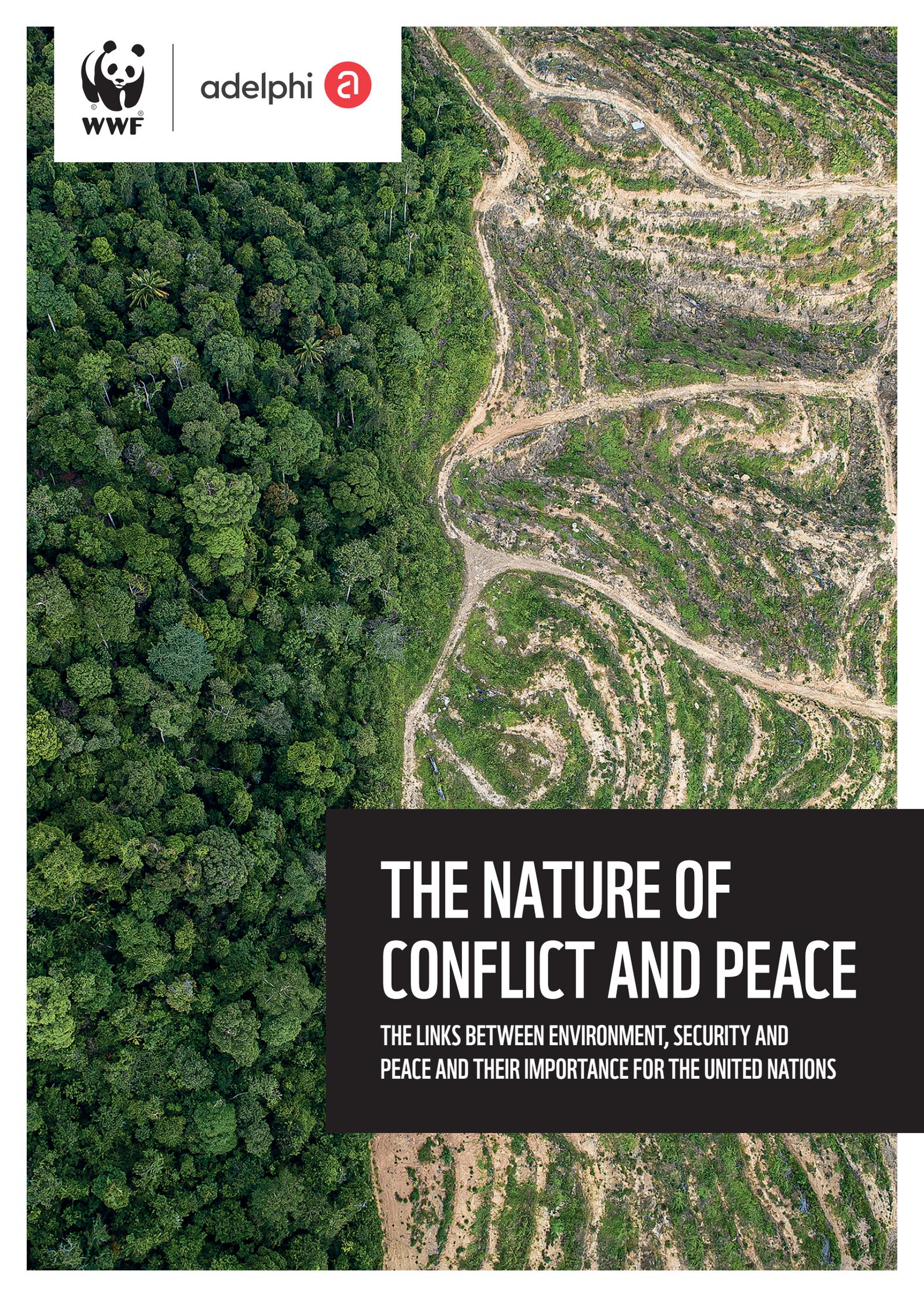




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An aerial photograph showing a stark contrast between a lush green forest on the left and a heavily eroded, brownish landscape on the right. A network of dirt roads winds through the eroded area. The text is overlaid on a black rectangular background at the bottom right of the image.

THE NATURE OF CONFLICT AND PEACE

THE LINKS BETWEEN ENVIRONMENT, SECURITY AND
PEACE AND THEIR IMPORTANCE FOR THE UNITED NATIONS

REPORT: The nature of conflict and peace: The links between environment, security and peace and their importance for the United Nations

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WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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List of Abbreviations

CAR Central African Republic
CBD United Nations Convention on Biological Diversity
CEB United Nations System Chief Executives Board for Coordination
CPT Catholic Church-affiliated Pastoral Land Commission
DRC Democratic Republic of Congo
ECOSOC United Nations Economic and Social Council
ECP Environmental Cooperation for Peacebuilding
ESS Environmental and Social Standards
FAO Food and Agriculture Organization of the United Nations
FARC Revolutionary Armed Forces of Colombia
GHG Greenhouse Gas Emissions
ICRC International Committee of the Red Cross
IFAD International Fund for Agricultural Development
IHL International humanitarian law
IOM International Organisation for Migration
IPBES Intergovernmental Platform on Biodiversity and Ecosystem Services
PBC Peace Building Commission
PBF Peace Building Fund
PKK Kurdistan Workers' Party
RBAs United Nations Rome-based Agencies
RUF Revolutionary United Front
SL Shining Path
TTP Tehrik-i-Taliban
UNCCD United Nations Convention to Combat Desertification
UNDP United Nations Development Programme
UNDRR United Nations Office for Disaster Risk Reduction
UNEA United Nations Environment Assembly
UNEP United Nations Environment Programme
UNGA United Nations General Assembly
UNHCR United Nations Refugee Agency
UNITA União Nacional para a Independência Total de Angola
UNODC United Nations Office on Drugs and Crime
UNSC United Nations Security Council
US United States
USD United States Dollar
WFP World Food Programme
WWF World Wildlife Fund for Nature

EXECUTIVE SUMMARY

Through humanity's wide-ranging impacts on nature, the safe operating space for the Earth's natural systems to provide the basis for human wellbeing, prosperity and security has now been crossed. This is particularly true for two closely interlinked crises: biodiversity loss and climate change. Ecosystems, which both sustain and depend on a balanced climate and healthy biodiversity, are at the centre of this double crisis.

At the same time, the world is experiencing increasing insecurity and conflict. Both intrastate and interstate conflict had been declining since the end of the Cold War, but in the last decade, the number of war deaths has risen significantly again compared to the preceding decade. Hand in hand with these developments, geopolitical tensions between regional and global powers have increased as well. Today in 2022, with the war in Ukraine, geopolitical tensions have reached levels reminiscent of the Cold War that will likely shape global politics and relationships for the years to come.

Both the consequences of biodiversity loss and climate change, as well as conflict and insecurity, are far-reaching and touch all aspects of human society. However, we are not just seeing a confluence of environmental crisis and conflict; nature and conflict are increasingly interacting. Environmental degradation and biodiversity loss are important drivers of insecurity and conflict around the world and, as they intensify, they also increasingly impact global peace and security. Environmental degradation and biodiversity loss are part of a complex web of interactions among different social, economic, political and environmental risk drivers. Simultaneously, conflict and insecurity contribute to environmental destruction and degradation. Together, these interactions form the nature-security nexus.

The climate-security nexus and the nature-security nexus overlap and cannot be fully addressed independently of one another. In fact, environmental factors are often a critical link in the pathway from climate change impacts to security risks. However, the nature-security nexus comprises additional interactions in which climate impacts play no or only smaller aggravating roles. Hence, the nature-security nexus puts biodiversity and ecosystems rather than climate change at its centre. This perspective allows for assessing the whole breadth of interactions between environment, peace and security.

THE NATURE-SECURITY NEXUS: KEY PATHWAYS

Four main pathways form the nature-security nexus. These pathways spell out the different ways in which environmental degradation and biodiversity loss interact with conflict, insecurity and peace:

1. Ecosystem and biodiversity loss, livelihood insecurity and political instability: Climatic and environmental changes increasingly disrupt the systems that are the very basis of the livelihoods of billions of people around the world. The resulting food, water and energy insecurity can contribute to political instability, aggravate political tensions and, in the worst case, overwhelm governments. As livelihood insecurity increases, population

groups can become more vulnerable to taking part in illegal and criminal activities and being recruited into armed and terrorist groups. Environmental degradation and livelihood insecurity can also act as push factors for migration, which, if not managed well, can lead to tensions, violence and conflicts in receiving communities and add pressure on natural resources, job markets and public services.

2. The environment, conflict financing and organised crime:

Transnational environmental crime generates an estimated 110 to 281 billion USD annually. It constitutes around 38% of the financing for illegal, non-state armed groups, including terrorist groups, representing their largest source of income. Environmental crimes often form a central part of the political economy of conflicts. They provide important financial incentives for conflict actors to sustain and prolong instability and conflict. In addition, conflicts that involve natural resources are more likely to reignite after resolution than other types of conflict. Conflict economies in turn tend to corrupt and undermine state institutions, thus weakening states and pushing them towards more instability and conflict. Environmental crimes often directly involve the exploitation of natural resources and can be linked with significant negative environmental and social impacts.^a Five areas are particularly relevant for conflict finance and organised crime: illegal mining, illegal exploitation and trade of oil, illegal drug production, illegal wildlife trade and poaching, and illegal timber trade.

3. Competition and conflicts around natural resources:

Biodiversity loss and environmental degradation together with climate change have severe impacts on the availability of and access to natural resources such as water, forests and land. These changes can increase competition over natural resources. This competition in turn can escalate into violence, in particular in areas that have experienced violent conflict and/or where certain groups are excluded from natural resource management institutions or directly depend on natural resources for their livelihoods. While most of these natural resource conflicts are at the local, sub-national level, they can escalate into or play a significant role in larger scale conflicts such as civil wars. Where transboundary natural resources are under pressure, tensions between states can also increase.

4. The impacts of war and conflict on the environment:

Wars and conflicts can directly lead to environmental destruction. The areas in and around conflict hotspots are often filled with wreckage from bombed infrastructure and damaged military equipment, chemical pollution and, at times, even radioactive waste. Natural resources such as water are increasingly used as weapons of war, for example by diverting water or destroying dams. At the same time, in times of conflict, environmental protection

activities often decrease and the unsustainable exploitation of natural resources and environmental crimes increase.

The four pathways clearly show that environmental crises and insecurity often reinforce each other. This vicious circle makes stability and peace harder to achieve and maintain. At the same time, it deepens the environmental crises humanity is facing, in particular biodiversity loss and climate change. Together, they threaten the very basis of human civilization: its wellbeing, livelihoods and peace. As we are moving into a world where geopolitical tensions are increasing and conventional war is on the forefront of attention, we should not lose the gains that have been made to broaden our understanding of security. What the current decade of increasing conflicts and crisis has underlined is the urgent need for more preventative action and resilience. Part of this broader move towards preventative action and resilience needs to be the engagement of all security, environment and development actors as part of a comprehensive environmental security agenda. The aim of their concerted efforts should not be reduced to addressing the symptoms of the environment-conflict trap, but rather tackle the root causes of environmental degradation, biodiversity loss, insecurity and conflict, with a particular focus on breaking the links between them. The four pathways laid out in this report are not just compound risks; they can simultaneously serve as multidimensional entry points for action.

The environmental security agenda complements the existing activities and initiatives on climate-related security risks: Environmental degradation and climate change risks often interact and reinforce each other. At the same time, nature-based solutions may provide benefits for both addressing climate change and building peace. A holistic approach including environmental factors can thus help to address climate security risks more comprehensively and make sure that the focus on climate security risks does not prevent action in other parts of the nature-security nexus.

RECOMMENDATIONS

Responsibilities to address the nature-security nexus are dispersed across the UN system. Many UN organs, programmes, funds, specialised agencies and bodies have specific roles to play and are already working on different parts of the problem. Yet the structural challenge for global peace and security that the nature-security nexus poses is not yet fully understood and treated as such. The scale of the environmental crisis and its critical importance in driving insecurity make it imperative that the UN system recognises and acts more comprehensively on this overarching challenge. The following recommendations outline critical starting points and possible next steps to work towards a comprehensive environmental security agenda.

^a Activities of indigenous peoples and other local communities (IPLCs) are sometimes informal or illegal, but not necessarily unsustainable.

UNSC

- Successively expand action on climate-related security risks to address the full breadth of links between the environment, conflict and peace.
- Address the nature-security nexus as part of UN peace operations.
- Engage in preventive diplomacy to address transboundary environment-related security risks.

UNGA

- Increase institutional capacity to address the nature-security nexus across the UN system.
- Raise awareness and recognise new threats as well as the links between environment and conflict, building on preceding resolutions.

UNDP

- Continue operationalising the concepts set out in the special Human Development Report “New threats to human security in the Anthropocene”.
- Expand and upscale integrated programming that links sustainable development, the environment and human security.
- Focus action and attention on those most excluded and vulnerable to both environmental degradation and conflict.

UNEP

- Provide environmental security expertise.
- Provide support to other parts of the UN system to facilitate and enable action on the nature-security nexus.
- Expand integrated nature-security programming that integrates environmental or climate action with peacebuilding and conflict prevention and continue to test new approaches.

IOM

- Expand the provision of knowledge, expertise and advice on the environment-migration nexus to the rest of the UN system.
- Upscale ongoing work on supporting policy coherence and mainstreaming migration, environmental and climate change.

UNHCR

- Expand efforts to strengthen the resilience of displaced people and host communities to climate-related and other environmental risks.
- Intensify ongoing work on strengthening preparedness, anticipatory action and response to support protection and solutions for displaced people and host communities in disaster situations.

WFP

- Continuously strengthen the focus on avoiding harm by guaranteeing that both emergency aid and long-term support do not unintentionally increase environmental and conflict-related challenges.
- Expand the use of supply chains and food procurement practices as agents of change in fragile contexts, supporting sustainable production models that strengthen vulnerable livelihoods and foster environmental protection and restoration.
- Design strategies with the long-term goal of reducing dependency on aid and support.

IFAD

- Prioritise longer-term food and livelihood security by promoting sustainable agricultural practices over a primary focus on increasing yields.
- Strengthen focus on social issues that affect access to food and act as drivers of conflict, such as poverty and marginalisation.
- Mitigate maladaptation by providing contingency planning and capacity-building to vulnerable populations.

FAO

- Increase work with peacebuilding actors to develop adaptation guidelines and practices that foster livelihood security in fragile contexts.
- Create guidelines and programmes to help fragile and conflict-affected countries and regions to increase the resilience of their food systems and reduce food insecurity.
- Play a stronger role in increasing the sustainability standards of middle and large-scale agriculture.

PBC

- Address the nature-security nexus in its regional and national engagement and thematic meetings.
- Use its advisory and bridging role to foster integrated action across the UN system.

PBF

- Include the elements of the nature-security nexus that are not part of climate security in strategic planning and expand the portfolio of environmental security projects.
- Use catalytic role to foster collaboration between UN agencies and cross-border projects.

All of these actions also tie into the effort of the UN as a whole to better work together and increase synergies and cross-cutting approaches. This includes Delivering as One as well as the actions outlined by the Secretary-General in Our Common Agenda, in particular the commitments to *promote peace and prevent conflicts*, and to *be prepared*.



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1. BACKGROUND AND SCOPE



The world is facing an environmental crisis of unprecedented scale. Humanity has crossed several of its planetary boundaries and is leaving what scientists call the safe operating space for Earth and the systems that provide the basis for human wellbeing and prosperity.¹ This is particularly the case for two interlinked crises: biodiversity loss and climate change. Ecosystems, which both sustain and depend on balanced climate cycles and healthy biodiversity, are at the centre of this double crisis.

At the same time, the world is experiencing increasing insecurity and conflict. Both intrastate and interstate conflict had been declining since the end of the Cold War, but in the last decade, the number of war deaths has risen significantly again compared to the preceding decade.^b In the past decade, the number of major civil wars has nearly tripled and battle deaths have increased by a factor of six since 2011.² Displacement and refugee numbers increased accordingly, with 65.3 million people displaced globally from conflict, the highest seen since the Cold War.³ Hand in hand with these developments, geopolitical tensions between regional and global powers have increased as well. Today in 2022, with the war in Ukraine, geopolitical tensions have reached levels reminiscent of the Cold War that will likely shape global politics and relationships for the years to come.

The latest assessments on the state of ecosystems estimate that about 75% of the terrestrial and 40% of the marine environment have been degraded.⁴ Between 1980 and 2000 alone, 100 million hectares of tropical forest were lost⁵ and wetlands have declined at a fast pace, with 35% lost since 1970.⁶ Between 1970 and 2016, the global average abundance of mammals, birds, amphibians, reptiles and fish has declined by 68%, reaching up to 94% in Latin America and the Caribbean.⁷ As of today, about one million animal and plant species are on the verge of extinction across all of Earth's ecosystems.⁸

Human-led habitat conversion, resource pollution and depletion, and the eradication of species is so widespread and rapid that ecosystems do not have a chance to regenerate or absorb these impacts.⁹ Parallel to this, human-induced changes to the

^b The number of deaths in state-based conflicts has more than doubled in comparison to the decade before. In 2014, the number of deaths has surpassed 100,000 for the first time since 1988 (Roser et al 2016).



Earth's climate through the release of greenhouse gases (GHG) into the atmosphere put further pressure on biodiversity and ecosystems by degrading habitats and impacting the availability and quality of natural resources.¹⁰

This degradation of ecosystems aggravates the climate crisis. There are several ecosystem services that are crucial for the mitigation of and adaptation to climate change.¹¹ For example, forests capture and store carbon and regulate the climate; wetlands help to mitigate floods and protect coastlines;¹² higher plant variation – or polyculture – reduces land erosion;¹³ urban greenery helps to reduce cities' temperatures;¹⁴ and mangroves and coral reefs reduce the impact of extreme weather events in coastal regions, such as cyclones and storm floods.¹⁵

Both the consequences of biodiversity loss and climate change, as well as conflict and insecurity, are far-reaching and touch all aspects of human society. However, we are not just seeing a confluence of environmental crisis and conflict; nature and conflict are increasingly interacting.

In fact, environmental factors are important drivers of conflict dynamics and are impacting global peace and security. This includes climate change, but also other environmental factors: biodiversity, ecosystems and natural resources can all play a role in conflicts and insecurity, and often form one of the key links between climate change and conflict. In addition, destructive practices such as mining and environmental crimes can drive conflict and undermine peace. And they

often thrive in contexts of insecurity and conflict. Together with the pollution and destruction of the environment that can go hand in hand with military and security operations, these destructive practices are the ways that insecurity, war and conflict can impact the environment directly.

The links between climate change, environment, peace and security have gained increasing political attention, including in the UNSC. In the past 15 years, much of this attention has been on climate-related security risks. In 2007, the UNSC addressed climate change for the first time during a ministerial-level open debate initiated by the United Kingdom. Following a 2009 UN report on the security implications of climate change, the topic was solidified on the foreign policy agenda through a 2011 Security Council Open Debate.¹⁶ The resulting presidential statement (S/PRST/2011/15) acknowledged the need for conflict analysis and contextual information in light of climate change's role as a 'threat multiplier' that can aggravate existing threats and conflicts.

Subsequent Arrria formula debates in 2013, 2015, and 2017 kept climate security on the UNSC agenda. Institutional developments since 2018 include the creation of the Climate Security Mechanism, as well as the Group of Friends on Climate and Security.¹⁷ During its July 2020 UNSC Presidency, Germany organised a high-level debate and created the Informal Expert Group on climate-related risks to peace and security, which has seen widespread participation.¹⁸ These developments have gone hand in hand with an increasing inclusion of climate change considerations in peacekeeping missions. The UNSC has specifically recognised the role of climate change as a risk factor in the Lake Chad Basin, West Africa, Somalia, Mali, Sudan, South Sudan, the Central African Republic, the Democratic Republic of the Congo, and Central Africa.¹⁹

Yet, even before its engagement on climate change, the UNSC has addressed a broad range of environmental issues including the impact of conflicts on the environment. Since the end of the Cold War, the number of UNSC resolutions that addressed natural resources and/or the environment increased sharply from 2.6% of resolutions between 1946 and 1989 to 19% between 1990 and 2016. Following the 1990-1991 Gulf War, for example, the UNSC issued Resolution 687, which held Iraq liable for "environmental damage and depletion of natural resources" as a result of the invasion of Kuwait, and established the UN Compensation

Commission to handle environmental claims as part of war reparations (S/RES/687(1991)).

The UNSC has taken a particularly active role in natural resource management where it relates to security. The UNSC established the direct link between natural resources and conflict for the first time in 1998, when it adopted a resolution (S/RES/1173 (1998)) to prevent the União Nacional para a Independência Total de Angola (UNITA) from using revenues from diamond exports to finance the protracted civil war.²⁰ Resolutions mostly focused on hydrocarbons and minerals, but forestry, wildlife and biodiversity have also played an increasingly important role.

