

ADDRESSING CONFLICT-SUSTAINABILITY NEXUS IN AFRICA: THE ROLE OF ENVIRONMENTAL INTELLIGENCE FOR SUSTAINABILITY FRAMEWORK

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ABSTRACT:

Africa is currently faced with complex conflict situations and confronted with difficult choices to rebuild economies based on business-as-usual development models or choose to develop more sustainably. Addressing security-sustainability challenges in Africa therefore calls for innovative ways to avoid that armed conflicts and insecurity set back efforts towards achieving sustainable development in Africa by 2030. The paper introduces the concept of Environmental Intelligence for Sustainability (EIS) as an analytical tool to assess security-sustainability risks in Africa. It shows how the EIS framework helps analyze the implications of armed conflicts on achieving sustainability through a pragmatic instrument for African policy makers, development practitioners, businesses, and regional/international organizations to better integrate conflict risks into their sustainability planning processes. The article highlights the need for a more holistic, systematic, and coordinated Africa-wide Environmental Intelligence for Sustainability as a core element for building peace and stability while achieving sustainability by 2030.

Keywords: Africa - Armed conflicts – Sustainability - Environmental damages - Sustainable development - Environmental Intelligence - Environmental stability.

¹ Disclaimer: “The views expressed herein are those of the author and do not necessarily reflect those of the African Development Bank Group”.

INTRODUCTION

Armed conflicts cause considerable human and economic impacts, resulting in economic decline, social dislocation (Couteau-Bégaire, 2017). In addition to causing humanitarian disasters, they are a source of significant environmental damages to critical infrastructure and vital natural resources, some of which are irreversible or persist a long time after the end of the war (Dorsouma et Bouchard, 2006; Busset 2009; Dorsouma 2022; Dorsouma, 2023), compromising potential recovery and reconstruction at the end of wars (Dorsouma and Bouchard, 2006; Dorsouma, 2022). Dorsouma and Bouchard (2006) grouped the environmental, social, and economic consequences of armed conflicts into pre-conflict impacts, direct and indirect impacts during the kinetics of armed conflicts (syn-conflict) and post-conflict impacts. Post conflict and syn-conflict impacts on sustainability are relatively straightforward and have been discussed in numerous studies (Dorsouma and Bouchard 2006, Reuveny et al., 2010, UNEP series of desk studies on post-conflict environmental assessments). Syn-conflict impacts lead to direct damages to infrastructure, economic decline and ecological losses, generally compromising post conflict development thereby posing a particular challenge for long term sustainability (Maertens, 2016; Pathak, 2020; Dorsouma, 2023). More specifically, terrestrial military attacks, aerial strikes, and troop movements can be highly damaging to the environment, including harmful air emissions, as well as direct and indirect environmental impacts. For instance, any attack in the Chernobyl nuclear plant in Ukraine will lead to increased levels of radiation, with direct damages and unknown long-term consequences on the human health and the environment, thereby putting global sustainability at risk.

This paper focusses on Africa and introduces the notion of Environmental Intelligence for Sustainability as a tool to manage conflict risks and possibly incorporate them within the sustainability agenda. It further highlights the implications arising from the complex relationship between armed conflicts and sustainability in Africa. It represents a paradigm shift from the traditional reactive conflict resolution approach to a more preventive and proactive approach for achieving sustainability, while opening up new research perspectives on effective action-oriented analytical approaches towards sustainability. The paper presents an analytical and conceptual framework to better apprehend and understand the nexus between conflict and sustainability in Africa through presenting examples of national and regional conflict situations where Environmental Intelligence could serve to propose sustainable solutions. The EIS framework is intended to be a pragmatic tool to African policy makers, development practitioners, businesses, and regional/international organizations to better consider sustainability, recognizing that the security-sustainability nexus often transcends national boundaries and requires a regional cooperation approach given the interdependence between countries in the African continent. The EIS framework presented in this article therefore constitutes an optimistic pathway for proactive and collaborative strategies to create a more sustainable future for Africa.

Following this introduction, the article is structured around a few sections. After presenting the methodological approach, it provides a general overview of environmental damages caused by armed conflicts globally, followed by a detailed analysis of the nexus between conflicts and sustainability in Africa. The paper then introduces the concept of Environmental Intelligence for Sustainability (EIS), and highlights case studies for applying it in Cote d'Ivoire, West Africa, while outlining an Africa-wide regional approach for EIS application. Before it concludes, the paper analyses some key aspects on institutionalizing the EIS framework in Africa as well as presenting a range of implementation barriers.

