries are dependent on the land for survival. Throughout the project area, beneficiaries repeatedly mentioned declining yields.

In absence of mechanical demining, the process of vegetation removal by manual means, and with the use of grass-cutters and brush-cutters for technical survey and clearance, also has an impact on land degradation. Vegetation removal greatly accelerates erosion by both wind and rain[62]. Deforestation, and the removal of surface vegetation allows the wind to cut long, open channels as it travels over the ground at higher speeds and topsoil may be blown away by the wind and destroyed as a consequence. In absence of vegetation to absorb and slow down surface water flows from heavy rains, there is both less ground water recharge and lowland areas become more prone to flooding. The removal of smaller trees and underbrush also implies the removal of litter, which also while playing a crucial role in infiltration, and protecting soil from erosion also provides organic matter that is important to the stability of soil structure and its nutrient content. Surface vegetation clearance also makes the leftover trees more vulnerable to felling. Although most operators know not to remove trees of a certain diameter themselves, they are largely unaware of the role of surface vegetation itself on erosion processes. The aggregate of these processes

[60] (Morin, 2008)
[61] (GICHD, 2014)
[62] ibid.

leads to overall soil degradation with changes in soil depth and quality, leading as mentioned to lower crop yields and losses in agricultural revenue. These changes greatly contribute to the overall vulnerability to Climate Change.

Field interviews with beneficiaries and local officials revealed multiple reports regional impacts of climate change. Villagers and local officials described changing weather patters characterized by heavier rains during the wet season and longer hotter dry seasons, with a marked increase in drought. Villagers also commented on shifting seasonal transitions and lower crop yields. Similar findings were reported during interviews for the Impact Assessment of CFR II. Households reported that due to decreasing soil fertility, crop cultivation was characterized by shorter rotations compared to traditional methods, and that farmers were pushed to change the type of cultivated crops due to land exhaustion in 55 percent of households interviewed, also mentioning that natural disasters caused less agricultural production, consequently affecting farmer's abilities to repay their loans. These regional climate change impacts are further compounded by unsustainable mine clearance protocols.

Greenhouse Gas Emissions

In addition to the land degradation impacts discussed above, mine action also contributes to climate change impacts through the release of greenhouse gas (GHG) emissions. There are three principles sources of GHGs from mine clearance. The first is from burning of fossils fuels used in mine clearance operations, the second is from emissions from temporary accommodations and the third is from vegetation removal and deforestation, given that forests are the largest terrestrial store of carbon. The fuel use of individual demining teams varies according to site, location and size of the demining unit, and although operators reported tracking fuel use data for financial management purposes, it was not possible to obtain official estimates of average fuel use for each operator on a yearly basis. Regardless, on site operations managers reported that the vehicles used to transport demining teams to the clearance site and between the site and temporary accommodations use anywhere between 140L/month to 200L /month, and the number of vehicles used usually varies from 1-3 depending on the size of the team. Other sources of emissions include grass-cutters, which are lighter and use less fuel (30L/month), but heavier brush-cutters are gas-guzzlers, and use between 15- 20L/hr, sometimes averaging over 2500L in fuel per month, if used everyday for 5-6 hours a day. Operators also estimated that generators used at living accommodations used on average 150L/month, and fuel used for cooking varied between gas, fuel wood collected from the surrounding area and clearance sites, and charcoal.

Given that the impacts described are of high intensity, are wide-ranging, and sometimes irreversible, and that the current level of mitigation is low, mine action was found to have a high negative impact Climate Change Mitigation and Adaptation.

6.4 Community Health and Safety and Working Conditions

Community Health of Beneficiaries

The primary goal of humanitarian demining is to improve the safety and health of beneficiary communities. Although integration with wider development goals is still in the process of being articulated and systematically accounted for by mine action actors, the goal of humanitarian demining has always been to reduce casualty and injury in communities affected by contamination. In so doing, it is clear that the single most important impact of mine action is the enhanced health and safety of communities threatened by landmines hazards. Mine action operators individually report progress in this regard to donors and the public, in addition to sector progress, which is tracked through the CMAA. In addition to this undeniable and essential role of mine action is improving community health and safety there is also some potential for mine action to have negative impacts on community health. These impacts are derived from the generation of wastes during clearance operations, which if not managed adequately, can negatively impact community health where clearance is occurring. Demining operations and demining sites produce emissions and waste including organic waste from latrines, and occasional fuel and lubricant spills, which can impact public health if allowed to enter waterways.

Furthermore demining teams live in temporary accommodations during demining operations, which can take several forms, including the use of existing public infrastructure such as pagodas and schools, housing constructed in a remote area close to the demining site or within the homes of community members. A group of deminers living among a community for a period ranging from a few weeks to a few months also has the potential for negative public health impacts through the transmission of communicable diseases (including HIV and other sexually transmitted diseases) and waterborne diseases from inadequate sanitation practices. Finally, the presence of a temporary, mobile, largely male workforce away from family and normal social structures within a host community has the potential for negative social impacts, such increased incidence of alcohol use among deminers and harassment of female villagers. Fieldwork and interviews revealed that these types of impacts are rare and that interaction of demining teams with villagers seems in general very positive. Deminers are well received in host communities and are considered local heroes, as well as appreciated for spending money in villages in which they are housed, by purchasing food and other items.

Given that the direct positive impacts of land mine threat removal are of high intensity, wide-ranging, and irreversible (and require no mitigation, as a positive impact) and the indirect negative impacts described are of low intensity, site-specific and can be easily mitigated, the overall impact of mine action was found to have a high positive impact on Community Health and Safety.

Working Conditions of Deminers

In terms of working conditions, the nature of demining work is inherently dangerous and a high level of risk exists to workers while carrying out demining activities. Deminers are exposed to a range of hazards, the most obvious and severe of which is the process of uncovering a land mine threat and either destroying the threat in-situ through detonation or neutralization. Despite Standard Operating Procedures (SOPs) and in general strict adherence to safety procedures, accidents among deminers do occur, although there were no accidents on CFR II project sites. Given the relative hazard level of demining work however, accidents remain rare, mostly due to excellent safety standards and emphasis on safety procedures in quality control verifications, both internally by operators and by the CMAA. It was observed during field visits that mine action operators show strict adherence to worker safety guidelines at the demining site, although it should be noted that all sites visits were planned ahead of time. All personnel interviewed were aware of procedures, sites were clearly marked for hazards, there was always a medic or personnel trained in first aid on site among those visited, and the team leader was aware of transport times to the nearest hospital, often down to the minute. This is in line with the history of mine operators as military organizations, which place safety, and security as their prime operating targets and is a testament to how risk can be effectively reduced when all the appropriate policy, procedures and verification is in place.

Given the fact that this impact is high intensity, site-specific and irreversible, and a high level of mitigation is currently in place, mine action was found to have a medium negative impact on Working Conditions.

6.5 Cultural Heritage

Archaeological Sites

Cambodia is known as a global destination for its outstanding cultural heritage, and the world famous site of Angkor Wat, successfully nominated as a UNESCO World Heritage Site in 1992, attracts over 2 million visitors every year and is the principle tourist draw to the country. Angkor Wat however is not the only site of cultural importance, and though preservation of the Angkor Wat site has been prioritized, dozens of other elaborate sites and temples remain unstudied and hundreds remain undiscovered. Again due to the history of conflict, and a lack of funds and capacity, many sites of archaeological important are not only unstudied, but also unprotected, and heritage theft and destruction is an on-going and severe problem[63]. An archaeological field survey undertaken by Heritage Watch in 2006 recorded twenty-three looted archaeological mounds, containing ancient burial remains from the Iron Age (500 BC- 500AD) in a 100 km^2 area surrounding the town of Thmar Puok, Banteay Meanchey Province[64]. Large-scale looting has also been recorded at Banteay Chhamar and Prasat Preah Khan in Preah Vihar. Looting occurs at many scales but is often carried out by poor villagers looking to supplement their income, as well as by

[63] (O'Reillly, 2007)
[64] ibid.

semi-professional and professional looters. Many looters use metal detectors used for anti-personnel mine detection to identify locations of buried artifacts and gravesites.

Mine action, by releasing land that may have previously been avoided, has the potential to increase access to sites of archaeological importance that are vulnerable to looting. Furthermore, demining operations, in particular excavation and in-situ destruction of landmines in proximity to cultural heritage sites, has the potential to cause irreparable damage to ancient buildings, artifacts and burial sites and may, if not adequately managed be subject to damage and looting by deminers themselves. Interviews revealed that many demining operators are somewhat aware of chance find procedures, but information sharing among cultural heritage authorities and operators, as well as the CMAA is seriously limited and managing the risk of damage to sites of cultural importance is done in an ad hoc manner.

Given that the impacts described are of high intensity, are wide-ranging, and sometimes irreversible, and that the current level of mitigation is medium, mine action was found to have a high negative impact on Cultural Heritage.

6.6 Displacement and Resettlement

Mine Action Planning for Displacement Risk

Mine action is inextricably linked to issues of land tenure security, as the ultimate goal of mine clearance is the release of safe and usable land to beneficiaries. The land tenure security issues around land release in Cambodia then, are a reflection of the current complex socio-political context in the country, which has drawn significant international attention in recent years for widespread human rights violations in regards to forced evictions and displacement[65]. Many of these violations have been around the issue of Economic Land Concessions (ELCs), which are large tracts of land that are allocated by the government to domestic or foreign investors, often for agro-industrial plantations. These concessions are granted by state authorities without an ESIA and may be funded by international financial institutions, multinational companies or state-owned or private national companies. They are often granted in protected areas or farming areas and are a major source of both forced evictions and deforestation. The land tenure situation is further complicated by complex resettlement dynamics following the end of the civil conflict, a lack of formal titles and widespread landlessness among the most poor.