These developments have been part of a broader trend in the UNSC and the UN as a whole to move from a traditionally narrow to a more integrated and holistic understanding of peace and security. The UNSC has acknowledged that a more comprehensive approach is needed to fulfil its mandate and move towards conflict prevention and sustaining peace ((S/RES/2282 (2016); A/72/707-S/2018/43 (2018)). This means addressing the full range of topics that are relevant for security as well as the different root causes and drivers of instability and conflicts. This move has also been reflected in other parts of the UN system, for example in UNEP's flagship report "From Conflict to Peacebuilding",²¹ its Environmental Cooperation for Peacebuilding Programme,²² and UNDP's most recent special Human Development report "New threats to human security in the Anthropocene".²³

SCOPE OF THE REPORT AND KEY QUESTIONS

This report focuses on the role of the UN, in particular the UNSC, in addressing the nature-security nexus. It does so to complement and broaden

1. the current climate security debate by highlighting the role that biodiversity loss and ecosystem degradation play in translating climate impacts into security risks, and identifying those areas where non-climate related environmental factors, such as biodiversity loss and ecosystem degradation, play a critical role as conflict drivers, for example in the case of environmental crime;^c and

^c This does not mean that in these cases climate change does not play a role, but the causal link is different. For example, crime-related environmental degradation is not caused by climate change, but can be aggravated by climate change.



2. the debate on how to prevent conflict and sustain peace in a world of increasing insecurity, conflict and geopolitical tensions by explaining where nature, security and peace are linked and in particular where insecurity, conflict and environmental crisis reinforce each other.

Against this backdrop, the purpose of this report is twofold:

1. Elaborate the interrelations between nature, climate, and peace and security by outlining the 'nature-security nexus' (Chapter 2). This discussion is structured along four main pathways that link environment and insecurity:
 - Ecosystem and biodiversity loss, livelihood insecurity and instability (Chapter 2.1)
 - The environment, conflict financing and organised crime (Chapter 2.2)
 - Competition and conflicts around natural resources (Chapter 2.3)



- The impacts of war and conflict on the environment (Chapter 2.4)

2. Provide recommendations (Chapter 3) on the role of the UN and in particular the UNSC to better address the nature-security nexus.

Underlying this report is a broad understanding of peace and security. It is based on the concept of human security which is about living free from want, free from fear and free from indignity. Human security is people-centred and includes different dimensions of security including economic, food, health, environmental, personal, community and political security.^d UNDP's 2022 special Human Development report "New threats to human security in the Anthropocene" further expands human security from the individual and community to the relationship between people and the planet, reflecting the fact that the risks we face are increasingly interconnected.²⁴

This report shows how human (in)security relates to different kinds of instability and conflict ranging

from political instability and (organised) crime to urban violence, terrorism and violent conflict within and between states. It uses the term nature-security nexus to refer to the different ways environmental factors can play a role in driving conflict and undermining peace, and how conflict and war can drive environmental degradation. Whenever possible the report refers to specific kinds of conflict and violence.

The report is based on a review of the existing literature and research on the links between environment, security and peace. It specifically draws on the key resources from the field of environmental security and research on the security implications of climate change, as well as related topics such as environmental crime. The report does not cover the entire range of working areas in which the global WWF network is engaged, but focuses specifically on the most security-related environmental factors, which are of most importance for the UNSC.

^d The UN General Assembly agreed on a common understanding that is defined in resolution A/RES/66/290.



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2. THE NATURE-SECURITY NEXUS: KEY PATHWAYS

Not only can nature and environmental factors drive insecurity, but conflict and insecurity are also drivers of environmental degradation. Environmental degradation and biodiversity loss are part of a complex web of interactions between different social, economic, political and environmental risk drivers. In particular in fragile and conflict-affected contexts, environmental factors can undermine peace and contribute to different security risks ranging from political instability to organised crime and violent conflict, while at the same time insecurity and conflict further damage the environment.

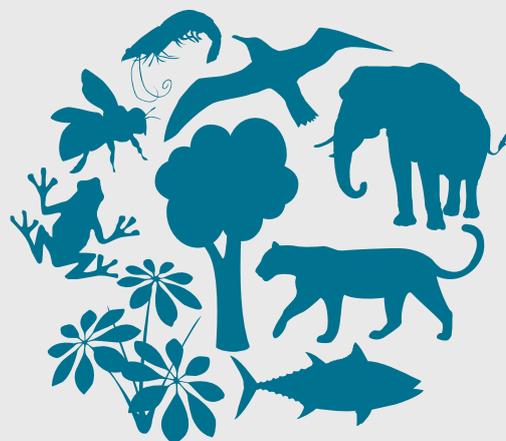
The nature-security nexus comprises all of these interactions between environmental factors, security and peace. These interactions can be organised along four pathways that spell out how different environmental factors are linked with specific kinds of security risks. These pathways necessarily overlap and interact in multiple ways, but they also help to understand the different ways in which environmental factors can contribute to conflict and undermine peace, and how conflict is affecting the environment.

The climate crisis plays a central role as one subset of the nature-security nexus. The latter also comprises additional interactions in which climate impacts play no or only smaller aggravating roles. This means that some interactions would also appear without the effects of climate change, although climate change amplifies them. Hence, the nature-security nexus puts biodiversity and ecosystems rather than climate change at its centre. This perspective allows for assessing the whole breadth of interactions between environment, peace and security.

Infobox 1: What are biodiversity and ecosystems?

According to the UN Convention on Biological Diversity (CBD), biological diversity – often called biodiversity – is defined by the variability among living organisms from all of Earth’s ecosystems, as well the ecological complexes (or ecosystems) to which they belong.²⁵

Ecosystems are composed of living beings and natural resources interacting within a system. To function properly, they depend on a natural balance of elements to maintain their biodiversity. The beings that comprise biodiversity make use of natural resources for their own survival and in turn maintain healthy ecosystems. Our dependence on ecosystems is a fundamental aspect of human life and wellbeing. As humans, our survival requires animals and plants, which provide us with food, and natural resources such as water and air.



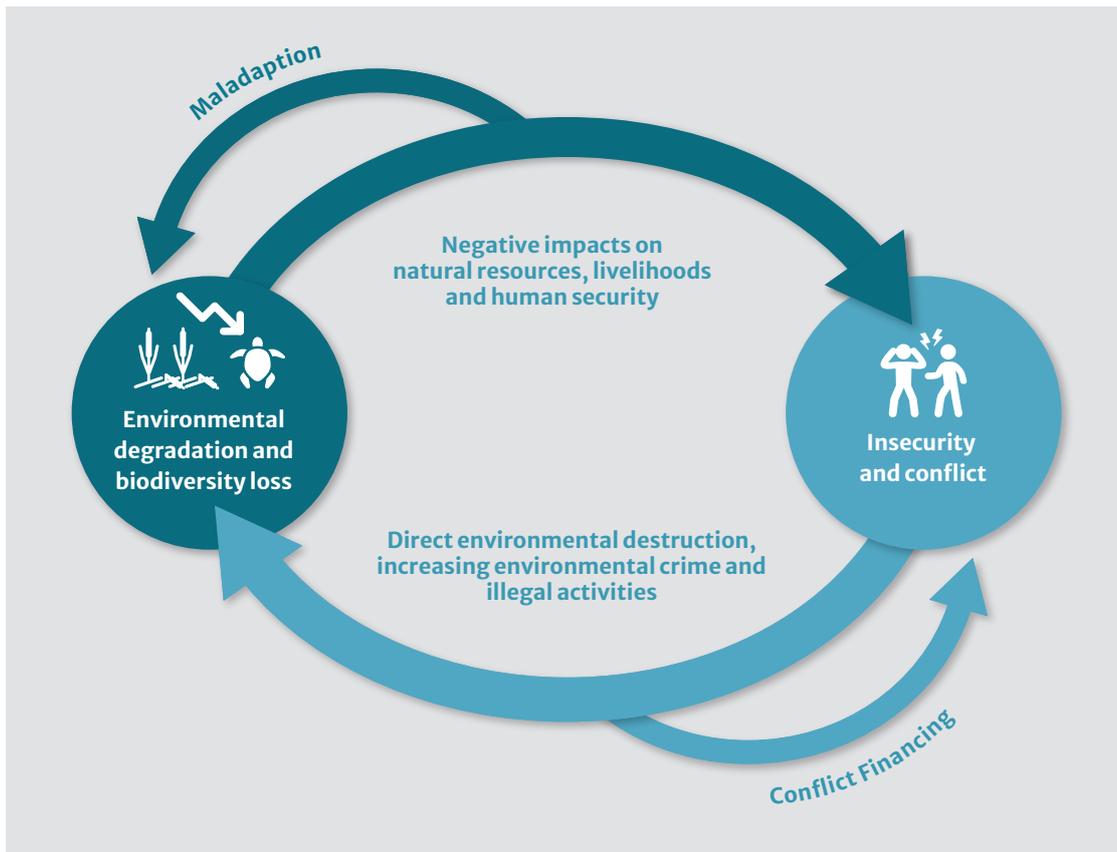


Figure 1: The nature-security nexus; **Source:** adelphi

Environmental crisis and insecurity reinforce each other

In general, the four pathways outlined in this chapter – 1) ecosystem and biodiversity loss, livelihood insecurity and instability; 2) the environment, conflict finance and organised crime; 3) competition and conflict around natural resources; and 4) the impact of war and conflict on the environment – show that the environmental crisis and insecurity are reinforcing each other (see Figure 1). Environmental degradation and biodiversity loss can negatively affect natural resources, livelihoods and human security, which in turn can contribute to conflicts, crime and political instability. At the same time, war and conflict have direct negative impacts on the environment and environmental crime and illegal exploitation of natural resources, ecosystems and wildlife, and play a role in prolonging conflict, undermining peace processes and fostering organised crime. They also often involve human rights violations while further degrading the environment and threatening biodiversity.

2.1 ECOSYSTEM AND BIODIVERSITY LOSS, LIVELIHOOD INSECURITY AND INSTABILITY

As climatic and environmental changes disrupt the systems that are the basis for the livelihoods of billions of people around the world, several security risks arise. The resulting food, water and energy insecurity can contribute to political instability, aggravate political and intercommunal tensions, and in the worst case overwhelm governments. As livelihood insecurity increases, population groups can become more vulnerable to taking part in illegal and criminal activities and to recruitment into armed and terrorist groups. Additionally, environmental degradation and livelihood insecurity can act as a push factor for migration, which if not managed well, can lead to tensions, violence and conflicts in receiving communities and add pressure on natural resources, job markets and public services.

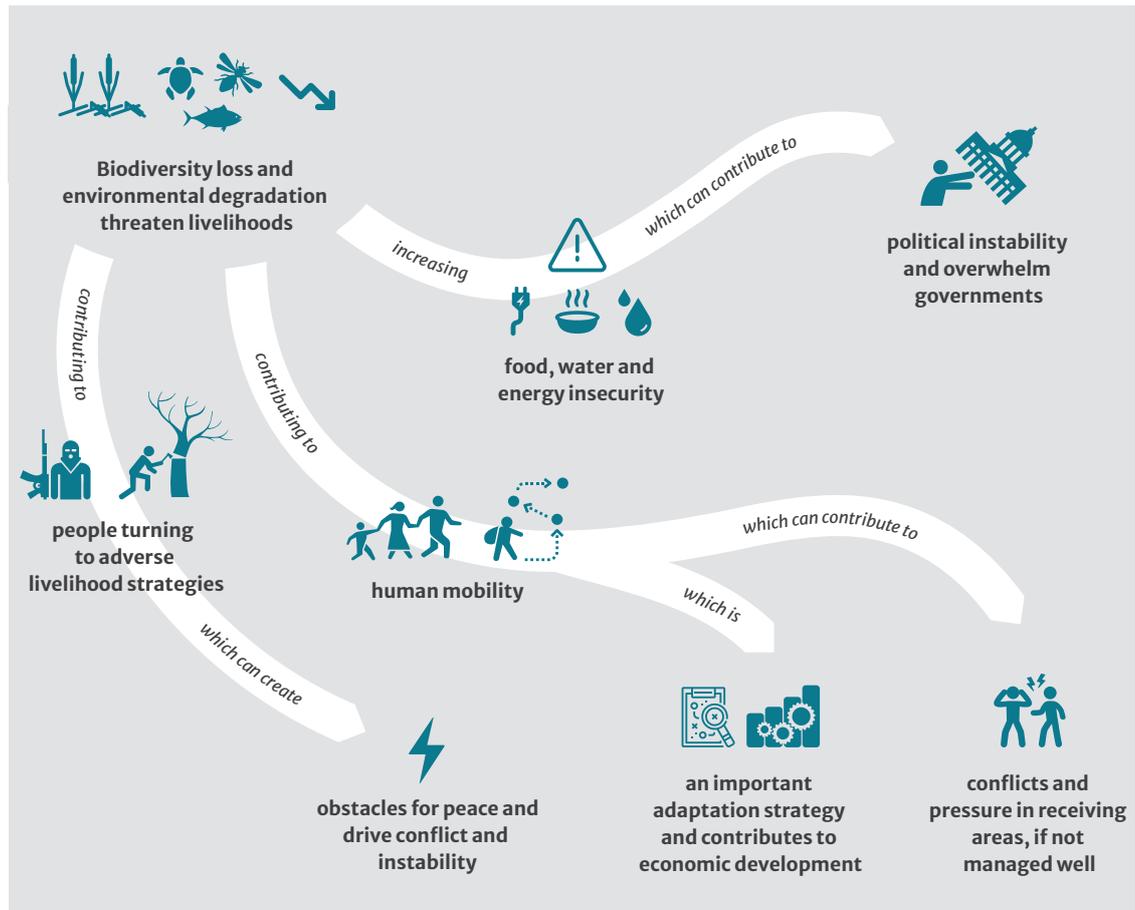


Figure 2: Overview of ecosystem and biodiversity loss, livelihood insecurity and instability; **Source:** adelphi

Food, water and energy insecurity as drivers of political instability

Deteriorating ecosystems often have serious impacts on food, water and energy security. This deterioration can be caused directly by human activities that lead to pollution and overuse, or indirectly through climate change, which harms ecosystems by disrupting the delicate balance of elements, temperatures and resources needed to maintain plant and animal biodiversity. Together, these impacts mean that 2.67 billion inhabitants in 201 river basins around the world experience severe water scarcity during at least one month a year.²⁶ Land degradation – which is caused both by climate change and by detrimental farming and water management practices – has reduced the productivity of 23% of the global land surface, with soil-related issues such as erosion, pollution, acidification, salinization and loss of microbial biodiversity threatening food production.²⁷ Heatwaves have severely impacted energy security by reducing water available for thermal

and hydropower plants while increasing energy demand for cooling.^{e 28}

Food, water and energy insecurity in turn can exacerbate political instability. Quickly rising food, energy or water prices and an insufficient supply can trigger political unrest, increase grievances and undermine the legitimacy of governments. This is particularly the case in situations that are already politically unstable and where population groups already feel marginalised. In these situations, governments can be overwhelmed and not willing or able to manage the increasing political pressure and tensions in a peaceful manner. At the same time, some politicians and governments take advantage of the social vulnerabilities arising from resource and livelihood insecurity to rise to power, building on and exacerbating pre-existing grievances and offering simplistic, often exclusionary solutions, and ultimately further increasing political instability.^{29 30}

The links between food insecurity and political

^e Food, energy and water security are so closely linked that their interaction is often referred to as the food-energy-water nexus. There are several ways in which these systems are interdependent: water is essential for food production and is a source of energy while energy is required for water pumping and treatment, as well as for food transportation and storage (Katz et al 2020).

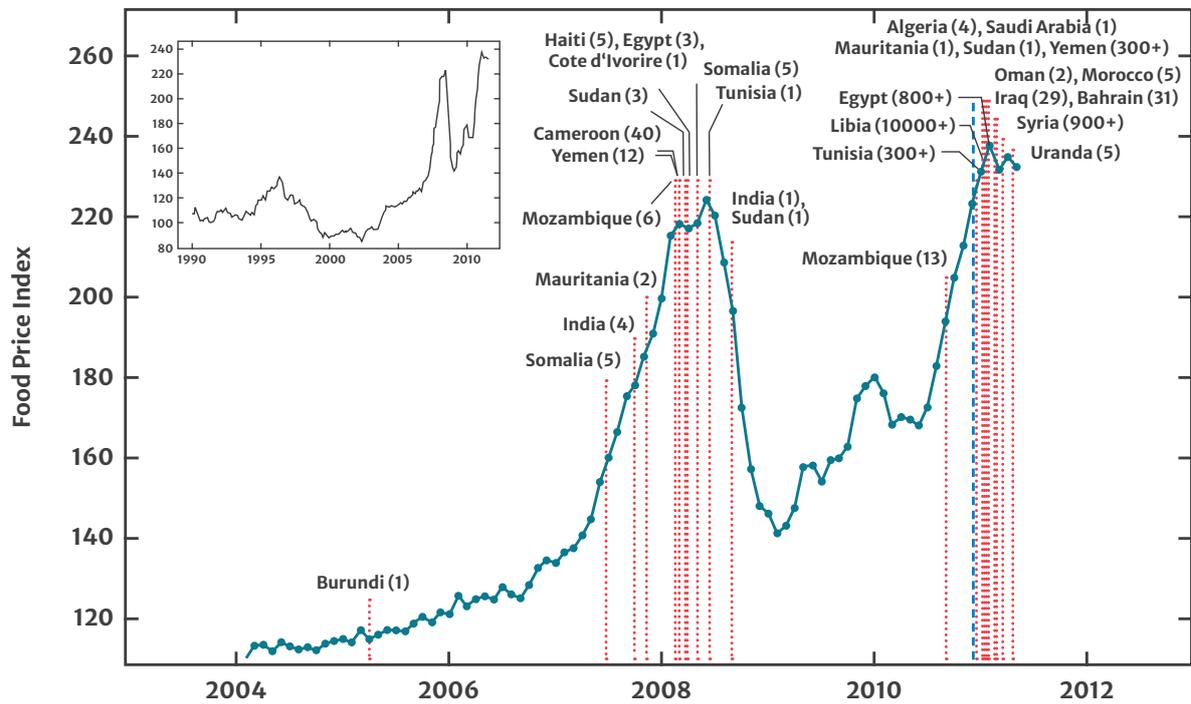


Figure 3: The link between food price spikes and riots; **Source:** Marco Lagi, Karla Z. Bertrand and Yaneer Bar-Yam 2011: *The Food Crises and Political Instability in North Africa and the Middle East*. Available at SSRN: <https://ssrn.com/abstract=1910031>, page 3.

instability have been well researched: sudden supply shocks and related price spikes can contribute to the outbreak of riots and protests. The graphic above shows how global spikes in food prices (blue line) triggered so-called food riots (red lines). The numbers in the brackets represent the number of casualties in each country. The large price spikes in 2008/2009 and 2010/2011 were both driven by extreme weather events, in particular droughts, in some of the main wheat producing regions in the world. Some countries reacted by enforcing export bans which further drove up prices.^{31 32}

Similar dynamics can be observed when it comes to water and energy prices and supply.³³ For example, protests broke out in Iran's Khuzestan province in July 2021 over inadequate water supply, affecting agriculture and livestock,

and contributing to energy blackouts.³⁴ An aggravating factor for this political instability was that Khuzestan is mainly Sunni Arab, which is a minority in Shia Iran and has frequently raised concerns over being marginalised in the country.

In India, a longstanding conflict between the states of Karnataka and Tamil Nadu over the allocation of waters of the Cauvery Basin, one of India's most important rivers with over 800 km length, has been the cause of repeated political protests and violence. Both riparian states require over 90% of the river's water for crop cultivation and livelihoods, and discontent with water allocation plans has led to repeated clashes and violence, most recently in 2016 when demonstrations and riots in both states led to 500 people being arrested and two protesters killed.^{f 35}

f There have been concerted efforts to resolve the conflict since 2016. The Supreme Court ruled in a landmark judgement that "waters of an inter-state river passing through corridors of the riparian states constitute a national asset and no single State can claim exclusive ownership of its water" (Supreme Court of India 2018). In 2018, the Ministry of Water Resources constituted the Cauvery Water Management Authority along with the Cauvery Water Regulation Committee to implement the decisions of the Cauvery Water Disputes Tribunal (Ghosh et al 2018). No new conflicts have been documented since.

Recruitment into armed groups and maladaptation

As livelihoods that depend on natural resources and functioning ecosystems deteriorate, people look for alternatives. This in turn can drive a set of security-relevant dynamics. Gender dynamics play an important role in this regard; for women and girls, for example, taking longer routes to fulfil their role of collecting water increases risks of gender-based violence.^g For men and boys, a lack of economic prospects and related threats to their identity as bread-winners and household heads increase their vulnerability to being recruited by non-state armed groups^h such as terrorist or organised criminal groups. In most societies in the world, men are still often seen as providers, carrying the responsibility to sustain their families financially.³⁶ When a degraded environment limits livelihood and earning options, the income possibilities offered by these groups become more attractive. Beyond income, these non-state armed groups also exploit existing grievances between ethnic populations and the lack of public services, for example by offering education, healthcare and food provision.³⁷ Furthermore, recruitment into such groups can play into other traditionally male gender dynamics, such as the possibility of achieving social status by rising in the para-military ranks, or exercising aggression and violence.^{i 38}

It is not uncommon for non-state armed groups to look for recruits in places with high levels of environmental stress, or in the aftermath of disasters. In Iraq, biodiversity loss and environmental and resource degradation in the past decades, followed by a series of droughts in 2006,³⁹ created a fertile ground for the recruitment of young men into non-state armed groups and helped give rise to large terrorist organisations such as ISIS and Al-Qaeda.⁴⁰ In the Lake Chad Basin, social and economic inequality, poor governance and weak social cohesion converge with increasingly vulnerable livelihoods and growing resource competition to make the financial incentives offered by armed opposition groups more attractive for new recruits.⁴¹

In some cases, livelihood insecurity also pushes population groups to take up livelihoods that further deteriorate the environment and drive conflict. This is also referred to as maladaptation. In Somalia, for example, frequent droughts have led pastoralist communities to turn to illegal charcoal trade as an income source. The activity has severely increased deforestation, adding further pressures on local livelihoods. Moreover, non-state armed groups such as Al-Shabaab earned between 38 and 56 million USD in peak times from charcoal trade^j in the region, strengthening the groups' scopes of action and driving further recruitment of young men.⁴² In Afghanistan, farmers struggling to make ends meet amidst frequent droughts turned to poppy production – a drought-resistant, water-saving crop used for opium production.⁴³ In Colombia, poor peasant farmers have turned to illegal coca and marijuana production as other livelihood options have deteriorated.⁴⁴ They represent livelihood options in areas lacking infrastructure and public goods and provide a better income than most existing economic alternatives.⁴⁵ However, most of the large profits go to middlemen and non-state armed groups (for a detailed discussion of the links between environment, crime and conflict finance, see pathway 2).