THEORETICAL AND METHODOLOGICAL APPROACH

The article is based on the theory of integrated management initiated long time ago by Gilford Pinchot (1865-1946)², and later labeled as “ecological modernization” (Jaenick, 1993) and “eco-efficiency” concept (Alier, 2014). This theory reconciles two schools of thought which appeared on sustainability which are the weak sustainability or “reformist” current which argues for substituting natural capital by technical progress to achieve sustainability; and the strong sustainability or “radical” current which rejects the substitution of natural capital thereby postulating that a weak transition is not sufficient for achieving sustainability (Jacquemot, 2015). The methodological approach used for this research is anchored in the existing knowledge and research in both environmental science and business science. It combines the integrated resource management approach with the prospective approach popularized by Gaston Berger (1957) as a dialectic method to analyze the issues of the present to anticipate and master the future. The paper primarily relied on the research-intervention method to describe and analyze in a more systematic way the correlation between armed conflict and sustainable development, including key strategic stakes and sustainability risks. It is also based on a robust literature review on conflicts and sustainable development globally and in Africa, and on a case study on Cote d’Ivoire, with conclusions extended to West Africa. The case study method (Leplat, 2002; Hlady-Rispal, 2015; Gagnon, 2012) was used with the view of analyzing the specific situation of a country like Cote d’Ivoire affected by an armed conflict from 2002 to 2011 which significantly affected the country’s sustainable development foundations. The research was carried out through two core focal groups with sustainability experts and planners which resulted in the development of the design of EIS tri-dimensional framework comprising a preventive, a proactive and a reactive dimension. The case study was conducted through the grounded theory method (Glaser et Strauss; 1967; Strauss et Corbin; 1994; Strauss et Corbin, 1998; Fendt, 2008; Khan, 2014; Charmaz, 2000, Fendt, 2008) based on the perceptions and realities of the key stakeholders involved in the research. The case study and grounded theory methods were complemented by an online survey with about 80 participants to collect additional data. The foresight method was further explored to analyze the key issues arising from focus groups and the survey, leading to the design of a series of strategic scenarios on the nexus between conflicts and sustainability in Cote d’Ivoire by 2030. The qualitative and quantitative data collected by the research were analyzed and codified through Sphinx Software, and other exploratory techniques such as the theoretical coding system to help automatically regroup the verbatims into specific and thematic concepts and labels, resulting in conceptualizing the EIS based on emerging theories grouped into key classes and categories. The theoretical and methodological framework of this research is further summarized below:

² Known as the founder of the American Society of Foresters and father of the sustainable resource management concept.