In some sense the current mine action planning system is a reflection of the recognition that displacement and resettlement is an issue of paramount important in mine action and presents real risk to the effectiveness of interventions. That is, Cambodia has been recognized for developing one of the most sophisticated, participatory mine action-planning mechanisms in the world[66]. Although early

[65] (Global Witness, 2013)
[66] (Shimoyachi-Yuzawa, 2012), (GICHD, 2016)

clearance operations primarily responded to humanitarian and emergency imperatives on a case-by-case basis, the necessity to integrate socio-economic considerations in the planning system emerged even before the creation of CMAA, when it was recognized by CMAC that demining operators should not decide by themselves which land should be cleared. Mine action requires extensive resources in the form of time and money, and hence stakeholders recognized early that planning should ensure that cleared land is effectively used for development purposes and by its intended beneficiaries, not least because of stories of land grabbing of demined lands by civilian and military officials started to emerge at the end of the 1990s.[67]In light of these incidents a Land Use Planning Unit was first created in Battambang in 1999, and later spread to other provinces including Banteay Meanchey. The system was designed to be transparent, bottom-up, decentralized and participatory, and with the establishment of CMAA in 2000, it transformed to the current system of planning and prioritization, described above in the project description, which is governed by Provincial Mine Action Committees (PMACs), whose operational arms are the Mine Action Planning Units (MAPUs) in each province.

Unfortunately, despite this early recognition, and perhaps in some sense because of it, mine action is still not adequately and systematically managing the risks and impacts of potential displacement of beneficiaries post-clearance. That is, although the current system has many important safeguards in place designed to manage displacement risks and ensure that intended beneficiaries are using land (including pre-clearance assessment of prioritized minefields, as well as post clearance monitoring), an unacceptable level of residual risk remains.

Current Situation

The recently conducted sector review by GICHD touched on this issue by examining progress towards NMAS Goal 2: Contribute to economic growth and poverty reduction and specifically sub-goal 2.4: Support land management process to secure rights of intended beneficiaries on cleared land. In regards to this goal the sector review found that the latest available report, produced by CMAA in 2012 (though the review was conducted in 2016) did not elaborate on this issue, but seemed to report that there was 'no particular land rights issue.' The review goes onto state that this indicator was not clearly understood by CMAA staff and advisors, and hence was not commented on in further detail. Similarly, the recently conducted Impact Assessment of the CFR II project looked at the issue of both land rights and land disputes and states, "land disputes and grabbing has not been observed in any province. Hence land disputes are found not to be not an issue.[68]" This conclusion is highly questionable for two reasons. Firstly, the method used to identify beneficiaries was not done through the IMSMA, due to the inconsistency and inaccuracy of data, but rather through MAPU's land prioritization and post clearance monitoring reports. Land prioritization reports would not be able to identify areas of conflict, since the

[67] ibid.
[68] (Rajabova, 2015)

prioritization process currently avoids land where there is a pre-existing conflict, and the post clearance monitoring data is only collected between 6-12 months after land release, and hence, if there is an issue past 12 months, then the conflict is not recorded. Secondly, the Mine Sector Review, the Impact Assessment and the Final Evaluation of the CFR II project make no reference to the ample data on land conflicts which exists outside of MAPU collected data, which reveal a plethora of conflicts, many of which spatially overlaps with mine action areas.

In fact, after concluding that land disputes are not an issue, the Impact Assessment goes on to describe a major land dispute in Banteay Meanchey on cleared land that was allocated as an ELC. It notes that UNDP was aware of the fact that 19 suspected areas, which were included for release were affected by the conflict and hence removed the sites from the 2014 work plan, but that suspected areas within the ELC had been cleared previously both under CFR II and by other operators. This case was reconfirmed in interviews with Adhoc and Licadho, which were also aware that two separate operators had demined the land in the forcefully confiscated area. This land grab has since partially been resolved, with a portion of the economic concession converted on appeal by ADHOC to a social land concession, which was then handed back to the villagers. Regardless, it is imperative that mine action stakeholders understand the high significance of such risks, and that even a few cases of land grabs and forced evictions are a few too many, undermining the goals of the mine action sector, and having the potential to reflect badly on the extremely essential and hard work of both CMAA and operators.

There is widely available information on the frequency of land conflicts and forced evictions throughout the country, many of which have occurred in the CFR target provinces. Sources interviewed include the Office of the High Commissioner of Human Rights (OHCHR), the local environment and land rights NGOs Adhoc and Licadho, as well as reports from the NGO forum on land conflicts and two Geneva International Center for Humanitarian Demining (GICHD) papers specifically on the topic of land conflict and mine action in Cambodia[69]. A selection of the cases identified by these organizations is presented in the following sub-section. More generally, however it should be noted that the very fact that land prices increase dramatically post clearance (illustrated below in Tables from the Impact Assessment), make beneficiaries more vulnerable to land grabs:

Table 2: The value of Residential Land before and after clearance

Province	The average price before clearance (US$ per ha)	The average price after clearance (US$ per ha)	Increase %
Battambang	455	2,837	524%
Banteay Meanchey	158	1,524	865%

[69] (OHCHR Cambodia), (GICHD, 2014), (GICHD, 2013), (NGO Forum, 2015), (Licadho, 2014)

Pailin	696	3,396	388%

Table 3: The value of Agricultural Land before and after clearance

Province	The average price before clearance (US$ per ha)	The average price after clearance (US$ per ha)	Increase %
Battambang	446	2,454	450%
Banteay Meanchey	298	1,925	546%
Pailin	597	3,244	443%

In addition to land conflicts on agricultural land, there are also land conflicts on forested land. These land disputes are also relevant to the discussion regarding management of forest loss impacts discussed above, as forest boundaries in Cambodia are often disputed due to the aforementioned rate of agricultural encroachment on protect areas, and in no part due to the fact that boundaries are often ambiguous. Land disputes in Cambodia can be classified into three broader types of grievance:

1) Between the state and citizens, which in turn can be further subdivided between occasions when the state is appropriating land for public purposes and those in which villagers are occupying or using land and forest which official belong to the state
2) Between citizens and representatives of the state, who are either acting in their own personal interest or as intermediaries for the private sector. In these cases it is well documented that there is a blurring of the distinction between private sector actors and the state as government officials that are directly involved in the private sector or acting in cooperation with investors
3) Between private parties, which can be both internal disputes within communities or external disputes between communities and outsiders.

The majority of disputes scenarios, which fall under the first two categories, are characterized by the fact that communities have limited political and economic power compared to the other actors in the conflict (the state or its representatives) and may include forced evictions due to concessions or land encroachment by corporations, army members and powerful people. Given the unbalanced power dynamic, and the fact that the state is often the perpetrator of the land conflict, there is sometimes a lack of transparency with which disputes are recorded and resolved.
Regardless, the NGO forum found that in 2013 over 180,000 ha were under dispute and that the total number of cumulated land disputes at that time were over 400[70]. About half of those were easier to resolve conflicts among citizens, but over 200 cases

[70] (NGO Forum, 2015)

were between the state and state representatives and citizens, and that a quarter of the total disputes were related to the granting of ELCs.

Currently, information on land disputes is collected by several different organizations. The Ministry of Land Management, Urban Planning and Construction is officially responsible for the recording and resolution of land use conflicts through the National Cadastral Commission. Complaints reach this commission either directly, or through reports to village chiefs, which are then brought to district level officials and then passed on to higher levels. In addition to the information on land disputes reported through the cadastral commission and courts, external actors are also involved in collection of land dispute data, including environmental and land rights NGOs, such as Licadho, Adhoc and the NGO Forum, as well as the UN Office of the High Commissioner on Human Rights (OHCHR). Licadho has produced a map of the land conflicts occurring between 2000-2014, which shows the frequency of land conflicts in the CFR provinces of Pailin, Battambang and Banteay Meanchey:

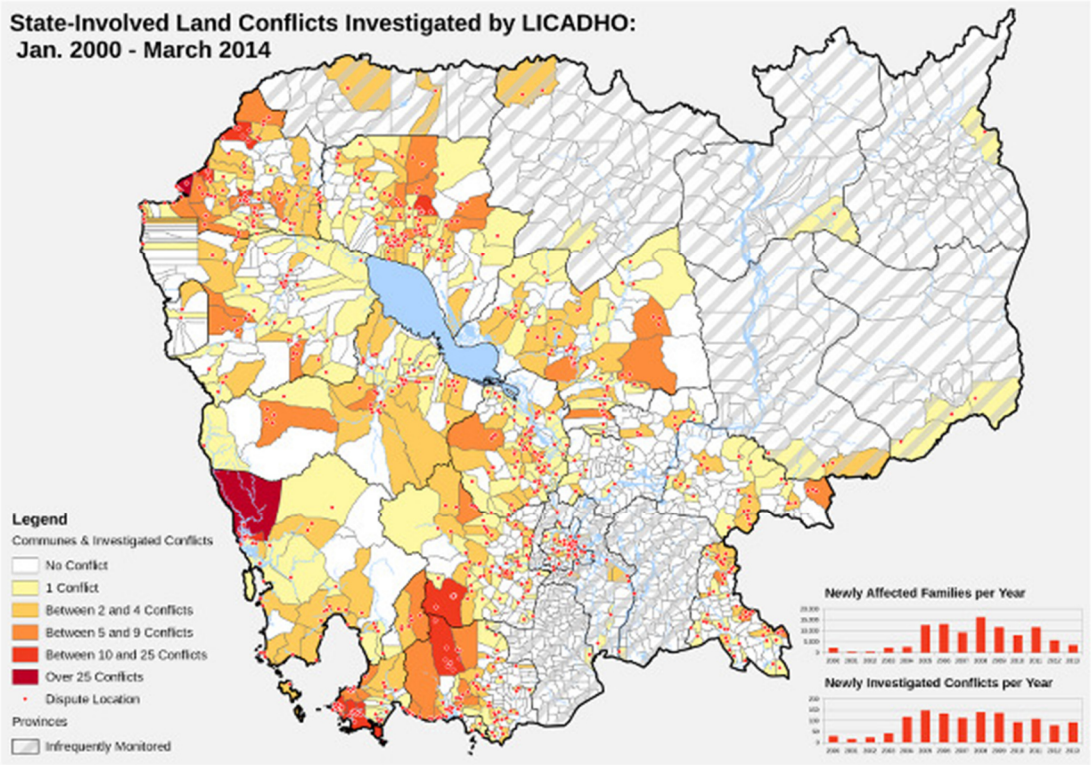

Figure 4: State Involved Land Conflicts Investigated by Licadho 2000-2014

Land Conflicts on Demined Land

Due to the limited time of allocated for the ESIA study, it was not possible to carry out a comprehensive analysis of land conflict records with demined land records held by the CMAA and operators. Gathering the information required for such an analysis from the various organizations listed above will take some time, but should be

prioritized, as it is essential to understand the true scope of the problem. Regardless, even in the short period allowed for field visits, and interviews, and a revision of relevant literature revealed several cases of land conflicts on demined land in the CFR III target provinces including:

1) Fieldwork carried out for a recent paper on Land Issues and Demining in Cambodia by GICHD in 2014, entitled 'Doing no harm? Mine Action and land issues in Cambodia' found that in 2006, approximately 296 landless households living in OuRo'el village in Pailin made a request to an operator to clear contaminated land in their village. The land was unoccupied at the time and they required the land for housing and agriculture purposes. The local authorities agreed that land, once cleared, would be allocated to them. In 2007, the villagers visited the land to observe the clearance process and were surprised to find that other people were starting to farm parts of the land that the operator had finished clearing and that the local authorities did nothing to stop them. The representatives of the 296 households contacted the Deputy Provincial Governor (Chair of the PMAC) who reassured them that they would receive the land once clearance was completed. However, following clearance, commune and district officials allocated the land to households from outside their village. The village representatives believe the Commune and District officials may have benefited personally from the misallocation of the land in some way, such as through unofficial payment. Although the OuRo'el villagers submitted a formal complaint to the Provincial Governor, the PMAC and the MAPU, the case remains unresolved and the families remain landless

2) The same report by GICHD[71] mentioned above also includes a discussion of cases where landless families have settled on state property that is contaminated. They reside on and/or cultivate the land despite knowing the risk of mine and ERW contamination, in order to meet their socio-economic needs. People who have settled on State private property after the legislative cut-off date (August 2001) cannot claim possession or ownership rights. In other cases, people have settled on contaminated land that is classified under the Land Law as State public property, such as forests or riverbanks, which means it cannot be privately owned. The report notes that mine actors continue to encounter problems in releasing this type of land only to find it cannot be officially allocated to intended beneficiaries during the handover process. The beneficiaries thus remain highly insecure and vulnerable to forced eviction despite the considerable survey and clearance assets used to provide them with safe land for their housing and livelihood needs. In rare instances, state property has been allocated to landless households through a Social Land Concession (SLC). For State public property, it is necessary to first reclassify the land as state private property, which is an additional slow administrative step. The report notes that while CMAA has intervened in a small number of cases to have state property reclassified and allocated as an SLC to intended beneficiaries of clearance, this mechanism has been used only in exceptional circumstances and is not standard practice. The Final

[71] (GICHD, 2014)

Evaluation of CFR II only makes reference to this discussion in a footnote, in regards to a discussion of CFR II attempting to target the most vulnerable beneficiaries.

3) An interview with Adhoc[72] revealed that in 2011 a portion of cleared land in Banteay Meanchey was granted as an ELC to a national development company. When Adhoc was requested by community members to investigate on their behalf in the Banteay Chhamar area of the concession, Adhoc found that trees had been cut down indiscriminately in the previously forested area, that pagodas had been bulldozed and that sections of the forest were burnt in order to clear the land for large-scale agriculture. Clearance signs of an operator were still visible in the area.

4) The interview with Adhoc also revealed that cleared land in the Roniem Daum Sam Wildlife Sanctuary in Battambang was granted as a Social Land Concession (SLC) in 2005, due to the fact that villagers already lived in the area, and had been claiming land in the sanctuary for agricultural purposes for some time. Once the SLC was granted and the land was reclassified, villagers reported to Adhoc that more than 50% of the SLC went to the richest landowner and a provincial official, rather than being distributed among beneficiaries.

5) The final case reported by Adhoc was that of Ou Ampil village in Tuol Pongro commune in Banteay Meanchey, where the Prime Minister had allocated cleared land to disabled families and veterans. Reportedly, these beneficiaries did not have sufficient capital to cultivate the land immediately and hence, left the land briefly unoccupied in order to go to Thailand for work. Upon their return, the veterans found their previous commander had sold the allocated land to others outside the village. This case was discussed during the training session with mine action stakeholders and the MAPU chief of Banteay Meanchey was unaware of the case.

6) An email communication from Licadho, revealed that in 2011, a 1,783 ha land concession approved by the Ministry of Environment was granted to Leang Bou company and resulted in a land conflict with 428 families, mostly former resistance fighters, in Banteay Chhmar commune, Thmar Puok District, Banteay Meanchey. The disputed land was demined by an operator whose clearance signs were still visible in the area, prior to the granting of the concession. Given the similarities with case #2 reported by Adhoc, it is possible that both NGOs may be referring to the same land conflict.

7) In March 2005, a deadly attempt to forcefully evict 218 families in Kbal Spean Village of Banteay Meanchey's then Poipet district along the Thai-Khmer border occurred, resulting in the shooting deaths of five villagers, the injury of 40 people and the temporary detention of 30 journalists and NGO staff that witnessed the incident. The land has been heavily mined and had been cleared by villagers themselves as well as another operator involved in CFR II clearance, according to the affected villagers. A special report written on the case notes that land conflict cases in Banteay

[72] (Adhoc Banteay Meanchey, 2016)

Meanchey province are particularly characterized by violence, contemptuous treatment of the victims and difficulties resolving the cases in ways that are fair and beneficial to the poor and that the large military presence and enormous increase in land prices due to casino construction has created a high potential for land conflict[73].

The severity of the land conflict cases above, combined with the lack of awareness of these incidences among mine action operators is deeply worrying and present a significant risk to the work of the mine action sector. The cases described above should by no means be considered a comprehensive list of land conflicts on demined land, and are more likely the tip of the iceberg. They should be further investigated by CMAA, the relevant MAPUs and the operators involved as a first step in mitigating the impacts of displacement.

Given that the impacts described are of high intensity, are wide-ranging, and often irreversible, and that the current level of mitigation is low, mine action was found to have a high negative impact on Displacement and Resettlement.

6.7 Pollution Prevention and Resource Efficiency

Sources of Pollution

Demining operations and on-site survey and clearance activities generate various types of pollution and require resources that should be used efficiently to minimize impact to the environment. These sources of pollution include organic and inorganic waste generation including waste from latrines at the site and at temporary accommodations, as well as plastics, metals and batteries used in clearance operations. In addition to demining operations producing GHG emissions, which have been discussed above in the section on climate change impact, site survey and clearance activities can also generate noise pollution (from detonation activities), and water pollution. Furthermore, not only can mechanical mine clearance result in soil erosion (also as discussed above in the climate change section in terms of land degradation impacts) but it can also lead to other environmental damage, such as the chemical pollution of soil and water. Contamination can also be caused by detonations or destruction of explosive items in the ground or by leaking hydraulic fluids and fuel, which can occur when refueling demining machines. When such spills occur, and fluids enter the environment through spills and leaks from machines or storage areas and waste sites, serious environmental damage can result, particularly if spills occur close to watercourses or in sensitive environments such as wetlands. Furthermore, explosive materials used for land mine destruction such as Trinitrotoluene (TNT) are hazardous to human health and in addition to being carcinogenic (cancer causing) have also been shown to effect immune system and liver function and can affect male fertility with prolonged exposure[74]. Furthermore, residual TNT from storage and use

[73] (Cambodian Human Rights Action Committee, 2005)
[74] (Lima, 2011)

in the field can pollute the surrounding water, the atmosphere and the soil. If soil is contaminated, its uptake through the roots and stems of plants results in the concentration of toxic compounds in the leaves, making them dangerous to grazing animals and crops grown in the area.

Resource Use

Mine action activities can have an impact on the environment similar to that of other humanitarian operations, and can result in the overconsumption of resources if not adequately managed. The mere presence of demining personnel on the ground and their temporary field camps might lead to an over-exploitation of local resources such as drinking water, fuel wood or food, and produce waste which, if not properly managed, can result in environmental degradation persisting long after the demining site and temporary accommodation is dismantled. Again, one of the principle resources that demining operations use is fuel, and this has been discussed in the section on climate change. Regardless on overall focus on efficient resource use in terms of fuel, other types of energy (batteries) and local on-site resources such as water and wood should be emphasized to minimize pollution and resource use impact.

Given that the impacts described are of medium intensity, mostly site-specific, often reversible and current mitigation is low, but can be easily implemented, mine action was found to have a low negative impact on pollution prevention and resource use.

7 Environmental and Social Management Plan

7.1 Approach to Environmental and Social Management

In order to take a comprehensive and cohesive approach to managing the environmental and social impacts of both the CFR III Project and the broader mine action sector coordinated by CMAA, both UNDP and CMAA must take the lead, by following four key steps:

1) Create an enabling environment for environmental and social management
Stakeholders within the mine action sector need to reach a shared understanding of the 'Do No Harm' approach to humanitarian action. The completion of the ESIA and associated training is an important step in that process, and the results of the ESIA should be widely shared among stakeholders. It is essential however to continue to raise awareness among all mine action stakeholders of the environmental and social impacts of mine action, and the importance of mainstreaming environmental sustainability and human rights into operations.