Migration and displacement increasing pressure in receiving areas

Through its impacts on livelihoods, environmental change can be a key driver of human mobility.⁴⁶ Where environmental change and resource stress deteriorate living conditions, for example by increasing temperatures and food insecurity, migration is often used as an adaptation strategy.⁴⁷ Research suggests that environmental degradation mainly intensifies already existing migration trends, in particular internal, rural-urban migration as it negatively impacts the viability of agricultural and rural livelihoods.⁴⁸ Migration by itself is not a risk, but instead an important adaptation strategy and driver of economic development. However, especially when

^g The specific role women play in conflict and peace is acknowledged in UNSC Resolution 1325 (S/RES/1325 (2000)).

^h While there is no internationally accepted definition of non-state armed groups, they are normally defined in opposition to state security forces. They challenge the state's monopoly of power and its capacity to control violence throughout its territory and cover a broad spectrum of actors both with and without intentions to take over political power and induce political change. They include militias, guerrillas, organised crime and terrorist groups. For more information see Nett & Rüttinger 2016.

ⁱ Environmental factors and economic incentives are not the only or main factors driving recruitment. It is always a combination of factors: Membership in non-state armed groups provides recruits with not just a wage but also a larger religious or political purpose, the chance to gain respect, belonging and community. Negative experiences with state security forces are also often an important driver of recruitment.

^j Al-Shabaab shifted away from charcoal trade in late 2015, taking it up again in late 2016 to early 2017. Its estimated revenue from charcoal is currently about 10 million USD.

not managed well, it can contribute to a number of security-relevant dynamics, in particular by increasing pressure, tensions and instability in receiving areas, for example contributing to conflicts between migrants and host communities.

Urban areas are particularly affected: Rapid and unmanaged urban growth drives environmental degradation, as new settlements tend to encroach into peri-urban areas, leading to deforestation, loss of wetlands, and pollution of water and land, given the lack of appropriate sanitation and waste management.⁴⁹ Unplanned settlements are also at higher risk of weather-related disasters, such as landslides and floods.⁵⁰ The number of people living in settlements with poor living conditions – often called ‘slums’ – has been steadily increasing in the developing world and is set to triple by 2050.⁵¹ Rural-to-urban migration and rapid urban growth put pressure on job markets and public services and exacerbate already existing security risks. For example, in Latin America, rapid and uncontrolled urban growth is contributing to urban crime and violence. A study looking at the impact of labour migration on violent crime in several metropolitan areas of Brazil showed that the arrival of low-skilled migrants in these areas correlated with an increase in homicide rates,^k though only in places where the labour market was not able to absorb the additional workforce.⁵²

Another key challenge are conflicts between host communities and arriving migrants over access to natural resources and public services. This often goes hand in hand with the stigmatisation and marginalisation of migrants. For example, in Mali, clashes between refugees from Ivory Coast and the host community Loulouni broke out after an initial welcoming and positive period, due to competition for the use of ‘common pool resources’ such as water, firewood, resins and fibres.⁵³ In Bangladesh, the arrival of about 700,000 Rohingya refugees fleeing from ethnic conflict in Myanmar has led to tensions with host communities at Cox’s Bazar, which saw an encroachment into forest resources, competition for land and firewood, and reduced employment opportunities as a consequence.⁵⁴

A further, often overlooked aspect of environmental migration is the disruption of cultures and traditions, which are often connected to and dependent on specific ecosystems and natural elements. Ruptures in traditional knowledge – which include the disappearance

of ancient languages, rituals and records – are not just an immense cultural loss, but also signal the loss of environmental stewardship, which is a common practice among indigenous populations throughout the world.⁵⁵ Disruption of the natural environment and of climatic cycles is driving indigenous populations of the Brazilian Amazon to move to other areas, including cities. For these populations, the loss of natural living spaces reduces their resilience by increasing their overall socioeconomic vulnerability, as their skills and livelihoods are connected to these spaces. Additionally, it puts them at higher risk of marginalisation and discrimination.⁵⁶

In addition to longer-term environmental changes and changes in migration patterns, sudden displacements present a whole range of additional challenges. Extreme weather events such as floods, droughts, storms and hurricanes are already displacing more people than conflicts every year.⁵⁷ At the same time, as climate change is increasing the severity and likelihood of extreme weather events, biodiversity loss is weakening the important functions that ecosystems have in preventing disasters. For example, the presence of vegetation cover on slopes protects against soil erosion and can prevent landslides under heavy rainfall; forests stabilise snow and reduce the risk of avalanches; wetlands help mitigate floods inland, reduce wave energy and height in coastal areas, and, together with dryland grasses and shrubs, help retain moisture and conserve soil during droughts.⁵⁸

Disasters and displacement in turn can drive criminality and directly threaten the security of those affected. This is particularly the case when, in the aftermath of disasters, state security institutions are overwhelmed and not able to respond to increases in instability and crime. For example, in Bangladesh, a rise in cases of slavery and human trafficking could be observed in the aftermath of disasters.⁵⁹ In Guatemala, displaced persons arriving in urban centres, particularly men and boys, had a higher likelihood of joining gangs or organised crime groups and committing petty crimes as a result of their sudden economic and social vulnerability.⁶⁰

Most of the time, displaced people can return to their homes after disasters. However, in cases where disasters occur regularly or where return is not possible anymore, tensions with host communities similar to those described before can occur. A specific case is with coastal communities

k There is no data as to whether these crimes are committed primarily by the local population, migrants, or both.

and populations of small island states, which are permanently displaced by a combination of environmental degradation and sea-level rise. In extreme cases, such as Tuvalu, it is projected that entire islands might disappear by 2050 under current emission scenarios.⁶¹ In Jakarta, large-

scale groundwater pumping has caused the land to sink rapidly. As a result, about 40% of Indonesia's capital currently sits below sea level, putting it at high risk of floods. In 2007, the seasonal monsoon submerged almost 70% of Jakarta's landmass.⁶²

Infobox 2: Environmental change and disease outbreaks

The COVID19 pandemic is a striking example of the risks posed to humans by diseases, both in terms of direct health impacts and security. The UNSC adopted a resolution in July 2020 to demand the cessation of hostilities in all situations on its agenda and recognised “that conditions of violence and instability in conflict situations can exacerbate the pandemic, and that inversely the pandemic can exacerbate the adverse humanitarian impact of conflict situations”, as well as “that the peacebuilding and development gains made by countries in transition and post-conflict countries could be reversed in light of the COVID19 pandemic outbreak” (S/RES/2532 (2020)). The UNSC reiterated its demands in February 2021 (S/RES/2565 (2021)). Concretely, the pandemic placed significant restrictions on mobility, reducing the effectiveness of migration as an adaptive strategy when faced with livelihood insecurity and affecting the crucial flow of remittances. Additionally, governments that are already struggling to provide adequate social services are further strained by the economic burden of COVID19. Their inability to manage the health crisis can further undermine their legitimacy and open space for instability and the rise of non-state armed groups. In addition, COVID19 exacerbates existing inequities, disproportionately affecting vulnerable people, for example those working in the informal economy, which in turn can increase discontent and instability.⁶³

COVID19 is presumably only the latest of many examples of harmful zoonotic diseases

in recent decades, which also included Ebola, HIV/AIDS, and SARS.⁶⁴ The links between disease outbreaks, environment and conflict are multifaceted: ecosystem loss and the related destruction of animal habitats, coupled with the encroachment of cities into natural environments and more frequent contact between humans and wildlife, increase the risk of zoonotic disease outbreaks.⁶⁵ ⁶⁶ Another example of close proximity between humans and animals is wildlife trade.⁶⁷

Studies have confirmed that deforestation in tropical and temperate countries is linked with a rise in zoonotic diseases.⁶⁸ For example, a study of the Brazilian Amazon found that a 10% increase in deforestation corresponded to a 3.3% increase in malaria infections.⁶⁹ At the same time, climate change is expanding the range of such vectorborne diseases, which are a subtype of zoonotic diseases. The WHO predicts that between 2030 and 2050, there will be an additional 60,000 malaria deaths per year, related to the expansion of the *Anopheles* mosquito range.⁷⁰

The consumption of both wild and farmed animals by humans presents a further threat to health. The lack of sanitary control of meat from wild animals means that they can be carriers of harmful pathogens that are transmissible to humans. With farmed animals, higher levels of sanitary control are offset by their close proximity to each other and to humans, making largescale disease outbreaks more likely.⁷¹

ECOSYSTEM LOSS AND THE RELATED DESTRUCTION OF ANIMAL HABITATS, COUPLED WITH THE ENCROACHMENT OF CITIES INTO NATURAL ENVIRONMENTS AND MORE FREQUENT CONTACT BETWEEN HUMANS AND WILDLIFE, INCREASE THE RISK OF ZOOONOTIC DISEASE OUTBREAKS.

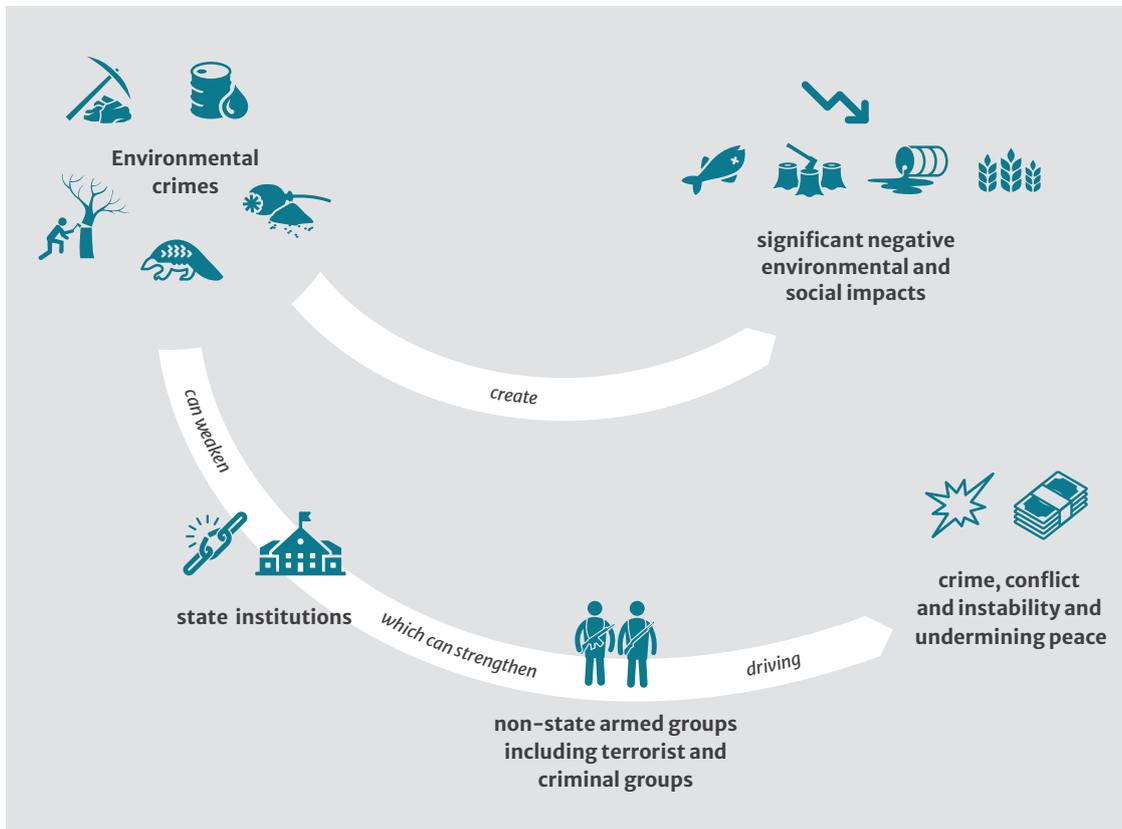


Figure 4: Overview of the environment, conflict financing and organised crime; **Source:** adelphi

2.2 THE ENVIRONMENT, CONFLICT FINANCING AND ORGANISED CRIME

There are a number of economic activities that rely on the environment and natural resources and are linked to conflict, human rights violations and violent crime. Transnational environmental crime^l generates an estimated 110 to 281 billion USD annually and constitutes 38% of the financing of non-state armed groups, including terrorist groups, representing their largest source of income.⁷² Environmental crimes often form a central part of the political economy of conflicts as they provide important financial incentives for conflict actors to sustain and prolong instability and conflict. In addition, conflicts that involve natural resources are more likely to reignite after resolution than other types of conflict.⁷³ These conflict economies create powerful obstacles for peace as the actors involved are often driven by the economic opportunities that conflict creates, which makes negotiating and maintaining peace challenging. In addition, conflict economies tend

to corrupt and undermine state institutions, thus weakening states and pushing them towards more instability and fragility.

Actors involved in these illegal activities range from militias and guerrilla and terrorist groups to criminal gangs and (organised) crime. However, it is important to underline that not everyone involved in environmental crimes and conflict economies is part of these groups. For example, as shown in the previous chapter, local population groups that experience livelihood insecurity can be pushed or forced to take part in such activities.

Environmental crimes often directly involve the exploitation of natural resources and can be linked with significant negative environmental and social impacts.^m This pathway explores five areas that are particularly relevant for conflict finance and organised crime: illegal mining, illegal exploitation and trade of oil, illegal drug production, illegal wildlife trade and poaching, and illegal timber trade. However, it must be underlined that these different illegal economic activities often take

^l Environmental crimes are defined as “illegal activities harming the environment and aimed at benefitting individuals or groups or companies from the exploitation of, damage to, trade or theft of natural resources, including serious crimes and transnational organized crime” (Nellemann et al 2016). Illegal activities are activities forbidden by law (e.g. production of illegal drugs), or comprise activities that are illegal when they are carried out by unauthorised actors (e.g. unauthorised practice of medicine). It is important to separate them from informal sector activities that are mostly legal: “Informal sector activities are not necessarily performed with the deliberate intention of evading the payment of taxes or social security contributions, or infringing labour legislation or other regulations. However, there can be some overlap, as some informal sector enterprises may prefer to remain unregistered or unlicensed in order to avoid compliance with regulations and thereby reduce production costs” (OECD 2002).

^m Activities of indigenous peoples and other local communities (IPLCs) are sometimes informal or illegal, but not necessarily unsustainable.

place at the same time and interact with each other. For example, armed and criminal groups are often involved in different illegal activities and use the same trafficking routes and networks to get final products to their markets. At the same time, the proceeds of one illegal activity are often used to finance others.

Illegal mining

Illegal mining is a major environmental crime and is estimated to generate 12 to 48 billion USD annually.⁷⁴ The extraction of mineral resources is often used by armed and criminal groups to finance their activities.⁷⁵ Non-state armed groups are estimated to derive 17% of their income from illegal mining.⁷⁶ This is particularly the case in areas that are already affected by crime, instability and conflict. In these contexts, armed and criminal groups often tax mining activities and, to a smaller degree, also directly take part in them. The issue is widely recognised by the UNSC, reflected by 93 UNSC resolutions between 1946 and 2016 addressing minerals, mostly focusing on the role of minerals in financing groups that were considered to pose a threat to international peace and security.⁷⁷

Illegal mining is not only fuelling and perpetuating conflicts and maintaining criminal structures, but also has significant negative impacts on the environment. Even when managed properly, mining always goes hand in hand with significant environmental impacts, for example in the form of land use for mining pits and infrastructure, water use for mining and refining processes, and noise, water and air pollution, as well as mining waste. These in turn often lead to environmental degradation, deforestation, and biodiversity loss. Illegal mining activities normally do not adhere to environmental standards, and their impact on the environment and local population groups can be significantly higher compared to legal mining activities.⁷⁸

The links between mining and conflict have a long history and can be observed around the world: Diamonds, for example, played an important role in the civil wars in Liberia and Sierra Leone, which took place from the late 1980s to the early 2000s. Liberian warlord Charles Taylor supported the invasion of Sierra Leone by the rebel group Revolutionary United Front (RUF) in 1991, motivated by the desire to gain control over Sierra Leonean diamond fields close to the Liberian border. Diamond trade financed Charles Taylor's

regime and the RUF⁷⁹ and had disastrous impacts on the environment that are still ongoing, as many of the mining sites that were expanded to finance the conflict were not rehabilitated.⁸⁰ After the end of the civil war, it was estimated that 80,000 to 120,000 hectares of land had been mined with minimal reclamation efforts, leaving behind deforested and degraded areas.⁸¹ The UNSC imposed sanctions on the export of diamonds from Liberia in 2001, putting pressure on the RUF, which laid down their arms in 2002. Charles Taylor's regime, in contrast, turned to timber as a new source of revenue (see paragraph below on illegal timber trade), which can be regarded as an unintended side effect of the UNSC sanctions.⁸²

In Colombia, illegal armed groupsⁿ are either directly or indirectly involved in gold, coltan and in some cases even coal mining. Research on the link between gold mining, armed conflict, and criminality in Colombia between 2001 and 2013 found that illegal armed actors ran mining operations themselves or took part in the trade of mined gold. Illegal armed actors were also indirectly involved in mining by demanding protection payments from small-scale miners.⁸³ More recently, it has been reported that Brazilian miners pay Colombian illegal armed groups to provide security services to protect their gold mining and trade activities in various National Parks near the Brazilian border.⁸⁴

At the same time, small-scale gold mining is an important driver of deforestation in Colombia, resulting in land degradation, erosion, habitat fragmentation, loss of natural corridors, change of ecosystems, loss of biodiversity, and increased carbon emissions contributing to climate change.⁸⁵ Mercury is used at such a scale in these operations that Colombia has had the highest levels of mercury contamination in the world for several decades.⁸⁶ UNODC and the Colombian Ministry of Mining and Energy estimate that in Colombia, 69% of alluvial gold mining is illegal. The majority (60%) of illegal mining takes place in areas where it is explicitly prohibited, in particular national and regional parks, wetlands of international importance (or RAMSAR sites), páramo zones and forest reserve zones.⁸⁷

Looking at more recent developments on the African continent, non-state armed groups including jihadists groups in Burkina Faso, Mali, and Niger have taken control over small-scale gold mines in areas with limited state presence.^{88 89} In addition to generating income, mining sites also

ⁿ In Colombia, the many non-state armed groups are mostly referred to as illegal armed actors.

serve as recruiting and training grounds for non-state armed groups.⁹⁰ Small-scale mining in the region is also associated with severe environmental degradation, including deforestation and water and soil pollution, due to the release of toxic substances such as mercury or cyanide.⁹¹

Infobox 3: Legal mining and conflict

Illegal mining as a means of financing non-state armed groups is not the only link between mining and violent conflict. Mining companies that do not necessarily operate illegally can also be directly involved in conflicts and violations of human rights, especially when they operate in fragile or conflict-affected areas and rely on public or private security forces for their protection.⁹² In this context, real and perceived negative impacts of mining operations on communities, including on the environment upon which they depend, can create opposition that can escalate into violence.⁹³

A well-documented case is the civil war in Bougainville, Papua New Guinea, which was linked to the development of a large-scale copper mining project, the Panguna mine. The mine had significant negative environmental and socioeconomic impacts and when the concerns of the local communities were not adequately addressed, the conflict escalated and became part of a larger independence movement. A civil war developed out of violent attacks by mining opponents on mining infrastructure, followed by heavy-handed responses by Papua New Guinean security forces. The conflict lasted over a decade and claimed between 15,000 and 20,000 lives.^{94 95} The mining company abandoned the mine in the face of the conflict and the environmental impacts have been compounded in the absence of a proper mine closure: “Since the end of mining activities 30 years ago, tailings have continued to move down the rivers and the waterways have never been treated for suspected chemical contamination.”⁹⁶

Illegal exploitation and trade of oil

The illegal exploitation and theft of oil represents between 19 and 23 billion USD of lost government revenues and income for organised crime and non-state armed groups per year. Illegally procured oil, gas, gasoline and diesel sales constitute 20% of income of the largest non-state armed groups.⁹⁷ The scale of the problem is also underlined by 94 UNSC resolutions between 1946 and 2016 that address hydrocarbons.⁹⁸ Of these resolutions, 40 referred to Iraq’s invasion of Kuwait and related embargoes and targeted sanctions. The others aimed at preventing non-state armed groups from accessing petroleum and related products, pressuring illegitimate governments, or focused on the effects of attacks on oil infrastructure.⁹⁸

One well-documented example of the complex links between oil and conflict is the Niger Delta, where oil spills, gas flaring and other activities of transnational oil companies have led to environmental degradation, negatively affecting land and marine resources. Grievances of local communities that engage in fishing and subsistence farming over lost income and improper compensation for these impacts have contributed to multifaceted conflicts in the region.⁹⁹ Non-state armed groups emerged in this context to demand restitution for environmental damages, greater shares of oil revenues for local governments and communities, and programmes to improve living conditions.^{100 101} At the same time, these groups steal oil to finance their own operations.¹⁰² In turn, illegal refining of oil and third-party interference are additional sources of pollution in the Niger Delta.¹⁰³ This example shows how oil production and its environmental impacts can play a role in creating conflict and giving rise to non-state armed groups, that in turn use the same resource to finance their operations.