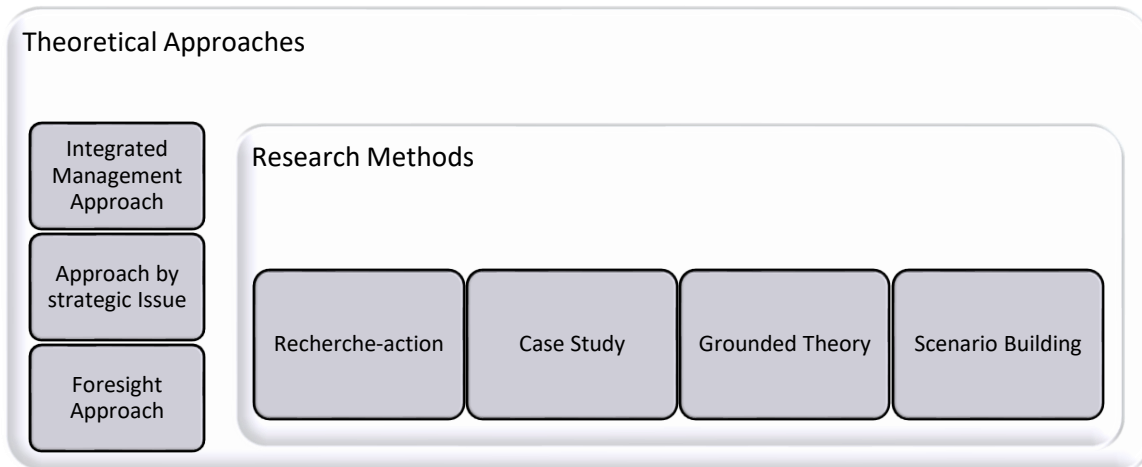


Figure 1: Research Methodology

ENVIRONMENTAL DAMAGES CAUSED BY ARMED CONFLICTS: A GENERAL OVERVIEW

In general, when they occur, armed conflicts have significant socioeconomic, environmental impacts, including direct and indirect impacts such as damages to infrastructure, including water, transport energy, and food systems (Sowers and Weinthal, 2021). The most emblematic environmental damages caused by armed conflicts were undoubtedly those triggered by the bombing of the Red River dikes by the US Army during the Vietnam War in the 70s, which caused major flooding on the Mekong plains and led to the starving of Vietnamese populations (Lacoste, 2011; Lacoste, 2014). Major air pollution impacts were also caused by the firing of Kuwaiti oil wells by the Iraqi army in 1992 and damages to agriculture following the destruction of dams in Croatia the same year during the Kosovo conflict (Mourier, 2010; Salbou and al, 2003; Pravdić, 1997). More recently, damages on water pumping stations in Aleppo in Syria and at the Great River in Libya, did put at risk water supply for a number of people (Zucchetti, 2011), compromising possible re-development of irrigated agriculture. Prolonged health and environmental concerns may be tied to land contamination, as was shown by the persistent use of depleted uranium in the former Yugoslav Republic of Macedonia and Kosovo which caused significant impacts on soils and agricultural productivity (Haavisto, 2003; Burger, 2013). Vast areas of potential agricultural, pastoral or tourism development in Lebanon are still barren from being productive due to large unmapped mine fields or unexploded cluster bombs. Century-old Cedar forests in norther Lebanon are still being inaccessible due to leftover mines as a result of a succession of civil wars, conflicts with the Syrian Army or from Israel occupation (Makdisi, 2012; Nagel & Staeheli, 2016).

Pathak (2020) and Borucke et al. (2013) used the notion of changes in ecological biocapacity and its components—cropland, grazing land, fishing grounds, forest, and built-up land—as a metric of the relative magnitude of conflict-related damages in various countries with differing economic and social contexts.

In Africa, Brito et al (2018) confirmed that the ongoing conflicts in the Sahel and Sahara region alone account for nearly 50% of African conflicts and 20% of global conflicts, and that they are the major cause of the wildlife decline in the region, with 12 species of vertebrates which disappeared or endangered due to conflicts. Vadrot (2005) further reported a wide range of

environmental damages caused by armed conflicts, including large-scale massacres and illicit trafficking of wildlife and endangered species, overexploitation of forests, degradation of protected areas, dumping of hazardous military waste, destruction of agricultural land, water poisoning, among others. Khazri (2011) and Dorsouma (2022) noted that the destruction of infrastructure, soil contamination, disruption of agricultural cycles and overall depletion of critical natural resources, pose a significant risk on achieving sustainable development.

As we write this paper, it is important to pay a particular attention to the ongoing conflict situations in the Middle East involving Israel and the Hamas group, which will probably lead to significant environmental damages as well as the direct and indirect impacts of the war in Ukraine which will also require a close monitoring from a sustainability standpoint.

NEXUS BETWEEN CONFLICT AND SUSTAINABILITY IN AFRICA

Despite being host of abundant world's natural resources, including 60% of the world's solar energy potential and 70% of cobalt (one of the critical minerals used in electric vehicle technology), Africa still remains extremely poor, with basic infrastructure undeveloped and natural resources (both renewables and non-renewables) illicitly lost and unsustainably managed. In this regard, the 2030 United Nations Sustainable Development Agenda adopted in 2015 with its 17 Sustainable Development Goals (SDGs) represented an important blueprint for promoting sustainability globally, and particularly in Africa. Since their adoption, the progress on achieving SDGs in Africa is still very limited, in the context of exacerbated development challenges and global environmental concerns, including extreme poverty, climate change, and complex global security issues, among others. While various plans, means of support and assistance to achieve these goals are being provided, generally little consideration is given to the severe impediments and major setbacks on achieving sustainability. More specifically, the sustainability risks and trends associated with armed conflicts are largely overlooked. As suggested by recent research findings, the escalation of armed conflicts at global scale and in Africa, put at risk economic growth and sustainable development, with significant social and environmental implications (AfDB, 2022; Behnassi & El Haiba, 2022; Chen, Chen, & Zhang, 2022; Diop & Asongu, 2022; Duho & al, 2022; LaFleur & al, 2022; Mhlanga & Ndhlovu, 2022; Quitzow, Renn & Zabanova, 2022; Zimba, Gasparyan & Ahmed, 2022).