2) Implement the appropriate environmental and social management policy
The recommendations of this report will only be useful if they are reflected in the

overarching policy of the sector as well as in the organization policy of CMAA and mine action operators. Environmental and social considerations should be immediately reflected in both the National Mine Action Strategy revision and CMAA should make it a priority to update the Cambodian Mine Action Standard to reflect IMAS 10.7. Accordingly, CMAA should require that all operators have SOPs in place which reflect this standard and have a requirement for an environmental and social management system in its accreditation process.

3) Implement internal processes which reflect policy by implementing the mitigation measures outlined in the Environmental and Social Management Framework

According to the assessment of impacts presented above, a series of mitigation measures related to each UNDP's project level standards is presented below in the Environmental and Social Management Framework – Mitigation Measures table. These mitigation measures span both operational level mitigation measures for operators, suggestions on how to modify the CMAA/MAPU planning and prioritization process and the post clearance monitoring process, as well as measures that should be checked during CMAA's QA/QC process. CMAA should also incorporate environmental and social indicators into its performance monitoring system and use the system as the implementation structure of the environmental management framework.

4) Pursue value added partnerships (and encourage operators to do so)

In order to best incorporate environmental and social safeguards into mine action, UNDP and CMAA should consider partnering with conservation, rural development and human rights NGOs for specialized expertise on conservation and livelihoods projects and for third party monitoring.

The following section outlines the mitigation measures required to implement an environmental and social management framework and elaborates on the other steps. In conjunction with the mitigation measures, following the above guidelines will effectively help to manage the impacts described above of the CFR III project and the mine action sector in Cambodia more broadly.

7.2 Environmental and Social Manage Framework – Mitigation Measures

Project Level Standard	Mitigation Measure	Who	When
Biodiversity Conservation	**1) <u>Raise awareness of biodiversity impacts among stakeholders:</u>** The first step in mitigating the impacts of mine action on biodiversity and sustainable resource management is to raise awareness among stakeholders of both the role of mine action on deforestation, as well as on the importance of biodiversity conservation and the essential	UNDP CMAA	0-6 months

and Sustainable Natural Resource Management	ecosystem services that forested areas provide. This is particularly important because there seem to be two persistent misconceptions regarding the relationship between mine action and deforestation among the range of mine action stakeholders interviewed over the course of this study. The first is that mine action was not perceived to contribute to deforestation "because we do not cut down the big trees." ***That is, most mine action actors, inclusive of CMAA, operators and beneficiaries, are often aware that they should not cut down large trees, but their view of impact is limited to this and not to the larger processes driving deforestation, nor the impact of losing vegetation cover.*** The second misconception that is not limited to mine action, but can be found across sectors (both humanitarian and commercial) is that accounting for deforestation and other environmental impacts somehow presents a choice between human lives and saving the environment. The question here is not whether mine action should cease its essential role in improving the lives of Cambodians. It is rather a question of how it should be done, to maximize its benefits to Cambodians, by not unintentionally harming their livelihoods and future prospects. ***Human wellbeing is inextricably linked to environmental quality and establishing this understand among stakeholders will take dedicated efforts to raising awareness and building capacity among all mine action stakeholders***. This will require systematic changes in the enabling environment, which should begin with a change in overarching policy (the NMAS and CMAS). In order to raise awareness of these impacts it is suggested to share the results of the ESIA through bilateral meetings with operators and donors as well as within the Technical Working Group. CMAA should also assign an environmental sustainability and human rights focal point.		
	2) <u>Apply the mitigation hierarchy for biodiversity impacts:</u> In order to mitigate the impacts of biodiversity loss, CMAA and operators should begin by applying the mitigation hierarchy for biodiversity offsets, which involves 1) prioritizing avoidance 2) minimizing those impacts which are unavoidable 3) pursuing opportunities for rehabilitating and restoring habitats affected by mine action. The mitigation hierarchy is in line with the prevention principle espoused in Cambodia's Environment Code, which states that it is better and more cost effective to avoid negative impacts rather than trying to fix them once they have occurred. The best way to avoid the impacts of clearance is to use ***non-technical survey for land release as an absolute priority for all mine clearance operators.*** Avoidance of biodiversity impacts should also involve careful spatial or temporal panning around minefield prioritization (below).	CMAA MAPU, Operators	0-12 months (Avoidance - next planning cycle) 6-12 months (Rehabilitation)

	Most importantly, ***MAPUs in conjunction with operators should avoid prioritizing minefields beside or within protected areas***. Avoidance is the easiest, cheapest and most effective way of reducing potential negative impacts, but it requires biodiversity to be considered in the early stages of a planning. For those mine clearance activities taking place adjacent to protected areas and in environmentally sensitive areas such as on hilltops with remaining forest and along the border with Thailand, where complete avoidance may not be possible, mine clearance operators should make every effort to minimize impact. That is, measures should be taken to ***reduce the duration, intensity and/or extent of impacts in the environmentally sensitive areas that cannot be completely avoided***. For example the loud noises associated with the in situ-destruction of mines can scare wildlife and disrupt normal hunting and breeding patterns and therefore should not be carried out in environmentally sensitive areas early in the morning or at or after dusk, when may large mammals are active. If neutralization rather than detonation is an option, this method should be prioritized. Finally ***mechanical demining should never be authorized within the boundaries or adjacent to protected areas or in areas adjacent to forested lands or on slopes in order to minimize damage to fragile environments.*** □ Finally rehabilitation and restoration measures should be taken to improve degraded or damaged ecosystems following exposure to impacts that cannot be completely avoided or minimized. Restoration processes attempt to return an area to the original ecosystem that was present before clearance. This approach may be appropriate in the future where clearance occurs in areas that can be promoted for ecotourism development and areas are chosen for clearance to ensure the safety of visitors to the area. Rehabilitation on the other hand only aims to restore basic ecological functions and/or ecosystem services (for example through planting trees to stabilize bare soil). ***Rehabilitation and restoration attempts should take into account the original vegetation present*** and can be done in conjunction with activities with raise awareness among communities about the importance of maintaining vegetation cover and plant diversity and promote community involvement protected area management.		
	3) Use planning and prioritization and post clearance monitoring to minimize deforestation Avoiding deforestation should remain the priority and a key to achieving this goal is to adjust the existing planning and prioritization and post	CMAA, MAPU	0-12 months (next planning cycle)

	clearance monitoring processes. That is measures to stem deforestation include **1)** ***Planning roads strategically to minimize intrusion into remote forested areas.*** Proximity to roads increases deforestation by encouraging settlement along the road, lowering transportation costs to markets, by making frontier land more accessible to new migrants, and by enabling remote economies to transform from local subsistence agriculture to market-oriented farming systems. The case of Roniem Daum Sam should be taken as a learning example for the sector, as a demonstration that a road through (or adjacent to) a protected area may all but guarantee its demise **2)** ***While clearance of high density (A1) minefields should be prioritized if these minefields are causing a higher number of casualties and injuries, and are chosen by communities for development purposes, they should not be prioritized simply due to their density and the possibility of future settlement.*** Mine action stakeholders, particularly operators, should recognize that clearance encourages internal migration for the purposes of agriculture along the border (and in prohibited areas) and that clearance in these areas greatly complicates forest and border area management. ***For clearance in the K5 mine belt, a long-term plan is required that takes into account transboundary impacts and that leaves appropriate biological corridors for the migration of fauna between contiguous protected areas*** 3) Finally, no exception should be made for clearance requested for the placement of roads and other infrastructure by the government, the military and or other operators outside of the set MAPU prioritization process, that is in a protected area, as these are the types of clearance activities that are likely to be of highest risk to biodiversity conservation. Both the CMAA and MAPU should ***ensure that operators are following the planning guidelines and have not placed polygons outside the approved plans.***		6-18 months (K5 plan)

	4) Work in conjunction with development partners and develop linkages with other UNDP projects and conservation organizations There are many efforts underway both by the ***UNDP in supporting environmental policy, particularly in regards to the future implementation the Reducing Emissions through Deforestation and forest Degradation (REDD)*** mechanism of the UNFCCC, as well as with other national and international organizations involved in conservation and biodiversity initiatives. ***UNDP should improve linkages between these projects and CFR III.*** Similarly, Operators and the CMAA should ***work in partnership with conservation organizations in order to identify and delineate critical habitats and design appropriate migration corridors***. Mine action stakeholders also should make efforts to support rather than hinder the already complicated activity of protected area management and ensure that ***mine clearance should never take place adjacent to protected area where the delineation of the border to the protected area is unclear and always in close collaboration with department of environment officials.*** Critical habitats and environmentally sensitive areas should also be identified in areas that do not occur within forested areas such as in the Tonle Sap Multiple Use Area. Finally operators should consider establishing ***partnerships with development NGO's which focus on livelihood diversification*** which can look at ways of supplementing income in mine affecting communities which do not involved agricultural encroachment into forested areas, ***such as building opportunities in ecotourism initiatives.*** Promoting alternative livelihood activities that are diversified from agriculture would not only increase the development impact of mine action but also build resilience to climate change. Finally, it is important to ***share experiences both globally and regionally***; given that environmental and social safeguard implementation within mine clearance is relatively new.	UNDP, CMAA, Operators	6-18 months
Climate Change Mitigation and Adaptation	**1) Use planning and prioritization and post clearance monitoring to minimize deforestation** That is all mitigation measures which ***reduce deforestation*** in order to preserve habitat will also fill the role of forests in ***increasing resilience to climate change impacts.***	CMAA, MAPU	0-12 months (next planning cycle)