Another example is Mexico. There, the state-owned Pemex oil pipelines and trucks are also the target of non-state armed groups. The main perpetrators are criminal cartels.¹⁰⁴ Illegal tapping of pipelines has increased by 1,720% between 2010 and 2018 in Mexico. Both the theft of refined oil products and illegal pipeline tapping are negatively impacting communities and the environment. In addition to the violence that is associated with criminal activities, explosions and oil leaks are often the results of theft. For example, in January

o This includes oil, natural gas, natural gas products, petroleum, petroleum products, oil infrastructure, oil installations, oil facilities, gas infrastructure, oilfields, and pipelines.

2019, illegal pipeline tapping caused an explosion in the farming community of Tlahuelilpan, which resulted in the death of 137 people and led to significant pollution and environmental damage.¹⁰⁵

Illegal wildlife trade and poaching

Wildlife trade consists of any sale or exchange of wild animal and plant resources. While legal and sustainable wildlife trade can contribute to maintaining healthy ecosystems and providing a source of income for local population groups,¹⁰⁶ illegal wildlife trade usually has devastating impacts on species all over the world.¹⁰⁷ Illegal wildlife trade can play a significant role in driving and prolonging conflicts.¹⁰⁸ In addition, it increases the risk of transmission of zoonotic and vector-borne diseases that originate from an animal host or vector (see Infobox 2 in Chapter 2.1). It often involves highly-organised criminal groups and networks.¹⁰⁹ As with the other illegal activities discussed above, wildlife poaching tends to increase in fragile and conflict-affected areas.^{p 110} Compared to other environmental crimes and sources of conflict financing, wildlife appeared relatively late – in 2013 – on the agenda of the UNSC. It has not been a UNSC priority in the subsequent years and biodiversity, wildlife, trafficking, poaching, wildlife products, and natural heritage were mentioned in only 16 resolutions as of 2016, with a focus on Sub-Saharan Africa and threats to international peace and security connected to terrorism and transnational organised crime.¹¹¹

Wildlife crime is often linked to other criminal activities, as criminal groups rely on the same routes, facilitators and approaches for wildlife trafficking as they do for trafficking other commodities. In addition, UNODC underlines that the profits generated are used to “finance other criminal activities, and in some cases the proceeds finance conflict and contribute to instability. These crimes are often interlinked with corruption and economic crimes, and can threaten the rule of law, governance and national security.”¹¹² At the same time, wildlife crime has significant environmental impacts, in particular the poaching of keystone species such as elephants that are critical for the functioning of ecosystems.¹¹³

The scale of the challenges wildlife crime poses is also reflected by the adoption of sanctions on the Democratic Republic of Congo (DRC) and the Central African Republic in January 2014.

The UNSC resolutions targeted individuals and entities that support non-state armed groups through, inter alia, illicit trade of wildlife or wildlife products. The resolution for the DRC specifically underlined “the linkage between the illegal exploitation of natural resources, including poaching and illegal trafficking of wildlife, illicit trade in such resources, and the proliferation and trafficking of arms as one of the major factors fuelling and exacerbating conflicts in the Great Lakes region of Africa” (S/RES/2136 (2014)).¹¹⁴

While the international focus is often on illegal wildlife trafficking in Africa and Asia, it is also a serious challenge in Latin America and the Caribbean. The region holds 40% of global biodiversity, but wildlife population sizes have been shrinking drastically over the past decades. Wildlife trafficking is not only threatening the region’s biodiversity, but is also empowering criminal organisations. For example, in Mexico, criminal groups that are mainly focused on drug and human trafficking have become active in the illegal wildlife trade to diversify their sources of revenue.¹¹⁵

Protected areas play a special role in the context of illegal wildlife trade, conflict and organised crime. Due to their often remote geographic location and the diversity of wildlife and other natural resources, protected areas frequently serve as base camps for non-state armed groups around the world.¹¹⁶ At the same time, and sometimes as a reaction to these dynamics as well as the increasing professionalisation of poachers, conservation efforts by governments in some regions have become increasingly militarised. In this context, serious human rights violations by state security forces have been reported.¹¹⁷

Illegal drug production

Illegal drug production and trafficking is linked in several ways to conflict and environmental degradation. On the one hand, it is used by a range of different non-state armed groups from rebel groups to organised crime and gangs to finance their activities.¹¹⁸ Globally, almost 30% of income of the largest non-state armed groups is generated by the production, trafficking and taxation of drugs.¹¹⁹ On the other hand, it often leads to significant negative environmental impacts. The UNSC has addressed the production and trafficking of illicit drugs as means to finance armed activities in 37 resolutions as of 2016.

^p However, this does not mean it always and automatically increases. There have also been documented cases of poaching decreasing during conflict (IUCN 2021).

For example, Shan State in Myanmar is the centre of a longstanding conflict between the central government and local militias and paramilitaries. It is also the global centre for the production of crystal methamphetamine. The trade of this drug is very profitable and fuels criminality and corruption. This conflict economy not only prolongs the area's conflicts, it also has severe environmental impacts, "as many of the precursors and waste products are highly toxic and disposed of improperly into waterways or the ground – in huge quantities given that each tonne of meth results in some five tonnes of chemical residue."¹²⁰

Latin America, and the Amazon region in particular, has long been a centre of global cocaine production. While there is a long history of farming and using coca leaves by many indigenous populations, illegal coca production has been used by non-state armed groups across the continent to finance themselves and their activities. This ranges from gangs in Brazil, to guerrillas and paramilitary groups in Colombia and crime networks and gangs in Central America. Although land use change, especially cattle ranching and soy production, remains the largest driver of deforestation in the Amazon, coca cultivation continues to contribute to forest loss, in particular in remote and protected areas. However, coca production and deforestation have a complex relationship, for example in Colombia: in some regions, the two phenomena are concentrated in the same area; in other regions, coca is concentrated in already deforested areas; and in others, deforestation is not associated with coca cultivation. While some consider coca production as a 'spearhead' that paves the way for more important drivers of deforestation (indirectly increasing deforestation), others find that coca production is a symptom rather than a major cause of deforestation.¹²¹ Nevertheless, the latest UNODC report on illicit crops in Colombia shows almost half of the coca production takes place in areas of interest for conservation: 20% of coca production takes place in forestry reserves, 15.5% on land of Afro-Descendant communities, 8% in indigenous reservations and 4% in national parks.¹²² In addition, the militarised responses to illegal coca production have also had negative social and environmental impacts in some cases. Aerial glyphosate spraying in Colombia has been criticised by many local communities and environmental organisations for its impacts on health, local livelihoods and the environment (for more information on this topic see pathway 4). Similarly,

recent military operations in Colombia have not proven to be effective in rooting out illegal armed groups, while at the same time being involved in environmental destruction and human rights abuses.¹²³

Illegal timber trade

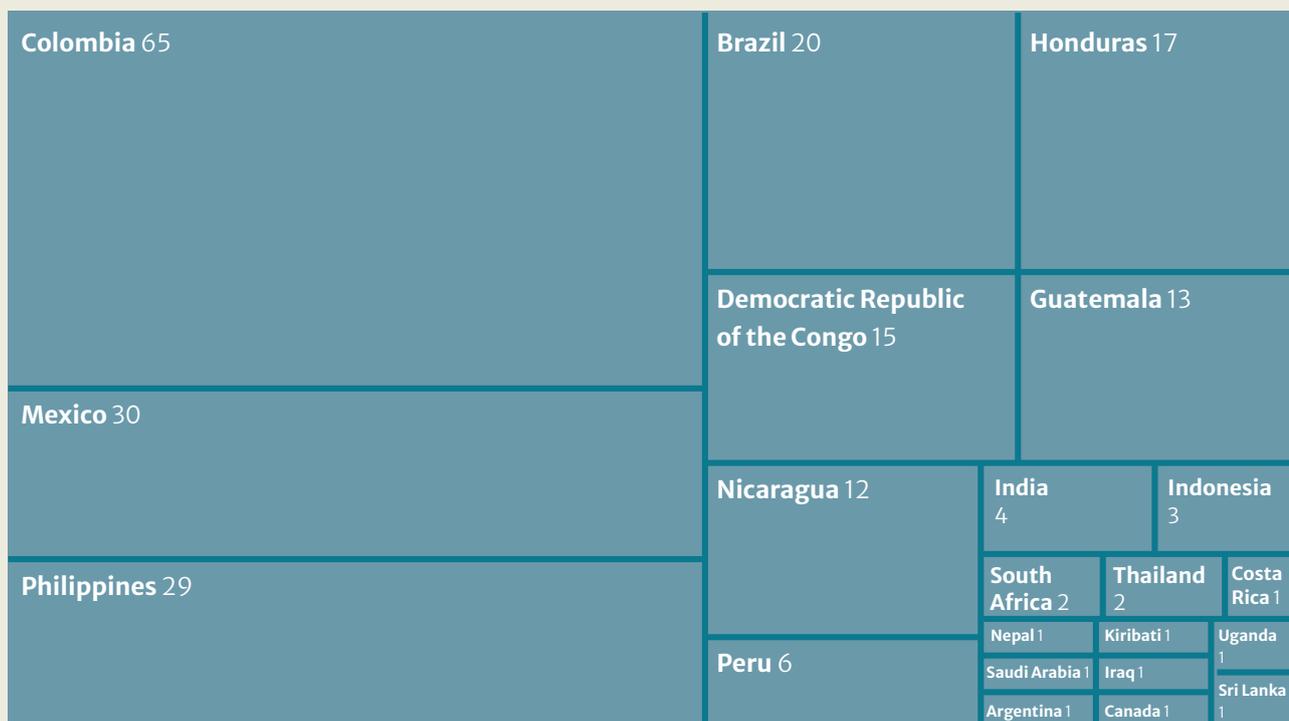
Timber played and plays a role in conflicts around the world, by being traded or taxed by armed and criminal groups. It received international attention due to the role it played in several conflicts in Asia and Africa in the 1990s and 2000s, most notably in Liberia, DRC, Cambodia, Guinea, and Sierra Leone.¹²⁴ It is still playing an important role in many of today's conflicts. After hydrocarbons and minerals, forestry resources, including timber, timber products, round logs, logs, and charcoal, are the third most addressed resource by the UNSC and are mentioned in 40 resolutions as of 2016.¹²⁵ Following the military coup in Myanmar in February 2021, research shows that deforestation increased as the military gained control over national forests and used logging, for example of teak, to generate incomes in the wake of international sanctions on other sectors.^{126 127 128 129} In the Mexican state of Chihuahua, local criminal groups have long been involved in illegal logging. In recent years, an influx of international drug trafficking organisations has greatly increased the level of violence as well as other social and environmental impacts. While these groups were mainly involved in deforestation to produce poppy and marijuana, they are now also directly involved in illegal logging and the control of sawmills and use different actors along the timber supply chain to launder money.¹³⁰

Mirroring the other examples, inadequate efforts to protect forests from deforestation that do not include safeguards protecting and including indigenous people, local communities and human rights can also have negative consequences and create new or exacerbate existing conflicts. In Mali, the paramilitary Forest Service was considerably strengthened in the 1980s to enforce conservation of natural resources and stop desertification. However, the Forest Service also became known for its predatory and corrupt behaviour, in particular towards local population groups who rely on access for forest resources for their livelihoods. Leaders of armed jihadi groups are using these grievances actively to gain the support of local population groups.¹³¹

Infobox 4: Environmental defenders are increasingly victims of crime, violence and conflict

2020 has been the deadliest year for land and environmental defenders around the world, with 227 defenders being killed. These killings mainly took place in the context of ongoing conflict, violence and instability. Over one third of deadly attacks were linked to logging, mining, small agribusiness and hydropower dams and other infrastructure.¹³² Other forms of aggression against defenders included death threats, judicial harassment, intimidation, beatings and violence.¹³³

A significant number of those killed come from indigenous communities: This is particularly worrying given the positive role of indigenous communities in the sustainable management of ecosystems. According to the IPBES flagship report on biodiversity, nature and biodiversity degrade at a slower pace on indigenous lands.¹³⁴ This underlines their integral part in addressing both the climate and biodiversity crisis the world is facing.



Total number of documented killings per country; Source: Global Witness 2021: *Last Line of Defence. The industries causing the climate crisis and attacks against land and environmental defenders*, page 11.

2.3 COMPETITION AND CONFLICTS AROUND NATURAL RESOURCES

Biodiversity loss and environmental degradation have severe impacts on the availability of and access to natural resources such as water, forests and land. These changes in turn can contribute to violent conflicts around natural resources. As ecosystems degrade, they are less able to fulfil their essential functions, which often means that fewer resources are available. For example, the degradation of soil biodiversity through pollution and overuse leads to the loss of productive lands. The UNCCD estimates that soil erosion occurs between 100 and 1,000 times faster in arable or intensively grazed lands.¹³⁵ Forest degradation can also have a direct impact on water supply. For example, the water supply of Brazil's biggest city – São Paulo – is under increasing pressure from deforestation in the Amazon basin.^{136 137}

These changes in the availability of and access to natural resources can lead to increased competition over natural resources. This competition in turn can escalate into violence, in particular in areas that have already experienced conflict, where certain groups are excluded from natural resource management institutions, and where groups directly depend on natural resources for their livelihoods (for more information, see Figure 6). While most of these natural resource conflicts are on the local, sub-national level, they can also escalate into or play a significant role in larger scale conflicts such as civil wars.

Natural resource conflicts are prevalent around the world. While they are normally driven by the same global megatrends (urbanisation, economic development and population growth) and context factors (see Figure 6), their dynamics differ significantly and are very context-dependent. To illustrate these differences, this chapter

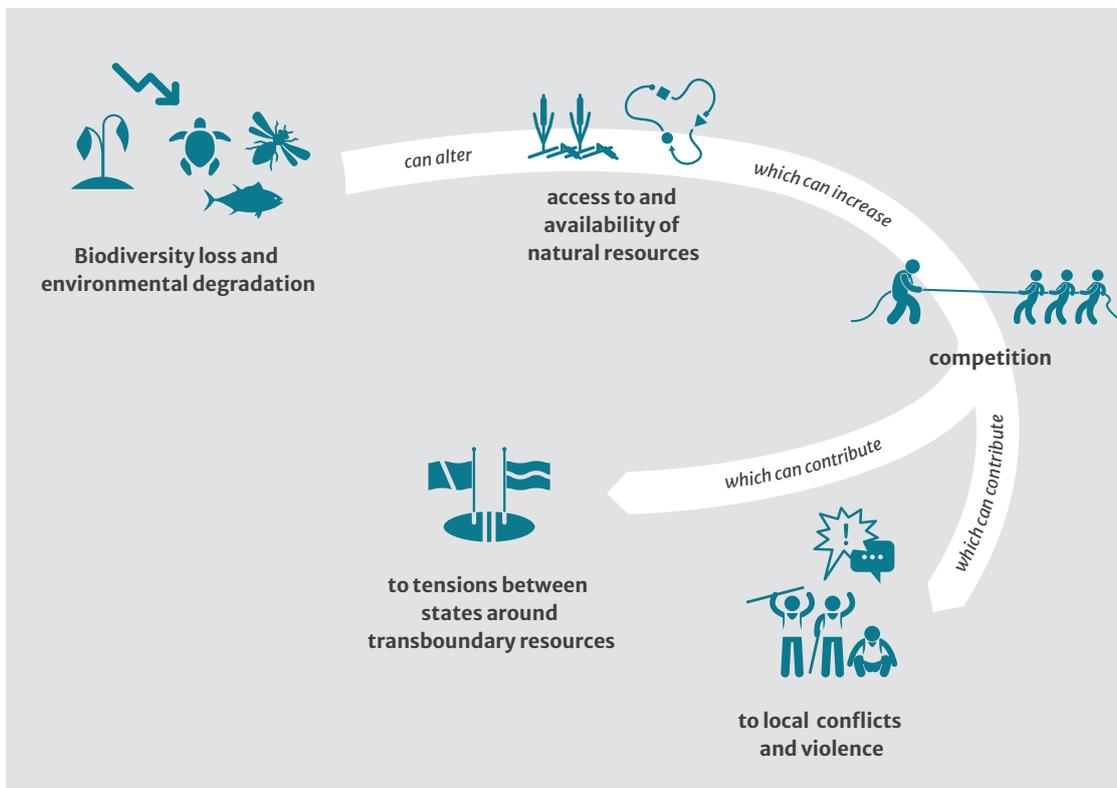


Figure 5: Overview of competition and conflicts around natural resources; **Source:** adelphi

discusses two examples of local natural conflicts: pastoralist conflicts in Sub-Saharan Africa and land conflicts in Latin America. In addition, it discusses transboundary natural resource conflicts, in particular those around water resources.

Pastoralist conflicts in the Sahel

Livestock herding is and has been an important livelihood source in the Sahel for millennia. Today, however, it is at the centre of several local and regional conflicts throughout the African continent. Climate change and environmental degradation are clear aggravating factors in these conflict dynamics. A devastating period of consecutive droughts between the 1960s and 1990s contributed to the deterioration of rural livelihoods in the region.¹³⁸ Although the drought period was followed by a greening of previously dry areas, high rainfall variability and pockets of desertification in Nigeria and Sudan remained.¹³⁹ In addition, growing resource demand from population growth put additional pressure on natural resources. The population of the Sahel grows by 3.5% every year on average, doubling every three decades. The combination of these drivers means that the Sahel region is in a severe state of water and land scarcity. For example, water availability per inhabitant has dropped by over 40% in the past two decades.¹⁴⁰

Another important cause for conflicts involving pastoralists was the introduction of borders, and the transfer of land rights to the state and to

private owners or groups by colonial powers, as opposed to the customary tenure arrangements put into place by the region's native populations.¹⁴¹ While nomadism was practiced throughout the continent's history as an adaptation strategy to cope with seasonal temperature fluctuations, droughts and floods, today, livestock herding for pastoralists often means crossing into private lands, into lands locked in contentious ownership battles, or into poor, overused and even dangerous public land. Therefore, clashes between farmers and pastoralists and among pastoralists are common.¹⁴²

Throughout the region, violent conflicts over land use between farmers and pastoralists occur mainly at the local level.¹⁴³ As the continent's most populous country, and due to high dependence on agriculture, Nigeria is one of the hotspots of farmer-herder conflicts, with fatalities growing exponentially since 2017. Climate change, environmental degradation, population growth, and insecurity have forced herders in the North to migrate to central Nigeria in search of pasture and water. Their movement has increased competition and disputes between herders and farmers over land resources.¹⁴⁴ In South Sudan, the rivalry between the Dinka and the Nuer pastoralist communities has been strongly aggravated in the past 30 years due to competition for increasingly scarce water and grazing land, as well as livestock raiding in the aftermath of droughts, leading to deadly clashes and an ongoing conflict situation.¹⁴⁵

Whether increased competition over natural resources escalates into conflict depends on a number of risk factors

» A history of conflict & fragility

Civil war, ethnic rivalries, and interstate conflict often establish a culture of violence, weaken cooperative mechanisms, and make arms easily available.



» Inequality & marginalisation

Imbalances in power and rights can lead to differences in access to resources, which can entrench poverty and inequality. Inequality, or the perception of it, can spur conflict between the “haves” and the “have-nots”. Marginalised groups are often excluded from formal methods of resolving resource conflicts.

» High dependence

Groups that are highly dependent on specific supplies of natural resources and lack alternatives may be more likely to pursue coping strategies that could spur conflict.

Figure 6: Risk factors for competition over natural resources escalating into violence; **Source:** adelphi

To aggravate matters further, the issue of who is a farmer and who is a pastoralist is often associated with specific ethnicities. This means that political actors have been able to leverage ethnic rivalries, often escalating conflicts even further. In the beginning of the 1990s in Mali, for example, Tuareg herders in favour of communal property rights in line with a nomadic lifestyle clashed with farming communities, who promoted the extension of private property rights. Drawing on inter-communal and racial tensions against the Tuareg people, farmers often conducted attacks on civilians associated with Tuareg rebels.¹⁴⁶

In these kind of contexts, environmental and climate-related impacts like biodiversity loss, soil desertification, water depletion, and unpredictable rainfall patterns are more than simply ‘additional’ stress factors, but often play a role in pushing tensions into full-blown conflicts. No region in the world is as dependent on agriculture as Sub-Saharan Africa, making its economies more susceptible to climatic and environmental stressors.¹⁴⁷ With temperatures rising well above the global average and political instability continuing to plague the region, conflicts around natural resources are likely to further increase.