In Africa, conflicts of different nature, including civil wars and cross-border terrorist attacks are currently affecting directly fifteen countries, combined with the repercussions of the ongoing war in Ukraine, resulting in shortages of food supply and undue rise in energy costs, food insecurity, fiscal and economic implications, resulting in shifting away from the sustainability agenda (Bonnemaison, 2012; Zimba, Gasparyan & Ahmed, 2022; Diop & Asongu, 2022; Mhlanga & Ndhlovu, 2022; Di Caracalla, 2022). Armed conflicts raise even more complex sustainability issues in Africa by aggravating the already existing development challenges facing the continent, including social inequality, regional disparities, dependence on global commodity prices, inequality of international trade, and poor governance. This has been recently compounded by the contracted economic growth due to COVID-19 pandemic, protracted conflicts and increased rate of terrorism in many African countries (Ide, 2021; Feindouno & Wagner, 2020; Dorsouma, 2023). Despite these challenges, it is worth stating that some African countries had made significant socioeconomic progress over the last decade in addressing poverty alleviation, improving water access, supporting infrastructure development and ensuring access to affordable energy, in line with the SDG agenda. This progress is

however hampered by the recent setback on the sustainability and is constantly at risk of armed conflicts. More concerning is the combined effect of the Covid 19 pandemic and the war in Ukraine, which have wiped out the little progress made by Africa, resulting in the deprioritisation of sustainability in the continent's development agenda and delaying efforts to achieve the SDGs by 2030 (Dorsouma, 2023; (Priyadarshini, 2022 ; Abdool Karim, Kelemu & Baxter, 2021 ; Angom, 2021 ; Arora et Mishra, 2020 ; Clemente-Suarez et al, 2022 ; Cawthorn, Kennaugh et Ferreira, 2021 ; Ekwebelem et al, 2021 ; Odey et al, 2021 ; Lafleur et al, 2022). Dorsouma (2023) argued that in Africa security is a global public good that cannot be dissociated from sustainability, as armed conflicts have had caused long-lasting and even irreparable damages on the economy, social cohesion and on the environment. This situation is being worsened by the war in Ukraine and its devastating global implications, including the rapid rise in prices, disruption in global value chains, inflation, and potential for new wars (Benton et al, 2022; Ben Hassen et El Bilali, 2022). This results in serious setbacks in achieving sustainability (Dulho et al, 2022; Ben Hassen and El Bilali, 2022; Mlanga & Ndlhlovu, 2022; Quitzow, Renn and Zabolova, 2022). In addition, a recent analysis by the Africa Center for Strategic Studies (2022) shows that armed conflicts continue to drive Africa's record levels of population displacement, with 36 million forcibly displaced people in 2022, representing 44% of the global total. This is a 12% increase compared to the past year and a triple of the same figure a decade earlier. It should also be noted that forced migration in Africa occurred largely in conflict-affected countries such as Ethiopia with 1.7 million people in 2022 out of the total 4.7 million Ethiopians forcibly displaced, South Sudan with 4.6 million persons (the highest proportion of any country in Africa). Other countries include the Democratic Republic of Congo (with 6.3 million forcibly displaced people) and Burkina Faso with half million people displaced in 2022 due to militant Islamic violence against civilians. Furthermore, it is worth mentioning that Africa is currently the youngest and fast-growing continent (hosting 1/3 of the world's youth aged 15 to 24 years), and it is set to represent a quarter of the planet's population in 2050 compared to 8% in 1950. This so-called "youth-earthquake" will have significant effects on the continent and on its relationships with the other parts of the world. Although this will raise important challenges for the continent such as on education, healthcare and unemployment, the Africa's youth boom may result in strengthening Africa's influence in the global geopolitical landscape, given the need for new markets and investment opportunities, with potential to changing the future world's development prospects (Declan & Reyes, 2023). In the Sahel, armed conflicts and terrorist attacks have already significantly increased the levels of insecurity over the last decade. According to the UNECA (2019), the structural causes of armed conflicts in this region include historical grievances, population growth and environmental pressure, linked to extreme poverty, food insecurity, frequent droughts, pre-existing civil wars, and poor governance (Mouiche and Ewusi, 2015). This often leads to cross-border insecurity, forced migration, economic decline, social inequalities, and ecological disaster. Currently, the Sahel is the global center of extremism, according to the Global Terrorism Index 2023, accounting for 43% of global terrorism related deaths in 2022, 7% more than in the year prior. In a region where 60% of the population is under the age of 25 and where countries are defined by artificial borders inherited from the colonial era, armed conflicts have taken a complex regional dimension, with the interconnection between human development challenges and security issues. There are two corridors of armed conflict in the Sahel: the conflict in Mali and the insurgence of Boko Haram group in Nigeria, with extension to other countries, including the Lake Chad Basin (UNECA, 2017). The International Crisis Group (ICG, 2019) reported that "Armed conflicts in West Africa are progressing like the desert, from north to south". In Mali, for instance, the conflict was triggered by the poor post-conflict management of the old Tuareg rebellion in the northern part of the country, and further exacerbated by the Libya's explosion in 2011 due to the North Atlantic