	2) Raise awareness of climate change impacts among operators and beneficiaries Similarly to biodiversity, there is an important lack of ***awareness of the role of forests on regulating climate and the various ways that mine action increases climate change vulnerability and can reduce resilience to changing weather patterns and extreme weather events***. An importance first step in mitigating these impacts is reaching a common understanding among mine action stakeholders as to why it is important to reduce deforestation, maintain vegetation cover and avoid soil erosion and unsustainable agricultural practices	UNDP, CMAA	0-6 months
	3) Avoid all unnecessary clearance This mitigation measure cannot be overemphasized and touches not only climate change mitigation, but on several project level standards. ***If land can be released without full clearance it is much better for the environment and for communities, as it avoids all of the impacts from vegetation removal (land degradation) as well as drastically cutting the amount of GHG emissions.*** The final evaluation of the CFR II project found that 25% of the minefields cleared by the CFR II project had either no contamination or was up for cancellation within a year. This means that the land and beneficiaries are bearing the full brunt of the environmental and social impact, with no actual risk reduction and it is a waste of not only resources, but also the time and money of operators and donors. ***Conversely, mine clearance should also not be prioritized in areas where there is high contamination but few casualties or development need.*** Clearance for future habitation drives deforestation. In general, clearance on steep slopes should also be avoided, as these areas are the most prone to erosion and are most often not suitable for agriculture. Access and use is already limited to communities, and the clearance procedures are more difficult and time consuming.	CMAA, MAPU, Operators	0-12 months (next planning cycle)

	4) Reduce impacts on soil quality by limiting mechanical demining and promoting erosion control measures Given that the intensity of ***impact of mechanical demining on soil quality is highly negative, this method of clearance should be actively limited and used only when absolutely necessary. Mechanical demining should always be used in conjunction with measures to replenish soil quality and reduce erosion***, such as returning processed soil layers to affected sites in the correct order so that the fertile top soil is once again the top layer if possible and re-seeding and replanting areas with local species of grasses immediately after clearance. The debris leftover after clearance should not be removed, as leaf litter decomposition is good for soil nutrients and vegetation should never be burned as this practice greatly depletes soil quality. In the same vein, demining should be scheduled so that the site can be cultivated as soon as possible after clearance to ensure regrowth of a root system, which will, at least in part, prevent erosion. Another erosion measure is to avoid demining during periods of the year with strong winds and/or heavy rainfall and to attempt to carry out demining tasks in the period of the year most suitable environmentally. In proximity to water bodies or on sloped areas prone to erosion, operators should leave a buffer strip of vegetation to control runoff.	CMAA, Operators	0-6 months (limit mechanical clearance) 6-12 months (erosion control)
	5) Promote sustainable agricultural practices It should be noted that one deterrent to the agriculture encroachment on forested areas and the ensuing impacts on both biodiversity and climate change, would be to support and encourage the more efficient utilization of already cleared and agricultural areas. That is, to lessen accelerating forest loss UNDP, CMAA, as well as operators should consider ***community outreach measures to improve the productivity of farms, pastures and plantations in beneficiary communities*.** By reducing unsustainable agricultural practices such as burning for clearance, and inconsistent crop rotation and improving already developed lands, communities can diminish the need to clear additional forest.	CMAA, Operators	12-24 months

	6) Reduce GHG emissions The reduction of GHG emissions from mine clearance operations is a relatively straightforward undertaking but requires both policy by CMAA and donor reporting requirements to incentivize operators and awareness of the benefits in terms of climate change impacts and cost savings. From interviews it was evident that most operators already have an idea of how much fuel is used per month, but the detail to which this data is recorded or analyzed varies considerably and it is not currently shared with CMAA nor monitored internally to remain within set targets, except in some cases where it is tracked for financial purposes. In order to reduce GHG emissions, ***all operators should systematically record fuel use from all sources and tabulate monthly and yearly use, disaggregated by source. These usage statistics should then be measured against target reduction indicators*** both internally by operators, as well as recorded and checked by CMAA.	CMAA. Operators	6-12 months
Community Health and Safety and Working Conditions	**1) Continue to enforce strict adherence to safety procedures** Although strict adherence to working safety procedures was observed during field visits, interviews outside field visits however did reveal that QA/QC visits frequently find non-compliances and so it should be noted ***that the level of residual impact will only remain acceptable as long as operators continue to emphasize good practice and strict adherence to SOPs on site.***	Operators	0-6 months
	2) Track and report on causalities and injuries within the sector as a whole, among communities and deminers Although ***reducing casualties and injuries among communities affected by landmines and thereby facilitating development is arguably the principle goal of humanitarian demining, ironically the reporting along these lines by CMAA is lacking.*** The recently completed mine action sector review of Cambodia conducted by the GICHD revealed that CMAA reports to the government in documenting achievements was limited and not up to date. Furthermore, the sector review completed in early 2016 only had data on mine/ERW casualties reported against the targets set in the NMAS up to 2012, which showed a reduction in casualties over three years as compared to 2009, with a spike in 2010 due to anti-tank mine accidents. Other reports indicated that there was also a spike in casualties in 2015 due to anti-tank mine accidents, attributed to the rise in tractors used for agricultural activities. In order to enhance the	CMAA	0-6 months

	achievements of the sector and demonstrate the crucial role of mine action to external donors, it is essential to ***better track casualty and injury data among communities.*** In regards to working conditions, all sites visited showed strict compliance to guidelines regarding safety markings, and personal protective equipment and most demining platoons were not more than a few hours away from either the nearest health center or hospitals and several had arrangements for a nearby helicopter pad in case of emergency evacuations. Regardless, many serious fatal accidents have occurred during operations including an anti-tank mine accident in 2015 that killed 7 deminers. Each individual operator collects mine risks accident statistics, however CMAA does not systematically collect this data and does not currently report on it. A few significant accidents were reported to have occurred over the past 5 years, all of which seemed to be due to non-compliance of standard operating procedures by deminers, who are particularly vulnerable during the stage of clearance when a threat has been identified and is prodded prior to excavation. Reducing mine action accidents among deminers requires set targets and regular reports and ***CMAA should be systematically collecting data on demining accidents and sharing this information with mine action stakeholders***		
	3) Improve working conditions In addition to better tracking of casualties and injuries among deminers and continued emphasis on safety procedures at demining sites there are several other mitigation measures that should be put in place to improve deminer working conditions. This includes an ***emphasis on safety at temporary working accommodation sites***, including storing explosives in a covered area that is lightning proofed to avoid accidents, as well as storing fuel used at the accommodation sites away from sleeping quarters in case of a fire, and away from watercourses. All operators should also ***adhere to local labour laws*** and ensure that all deminers receive appropriate notice and compensation in the case of termination. As part of gender mainstreaming efforts in mine action, many operators have made efforts to recruit female deminers in operations. ***Working conditions should strive to be gender sensitive***, ensuring separate accommodations and restrooms.	Operators	6-12 months

	4) Improve management of negative community health impacts In regards to Community Health and Safety and the management of temporary accommodations, operators were found to be considerably less compliant than in regards to working conditions in regards to safety at demining sites. Most sites only partially followed the guidelines outlines in the IMAS 10.7 on the environment, even among those operators that has an SOP based on the guideline. The IMAS 10.7 provides specific guidance on good sanitation practices including ***placing burial pits for solid waste away from water courses and ensuring that latrines are of certain depth and do not drain near a community water source.*** Most latrines observed during field visits were not of sufficient depth to avoid sanitation issues and more seriously, it was reported that deminers often do not use the constructed latrines, which should be immediately rectified so as to not compound existing sanitation issues in communities. Finally ***awareness of sexually transmitted diseases should be raised demining platoons and all deminers should have access to condoms for improved prevention of HIV/STIs.*** Despite the evident lack of social problems between host villages and demining platoons, operators should consider ***establishing a grievance mechanism in line with international best practice for villagers to be able to report any cases of conflict without fear of consequence.***	Operators	0-6 months
Cultural Heritage	**1) Raise awareness on importance of protecting Cultural Heritage** ***In order to mitigate the impacts of mine action on cultural heritage it is first imperative that all mine action stakeholders are aware of the importance of maintaining cultural heritage and the density and distribution of sites.*** Interviews revealed that most mine action stakeholders make accommodations for clearance around currently used temples, but are mostly unaware that operations may be occurring in proximity to undiscovered sites. Apsara authority also reported problems with clearance occurring on sites of importance without their consultation or authorization, and though some stakeholders were aware of chance find procedures it is doubtful that this aspect is emphasized in site inspections, due to lack of information and awareness.	CMAA	0-6 months

	2) Improve collaboration with Ministry of Culture and Fine Arts and Apsara Authority Mine action operators, including CMAA, the MAPUs and operators should ***increase their collaboration with the Ministry of Culture and Fine Arts as well as with the Apsara authority*****. It is *essential that CMAA obtains existing maps, and creates maps based on data from these authorities***, as well as cultural heritage organizations carrying out research in Cambodia. The Greater Angkor Project (GAP) has not only mapped the extended urban landscape of Angkor through the use of satellite imagery, but has launched similar mapping projects in Banteay Chhamar and Koh Ker. The more recent Cambodian Archaeological Lidar Initiative (CALI), carried out in partnership between the Ministry of Culture and Fine Arts, Apsara Authority and the Ecole Française d'Extrême Orient uses ***high-resolution lidar survey*** that can see through dense vegetation, and has already completed surveys over Angkor, Phnom Kulen and Koh Ker. A newer wide-ranging survey conducted in 2015 covered 1,600 km^2 including Banteay Chhmar (Banteay Meanchey province), Preah Khan of Kompong Svay (Preah Vihear province), Sambor Prei Kuk (Kampong Thom province), and Longveck/Oudong (Kampong Speu province). Preliminary results and analyses of the survey will become publicly available in 2017 and it is essential that CMAA is aware of the results in order to plan demining activities accordingly. Finally level ***officials from the Ministry of Culture and Fine Arts should be consulted at district integration meetings to share up-to-date information*****.**	CMAA	6-12 months