Land conflicts in Latin America

Economic development in Latin America, in particular the development of the agricultural sector, has gone hand in hand with rapid land use change. This has come mainly at the expense

of rainforests: More than 70% of the region’s deforestation is caused by conversion into pasture land, followed by 14% for commercial croplands, with hotspots in Argentina, Paraguay and Brazil.¹⁴⁸ This deforestation has an enormous consequence for regional biodiversity: according to the Living Planet Report 2020, 51.2% of biodiversity loss in Latin America and the Caribbean can be attributed to land use change.¹⁴⁹

Deforestation, mineral extraction and land grabbing are some of the biggest threats to indigenous peoples worldwide, but in particular in Asia and Latin America, which harbour the world’s largest primary forests. The negative impacts on the environment create severe social and economic impacts for native populations, in turn leading to tensions and conflicts. In Panama, for example, the exploitation of one of the world’s largest copper deposits (Cerro Colorado) has been the source of conflict with local indigenous communities since the 1970s.¹⁵⁰ In 2020, the Catholic Church-affiliated Pastoral Land Commission (CPT), which has kept track of land conflicts in Brazil since 1985, recorded the highest number of cases ever. In 2019, indigenous groups in the Peruvian Amazon put out an urgent call to the government to implement immediate measures to address escalating land grabbing of indigenous territories.¹⁵¹

Large-scale mining is another particularly conflict-prone sector. Nowhere else has mineral

extraction resulted in so many conflicts in the past 20 years as in Latin America. Driven by a global commodities boom, many governments in the region have made the extractive sector a central pillar of their economic development strategies.¹⁵² Many mining activities have expanded into ecologically sensitive areas that are often also the home of indigenous population groups. This has led to a number of conflicts. In Peru, for example, the extractive sector has been at the centre of severe social conflict with communities, including indigenous ones.¹⁵³ Human rights abuses and the criminalisation of community leaders and protesters are common in the context of conflicts around mining. In the past, protests have led to violent clashes with state security forces and resulted in deaths, mainly of civilians, but also of police officers.¹⁵⁴

Land rights and the exclusion of native populations can also be a driver of broader security issues. In Colombia, the region's highest concentration of land ownership and the inability of the government to regulate land use and conduct rural development policies contributed to the rise of the Revolutionary Armed Forces of Colombia (FARC). The resulting civil war lasted almost 60 years and was the longest in the Western Hemisphere, causing almost 300,000 deaths, kidnappings and disappearances.¹⁵⁵ Since 1985, conflict-related violence has displaced over 8.1 million people in Colombia.¹⁵⁶ The role of land access in the conflict has been widely acknowledged, and the 2016 peace agreement between the FARC and the Colombian government includes several provisions on land rights and a rural reform.¹⁵⁷

Infobox 5: Fossil fuel resources, the green transformation and energy security

Non-renewable resources and in particular fossil fuels have long been a strategic resource and, as such, an instrument of power and geopolitics. Most countries are dependent on fossil fuels for energy production, heating and transport¹⁵⁸ and only a minority of countries produce fossil fuels, in particular oil and gas, with only 10 countries accounting for 72% of global oil production.¹⁵⁹ These dependencies shape power relationships: they can be a cause for tension and conflict as well as an instrument used to exert pressure.¹⁶⁰ As much of the global oil and gas production is taking place in authoritarian regimes and dictatorships, the revenues created are often an important tool for these regimes to stay in power and project their power beyond their borders.^{161 162} The energy dependence of many European countries on Russia has played a major part in shaping the geopolitical situation that led to the war in Ukraine in 2022 and is just the latest example of the wider security implications of fossil fuel production and consumption.¹⁶³ It has also underlined the potential of renewable and more sustainable energy production to address these dependencies. Because renewable energy can be produced by harnessing regionally and locally available energy sources such as solar, wind and thermal, it helps in reducing energy dependency, thereby reducing the risk of energy insecurity in light of interstate conflicts

or diplomatic strife. At the same time, the prospect of looming energy insecurity and rising energy prices could also contribute to a revival of nuclear energy as a response to pressures in the energy market.

But as the world is transforming energy systems towards more sustainability and away from fossil fuels, the impact of this transformation on states overly dependent on oil and gas will carry its own security risks. If fully implemented, global emission targets will lead to significant decreases in oil and gas prices.¹⁶⁴ To put this into perspective, to limit global warming to 1.5 or 2 degrees, around one third of global oil reserves, half of gas reserves and over 80% of coal reserves will have to stay in the ground.¹⁶⁵ This will have massive implications for the fossil fuel sector and those countries that rely on fossil fuels. It will impact economic growth and livelihoods as well as the capacity of governments to fulfil their functions.¹⁶⁶ This is especially the case in authoritarian regimes which rely disproportionately on their ability to provide services and other benefits to their population for their legitimacy as there is no democratic process. This means that the risks described in pathway 1 around livelihoods and energy security will disproportionately increase and threaten the stability of these states.



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Interstate tensions around shared resources and ecosystems

When natural resources are shared across borders, they can fuel diplomatic conflicts. This is particularly the case for transboundary water resources such as rivers and lakes. Many basins around the world are under pressure from environmental degradation and climate change. The Nile basin, for example, is under pressure from the conversion of wetlands and forests to farmland and the expansion of urban areas, high demand for fresh water, overgrazing, over-exploitation of fuelwood and fish stocks, and pollution, all adding to the degradation of the basin.¹⁶⁷ Similarly, the Mekong basin faces major environmental disruptions, linked to the construction of dams, excessive groundwater extraction, deforestation for export agriculture and unsustainable sand mining.¹⁶⁸ In addition, both are expected to be severely affected by climatic changes, including increased temperatures, evaporative losses, and more extreme weather events.¹⁶⁹

Increasing demand for agriculture and hydropower has driven the development of dams and other infrastructure, which are often linked to severe environmental impacts while at the same time acting as flashpoints of tensions between states. The Blue Peace Index details how cooperation (or lack thereof) between up- and downstream states are at the centre of both tensions and conflict resolution, pertaining mostly to the building of hydropower infrastructure, agricultural practices and water pollution.^{170 171} For example, Southeast Asian countries in the lower basin of the Mekong river have long feared the consequences of China's hydropower developments and plans in the upper basin.¹⁷² Along the Nile basin, disputes over water rights between riparian countries have a long history. However, tensions have been intensifying as populations and economies along the Nile grow. When upstream Ethiopia in 2011 announced its plan to construct the Grand Ethiopian Renaissance Dam, it sparked new diplomatic tensions that continue to threaten stability in the region because Sudan and especially Egypt fear its potential consequences for hydropower and irrigation infrastructure.^{173 174}

In Central Asia, an integrated regional energy and water infrastructure that was built during the time of the Soviet Union is also at the centre of regional tensions. After the implosion of the Soviet Union in 1991, Central Asian governments successfully agreed on water sharing and cooperation. However, these agreements failed to link water

cooperation with the energy sector, effectively creating a situation of competition between countries on these different uses.¹⁷⁵ Consequently, upstream states do not always comply with the international agreements on water sharing, particularly during water and energy shortages at home, leading to diplomatic tensions,¹⁷⁶ as well as localised conflicts between border communities, such as in April 2021 at a water facility on the Kyrgyz-Tajiki border.¹⁷⁷

Many studies have pointed out that there are few if any historic examples of interstate wars over transboundary water resources.¹⁷⁸ At the same time, the combined pressures of environmental degradation and economic and population growth have never been so high and are projected to further increase. This raises the question whether the existing transboundary management and cooperation institutions between states will be able to manage this increasing pressure peacefully in the future. This challenge was underlined by a US intelligence assessment on global water security that found already in 2012 that out of seven important transboundary basins (Indus, Jordan, Mekong, Nile, Tigris-Euphrates, Amu Darya and Brahmaputra) assessed, five had limited or inadequate management capacity that can provide stability, increase cooperation, and mitigate political grievances over water.¹⁷⁹

There are efforts to improve global water governance. In particular, the UN Watercourses Convention, adopted in the 1990s, can act as a support mechanism for guaranteeing that agreements on the sharing and cross-border management of water bodies do not overlook the environmental dimension. The Convention seeks to address fragmentation in the global landscape of basin-specific agreements and push for a global treaty law. Among its many requirements are the protection, preservation and management of ecosystems in international waters.¹⁸⁰

In addition to transboundary waters, fishing has also been at the centre of interstate tensions. Because of the difficulty in defining borders and keeping it under constant watch, high seas are often at the centre of territorial disputes and criminal activity. In Somalia, the presence of foreign fishers (both legal and illegal) and related territorial disputes converged with institutional instabilities within the Somali fishing sector, weak governance and piracy to create an ongoing state of instability with recurring periods of conflict lasting for almost 30 years.¹⁸¹ In the Pacific Islands, small island nations are fundamentally

dependent on fisheries both for livelihoods and as a main source of national income due to tuna licensing fees. Marine ecosystem deterioration in the region is threatening the movement of crucial fish stocks out of the Pacific economic zones, and into the economic zones of powerful economies, such as the US. Besides the negative economic consequences for these already struggling economies, this shift can potentially lead to diplomatic tensions between Pacific and North American states, in addition to opening the doors for disputes over territories and fishing rights.¹⁸²

2.4 THE IMPACTS OF WAR AND CONFLICT ON THE ENVIRONMENT

In addition to the pressure that human activity is putting on ecosystems and biodiversity, war and conflict can also directly contribute to the destruction of natural resources and environmental degradation. Environmental degradation in conflict situations can happen in several ways:

The environment as a casualty of conflict

Deliberate or accidental attacks on military installations, infrastructure or industry can lead to negative environmental impacts. Conflict frequently takes place within or around sensitive ecosystems, leading them to become casualties of war. In 1999, the NATO campaign in former Yugoslavia conducted targeted bombings on military targets, releasing several toxic chemicals into the environment.¹⁸³ In 2020, fighting in Nagorno-Karabakh at the Armenia-Azerbaijan border caused an estimated 102 km² of burned land, including of biodiverse forest.¹⁸⁴ While it is too soon to know the full extent of the environmental impacts of the war in Ukraine, several concerning incidents have been reported that could have severe lasting impacts.¹⁸⁵

At times, conflicts can take a toll on the very mechanisms put in place to cope with resource constraints. In the already highly water-stressed Middle East region, the ongoing conflict between Israel and Palestine is an example of this: the blockade on Gaza has led to overdrawing of underlying coastal aquifers and the regular release of untreated sewage into the coastal area, leading to issues and temporary closures of Israeli desalination plants and affecting water quality and availability for the entire region.¹⁸⁶ Furthermore, the damages to the environment caused by war and conflict are not restricted to the time in which they take place. The largescale bombing of Laos by the US between 1964 and 1973, which destroyed entire

villages and countless acres of agricultural land and local ecosystems, shows the long-term effects of conflict on the environment. The toxic chemicals that polluted water, air and soil have continued to harm and kill both people and biodiversity for decades and continue to pose an environmental problem today.¹⁸⁷

In addition to the destruction that often goes hand in hand with conflict, militaries are also impacting the environment through their operations. Military training activities can release heavy metals such as arsenic, copper and lead into the environment.¹⁸⁸ In Romania, soil, vegetation and ground water samples from a National Defense testing facility confirmed the presence of several contaminants which pose a long-term threat to local ecosystems.¹⁸⁹ On the island of Okinawa in Japan, the local administration has associated US military bases – both closed and in operation – with oil spills, fuel leaks, heavy metal pollution, and the disturbance of marine ecosystems, as well as substantial noise pollution impacting nearby residential areas.¹⁹⁰ At the same time, militaries are major emitters of GHGs driving climate change,¹⁹¹ further contributing to environmental degradation and ecosystem loss indirectly via climate change impacts to nature. Since the US started its ‘global war on terror’ in 2001 and until 2017, its military – the largest institutional consumer of fossil fuels in the world – has emitted an estimated 1.2 billion metric tons of GHGs, 400 million of which are attributed to fuel consumption alone.¹⁹² A study from 2015 concluded that the US military consumes as much fuel as many mid-sized countries, and that if the US military were a country, it would rank 47th between Peru and Portugal in terms of fuel purchasing, while its fuel-related emissions would match the total (i.e. not only fuel) emissions of Romania.¹⁹³ In addition, research looking at the GHG emissions of UK and EU militaries shows that military procurement and other supply chains, particularly arms production and related mineral extraction, account for the majority of its emissions.¹⁹⁴ Rough estimates looking into the carbon footprint of some of the world’s biggest militaries, such as the US, UK and EU and its Member States conclude that the world’s armed forces and related industries are responsible for approximately 6% of total global emissions, not including emissions that stem from the impacts of war and conflict. Yet, these often don’t figure in countries’ emissions reports, since they are not obligated to include military-related emissions in their reporting under operating rules of the Paris Agreement.¹⁹⁵

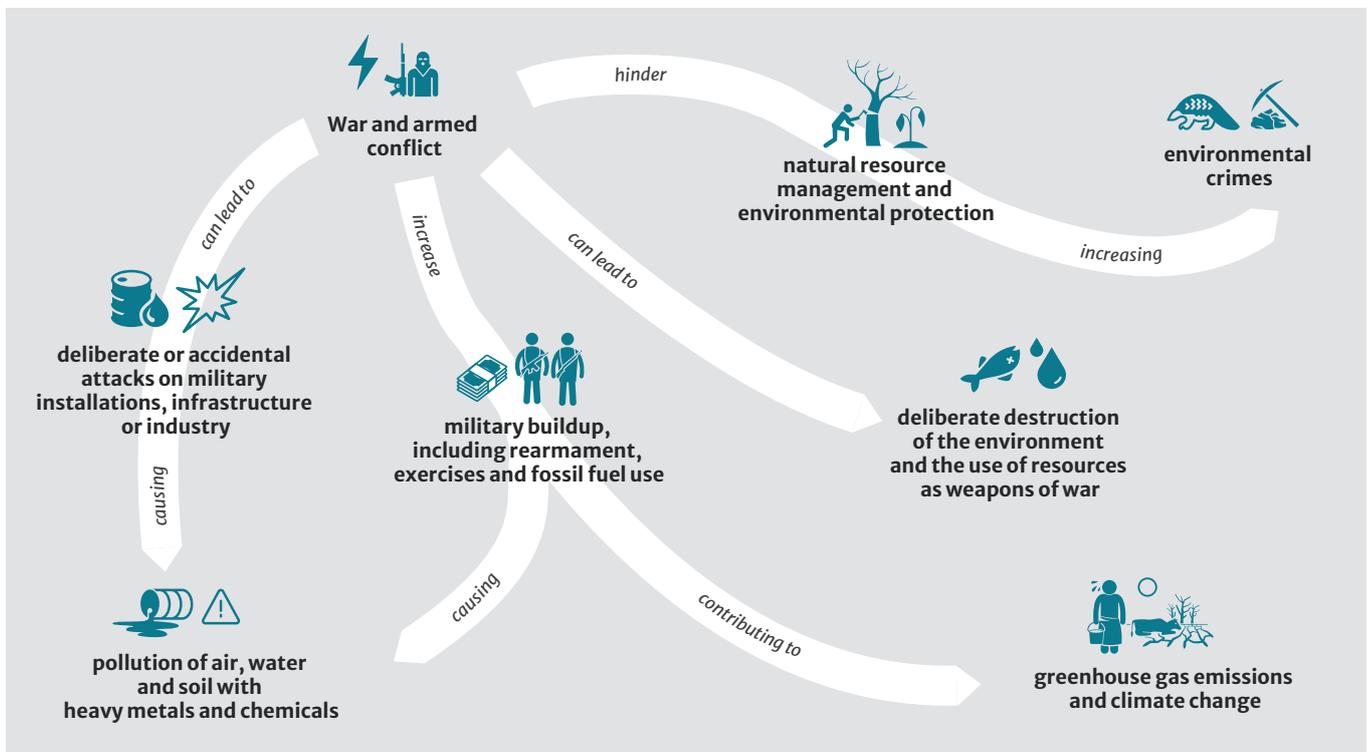


Figure 7: Overview of the impacts of war and conflict on the environment; **Source:** adelphi

Lastly, and perhaps the most indirect impact on the environment, can be its neglect as a result of conflict. In Yemen, the lacking institutional capacity in light of ongoing conflict and multiple related social, political and economic crises has led to an increased degradation of its natural reserves, and impeded the advancement of protection and conservation measures.¹⁹⁶

Strategic destruction of resources and areas of biological diversity

Military actors and non-state armed groups use natural resources – water, in particular – as a weapon of war. A database mapping water-related conflicts throughout history shows that since 2000, in at least 82 cases water has been used, or intended, as a weapon in conflicts ranging from small to large-scale.¹⁹⁷

In 2014, the Islamic State (or ISIS) gained control of large areas in Iraq and Syria which contained key regional water infrastructure. Their territory included the Euphrates river and the Tabqa Dam, critical for irrigation and energy in the region. This allowed the group to divert flows in order to harm enemies and expand territorial control. In some instances, the group released large volumes of water to cause floods and displacement, poisoned water with crude oil, or taxed its use to finance their activities. In 2015 in Nigeria, the military reported that Boko Haram poisoned water sources on several occasions, making their use dangerous for both humans and livestock. Other illegal or non-state armed groups that have either targeted or used water as part of their operations and strategies

are the FARC, Shining Path (SL), Kurdistan Workers' Party (PKK), and TehrikiTaliban (TTP).¹⁹⁸

In the 1990s, up to 90% of the marshlands of Southern Iraq – which covered an area of up to 20,000 km² around the confluence of the Tigris and Euphrates rivers and provided multiple livelihood options such as fishing, cultivation and livestock rearing to local populations – were intentionally destroyed. Drainage of the area for economic purposes had been envisioned since the 1950s; however, it was only when clashes between the government and local Shi'ite population groups spiked in 1988 that authorities targeted the marshlands, arguing that the remote areas provided political refuge for opponents of the regime. As a result, a series of dams, dikes and canals were built that prevented the flow of water from the Tigris and the Euphrates into the area. This large-scale drainage has ultimately led to the decimation of local livelihoods and to the virtual destruction of the Middle East's largest wetland ecosystem, in what the UNEP has later qualified as one of the world's greatest environmental disasters.^{199, 200}

In Colombia, toxic herbicides such as Glyphosate have long been used in large-scale aerial spraying operations in government-led efforts to eradicate coca plantations used for the illegal production of coca. The destruction of these crops is part of the military response against non-state armed groups and criminal networks, as illegal drug production is an important source of finance for these groups in Colombia and Latin America (for a detailed discussion of the links between environment, crime and conflict finance, see pathway 2). However,

the large-scale and indiscriminate employment of toxic herbicides poses severe threats for the health of local populations and the environment, as they contaminate land and water with chemicals and cause soil erosion, also impacting farming and livelihood options.²⁰¹ In 2015, the programme was suspended after the World Health Organization declared the substance as potentially carcinogenic, but a 2021 decree by Colombia's Ministry of Justice laid out plans to restart it, raising concerns about potential risks for human and environmental health.²⁰² Although in 2021, Decree 380 was published with the intention of resuming aerial spraying, at the beginning of 2022 the Constitutional Court opposed the procedure on grounds of the National Government having violated the right to prior consultation by issuing the decree.^q

War and conflict further driving environmental insecurity

In addition to these direct impacts that war and conflict have on the environment, war and conflict can also drive and exacerbate the pathways outlined above. This includes the increases of environmental crime rates in situations of conflict as outlined in pathway 2. Non-state armed groups use environmental crimes and the exploitation of resources as a source of revenue, for example by using illegal oil and gold extraction, drug production, logging, ivory hunting and many other activities that harm the environment and wildlife. In turn, such actors benefit from the disorder caused by conflict for their illegal activities, creating incentives for them to prolong conflict and impeding efforts to achieve and maintain peace.

The war in Ukraine can also serve as an example of how war and conflict can impact global food security. Both Russia and Ukraine are major exporters of key agricultural commodities, most importantly wheat, sunflower oil, livestock feed and fertilizer. Given the countrywide war taking place in its territory, agricultural production and exports in Ukraine have come to a virtual standstill. Furthermore, a large and increasing number of countries have imposed wide-ranging sanctions against Russia, impacting the ability of Russia to export agricultural commodities. This will particularly impact the African continent where 15 countries import more than half (and up to 100%) of their wheat supply from Russia and Ukraine, and a further 10 import at least one third. In

particular, countries that are already suffering from instability and are vulnerable to civil unrest and outbreaks of conflict, such as Somalia,²⁰³ are at risk to experience the indirect consequences of this war. With 100% of Somali wheat imports coming from Ukraine and Russia, Somalia is only one example of strong vulnerability. Turkey, China, and large parts of South Asia and Europe are also significantly dependent on agricultural commodities from both these countries. A new global food price crisis might contribute to political instability as was the case in 2008-2009 and 2010-2011 (see pathway 1 for more information).²⁰⁴

Infobox 6: The environment in international humanitarian law

The protection of the environment in contexts of war and conflict has long been a part of international humanitarian law (IHL). The wide use of herbicides during the Vietnam War and the oil spill in Kuwait during the Gulf War spurred actions in the United Nations, leading to several legal developments addressing the environment in armed conflict. Among them are the Nuclear Weapons Advisory Opinion by the International Court of Justice, the Rome Statute, the Eritrea-Ethiopia Claims Commission, UN Environmental Assembly resolutions, and the Treaty on the Prohibition of Nuclear Weapons.

In recent times, the issue has been resurfacing in light of climate change, which is compounding the environmental impacts of war and conflict. Since 2018, the UNSC has held two Arria-formula meetings discussing the protection of the environment during armed conflict, and twice has the UN Secretary General's annual report on the protection of civilians in armed conflict mentioned the compounding effects of environmental impacts of war and climate change on civilian suffering.²⁰⁵ The International Committee of the Red Cross (ICRC) developed guidelines for environmental protection in armed conflict in 1994 and published an update in 2020. The guidelines outline a set of 32 rules on the ways in which the natural environment is tied to and affected by conflict, and proposes recommendations for its implementation.²⁰⁶

^q After reviewing four guardianships of social and peasant organizations, the High Court concluded that the Environmental Management Plan debate infringed the right to participation (Dejusticia 2022).

2.5 CONCLUSION: THE NEED FOR A COMPREHENSIVE ENVIRONMENTAL SECURITY AGENDA

The four pathways that form the nature-security nexus show how environmental degradation, biodiversity loss, insecurity and conflict reinforce each other (see Figure 1). This vicious circle makes stability and peace harder to achieve and maintain. At the same time, it deepens the environmental crises humanity is facing, in particular biodiversity loss and climate change. Together, they threaten the very basis of human civilization: its well-being, livelihoods and peace.

What can be done to address these existential risks and break this vicious circle? As we are moving into a world where geopolitical tensions are increasing and conventional war is once more at the forefront of attention, we should not forget the progress that has been made to broaden our understanding of security. It is clear that militarised approaches alone are not the answer to these challenges, as many of the preceding examples demonstrated. Not only do they fail to address the root causes of environmental degradation, insecurity and conflict, but they frequently exacerbate environmental challenges and insecurity. What the current decade of increasing conflicts and crises has underlined is the urgent need for more preventative action and resilience.

Part of this broader move towards preventative action and resilience needs to be the engagement of all security, environment and development actors as part of a comprehensive environmental security agenda. The aim of their concerted efforts should not focus on reducing the symptoms of the environment-conflict trap, but rather tackle the root causes of environmental degradation, biodiversity loss, insecurity and conflict, with a particular focus on breaking the links between them. Environmental action can and has to play its role in addressing geopolitical tensions, preventing conflict and building peace, just as conflict prevention and peacebuilding have to – where and when possible – contribute to environmental action. The four pathways laid

out in this report are not just compound risks; they serve as multidimensional entry points for integrated action.

Action starts with environment and climate measures and policies that are conflict-sensitive and actively address environment-related security risks, for example by establishing inclusive natural resource management institutions that bring together conflicting parties. This is especially important in already fragile and conflict-affected areas. At the same time, peacebuilding, humanitarian and stabilisation actions must understand environmental and climate risks in order to avoid harm. This includes reflecting on the role of natural resources and environment in peace agreements and strategies. Where possible, peacebuilding and stabilisation programmes should actively address environment-related security risks and help to improve sustainability and resilience against environmental and conflict risks. Experiences from environmental peacebuilding can be used to fully realise the peacebuilding and cooperation potential of environmental action. Livelihood and development programmes also have a key role to play in addressing the links between environmental degradation, conflict and insecurity and their root causes by building more resilient and sustainable societies. Lastly, the impact of war and conflict on the environment has to be minimised.

This comprehensive environmental security agenda complements the existing activities and initiatives on climate-related security risks: Environmental degradation and climate change risks often interact and reinforce each other. In fact, environmental factors are often a critical link in the pathway from climate change impacts to security risks. At the same time, nature-based solutions often provide benefits for both addressing climate change and building peace. A holistic approach to include all environmental factors would thus help to address climate security risks more comprehensively and make sure that the focus on climate security risks does not prevent action in other parts of the nature-security nexus.



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3. RECOMMENDATIONS FOR THE UNITED NATIONS

Responsibilities to address the nature-security nexus are dispersed across the UN system. Many UN organs, programmes, funds, specialised agencies and bodies have specific roles to play and are already working on different parts of the problem. Yet the structural challenge for global peace and security that the nature-security nexus poses is not yet fully understood and treated as such. The scale of the environmental crisis and its critical importance in driving insecurity make it imperative that the UN system recognises and acts more comprehensively on this overarching challenge. The following recommendations outline starting points and possible next steps to work towards a comprehensive environmental security agenda.

UNSC

The UNSC has primary responsibility for maintaining international peace and security. This entails a mandate to assess and act on all factors that drive insecurity and undermine peace. To fulfil its responsibility, it should ensure that its discussions and mandates consider all environmental factors that drive insecurity and undermine peace in any given scenario, and mobilise action across the UN system in a coordinated manner. To this end, we recommend the UNSC to:

- Successively expand action on climate-related security risks to address the full breadth of links between the environment, conflict and peace. With the climate security agenda gaining traction in the UNSC, it is important that all aspects of the nature-security nexus are reflected as part of the efforts to tackle climate-related security risks. The UNSC should discuss environmental topics where this is relevant for peace and security in a specific region or country and invite respective experts on the matter from both external bodies and from within other UN bodies. UN and government responses should systematically consider all relevant environmental factors rather than look at them separately – as many of the ‘geographic’ resolutions already do to an extent by invoking consequences such as drought, desertification, and land degradation in addition to climate change. The overall aim must be to avoid creating or sustaining silos when it comes to the environment, natural resources and climate change.

- Address the nature-security nexus as part of UN peace operations. Peace operations need the mandates, capacities and resources to address the links between environment, security and peace in a comprehensive manner. This needs to go beyond reducing the environmental footprint of missions and include specific actions to address environment-related security risks, for example by supporting host countries to effectively fight environmental crimes or to prevent and address conflict around natural resources. The UN has made significant progress in this field, but experiences in the field show that more support is needed for UN peace operations to address environment-related security risks.
- Engage in preventive diplomacy to address transboundary environment-related security risks. Both tensions over shared natural resources such as water as well as international environmental crime can destabilise individual Member States or even whole regions. By supporting constructive engagement and reassuring affected countries that their challenges are being assessed and addressed, the UNSC can help contain and manage conflicts that otherwise fuel insecurity.

UNGA

The UN General Assembly (UNGA) is the main policy making organ of the UN where each of the 193 Member States has an equal vote. In

the absence of significant action on the nature-security nexus in the UNSC so far, the UNGA could use its role to sensitise and foster action across the UN system. To this end we recommend the UNGA to:

- Raise awareness and recognise new threats building on preceding resolutions on environment and conflict, such as the resolutions on environment and conflict (A/RES/35/71, A/RES/46/216 and A/RES/47/37), environmental crime (A/RES/69/314 and A/RES/76/185) and climate change and conflict (A/RES/63/281). It can specifically call on other organs to address relevant aspects of the nature-security nexus to address environment-conflict links within their respective mandates and initiate working groups to explore ways of sustaining peace through action on the nature-security nexus or call subsidiary bodies to do so.
- Increase institutional capacity to address the nature-security nexus across the UN system. The UNGA can help strengthen the UN's capabilities to respond to the nature-security nexus by giving political attention to the issue and ensuring adequate funding. This includes efforts that focus on environmental peacebuilding, peace-positive climate change adaptation and disaster risk reduction, environmental migration, environmental crimes and protecting the environment in conflict.

UNDP AND UNEP

Both the UN Development and Environment programmes are key in addressing the nature-security nexus. UNDP as a key actor for sustainable development in particular is a critical lever for strengthening the resilience of states and societies against environment-related conflict risks and for supporting those countries that are emerging out of conflict to rebuild. Thus, we recommend UNDP to:

- Continue operationalising the concepts set out in the special Human Development Report "New threats to human security in the Anthropocene". This includes linking conflict prevention, development and environmental action by breaking down internal silos between climate change, biodiversity loss, migration, refugees, and conflicts. This goes beyond climate-proofing conflict prevention, peacebuilding, stabilisation and prevention of violent extremism and conflict-proofing climate action, to realise the

synergies and co-benefits of integrating action on the environment and climate with conflict prevention, peacebuilding, stabilisation and prevention of violent extremism.

- Expand and upscale integrated programming that links sustainable development, the environment and human security. Over the past 20 years there have been many pilot projects and research efforts across the UN system to address the different aspects of the nature-security nexus. UNDP could help to synthesise these experiences and upscale those approaches that have proven to be working. These include, for example, (re)building social cohesion through inclusive natural resource management and resilient and sustainable livelihoods.
- Focus action and attention on those most excluded and vulnerable to both environmental degradation and conflict. There is a gap of reaching those communities, people and contexts that are most affected by environmental degradation and conflict. UNDP is the key development actor in the UN system in reaching these groups and should put a particular focus on women and youth in areas affected by environmental challenges, conflict and insecurity.

UNEP as the key environmental actor in the UN system also has a special role to play in addressing the nature-security nexus. To this end, it can rely on its specific expertise and experience on environmental peacebuilding and addressing the negative environmental impacts of conflicts, particularly through its Disasters and Conflicts branch and Environmental Security Unit. Therefore, UNEP can:

- Provide environmental security expertise, for example for rapid post-conflict environmental assessments and the experience gained from environmental and climate security programming. UNEP has unique expertise and experience on how to assess environmental damage and challenges in post-conflict situations as well as on environmental peacebuilding.
- Sensitise and provide support to other parts of the UN system to facilitate and enable action on the nature-security nexus. There is a particular need for experts on environmental and climate security across the UN system as action on the topic is expanding. One example is the provision of climate security and environmental

advisors in UN peace operations as has already happened in Somalia. These efforts should particularly focus on the Global South. In addition, the United Nations Environment Assembly (UNEA), which is hosted by UNEP and is the world's highest-level decision-making body on the environment, can be used to foster global action on the nature-security nexus.

- Expand integrated nature-security programming that integrates environmental or climate action with peacebuilding and conflict prevention and continue to test new approaches. UNEP has been on the forefront of innovating and testing environmental security and climate security approaches, it should continue and expand these efforts to help identify approaches and best practices that can be taken up by and expanded by other parts of the UN system and beyond.

IOM AND UNHCR

IOM and UNHCR are key in addressing the nature-conflict nexus around movements of people. They have a long track record of working on environmental migration and disaster displacement and have developed specially tailored strategies on addressing environmental risks and climate change in the context of human mobility.

IOM has been a pioneer working on environmental migration-related issues since the early 1990s, encompassing operational, policy and research dimensions. Based on these experiences we recommend IOM to:

- Expand the provision of knowledge, expertise and advice on the environment-migration nexus to the rest of the UN system. This includes delivering on IOM's plan to close remaining research gaps and provide further analysis on the interplay between migration, environmental degradation, climate change, sustainable development, protection, conflict, security, demography, urbanisation and resource management and to expand its collaboration on such matters with UNHCR, UNEP, UNDP and UNDRR.
- Upscale its ongoing work on supporting policy coherence and mainstreaming migration, environmental and climate change considerations into local, national and international agendas and strategies on disaster risk reduction, urban issues, conflict prevention, sustainable development,

humanitarian response and other relevant issues. This also includes expanding existing partnerships with local governments and organisations to promote dialogue and action at the municipal level, especially to address challenges linked to rapid and uncontrolled urban growth.

UNHCR, the UN refugee agency, is the global organisation for supporting refugees, forcibly displaced communities and stateless people. It has been increasingly committing to improving sustainable environmental management, reducing environmental degradation and enhancing the resources available to displaced persons and host communities since the 1990s. Building on these efforts, we recommend UNHCR to:

- Expand its efforts to strengthen the resilience of displaced people and host communities to climate-related and other environmental risks. A model activity in this regard is a UNHCR, IOM and WFP initiative in Cox's Bazar to protect residents against landslides and flooding risks during the monsoon season, by improving infrastructure in refugee settlements, preparing safe relocation areas for refugees at risk and engaging in community-centred emergency planning.
- Intensify its ongoing work on strengthening preparedness, anticipatory action and response to support protection and solutions for displaced people and host communities in disaster situations, brought on by climate- and weather-related hazards. This includes enhancing the provision of evidence-based forecasts of potential displacement patterns linked to climate and environmental risks and supporting contingency planning for possible displacement.

ROME-BASED AGENCIES (WFP, FAO AND IFAD)

Italy's capital is home to the United Nations Rome-based Agencies (RBAs), comprised of the Food and Agriculture Organization of the UN (FAO), the International Fund for Agricultural Development (IFAD), and the World Food Programme (WFP). Together, these agencies constitute an internationally recognised hub providing knowledge, financial and technical expertise, and specialised fora for policy discussions around agriculture, food security and nutrition. Pursuing different but complementary goals, these organisations can address the food security and livelihood-related impacts of

environmental pressures affecting security.

WFP is the UN system's largest humanitarian actor. Its activities focus on delivering food aid to the world's most vulnerable populations in emergency situations and it holds great potential for addressing the nature-security nexus. We recommend WFP to:

- Strengthen the focus on avoiding harm by guaranteeing that both emergency aid and long-term support do not unintentionally increase environmental and conflict-related challenges. This includes, for example, making sure that food aid delivery is accompanied by a holistic strategy which considers availability of and access to sustainable cooking fuels to avoid new deforestation, and guaranteeing that women have access to and autonomy over income from cash-transfer programmes.
- Expand the use of supply chains and food procurement practices as agents of change in fragile contexts, supporting sustainable production modes that strengthen vulnerable livelihoods and foster environmental protection and restoration. This includes favouring regional supply networks, including small and middle-scale producers and service providers, and working with partners who abide to social, environmental and human rights standards.
- Design strategies with the long-term goal of reducing dependency on aid and support. This includes providing starter capital and capacity-building for the diversification of livelihoods, and for livelihood activities with environmental co-benefits.

IFAD focuses on combating rural poverty, hunger and malnutrition by working with rural populations and focusing on increasing productivity and income. It is therefore best positioned to encourage long-term change in local contexts, for example by:

- Prioritising sustainable agricultural practices over increasing yields. The agricultural intensification practices that are currently central to the organisation's strategy might reduce the total surface area of environmental damage, but also accelerate deterioration of the area of practice, impairing future food production and creating a breeding ground for increased human insecurity in the long term.
- Strengthening its focus on social issues that affect access to food and act as drivers of

conflict, such as poverty and marginalisation. This means moving beyond insufficient food availability (except for crises and emergency scenarios). This will allow programmes to focus on the root causes of food insecurity and conflict, directing planning and resources towards increasing economic access to food, addressing unemployment and fostering social cohesion.

- Mitigating maladaptation by providing contingency planning and capacity-building to vulnerable populations for switching to sustainable alternative livelihoods in times of environmental and climatic crisis. This requires understanding local conditions and designing programmes to target contexts where the risk of maladaptation is higher, such as when communities are strongly dependent on specific natural resources for their livelihoods and alternative earning and subsistence options are lacking, and where criminal networks are particularly active.

FAO leads international efforts to defeat hunger. It focuses on combating food security, hunger and malnutrition, while increasing agricultural productivity and raising the living standards of rural populations. It has a key role in setting standards for sustainability in food and agriculture, and we recommend FAO to:

- Increase its work with peacebuilding actors to develop adaptation guidelines and practices that foster livelihood security in fragile contexts, and in light of compound crisis. This entails assessing local contexts and creating future scenarios that allow for local populations to diversify their livelihoods according to projected conditions and resource availability.
- Create guidelines and programmes to help fragile and conflict-affected countries and regions to increase the resilience of their food systems to outside risks (disease outbreaks and pandemics, climate impacts and conflicts in food-exporting regions, diplomatic issues affecting border crossings and trade, etc.) and risks from within (environmental degradation, local conflicts, etc.), thereby contributing to lower risk of conflict due to food insecurity.
- Play a stronger role in increasing the sustainability standards of middle and large-scale agriculture, as these are responsible for a large portion of current carbon emissions and the degradation of critical ecosystems and natural resources. Addressing unsustainable

practices in middle- and large-scale agriculture is key for improving livelihoods of small-scale producers, rural populations and of future generations.

PBF AND PBC

In order to strengthen the UN's response to environmental security risks, the Peace Building Commission (PBC) and Peace Building Fund (PBF) are key. Both organisations have started to address the nature-security nexus, in particular climate-related security issues, but they should further strengthen these efforts. Both institutions can act as important transmission mechanisms for advancing a broad environmental security agenda within the UN system.

The PBC can use its unique position and role within the UN peacebuilding architecture and system and make the nature-security nexus part of its discussions, meetings and exchanges. To this end, we recommend PBC to:

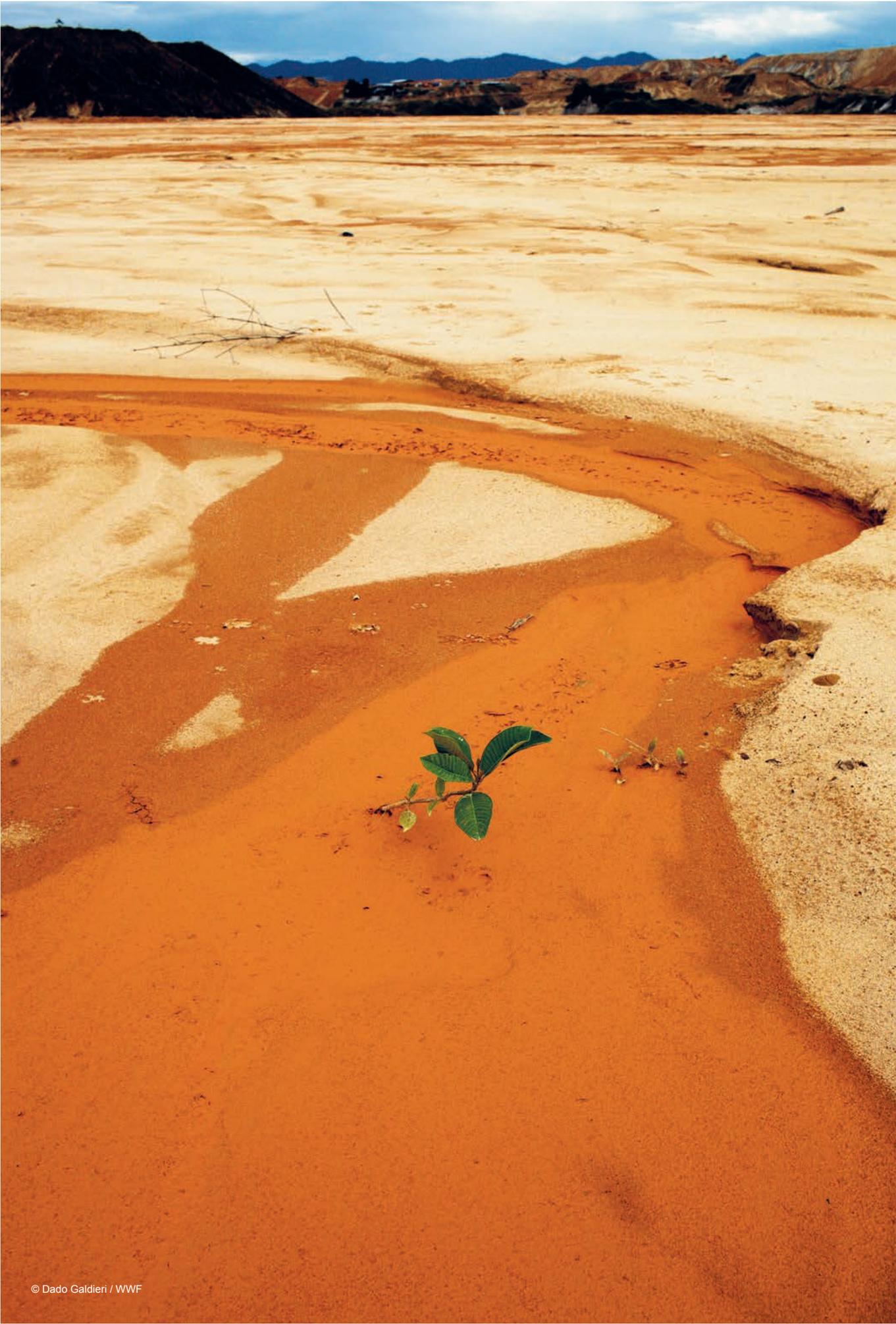
- Address the nature-security nexus in its regional and national engagement and thematic meetings: The PBC can include environmental issues in its regional engagement as well as its engagement with specific countries that receive peacebuilding support. Its focus on cross-border and regional issues gives the PBC a unique entry point for addressing the cross-border dimensions of the nature-security nexus such as transboundary ecosystems and water bodies. In addition, specific thematic meetings could be used to move the conversation on the environmental security agenda through the sensitisation and exchanging of experiences.
- Use its advisory and bridging role to foster integrated action across the UN system: The PBC has an advisory and bridging role to the General Assembly, the Security Council and ECOSOC which it can use to sensitise these institutions on nature-security links, for example as part of its formal and informal dialogues and briefings. Strengthening partnerships and collaborations with the World

Bank and other regional organisations could be another effective way to foster action on the topic.

The PBF has significantly increased its portfolio of climate security projects in the past years. Building on these experiences, it could broaden its action on the nature-security nexus. We recommend PBF to:

- Include the elements of the nature-security nexus that are not part of climate security in the strategic planning of the PBF and expand the portfolio of environmental security projects. Some partners and governments have criticised that climate security is getting too much attention and focus. Expanding the climate security portfolio towards a broader environmental security portfolio offers more entry points for programming and engagement with partners and governments.
- Use the catalytic role of the PBF to foster collaboration between UN agencies and cross-border projects: The PBF has the comparative advantage of being able to foster collaborative multi-agency projects that bring together the expertise of different actors across the UN system. This kind of collaboration is key to advance action on the nature-security nexus.

All of these actions also tie into the effort of the UN as a whole to better work together and increase synergies and cross-cutting approaches. This includes Delivering as One as well as the actions outlined by the Secretary-General in Our Common Agenda, in particular the commitments to *promote peace and prevent conflicts*, and to *be prepared*. The latter encompasses presenting a Strategic Foresight and Global Risk Report to member states every five years to assess short-medium and long-term risks, as well as the establishment of an Emergency Platform to be triggered automatically in times of crises, quickly connecting relevant actors, as well as outlining relevant mechanisms and response options. Both these instruments hold great potential to help identify, prevent and address environmental threats to security in a timelier manner.