	3) Adopt Chance Find Procedure SOPs All demining personnel should be familiar with Chance Find Procedures, which outline procedural guidelines in the case of cultural resources being identified or accidently exposed during clearance operations. The goal of the procedure is to avoid any further damage to the site or to objects of cultural heritage. As discussed above, this procedure is much more effective if deminers are aware of the possibility of finding such a site or object, and should be given training on the importance of such objects, as well as the forms they may take. ***The SOPs on handling chance finds of cultural heritage should include the following provisions*:** 1. ***Any item of archaeological, heritage, historical, cultural or scientific interest*** found during mine/UXO clearance activities ***remains the property of the government.*** 2. In the event of such a find, mine/UXO ***clearance operations that create ground disturbance in and adjacent to the find will cease, and the appropriate authorities will be notified.*** (This includes the CMAA, the Ministry of Culture and the Apsara Authority) 3. ***Operations will not resume until an appropriate directive has been received*** from those authorities. 4. The mine/UXO clearance ***operator is responsible for the actions of his personnel with respect to site vandalism and the unlicensed collection of cultural artifacts*.** 5. In order to prevent damage to sites and object operators should ***remove mines and ERW once authorization is granted to another area for destruction***. If items are unsafe to move and neutralization of the threat is not possible and in situ demolition is necessary, operators should use protective works.		
Displacement and Resettlement	**1) Make land related conflict risk management a top priority** Ensuring that the intended beneficiaries of the CFR III project are the ultimate beneficiaries of the land that is cleared, and reducing risks of land conflicts and forced evictions in the sector as a whole is paramount to CMAA's success in coordinating the mine action sector. Risks in regards to land rights violation has a great potential to undermine the essential work that operators are doing to improve the lives of beneficiaries and even one case, can undermine the legitimacy of CMAA, the MAPU's and individual operators. ***Mitigating the impacts of displacement and resettlement should therefore be of high priority for CMAA and the UNDP.***	UNDP, CMAA	0-6 months

	2) Improve post-clearance monitoring in regards to displacement Given that neither the CMAA, the MAPU's, nor the individual operators have a systematic record of the incidences of land conflicts and forced evictions that have occurred on demined land, despite the fact that there is a system of post-clearance monitoring in place, implies that the **current PCM process does not adequately capture what is happening to the land after clearance.** Although the PCM forms include several land-related questions, it is also noteworthy that past, consolidated PCM reports make no reference at all to land issues, despite the fact that they clearly occur. That is, the PCM may in the majority of cases serve as an adequate record of land use post clearance, but the few ***cases where there is a problem, which are those that require resolution and are the highest risk to the project, and the sector performance as a whole, are not being recorded***. As mentioned above, this is most likely due to the fact that the PCM only takes place between 6-12 months after clearance and hence would not catch any conflict that occurs beyond this window. Furthermore, a revision of a selection of PCM reports with verification in the field showed frequent inconsistency with the type of crop reported. This may simply be due to the fact that agricultural practices such as crop rotation are responsible for the type of crop changing when the tract of land is checked subsequent to the original PCM, but it may also be an indication that PCM reports are not being filled out consistently and accurately and given the resource limitations of the MAPUs it is possible that the reports don't capture the various stakeholders cultivating the land, but only those who are present when the monitoring visit occurs. It is also worth noting that the way the PCM reports record beneficiaries is misleading. The reports currently report the beneficiaries of the agricultural land cleared as the soft and hard titleholders of the land, and then list all the village members as 'indirect' beneficiaries. This is a stretch, and indirect beneficiaries should only be reported when clearance occurs for public infrastructure such as schools, hospitals and pagodas. ***Land conflicts, such as the cases listed above should be captured in consolidated reports that summarize post-clearance monitoring data. In order to do this there must be reporting by MAPU and operators to CMAA of issues that are occurring in cleared areas.*** It is likely not feasible given the already limited budget and resources of the MAPUs to carry out PCM on all cleared minefields annually. However ***a mechanism for land conflict information sharing should be created, where in areas that are signaled as problematic, additional post-clearance monitoring is carried out.*** This issue is further compounded	CMAA, MAPU	6-12 months

	by the fact that only some operators conduct their own additional post clearance assessment, which is also often within a twelve month period, partly due to short term funding modalities, which do not facilitate post clearance assessment beyond the length of the funding period. Finally, due to time and resource constraints, CMAA is only able to spot check 10% of these PCMSs annually[75]. This means there are currently no checks and balances in the PCM process.		
	3) Improve pre-clearance assessment and baseline data collection The current planning and prioritization process includes a pre-clearance assessment that checks whether there is any pre-existing conflict, as well as documenting the expected beneficiaries, which is an excellent practice. However clearly this process is also with its weaknesses, given that cases described in the GICHD report above where beneficiaries have settled on state private property or state public property that cannot be privately owned, have not been captured in the pre-clearance assessment. Overall, there is a sense that ***although much useful data is being collected, the data is not being used to its full potential in reporting or analysis*** and that some data, such as land title data is simply descriptive, and the fact that most beneficiaries have no title is recorded, but not acted upon. The ***information collected in the pre-clearance assessment is also a valuable opportunity to establish a socio-economic, and as appropriate biophysical baseline*** (in environmental sensitive areas such as forested areas, highlands and within and adjacent to protected areas), in order to measure impact through the performance monitoring system. The ***pre-clearance assessment should be adjusted in order to capture indicators such as income, access to services, and livelihood constraints and the data should be age and gender disaggregated.***	CMAA, MAPU	0-12 months

[75] (GICHD, 2014)

	4) Verify MAPU constraints on reporting land conflicts The other issue in terms of reporting land conflicts is an issue of independence. As signaled in the Do No Harm' report by GICHD, given that ***the MAPUs fall under the authority of the PMAC/Provincial governor, there is a possibility that they may not always feel free to record issues on PCM's or report the incidence to CMAA*** but rather feel compelled to minimize the situation or deal with it at the provincial level. This is particularly relevant if the Provincial Governor or high-ranking officials close to the official are themselves involved in the land grabbing or dispute. Finally the fact that these issues are not being dealt with by the MAPU's and CMAA is probably an indication of lack of sufficient capacity to deal with land related disputes. Despite the fact that MAPUs and other mine action actors inherently affect land use, access and tenure through their work, very few mine action actors interviewed appeared to have a good understanding of land tenure or land law, including the dispute resolution mechanisms that exist within sector (most relevantly the cadastral commission). In order to address this, it is suggested that there is ***an effort to verify MAPU constraints*** in ***regards to land conflict identification and resolutions.***	UNDP, CMAA	0-6 months
	5) Encourage true participation of beneficiaries in planning process Finally it is worth noting that based on the interviews and field work conducted for this assessment, which is clearly echoed in the finding of previous reports, the ***current planning and prioritization process, as well as post clearance monitoring, does not do enough to represent the poorest and most vulnerable segments of the population.*** The minefield prioritization process, despite its intention to target areas with the greatest development impact, and the most vulnerable beneficiaries doesn't capture those segments of the population that are not well physically and politically connected. That is, officially, village chiefs are required to hold a consultation at the village level in order to identify the land that is a priority for clearance to the whole community, and this process should include vulnerable groups such as female-headed households, the poorest community members, landless beneficiaries and the disabled. It was evident from interviews and from previous reports however, that this consultation rarely occurs and that ***local level views expressed at the district integration meetings are those of the village chief's rather than necessarily those of beneficiaries***. Although the village chief may well represent the views of most villagers, this is likely to be highly variable and may not always be the case, with established	CMAA, MAPU	6-12 months

	power dynamics at village level influencing what land is submitted for clearance. Furthermore, although 'development impact' is prioritized, this ***development impact has not been articulated according to UNDP basic development goals, such as the provision of basic services and poverty alleviation, but most often, for both village chiefs and commune level officials, means the construction of infrastructure such as roads***. Finally it is evident that, not only is the planning and prioritization process not as bottom-up as intended, it is not as top-down as intended either. That is, the minefield selection process is designed to be MAPU led, with MAPU selecting priority communes based on community consultation, casualty data, and development needs. However interviews revealed that the ***MAPU selection is too broad for meaningful prioritization, and that ultimately there is undue operator influence in the process, with prioritization based on existing operator work plans***. This undermines the ultimate purpose of planning and prioritization based on strategic goals, and should be rectified by establishing a more selective and targeted system for minefield selection at the village level, which reflect the priorities of the sector as a whole. If the mapping ***planning and prioritization process is adjusted in a way that reflects selection priorities, and is narrow enough to be followed by operators (without them individually deciding where they want to clear within a selected commune based on their own work plans), there is less overall risk of clearance causing unwanted impacts.***		
	6) Clarify roles and responsibilities in regards to land issues Mine action actors should be reminded that the Policy Guidelines and Operational Guidelines on Socio-Economic Management of Mine Clearance Operations issued in 2006 outline specific roles for national authorities in allocating and monitoring the use of land once it has been released, as follows: ***1) CMAA is responsible for monitoring the use of cleared land to ensure that it is reaching intended beneficiaries. CMAA is also responsible for monitoring the MAPU's coordination with relevant institutions in issuing legal documents and awarding ownership certificates.*** 2) PMACs are responsible for follow up and coordination on the use and distribution of cleared land for beneficiaries and handle land-related disputes. 3) District/Municipality mine-action working groups are responsible for overseeing the use and distribution of cleared land to the intended	CMAA	0-12 months

	beneficiaries. They are also supposed to participate in handling disputes related to cleared land. ***4) MAPUs coordinate land dispute resolution during the mine action planning process. They also coordinate the resolution of disputes that are identified during the post clearance monitoring process.*** 5) Local authorities (Commune Council) are responsible for ensuring that cleared land is used according to the original requests. They are also involved in dispute resolution with regards to cleared land and report on unresolved disputes to the district or provincial authorities as necessary. According to the guidelines, ***CMAA should make efforts to improve PCM to ensure it is reaching intended beneficiaries and should both more closely monitor MAPU's work, as well as start issuing land titles with the appropriate authorities to beneficiaries without title***. The MAPU's should also better improve reporting of land related disputes that come to their attention to CMAA and work more closely with commune councils to resolve these disputes.		
	7) Give land rights training to CMAA, MAPUs and operators The Cambodia Center for Human Rights (CCHR) has a land tenure security project with Action Aid Cambodia, which focuses on strengthening capacities of civil society organization and to hold local authorities and private sectors to account, thereby promoting land tenure security for the most vulnerable communities in Cambodia. ***Operators should consider partnering with CCHR to benefit from land rights training and to offer such training to beneficiary communities as an additional safeguard.*** In addition to the CCHR, both Adhoc and Licadho have programs to build land tenure aware in communities. ***Partnerships should be pursued with these organizations to build the capacity of CMAA and MAPU staff to deal with land conflict issues.***	UNDP	6-12 months