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4. REFERENCES

- 1 Rockström, J. S.; W. Steffen, K. Noone, Å. Persson, F. S. Chapin III, E. F. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. J. Schellnhuber, B. Nykvist, C. A. de Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen and J. A. Foley (2009): A safe operating space for humanity. In: *Nature*, 461, pp. 472–475.
- 2 von Einsiedel, S; L. Bosetti, J. Cockayne, C. Salih and W. Wan (2017): *Civil War Trends and the Changing Nature of Armed Conflict*. United Nations University Centre for Policy Research.
- 3 von Einsiedel, S et al. (2017).
- 4 IPBES (2019): *Global Assessment Report on Biodiversity and Ecosystem Services*. Brondizio, E.S.; J. Settele, S. Díaz, and H. T. Ngo (eds.). Bonn: IPBES secretariat, 1148 pages.
- 5 IPBES (2019).
- 6 Ramsar Convention on Wetlands (2018): *Global Wetland Outlook: State of the World's Wetlands and their Services to People*. Gland: Ramsar Convention Secretariat.
- 7 WWF (2020): *Living Planet Report 2020 - Bending the curve of biodiversity loss*. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). Gland: WWF.
- 8 IPBES (2019).
- 9 Walker, B.; C. S. Holling, S. R. Carpenter and A. Kinzig (2004): Resilience, Adaptability and Transformability in Social-ecological Systems. In: *Ecology and Society*, 9(2): 5.
- 10 Walker et al. (2004).
- 11 Locatelli, B. (2016): *Ecosystem Services and Climate Change*. In: *Routledge Handbook of Ecosystem Services*, pp. 481-490.
- 12 Ramsar Convention on Wetlands (2018).
- 13 Nuryati, R.; U. Atmaja, L. Sulistyowati and I. Setiawan (2019): *Climate Change Adaptation and Mitigation through Integrated Polyculture Plantation Application*. Conference: "The 2nd" ASEAN Agriculture University Network (AAUN) Forum and The 1st International Conference on Sustainable Agriculture and Food Management: The Roles of Asian Agriculture Universities.
- 14 Endreny, T. A. (2018): Strategically growing the urban forest will improve our world. In: *Nature Communications*, 9:1160, pp.1-3.
- 15 Barbier, E. B. (2017): *Primer: Marine ecosystem services*. In: *Current Biology*, 27, pp. R507-R510.
- 16 Romita, P. E. (2021): *The UN Security Council and Climate Change*. New York: Security Council Report.
- 17 Romita (2021).
- 18 CSEN (n.d.): *Climate Security at the UNSC - A Short History*. Retrieved 29.07.2021, from CSEN: <https://climate-security-expert-network.org/unsc-engagement>
- 19 Romita (2021).
- 20 Aldinger, P.; C. Bruch and S. Yazykova (2018): Revisiting securitization: An empirical analysis of environment and natural resource provisions in United Nations Security Council Resolutions, 1946–2016. In: *Routledge Handbook of Environmental Conflict and Peacebuilding*. pp. 143-172.
- 21 Matthew, R. A.; O. Brown and D. Jensen (2009): *From conflict to peacebuilding: the role of natural resources and the environment* (No. 1). Nairobi: UNEP/Earthprint.
- 22 UNEP (2015): *Addressing the Role of Natural Resources in Conflict and Peacebuilding: A Summary of Progress from UNEP's Environmental Cooperation for Peacebuilding Programme, 2008–2015*. Nairobi: UNEP.
- 23 UNDP (2022): *New threats to human security in the Anthropocene: Demanding greater solidarity*. New York: United Nations Development Programme.
- 24 UNDP (2022).
- 25 Convention on Biological Diversity (2006): Article 2. Use of Terms. Retrieved 28.06.2021, from <https://www.cbd.int/convention/articles/?a=cbd-02>
- 26 Hoekstra, A. Y.; M. M. Mekonnen, A. K. Chapagain, R. E. Mathews, and B. D. Richter (2012): *Global Monthly Water Scarcity: Blue Water Footprints versus Blue Water Availability*. In: *PLoS ONE* 7(2).
- 27 United Nations Convention to Combat Desertification (n.d.): *Land and Biodiversity*. Retrieved 29.07.2021, from <https://www.unccd.int/issues/land-and-biodiversity>
- 28 van Vliet, M. T. H.; J. Sheffield, D. Wiberg and E. F. Wood (2016): *Impacts of recent drought and warm years on water resources and electricity supply worldwide*. In: *Environmental Research Letters*, 11:124021, pp. 1-10.
- 29 Mamonova, N. (2020): *Alternatives to Rural Right-Wing Populist Europe*. Paris: Agricultural and Rural Convention. Retrieved 04.08.2021, from <https://www.arc2020.eu/alternatives-for-rural-right-wing-populist-europe-part-i/>.
- 30 Resnick, D. (2010): *Populist Strategies in African Democracies*. Helsinki: United Nations University World Institute for Development Economics Research, pp.1-34.
- 31 adelphi (n.d.): *Case Study: Droughts and the Grain Export Ban in Russia*. Berlin: adelphi Research. Retrieved 19.09.2021, from <https://climate-diplomacy.org/case-studies/droughts-and-grain-export-ban-russia>
- 32 adelphi (n.d.): *Case Study: Global Food Price Shocks*. Berlin: adelphi Research. Retrieved 19.09.2021, from <https://climate-diplomacy.org/case-studies/global-food-price-shocks>
- 33 Hossain, N.; F. Aremu, A. Buschmann, E. Chaimite, S. Gukurume, U. Javed, E. da Luz (aka Azagaia), A. Ojebode, M. Oosterom, O. Marston, A. Shankland, M. Tadros and K. Taela (2018): *Energy Protests in Fragile Settings: The Unruly Politics of Provisions in Egypt, Myanmar, Mozambique, Nigeria, Pakistan, and Zimbabwe, 2007–2017*. Brighton: Institute for Development Studies, pp. 1-42.
- 34 Aljazeera (2021): *Two killed in Iran's Khuzestan water crisis protests*. In: *Aljazeera*, 17.07.2021.
- 35 adelphi (n.d.): *Case Study: Dispute over Water in the Cauvery Basin in India*. Berlin: adelphi Research. Retrieved 17.08.2021, from <https://climate-diplomacy.org/case-studies/dispute-over-water-cauvery-basin-india>
- 36 WHO (2014): *Gender, Climate Change and Health*. Geneva: World Health Organization, 42 pages.
- 37 Detges, A.; D. Klingensfeld, C. König, B. Pohl, L. Rüttinger, J. Schewe, B. Sedova and J. Vivekananda (2020): *10 Insights on Climate Impacts and Peace*. Berlin: adelphi Research.
- 38 Birchall, J. (2019). *Gender as a causal factor in conflict*. Brighton: K4D Helpdesk Report 549.
- 39 adelphi (2018): *Terrorist recruiting, water conflicts and climate change in Iraq* [Video]. Retrieved 28.06.2021, from <https://climate-diplomacy.org/magazine/conflict/terrorist-recruiting-water-conflicts-and-climate-change-iraq>
- 40 Nett, K. and L. Rüttinger (2016): *Insurgency, Terrorism and Organised Crime in a Warming Climate - Report and Summary*. Berlin: adelphi Research.
- 41 Vivekananda, J.; M. Wall, F. Sylvestre and C. Nagarajan (2019):

- Shoring Up Stability: Addressing Climate and Fragility Risks in the Lake Chad Region. Berlin: adelphi Research.
- 42 adelphi (n.d.): Case Study: Climate Change, Charcoal Trade and Armed Conflict in Somalia. Berlin: adelphi Research. Retrieved 28.06.2021, from <https://climate-diplomacy.org/case-studies/climate-change-charcoal-trade-and-armed-conflict-somalia>
- 43 Brown, O. (2019): Climate-Fragility Risk Brief: Afghanistan. Berlin: adelphi Research.
- 44 Ciro, E. (2019): Levantados de la selva: Vidas y legitimidades en los territorios cocaleros del Caquetá. Bogotá: Ediciones Uniandes-Universidad de los Andes.
- 45 Gutiérrez-Sanín, F. and J. V. Reina (2016): El despojo paramilitar y su variación: Bogotá: Editorial Universidad del Rosario.
- 46 IOM (2015): Ecosystem services: Relation to environmental change and impacts on mobility [Infographic]. Grand-Saconnex: UN Migration.
- 47 Mosello, B.; C. König, E. Wright and G. Price (2021): Climate migration can be a viable adaptation strategy, if policy keeps up. Berlin: adelphi Research.
- 48 Asian Development Bank (2012): Addressing Climate Change and Migration in Asia and the Pacific. Mandaluyong City: Asian Development Bank, p. 34.
- 49 Elmqvist, T.; W.C. Zipperer and B. Gueneralp (2016): Urbanization, Habitat Loss and Biodiversity Decline: Solution pathways to break the cycle. In: The Routledge Handbook of Urbanization and Global Environmental Change, pp. 139-151.
- 50 Sandoval, V. and J.P. Sarmiento (2019): A Neglected Issue: Informal Settlements, Urban Development, and Disaster Risk Reduction in Latin America and the Caribbean. Contributing Paper to Global Assessment Report on Disaster Risk Reduction, pp. 3-4.
- 51 Schreiber, F.; E. Dellas and L. Rüttinger (2016): Understanding Fragile Cities – The Nexus between Migration, Climate Change and Urban Fragility. Working Paper. Berlin: adelphi Research, p. 2.
- 52 Egger, E-M. (2019): Internal migration and crime in Brazil. Maputo: UNU-WIDER, pp. 15-16.
- 53 Blaser, C. (2008): Opportunity and conflict: the impact of a refugee influx on decentralisation in Mali. Geneva: UNHCR, pp. 3-5.
- 54 Save the Children, BRAC, World Vision, WFP and UNHCR (2018): Self-reliance Situation of Host Communities in Cox's Bazar. Dhaka: Brac Institute of Governance and Development, p. 3.
- 55 Sneed, A. (2019): What Conservation Efforts Can Learn from Indigenous Communities. In: Scientific American, 29.05.2019.
- 56 Folly, M. and E. P. Ramos (2021): Climate change is already driving migration in the Brazilian Amazon. Retrieved 28.06.2021, from <https://climate-diplomacy.org/magazine/conflict/climate-change-already-driving-migration-brazilian-amazon>
- 57 IDMC and NRC (2021): GRID 2021: Internal displacement in a changing climate. Geneva: The Internal Displacement Monitoring Centre.
- 58 UNDRR (2020): Ecosystem-Based Disaster Risk Reduction: Implementing Nature-based Solutions for Resilience. Bangkok: United Nations Office for Disaster Risk Reduction – Regional Office, p. 13.
- 59 Nett and Rüttinger (2016), p. 42.
- 60 Millard, A. S. and G. Lara-Florian (2018): Cause or consequence? Reframing violence and displacement in Guatemala. Geneva: IDMC, pp. 24-25.
- 61 Martyr-Koller, R.; A. Thomas, A. Nauels and C-F. Schleussner (2019): Home by the sea: new science shows more sea-level rise impacts on small islands. Retrieved 28.06.2021, from <https://climateanalytics.org/blog/2019/home-by-the-sea-new-science-shows-more-sea-level-rise-impacts-on-small-islands/>
- 62 Voiland, A. (2019): As Jakarta Grows, So Do the Water Issues. Earth Observatory. Retrieved 28.06.2021, from <https://earthobservatory.nasa.gov/images/148303/as-jakarta-grows-so-do-the-water-issues>
- 63 Mosello, B., A. Foong, C. König, S. Wolfmaier and E. Wright (2020): Spreading Disease, Spreading Conflict? COVID-19, climate change and security risks. Berlin: adelphi Research, p. 2.
- 64 UNODC (2020): Global Programme for Combating Wildlife and Forest Crime: Annual Report 2020. Vienna: UNODC.
- 65 UNODC (2020).
- 66 Myers, S. S.; L. Gaffikin, C. D. Golden, R. S. Ostfeld, K. H. Redford, T. H. Ricketts, W. R. Turner and S. A. Osofsky (2013): Human health impacts of ecosystem alteration. In: Proceedings of the National Academy of Sciences, 110(47), pp. 18753-18760.
- 67 UNODC (2020).
- 68 Morand, S. and C. Lajaunie (2021): Outbreaks of Vector-Borne and Zoonotic Diseases Are Associated With Changes in Forest Cover and Oil Palm Expansion at Global Scale. In: Frontiers in Veterinary Science: Parasitology, 8, pp. 1-11.
- 69 MacDonald, A. and E. Mordecai (2019): Amazon deforestation drives malaria transmission, and malaria burden reduces forest clearing. In: Proceedings of the National Academy of Sciences, 116(44), pp. 22212–22218.
- 70 WHO (2016): The World Health Report 2016: Mental health, climate change and health. World Health Organisation. Retrieved 30.06.2021.
- 71 Dobson, A. P.; S. L. Pimm, L. Hannah, L. Kaufman, J. A. Ahumada, A. W. Ando, A. Bernstein, J. Busch, P. Daszak, J. Engelmann, M. F. Kinnaird, B. V. Li, T. Loch-Temzelides, T. Lovejoy, K. Nowak, P. R. Roehrdanz and M. M. Vale (2020): Ecology and economics for pandemic prevention. In: Science, 369(6502), pp. 379-381. Retrieved 06.08.2021.
- 72 Nellemann, C.; R. Henriksen, R. Pravettoni, D. Stewart, M. Kotsovou, M.A.J. Schlingemann, M. Shaw, and T. Reitano (eds.) (2018): World atlas of illicit flows. A RHIPTO-INTERPOL-GI Assessment. RHIPTO-Norwegian Center for Global Analyses, INTERPOL and the Global Initiative Against Transnational Organized crime.
- 73 Nellemann, C., Henriksen, R., Raxter, P., Ash, N., Mrema, E. (eds.) (2014): The Environmental Crime Crisis – Threats to Sustainable Development from Illegal Exploitation and Trade in Wildlife and Forest Resources. A UNEP Rapid Response Assessment. Nairobi and Arendal: United Nations Environment Programme and GRID-Arendal.
- 74 Nellemann, C. et al. (2018).
- 75 Spohr, D. M. (2016): Human Rights Risks in Mining: A Baseline Study. Bundesanstalt für Geowissenschaften und Rohstoffe.
- 76 Nellemann, C. et al. (2018).
- 77 Aldinger, P. et al. (2018).
- 78 Rüttinger, L. and L. Griestop (2017): Ansätze zur Reduzierung von Umweltbelastung und negativen sozialen Auswirkungen bei der Gewinnung von Metallrohstoffen (UmSoRes): Vergleichende Analyse von 13 Länder-Rohstoff-Fallstudien. Umweltforschungsplan des Bundesministeriums für Umwelt, Naturschutz, Bau und Reaktorsicherheit Forschungskennzahl 3712 94 315 UBA-FB 002459.
- 79 UNEP (2009): From Conflict to Peacebuilding: The Role of Natural Resources and the Environment. Nairobi: United Nations Environment Programme.
- 80 UNEP (2010): Sierra Leone: Environment, Conflict and Peacebuilding Assessment. Nairobi: United Nations Environment Programme.

- 81 UNIPSIL (2003): Sierra Leone Vision 2025: "Sweet-Salome." National Long Term Perspective Studies, Strategies for National Transformation. Retrieved 03.08.2021, from https://unipsil.unmissions.org/sites/default/files/vision_2025.pdf
- 82 UNEP (2009).
- 83 Rettberg, A. and J. F. Ortiz-Riomalo (2014): Golden Conflict: Exploring the Relationship Between Gold Mining, Armed Conflict, and Criminality in Colombia. Social Science Research Network.
- 84 FIP and adelphi (2021): A DANGEROUS CLIMATE: Deforestation, climate change and violence against environmental defenders in the Colombian Amazon. Berlin: WWF Germany.
- 85 UNODC and Gobierno de Colombia (2016): Colombia Explotación de oro de aluvión: Evidencias a partir de percepción remota. Retrieved 11.06.2020, from <http://www.odc.gov.co/Portals/1/publicaciones/pdf/oferta/estudios/OF5022016-colombia-explotacion-oro-aluvion-evidencias.pdf>
- 86 GAIN (2016): Organized Crime and Illegally Mined Gold in Latin America. Geneva: The Global Initiative Against Transnational Organized Crime. Retrieved 11.06.2020, from <https://globalinitiative.net/wp-content/uploads/2016/03/Organized-Crime-and-Illegally-Mined-Gold-in-Latin-America.pdf>
- 87 UNODC and Minergía (2021): Colombia Explotación de oro de aluvión: Evidencias a partir de percepción remota 2020. Retrieved 04.08.2021, from https://www.unodc.org/documents/colombia/2021/Julio/EVOA_2020_Web.pdf
- 88 International Crisis Group (2019): Getting a Grip on Central Sahel's Gold Rush. Brussels: International Crisis Group, 26 pages.
- 89 Munshi, N. (2021): Instability in the Sahel: how a jihadi gold rush is fuelling violence in Africa. In: Financial Times, 27.06.2021.
- 90 International Crisis Group (2019).
- 91 Bohbot, J. (2017): L'orpaillage au Burkina Faso: une aubaine économique pour les populations, aux conséquences sociales et environnementales mal maîtrisées. In: EchoGéo, (42).
- 92 Spohr (2016).
- 93 United Nations Interagency Framework Team for Preventive Action (2012): Toolkit and Guidance for Preventing and Managing Land and Natural Resources Conflict: Extractive Industries and Conflict. UN Department of Political Affairs.
- 94 United Nations Interagency Framework Team for Preventive Action (2012).
- 95 Allen, M. G. (2020): A brutal war and rivers poisoned with every rainfall: how one mine destroyed an island. In: The Conversation, 30.09.2020.
- 96 Allen (2020).
- 97 Nellemann, C. et al. (2018).
- 98 Aldinger et al. (2018).
- 99 Babatunde, A. O. (2020): How oil and water create a complex conflict in the Niger Delta. In: The Conversation, 21.04.2020.
- 100 Omeje, K. (2006): Oil Conflict and Accumulation Politics in Nigeria. In: Environmental Change and Security Program Report Issue 12. Washington DC: Wilson Center, pp. 44-49.
- 101 Reuters (2021): Nigeria's 'Delta Avengers' threaten oil installation attacks. Retrieved 17.08.2021, from <https://www.reuters.com/business/energy/nigerias-delta-avengers-threaten-oil-installation-attacks-2021-06-26/>
- 102 Nellemann, C. et al. (2018).
- 103 TRACIT (2019): Mapping the Impact of Illicit Trade on the UN Sustainable Development Goals. New York: Transnational Alliance to Combat Illicit Trade, 16 pages.
- 104 Nellemann, C. et al. (2018).
- 105 Berbotto, A. A. and S. Chainey (2021): Theft of oil from pipelines: an examination of its crime commission in Mexico using crime script analysis. In: Global Crime, pp. 1-23.
- 106 TRAFFIC (n.d. a): Legal wildlife trade: Action to enhance benefits from sustainable, legal wildlife trade. Cambridge: TRAFFIC: The Wildlife Trade Monitoring Network. Retrieved 29.07.2021, from <https://www.traffic.org/about-us/legal-wildlife-trade/>
- 107 TRAFFIC (n.d. b): Illegal wildlife trade: Enhancing responses to wildlife crime and illegal trade. Cambridge: TRAFFIC: The Wildlife Trade Monitoring Network. Retrieved 29.07.2021, from <https://www.traffic.org/about-us/illegal-wildlife-trade/>
- 108 Wyatt, T. (2015): Mapping the Links between Conflict and Illegal Logging. In: Brisman, A., South, N. and R. White (Eds): Environmental Crime and Social Conflict Contemporary and Emerging Issues. Ashgate Publishing Limited: Farnham/Burlington, pp. 41-56.
- 109 TRAFFIC (n.d. b).
- 110 IUCN (2021): Conflict and Conservation: Nature in a Globalised World. Gland: International Union for Conservation of Nature and Natural Resources, Report No.1.
- 111 Aldinger, P. et al. (2018).
- 112 UNODC (2020).
- 113 UNODC (2020).
- 114 Peters, A. (2014): Novel practice of the Security Council: Wildlife poaching and trafficking as a threat to the peace. In: EJIL:Talk! (Blog of the European Journal of International Law).
- 115 Connelly, B. and H. Peyronnin (2021): Taking Off: Wildlife Trafficking in the Latin America and Caribbean Region. Reducing Opportunities for Unlawful Transport of Endangered Species (ROUTES).
- 116 Douglas, L. R. and K. Alie (2014): High-value natural resources: Linking wildlife conservation to international conflict, insecurity, and development concerns. In: Biological Conservation, 171, pp. 270-277.
- 117 Nagarajan, C. (2020): Climate-Fragility Risk Brief: Mali. Berlin: Climate Security Expert Network.
- 118 Jonsson, M.; E. Brennan and C. O'Hara (2016): Financing War or Facilitating Peace? The Impact of Rebel Drug Trafficking on Peace Negotiations in Colombia and Myanmar. In: Studies in Conflict & Terrorism, 39(6), pp. 542-559.
- 119 Nellemann, C. et al. (2018).
- 120 International Crisis Group (2019): Fire and Ice: Conflict and Drugs in Myanmar's Shan State. Brussels: International Crisis Group, Report No. 299.
- 121 Erasso, C. and M. A. Vélez (2020): ¿Los cultivos de coca causan deforestación en Colombia? Área del CESED: Desarrollo Rural, Economías Ilícitas y Medio Ambiente. Colombia: Universidad de los Andes, Facultad de Economía, Documento Temático 5.
- 122 UNODC (2021): Colombia Coca Cultivation Survey 2020. Illicit Crop Monitoring, United Nations Office on Drugs and Crime.
- 123 FIP and adelphi (2021): A DANGEROUS CLIMATE: Deforestation, climate change and violence against environmental defenders in the Colombian Amazon. WWF Germany: Berlin.
- 124 Price, S.; D. Donovan and W. D. Jong (2007): Confronting Conflict Timber. In: Jong, W.D.; Donovan D., Abe K. (eds.) Extreme Conflict and Tropical Forests. WORLD FORESTS, vol 5. Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-5462-4_7
- 125 Aldinger, P. et al. (2018).
- 126 Aung, T. S. (2021): What Myanmar's coup could mean for its environment and natural resources. Conflict and Environment

- Observatory. Retrieved 29.07.2021, from <https://ceobs.org/what-myanmars-coup-could-mean-for-its-environment-and-natural-resources/>
- 127 EIA (2021): Myanmar's tainted timber and military coup. UK: Environmental Investigation Agency. Retrieved 29.07.2021, from <https://eia-international.org/forests/myanmars-tainted-timber-and-the-military-coup/>
- 128 Forest Trends (2021): Illegal logging and associated trade in Myanmar: Impacts of Government measures to address illegal logging. Forest Policy Trade and Finance Initiative. Retrieved 29.07.2021, from <https://www.forest-trends.org/wp-content/uploads/2021/01/ILLAT-Myanmar-Report-Jan-2021.pdf>
- 129 Taylor, M. (2021): Military coup, economic sanctions hike threats to Myanmar's forests. In: Thomson Reuters Foundation, 22.02.2021. Retrieved 29.07.2021, from <https://news.trust.org/item/20210222101436-hopx1/>
- 130 Wagner, L.; D. Siller and R. Landa (2020): People and Forests at Risk: Organized crime, trafficking in persons and deforestation in Chihuahua, Mexico. Geneva: Global Initiative Against Transnational Organized Crime.
- 131 Nagarajan, C. (2020).
- 132 Global Witness (2021): Last Line of Defence: The industries causing the climate crisis and attacks against land and environmental defenders. London: Global Witness. Retrieved 29.07.2021, from <https://www.globalwitness.org/en/campaigns/environmental-activists/last-line-defence/>
- 133 Business and Human Rights Resource Centre (2021): Human Rights Defenders & Civic Freedoms Programme. London: Business and Human Rights Resource Centre. Retrieved 29.07.2021, from <https://www.business-humanrights.org/en/from-us/human-rights-defenders-database>
- 134 IPBES (2019).
- 135 UNCCD (2017): Biodiversity and Soil. In: Global Land Outlook, pp. 191-192. Bonn: UNCCD.
- 136 Verchot, L. (2015): The science is clear: Forest loss behind Brazil's drought. In: Forest News, 29.01.2015. Retrieved 18.08.2021, from <https://forestsnews.cifor.org/26559/the-science-is-clear-forest-loss-behind-brazils-drought?fnl=en>
- 137 Tabari, H. (2020): Climate change impact on flood and extreme precipitation increases with water availability. In: Scientific Reports, 10:13768, pp.1-10.
- 138 Descroix, L.; F. Guichard, M. Grippa, L. A. Lambert, G. Panthou, G. Mahé, L. Gal, C. Dardel, G. Quantin, L. Kergoat, Y. Bouaïta, P. Hiernaux, T. Vischel, T. Pellarin and F. Bakary (2018): Evolution of Surface Hydrology in the Sahelo-Sudanian Strip: An Updated Review. In: Water, 10(6):748, pp.1-37.
- 139 IPCC (2019): Desertification. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. Retrieved 06.07.2021, from <https://www.ipcc.ch/srecl/chapter/chapter-3/>
- 140 United Nations Office for the Coordination of Humanitarian Affairs (2016): The Sahel: Converging challenges, compounding risks – A region under high pressure. Relief Web, pp. 2-3.
- 141 Nelson, J. (2004): A survey of indigenous land tenure in sub-Saharan Africa. In: Land Reform, Land Settlement and Cooperatives, pp. 64-65. Retrieved 30.06.2021.
- 142 Krätli, S. and C. Toulmin (2020): Farmer-herder conflict in sub-Saharan Africa? London: International Institute for Environment and Development, pp. 57, 66.
- 143 adelphi (n.d.): Case Study: Pastoralist and Farmer-Herder Conflicts in the Sahel. Berlin: adelphi Research. Retrieved 30.06.2021, from <https://climate-diplomacy.org/case-studies/pastoralist-and-farmer-herder-conflicts-sahel>
- 144 Eberle, U. (2020): The Climate Factor in Nigeria's Farmer-Herder Violence. Brussels: International Crisis Group. Retrieved 02.07.2021, from <https://nigeriaclimate.crisisgroup.org/>
- 145 adelphi (n.d.): Case Study: Conflict between Dinka and Nuer in South Sudan. Berlin: adelphi Research. Retrieved 30.06.2021, from <https://climate-diplomacy.org/case-studies/conflict-between-dinka-and-nuer-south-sudan>
- 146 adelphi (n.d.): Case Study: Conflict Between Tuareg and Farming Communities in Mali. Berlin: adelphi Research. Retrieved 06.07.2021, from <https://climate-diplomacy.org/case-studies/conflict-between-tuareg-and-farming-communities-mali>
- 147 The World Bank (n.d.): Agriculture, forestry, and fishing, value added (% of GDP) [Infographic]. Retrieved 05.08.2021, from https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?most_recent_value_desc=true
- 148 De Sy, V.; M. Herold, F. Achard, R. Beuchle, J. G. P. W. Clevers, E. Lindquist and L. Verchot (2015): Land use patterns and related carbon losses following deforestation in South America. In: Environmental Resource Letters, 10:124004, p. 7.
- 149 WWF (2020).
- 150 Runk, J. V. (2012): Indigenous Land and Environmental Conflicts in Panama: Neoliberal Multiculturalism, Changing Legislation, and Human Rights. In: Journal of Latin American Geography, 11(2), pp. 21-47.
- 151 ASOMASHK (2019): The Yarinacocha Declaration. Retrieved 29.07.2021, from <https://www.forestpeoples.org/sites/default/files/documents/The%20Yarinacocha%20Declaration%202019%20Eng%20FV%5B1%5D.pdf>
- 152 Bartelt, D. D. (2017): INTERVIEW: Resource extraction and violent conflicts in Latin America - a shared responsibility. Retrieved 30.06.2021, from <https://climate-diplomacy.org/magazine/conflict/interview-resource-extraction-and-violent-conflicts-latin-america-shared>.
- 153 Defensoría del Pueblo 2020 and OHCHR (2018): Report of the Working Group on the issue of human rights and transnational corporations and other business enterprises on its mission to Peru. Human Rights Council, Thirty-eighth session, 18 June-6 July 2018, Agenda item 3, Promotion and protection of all human rights, civil, political, economic, social and cultural rights, including the right to development. Retrieved 19.06.2020, from <https://www.ohchr.org/Documents/Issues/Business/A.HRC.38.48.Add.2.pdf>
- 154 DuPée, M. (2019): Peru's Militarized Response to Illegal Mining Isn't Enough to Protect the Amazon. In: World Politics Review. Retrieved 19.06.2020 from <https://www.worldpoliticsreview.com/articles/27679/peru-s-militarized-response-to-illegal-mining-isn-t-enough-to-protect-the-amazon>
- 155 adelphi (2019): Climate change and peacebuilding in Colombia. Retrieved 05.07.2021, from <https://youtu.be/NJweR5Euz8o>
- 156 Human Rights Watch (2020): Colombia: Events of 2019. In: Word Report 2020. New York: Human Rights Watch, pp. 143-150.
- 157 Lema, S. and J. Kleffmann (2019): Linking climate change and peacebuilding in Colombia through land access. Retrieved 05.07.2021, from <https://climate-diplomacy.org/magazine/conflict/linking-climate-change-and-peacebuilding-colombia-through-land-access>
- 158 Ritchie, H. and M. Roser (2020): What share of primary energy comes from fossil fuels? Published online at OurWorldInData.org. Retrieved 24.03.2022, from <https://ourworldindata.org/energy>.
- 159 Al Jazeera Staff (2022): Infographic: How much of your country's oil comes from Russia? In: Al Jazeera, 10 March 2022. <https://www.aljazeera.com/news/2022/3/10/infographic-how-much-of-your-countrys-oil-comes-from-russia-interactive>
- 160 Ivleva, D. and D. Tänzler (2019): Geopolitics of Decarbonisation:

- Towards an Analytical Framework. Berlin: adelphi Research. Retrieved 24.03.2022, from https://climate-diplomacy.org/sites/default/files/2020-10/Geopolitics-of-decarbonisation_Towards-an-analytical-framework.pdf.
- 161 Ulfelder, J. (2007): Natural-Resource Wealth and the Survival of Autocracy. In: *Comparative Political Studies*, 40(8), 995–1018.
- 162 Frantz, E.; B. Geddes and J. Wright (2014): How oil helps dictatorships survive. In: *Washington Post*. Retrieved 24.03.2022, from <https://www.washingtonpost.com/news/monkey-cage/wp/2014/06/17/how-oil-helps-dictatorships-survive/>.
- 163 European Commission (2022): REPowerEU: Joint European Action for more affordable, secure and sustainable energy. Strasbourg, 8 March 2022. Retrieved 22.03.2022, from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A108%3AFIN>
- 164 Wood Mackenzie (2021): Action to achieve Paris climate goals will upend oil and gas prices. News release, 15.04.2021. Retrieved from <https://www.woodmac.com/press-releases/action-to-achieve-paris-climate-goals-will-upend-oil-and-gas-prices/>.
- 165 Schlösser, T.; K. R. Schultze, D. Ivleva, S. Wolters, C. Scholl (2017): From Riches to Rags? Stranded Assets and the Governance Implications for the Fossil Fuel Sector. Berlin: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
- 166 Schlösser, T. et al. (2017).
- 167 Nile Basin Initiative (2020): State of the Nile Basin Report Synthesis. Entebbe: Nile Basin Initiative Secretariat. Retrieved 19.08.2021, from <https://www.adelphi.de/de/system/files/mediathek/bilder/State-of-the-River-Nile-Basin%20synthesis.pdf>
- 168 Espagne, É.; T. P. L. Huynh, A. Drogoul and S. Lagrée (2021): Inequalities and environmental damage: the case of the Mekong River Basin. In: *Ideas for Development*, 24.06.2021. Retrieved 19.08.2021, from <https://ideas4development.org/en/basin-mekong-inequalities-environment/>
- 169 Blumstein, S. (2017): *Integrating Water and Climate Diplomacy in the Mekong River Basin*. Berlin: adelphi Research.
- 170 EIU (2020): *The Blue Peace Index 2020*. The Economist Intelligence Unit Limited, pp. 8-9.
- 171 Pohl, B.; A. Carius, K. Conca, G. D. Dabelko, A. Kramer, D. Michel, S. Schmeier, A. Swain and A. Wolf (2014): *The Rise of Hydro-Diplomacy: Strengthening foreign policy for transboundary waters*. Berlin: adelphi Research, 47 pages.
- 172 adelphi (n.d.): *Case Study: Dam projects and disputes in the Mekong River Basin*. Berlin: adelphi Research. Retrieved 29.06.2021, from <https://climate-diplomacy.org/case-studies/dam-projects-and-disputes-mekong-river-basin>
- 173 adelphi (n.d.): *Case Study: Dispute over Water in the Nile Basin*. Berlin: adelphi Research. Retrieved 07.07.2021, from <https://climate-diplomacy.org/case-studies/dispute-over-water-nile-basin>
- 174 Pohl, B.; S. Blumstein and S. Schmeier (2021): *Strengthening Water Diplomacy*. In: *Environmental Affairs*. London: Policy Exchange.
- 175 Pohl, B.; A. Kramer, W. Hull, S. Blumstein, I. Abdullaev, J. Kazbekov, T. Reznikova, E. Strikeleva, E. Interwies and S. Görlitz (2017): *Rethinking water in Central Asia: The costs of inaction and benefits of water cooperation*. Berlin: adelphi and CAREC, p. 7.
- 176 adelphi (n.d.): *Case Study: Conflict Over Water in the Aral Sea*. Berlin: adelphi Research. Retrieved 28.06.2021, from <https://climate-diplomacy.org/case-studies/conflict-over-water-aral-sea>
- 177 BBC News (2021): *Deadly fighting on Kyrgyzstan-Tajikistan border kills at least 31*. London: BBC News, 30.04.2021. Retrieved 28.06.2021, from <https://www.bbc.com/news/world-asia-56940011>
- 178 Detges, A. et al. (2020).
- 179 National Intelligence Council (2012): *Global Water Security Intelligence Community Assessment*. ICA 2012-08. Retrieved 09.08.2021, from https://www.dni.gov/files/documents/Special%20Report_ICA%20Global%20Water%20Security.pdf, p. ii-iii
- 180 UNWC (n.d.): *The Convention*. UN Watercourses Convention. Retrieved 14.09.2021, from <https://www.unwatercoursesconvention.org/the-convention/>
- 181 Devlin, C.; S. M. Glaser, C. Villegas and N. Poinatte (2020): *Rough Seas: The causes and consequences of fisheries conflict in Somali waters*. Broomfield: One Earth Future, p. vii.
- 182 Pasisi, C. (2019): *Climate-Fragility Risk Brief: The Pacific Islands Region*. Berlin: Climate Security Expert Network, adelphi Research, pp. 11-12.
- 183 Stahn, C.; J. Iverson and J. S. Easterday (2017): *Environmental Protection and Transitions from Conflict to Peace: Clarifying Norms, Principles, and Practices* (p. 512). Oxford University Press.
- 184 Darbyshire, E. (2021): *Report: Investigating the environmental dimensions of the 2020 Nagorno-Karabakh conflict*. Conflict and Environment Observatory. Retrieved 05.07.2021, from <https://ceobs.org/investigating-the-environmental-dimensions-of-the-nagorno-karabakh-conflict/>
- 185 Weir, D. and E. Darbyshire (2022): *Environmental trends in the Ukraine conflict, 10 days in*. In: *Conflict and Environment Observatory*, 05.03.2022. Retrieved 23.03.2022, from <https://ceobs.org/environmental-trends-in-the-ukraine-conflict-10-days-in/>.
- 186 Bromberg, G.; N. Majdalani and Y. A. Taleb (2020): *A Green Blue Deal for the Middle East*. Tel Aviv: EcoPeace Middle East, p. 11.
- 187 Arias, Á. M. A.; D. Averin, C. Bruch, N. Denisov, K. Harrison, M. Londoño, O. Lystopad, F. Münger, I. Nikolaieva, R. Pearshouse, L. Salamé, Y. Shi, M. Tignino, E. Darbyshire, J. Willemin and W. Zwijnenburg (2020): *Witnessing the Environmental Impacts of War: Environmental case studies from conflict zones around the world*. PAX for Peace, pp. 22-24.
- 188 Barker, A. J.; J. L. Clausen, T. A. Douglas, A. J. Bednar, C. S. Griggs and W. A. Martin (2021): *Environmental impact of metals resulting from military training activities: A review*. *Chemosphere*, 265, 129110.
- 189 Petre, R.; T. Rotariu, T. Zecheru, N. Petrea and S. Băjenaru (2016): *Environmental Long Term Impact on a Romanian Military Testing Range*. *Central European Journal of Energetic Materials*, 13, 3–19.
- 190 Okinawa Municipality (2022): *Environmental Issues of Military Bases*. In *Current Environmental Conditions and Issues*. Retrieved 24.03.2022 from <https://www.pref.okinawa.jp/site/kankyoseisaku/kikaku/documents/2-4.pdf>.
- 191 European Commission (n.d.): *Environment challenges*. Retrieved 24.03.2022, from https://ec.europa.eu/clima/eu-action/adaptation-climate-change/how-will-we-be-affected/environment-challenges_en.
- 192 Crawford, N. C. (2019): *Pentagon fuel use, climate change, and the costs of war*. Watson Institute, Brown University.
- 193 Belcher, O.; P. Bigger, B. Neimark and C. Kennelly (2019): *Hidden carbon costs of the “everywhere war”: Logistics, geopolitical ecology, and the carbon boot-print of the US military*. *Transactions of the Institute of British Geographers*, 45(1), 65-80.

- 194 Cottrell, L. and E. Darbyshire (2021): The military's contribution to climate change. In: Conflict and Environment Observatory, 16.06.2021. Retrieved 24.03.2022, from <https://ceobs.org/the-militarys-contribution-to-climate-change/>.
- 195 Parkinson, S. (2019): The Carbon Boot-print of the Military. In: Responsible Sci, 2, 18. Retrieved 25.03.2022, from <https://www.sgr.org.uk/sites/default/files/2020-08/SGR-RS02-Military-carbon-boot-print.pdf>.
- 196 Weir, D. and E. Darbyshire (2021): Report: Protected area conservation in Yemen's conflict. In: Conflict and Environment Observatory. Retrieved 24.03.2022, from <https://ceobs.org/protected-area-conservation-in-yemens-conflict/>.
- 197 Pacific Institute (2022): Water Conflict Chronology. Retrieved 25.03.2022, from <https://www.worldwater.org/conflict/map/>.
- 198 Schoonover, R.; C. Cavallo and I. Caltabiano (2021): The security threat that binds us: The unravelling of ecological and natural security and what the United States can do about it. Washington, DC: The Converging Risks Lab, Council of Strategic Risks. Retrieved 18.08.2021, from https://councilonstrategicrisks.org/wp-content/uploads/2021/01/The-Security-Threat-That-Binds-Us_2021_2-1.pdf
- 199 Khan, A. (2005): USAID helps restore Iraqi marshlands destroyed by Saddam Hussein. United States Department of State, 05.05.2005. Retrieved 28.03.2022, from <https://reliefweb.int/report/iraq/usaid-helps-restore-iraqi-marshlands-destroyed-saddam-hussein>.
- 200 Human Rights Watch (2003): The Iraqi Government Assault on the Marsh Arabs. Washington, DC: Human Rights Watch. Retrieved 28.03.2022, from <https://www.hrw.org/legacy/backgrounder/mena/marsharabs1.htm>.
- 201 Kleffmann, J. (2019): Holding criminal spoilers at bay for environment and peace in Colombia. Berlin: adelphi Research. Retrieved 24.03.2022, from <https://climate-diplomacy.org/magazine/environment/holding-criminal-spoilers-bay-environment-and-peace-colombia>.
- 202 FIP and adelphi (2021).
- 203 HRW (2022): Somalia: Events of 2021. In: World Report 2022: Events of 2021. New York: Human Rights Watch.
- 204 UNCTAD (2022): The impact on trade and development of the war in Ukraine. Geneva: United Nations Conference on Trade and Development.
- 205 Murphy, V. and H. O. Gieseken (2021): Fighting without a Planet B; how IHL protects the natural environment in armed conflict. In: ICRC Humanitarian Law & Policy Blog. Retrieved 28.03.2022, from <https://reliefweb.int/report/world/icrc-humanitarian-law-policy-blog-fighting-without-planet-b-how-ihl-protects-natural>.
- 206 Murphy, V.; H. O. Gieseken and L. Gisel (2020): Guidelines on protection of natural environment in armed conflict. Geneva: International Committee of the Red Cross, pp. 7-12.

Footnote References

References for footnotes are listed below. The letters refer to the respective footnotes.

- b Roser, M.; J. Hasell; B. Herre; B. Macdonald (2016) - War and Peace. In OurWorldInData.org. Retrieved 28.04.2022, from: <https://ourworldindata.org/war-and-peace>
- e Katz, S. L.; J. C. Padowski, M. Goldsby, M. P. Brady and S. E. Hampton (2020): Defining the Nature of the Nexus: Specialization, Connectedness, Scarcity, and Scale in Food–Energy–Water Management. In: Water, 12(4), 972, pp.1-21.
- f Supreme Court of India (2018): In the Supreme Court of India: Civil appellate jurisdiction, civil appeal no. 2453 of 2007. New Delhi, par. 363.
Ghosh, N.; J. Bandyopadhyay and J. Thakur (2018): Conflict over Cauvery Waters: Imperatives for Innovative Policy Options. New Delhi: Observer Research Foundation, 54 pages.
- h Nett, K. and L. Rüttinger (2016): Insurgency, Terrorism and Organised Crime in a Warming Climate - Report and Summary. Berlin: adelphi Research.
- l Nellemann, C.; R. Henriksen, A. Kreilhuber, D. Stewart, M. Kotsovou, P. Raxter, E. Mrema, and S. Barrat (2016): The Rise of Environmental Crime: A Growing Threat to Natural Resources, Peace, Development and Security. RHIPTO.
OECD (2002): Measuring the Non-Observed Economy: A Handbook. Paris.
- p IUCN (2021): Conflict and Conservation: Nature in a Globalised World. Gland, Switzerland: International Union for Conservation of Nature and Natural Resources, Report No.1.
- q Dejusticia, January 19, 2022. Retrieved 4.5.2022, from <https://www.dejusticia.org/corte-constitucional-le-dijo-no-al-tramite-con-el-que-el-gobierno-reanudaria-las-fumigaciones-con-glifosato/>

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