	8) Establish a grievance mechanism and a mechanism for third party monitoring UNDP's social and environmental standards are underpinned by an accountability mechanism a key component of which is to ***establish a Stakeholder Response Mechanism (SRM) that ensures individuals, peoples, and communities affected by projects have access to an appropriate grievance resolution procedure, for hearing and addressing project-related complaints and disputes*.** This is essential for the CFR III project, given the risks impacts described for all project level standards, and will be particular useful in regards to managing displacement risks. Although beneficiaries currently have access to official channels, and most often report land conflicts to village chiefs and the cadastral commission, these established methods should not be overlooked or undermined, while ***providing an alternative channel to report grievances, first through the CMAA or alternatively directly to UNDP until such a mechanism is established.*** The grievance mechanism should be accessible, collaborative, expeditious, and effective in resolving concerns through dialogue, joint fact-finding, negotiation, and problem solving. This will allow UNDP and the CMAA to better account for impacts, and have an extra level of risk reduction for beneficiaries, who should be informed of this channel to report conflicts at an early stage of consultation (at least at the stage of being selected for inclusion in the CFR III project). ***Awareness of the grievance mechanism among beneficiaries can be incorporated either into commune council meetings, district integration meetings or at the pre-clearance assessment stage*.** The mechanism should allow stakeholders to register a complaint with CMAA, and have dedicated personnel available to investigate and respond to complaints when received.	UNDP, CMAA	0-12 months
Pollution Prevention and Resource Efficiency	**1) Reduce all sources of pollution at the clearance site and at temporary accommodations** The IMAS 10.7 states that all demining operations should implement the following for measures for pollution reduction: 1) All mine/UXO clearance activities, including the establishment and operation of temporary accommodation will be undertaken in a manner that **a*voids or minimizes erosion problems, the discharge of silt or other harmful substances into any watercourse*** (e.g. river, stream, lake and pond). No obstruction or debris will be placed in any watercourse during any operations.	Operators	0-6 months

	2) When mechanical assets are serviced or repaired in the field, any used parts or by-products from the work are to be collected and disposed of in an environmentally acceptable location and manner. 3) ***The dumping of oil or other materials onto the ground or into any watercourse is prohibited.*** 4) Drained oil or other materials is to be contained using a drip pan or other suitable receptacle and disposed of in an environmentally acceptable manner.		
	2) Use innovative waste and energy reduction practices In addition to ***tracking resource use and waste generated both during demining operations and temporary accommodations and setting reduction targets*****, Operators should** ***also consider implementing international best practice solutions for reducing the environmental impacts of their operations*****,** while also supporting local development initiatives. In line with their humanitarian mission to support communities, operators should consider implementing some of the following ideas: 1) Rather than using generators and fuel for energy purposes at temporary accommodation sites, ***operators can install solar panels for their energy generation needs*** and then leave the solar infrastructure for the community to use after they leave. 2) Plastic waste lasts forever and Cambodia is suffering from a serious waste management problem of which plastic water bottles are an important component. ***Minimizing the use of plastic bottles*** on site should be the first priority of operators. However if plastic bottles are used in various areas of operations, organizations should consider ***collecting used bottles and donating them to a local organization such as Husk Cambodia*****,** which uses used plastic bottle and other waste materials to construct affordable public infrastructure for in need communities. Furthermore ***operators should only use equipment with rechargeable batteries, as there is currently no capacity at the national level to deal with battery waste, which is hazardous.*** 3) Golden West Humanitarian Foundation is a humanitarian organization dedicated to developing innovating technologies to destroy munitions. They developed the ***Explosive Harvesting System (EHS), an innovative explosives supply solution that that saves resources and costs***. By using unexploded ordnance (UXO) that is already slated for destruction, the EHS extracts the available explosives and manufactures it into a stable, safe and effective tool for clearing landmines and UXO. Golden	Operators	6-18 months

	West pioneered the Explosive Harvesting System (EHS) in Cambodia with strategic partners including the Cambodian Mine Action Centre (CMAC). ***All operators should consider using this recycled explosive solution*** given that it is reduces a series od environmental impacts in one go, eliminating the costly and emissions heavy process of importing explosives, eliminating the need to stockpile explosives which can be another potential source of pollution and finally reusing readily available material. 4) Rather than using fuel wood from the surrounding area at temporary accommodation sites, an unsustainable practice, operators should consider using a product such as ***Sustainable Green Fuel Enterprise's recycle biomass briquettes.*** This local business manufactures charbriquettes from organic waste collected around Phnom Penh, which are 100% recycled and an efficient source of cooking fuel.		

7.3 Challenges and Opportunities in ESMP Implementation

In order to successfully implement the Environmental and Social Management Plan described above, it is essential to create an enabling environment for mainstreaming environmental sustainability and human rights into mine action. The conditions are ideal in the Cambodian context, given that Cambodia is already a leader in many aspects of mine action, and that there are policy changes underway, in both the mine action sector and in the national context in regards to the environment. Considerable effort however will be required to gain adequate awareness among stakeholders of environmental and social impacts and to gain buy-in for the implementation of environmental and social safeguards.

Throughout the assessment it was clear that the level of awareness in regards environmental and social impacts was limited. This is due to a combination of factors, not least of which is that mine action has traditionally been carried out as an emergency response activity in conflict or post-conflict environments, which emphasizes the neutralization of a threat rather than looking at longer-term development goals. At the beneficiary level, means are often limited and environmental and rights awareness is lacking. Furthermore, although mine action organizations have amassed considerable expertise in the technical aspects of detection and clearance, they lack expertise in international development and environmental management, although mine action ultimately is an environmental remediation activity, which aims to save and enhance the lives of people impacted by contamination by removing barriers to development. Mine action organizations have only more recently started evaluating their programs in terms of actual impact on beneficiaries and have just started looking at mine action activities through a development lens, and this approach, much less a *sustainable* development approach, is still not the norm.

Cambodia however is no longer a country at war, and the fruits of its rapid development depend significantly on how it manages its rich natural resource base and protects the rights of its citizens to those resources. The mine action sector, by building in environmental and social safeguards into its operations, can greatly enhance the already essential role it plays in Cambodian development. Much progress has recently been made in integrating gender consideration into mine action. Similarly quality assurance and control systems, as well as information management systems, may at one time have been thought as additional burdensome activities, but with their establishment, have shown to be essential to the impact and efficient coordination of the sector. The most important thing to understand for stakeholders is that integrating environmental and social safeguards into the mine action sector is not an additional activity. It is essential to the goals of mine action itself: saving lives and helping those communities impacted by mine contamination.

Implementing these processes will take time and will involve a combination of building capacity, allocating resources, establishing policies and processes and then verifying whether these processes are having the intended impact. As mentioned above, this process is not starting from scratch. A successful Environmental and Social Management System should be integral to the Performance Monitoring System (PMS) that will be developed for CMAA coordination of the mine action sector. Indicators specific to environmental and social safeguards should be included in this PMS. Furthermore, parallel monitoring does not have to take place in addition to existing monitoring, but rather existing QA/QC processes should be modified, to enhance the existing system.

Finally, in order to avoid delays in CMAA and operator action in absence of a CMAS standard on the environment, it is important to remind stakeholders of their responsibilities as laid out in the International Mine Action Standards (IMAS).

Cambodian Mine Action and Victim Assistance Authority Responsibilities:

1) Document its environmental management policy in national mine action standards or other relevant publications. Such environmental management policies shall be in accordance with national policies
2) Monitor compliance by demining organizations with documented environmental management requirements
3) Ensure that protection of the environment is taken into account during planning for demining operations
4) Maintain records of reported environmental incidents
5) Where necessary, conduct investigations into environmental incidents and
6) Promulgate information about significant environmental incidents to other demining organizations within the programme.

Demining Organization Responsibilities:

1) Comply with NMAA environmental management policy
2) Document their environmental management requirements in Standard Operating Procedures (SOPs) or other relevant documents and ensure that all personnel are aware of the requirements
3) Ensure that the protection of the environment is a factor in the planning and conduct of all demining operations
4) Maintain records of environmental incidents and
5) Report any significant environmental incidents to the NMAA or organization acting on it behalf.

The completion of the ESIA for the CFR III project is an important and largely unprecedented step in mainstreaming environmental sustainability and human rights into a mine action program globally. Dissemination of the results of the ESIA, as well as the related training is the first step in creating an enabling environment. Although the current level of awareness of impacts is low, and the implementation of environmental and social management measures is limited, there was, among stakeholder's interviewed, a willingness to look critically at practices and for improvement. Most importantly, the CMAA recognizes the potential to take a leadership role on these issues not only nationally, but also globally.

8 Conclusions and Recommendations

Mine Action interacts with the environment and its beneficiaries in many ways, and has been shown to have range of both positive and negative direct impacts at the operations level, and more complex impacts at the strategic level across biological and social spheres. Although, the range and scale of impacts described above may seem daunting, CFR III project implementers and the wider mine action sector should see this assessment of impacts as an opportunity rather than an impediment to fulfilling the ultimate goals of mine action in Cambodia. The essential work that is carried out by CMAA and mine action operators is highly prized for its impact both on beneficiary communities and on Cambodia's overall development, and carrying out the work in a way that is sustainable, does no harm and takes into account the future needs of the Cambodian people is a win-win situation. The nexus of environmental protection and development is inherently complex, with biophysical elements, human dynamics and political and institutional elements often interacting in unpredictable and contradictory ways, and the temptation with complex systems is sometimes to not attempt their management at all. In doing so however, mine action stakeholders will not only fail to deal with the risks and impacts outlined above, detracting from their humanitarian goal to save lives in both the long and short term, but will also fail to capture the myriad opportunities that environmental and social management presents to both mine action beneficiaries and the environment that supports them.

In regards to policy related to environmental and social management in mine action, although a mine action standard for the environment (IMAS 10.7) already exists, the results of this assessment show that it is not well known (or in some cases at all known), nor applied, in Cambodia in any meaningful way. The first key step for adjusting policy should be to refer to environmental and social safeguards in the Cambodian Mine Action Standard (CMAS) by adopting IMAS 10.7 and then to roll out SOPs for this standard. The fact that the IMAS 10.7 is being updated at the international level should be taken as further impetus for change. Having an environmental management system in place should also be a part of the accreditation process, and operators already accredited should retroactively, and going forward, be checked for compliance. Furthermore, it is essential that environmental and social considerations should be reflected in the newly drafted NMAS, in order to enshrine environmental and social safeguards into the overarching strategic framework of the mine action sector going forward.

In regards to the process of implementing an environmental and social management plan, it is essential to use existing entry points, most importantly integrating environmental and social indicators into the performance monitoring system. Existing processes used by the CMAA, which are already relatively robust, should also be used to mitigate risks and maximize benefits to beneficiaries. As mentioned above, this means adjusting planning and prioritization to improve the efficiency and results of the sector, in regards to environmental and social considerations, particularly by avoiding full clearance when possible and avoiding environmentally sensitive areas. Post clearance monitoring should also be adjusted to account for changes in landuse, environmental incidents and possible land conflicts, which can only be adequately captured if monitoring extends beyond the 6-12 month mark. It is important that knowledge sharing between actors occurs both at the local level (at district integration meetings) and at the national level. For this reason it is also imperative that technical working group meetings also account for environmental and social performance of the mine action sector.

A robust stakeholder response grievance mechanism must be put in place in line with UNDP's global social and environmental procedure as a first priority. All relevant stakeholders, from project beneficiaries to MAPUs, and CMAA staff should all be made aware of the mechanism. The procedure for reporting a grievance should be simple and accessible to all stakeholders, regardless of socio-economic or geographical constraints. UNDP must also incorporate environmental and social safeguards into its procurement process. Technical proposals should include measures for environmental and social management and mitigation, and operator without an appropriate environmental and management policy in place should be excluded from bidding. Finally, UNDP should consider supporting an environmental sustainability and human rights mainstreaming in mine action plan, as was done with gender, to ensure that the recommendations of this report are put in place.

The completion of this ESIA on the CFR III project and the examination of the strategic impacts of mine action is one of the first of its kind. The ESIA hopes to support the

current revision of the IMAS 10.7, as well as serve as an example of good practice for mine actions programs around the world. Specifically, Cambodia should use the results of this study and the implementation of an environmental and social management system, to raise awareness of these issues in countries with similar challenges in regards to mine action. The results are particularly relevant in countries with a high level of contamination, coupled with high biodiversity and vegetation cover, as well as similarities in socio-political context, including Angola, Columbia, Laos, and Myanmar.

As noted in the sector review, impact assessment and the final evaluation of the CFR II project, UNDP's CFR III project must invest in understanding the most affected communities and people, and on making an impact in terms of risk reduction its dominant value. The ESIA has emphasized that this risk reduction should be both in terms of immediate risks in terms of injury and casualty, but also long-term risks to communities in terms of land rights and environmental vulnerability. Donors have a role to play here in incentivizing operators around qualitative indicators that measure outcomes for people, and which aim to diminish risks to beneficiaries and the environment on which they depend, and not just on quantitative indicators, such as meters squared released.

It is essential that all mine action actors involved in CFR III and broadly, in the mine action sector are aware of the risks and impacts described herein, and the measures, both operational and strategic, required to mitigate these impacts. This includes UNDP, other donors, the CMAA, government officials (including Provincial Mine Action Committees (PMACs), Mine Action Planning Units (MAPUs), commune, district and village level authorities), Operators (including CMAC, Halo Trust, MAG, NPA, NPMEC and RCAF) and of course the beneficiaries themselves. Given the importance of land mine contamination and clearance in Cambodia, all stakeholders have a responsibility and vested interest to be aware of, and account for, the *integrated* impacts of mine action. Taking a limited view in terms of square meters released, or focusing exclusively on the goals of the Maputo +15 declaration without consideration of Cambodia's other international obligations, will ultimately harm rather than help beneficiaries. UNDP should support CMAA to take a proactive lead on managing these issues for the sector as a whole and in so doing there is an important opportunity for CMAA to be a global leader in regards to environmental and social sustainability in mine action.

The overarching goal of this ESIA, and activities which arise from it to mainstream environmental sustainability and human rights into mine action, is to benefit both communities and the nation as a whole. The ESIA is therefore written in the hopes that it will serve as a useful tool in helping the CMAA, the RGC and operators to fulfill their united goal in helping communities impacted by the legacy of war to not just survive, but to thrive.

9 Appendices

9.1 Glossary of Environmental Terms

Biodiversity: the variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable

Catchment Area: the area from which rainfall flows into a river, lake, or reservoir

Climate change: is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time

Critical habitat: a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection

Cumulative Impact: effects on the environment which are caused by the combined results of past, current and future activities. Over time, direct and indirect human activities combine to collectively impact the environment
Erosion: the action of surface processes (such as water flow or wind) that remove soil, rock, or dissolved material from one location on the Earth's crust, then transport it away to another location.

Climate Risk is a risk resulting from climate change and affecting natural and human systems and regions and describes the probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions. Climate risk is a function of the type, magnitude and rate of climatic variation or extreme event. When faced with human societies, hazards create risks.

Deforestation: is the permanent destruction of forests in order to make the land available for other uses.

Disaster Risk Reduction: aims to reduce the damage caused by natural hazards like earthquakes, floods, droughts and cyclones, through an ethic of prevention

Ecosystem services: grouped into four broad categories: provisioning, such as the production of food and water; regulating, such as the control of climate and disease; supporting, such as nutrient cycles and crop pollination; and cultural, such as spiritual and recreational benefits

Endangered Species: a species of animal or plant that is seriously at risk of extinction

Endemic Species: are plants and animals that exist only in one geographic region.

Environmental Impacts are any effect (negative or positive) *to* and/or *from* environmental conditions (physical, biological and social interactions) surrounding a specific activity, such as a project.

Forest Degradation: is the long-term reduction in the overall capacity of a **forest** to produce or provide benefits, such as carbon storage, biodiversity, wood, and other products due to environmental and anthropogenic alterations

GHG emissions: are responsible for the greenhouse effect, which ultimately leads to global warming and made up of any gaseous compound in the atmosphere that is capable of absorbing infrared radiation, thereby trapping and holding heat in the atmosphere (including CO_2, CH_4 and N_2O)

Land degradation: is a process in which the value of the biophysical environment is reduced by a combination of human-induced processes acting upon the land

Land tenure security: refers to the right of individuals and groups of people to effective protection by their government against forcible evictions. Tenure refers to the status of individuals or groups in relationship to property

Mitigation: the action of reducing the severity or seriousness of something

Monoculture Plantation: the cultivation of a single crop in a given area

Primary forest: An old-growth forest (virgin forest, primeval forest) is a forest that has attained great age without significant disturbance and thereby exhibits unique ecological features

Secondary forest: forests regenerating largely through natural processes after significant removal or disturbance of the original forest vegetation by human or natural causes at a single point in time or over an extended period, and displaying a major difference in forest structure and/or canopy species composition with respect to pristine primary forests. Secondary vegetation is generally unstable, and represents successional stages. If undisturbed by recurrent disturbances such as grazing, tree felling, and frequent fires, secondary vegetation may slowly be invaded by primary forest trees and can eventually revert to the original type

Soil erosion: the wearing away of a field's topsoil by the natural physical forces of water and wind or through forces associated with farming activities such as tillage

Species Abundance: is the number of individuals per species, and relative abundance refers to the evenness of distribution of individuals among species in a community

Strategic Environmental Assessment: is the evaluation of likely environmental impacts, including socio-economic, ecological, and health impacts at the strategic level rather than just limited to the project level. The steps of an SEA include determining of the scope of an environmental assessment, carrying out of public participation and consultations, assessing impacts and making recommendations that can then inform policy and planning.
Threatened Species: any species (including animals, plants, fungi, etc.) that are vulnerable to endangerment in the near future.

Wildlife Poaching: the illegal capturing of wild animals that are threatened for trade or consumption.

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