Treaty Organization (NATO)'s attack that resulted in the death of the former Libyan President Muammar Gaddafi. The situation in Mali affects its neighboring countries such as Niger, Mauritania, Burkina Faso, Cote d'Ivoire. It poses a crucial security risk in a region where most countries are ranked below the UNDP's Human Development Index (HDI). UNDP (2018) reported that this regional insecurity challenge is the source of the displacement of 4.2 million refugees and Internal Displaced People (IDPs), with a significant humanitarian disaster. Similarly, in the Lake Chad Basin, the insecurity situation caused by the emergence of the Boko Haram group in Nigeria since the early 2000s has become a regional problem amplified by cross-border criminality, socioeconomic difficulties, accelerated circulation of guns, and environmental and climatic challenges (Mouiche and Ewusi, 2015). The situation has resulted in the militarization of the Lake Chad Basin, known as one of the most fragile regions in the world. The basin which was in the past a model of a vibrant cross-border trade among its member countries, has now become a major insecurity "hotspot" (Magrin et al, 2018). This conflict and the related military response by the basin countries has reconfigured the nature of socioeconomic development and trade relations in the Sahel, linked to the obstacles in trade exchanges, massive movement of rural populations to urban areas due to insecurity (Magrin et al, 2018). For instance, the trade corridor between Kano/Maiduguri (Nigeria) and N'Djamena (Chad) which is the most important one in the region, has become impracticable due to insecurity, with enormous economic consequences on countries like Chad, Nigeria, and Cameroon. This is complicated by the recent military escalation with the Coups d'état in Mali, Burkina Faso and Niger as well as and the ongoing war in Sudan with the potential military escalation risk in an already fragile context and the massive movement of Sudanese refugees in neighboring countries. This situation requires a close monitoring, as it may expand to many other African countries, with significant regional and global implications on Africa's security and global sustainability. Overall, the security situation in West Africa and its associated military response already result in serious budgetary displacement from national governments to deal with the security challenges. In addition, the massive movement of people (often with their livestock) due to conflicts, significantly increase the pressure on natural resources such as land, water and vegetation which have already been under significant environmental degradation due to natural factors and climate change. This has led to increased land competition over natural resources, and exacerbated environmental depletion and degradation, with environment becoming a source of conflict between farmers and herders. And all this, in the context of difficult coexistence between the agricultural and pastoral production systems and duality between the official legal system and the traditional customary law. In this regard, it is expected that the future repatriation and re-installation of refugees and Internally Displaced People (IDPs) at the end of the ongoing conflicts in the region, will lead to future land access issues and increased social and environmental implications across West Africa.

This conflict situation makes it difficult to invest in sustainability to promote structural economic transformation, education and health services, and environmental protection, as it erodes the hard-won development progress recently made. Recognizing the obstacles caused by armed conflicts to development, the African Union adopted in 2013 the 2063 Agenda "The Africa we want" as Africa's long-term socioeconomic transformation and regional integration agenda, alongside an ambitious plan on "Silencing the guns by 2020" (Khadiagala, 2015; Diatta et al, 2019). Even though its initial deadline has passed without success, the "Silencing the guns" plan remains a top priority in Africa, as part of addressing the security-sustainability nexus.

It is to address this nexus that the concept of Environmental Intelligence for Sustainability (EIS) has emerged as an important framework to contribute to the achievement of the Sustainable Development Goals in considering the increased risks associated with armed conflicts and insecurity in Africa.

INTRODUCING THE ENVIRONMENTAL INTELLIGENCE FOR SUSTAINABILITY (EIS) FRAMEWORK

The overall idea of using scenario planning methods to anticipate future risks is not new. It is important to note that “environmental intelligence” has been first conceptualized in the post-cold war period when the US Army was concerned about using modern scenarios in preparation of any future armed conflicts, including nuclear war (Briggs & Matejova, 2019). According to Pace, O’Connell and Lachman (1997), the notion of “environmental intelligence” was in use since 1992 in the sense of strategic, and possibly tactical, use of environmental information, with the establishment within the Central Intelligence Agency (CIA) of a "Task Force" to assess the possibilities of using classified intelligence data to address complex global environmental and climate change challenges that may lead or be related on some way to armed conflicts. This "Task Force" created within the CIA was then transformed into a research program in 1994 and involved both intelligence agencies, including the Central Intelligence Agency (CIA) and the Defense Intelligence Agency (DIA) and civil agencies such as the US National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) which are mostly the beneficiaries of extensive and unique environmental data collected by the intelligence community. The aim of this approach was to determine the nature of environmental data to be used for non-military purposes, without compromising the primary goal of military intelligence. Subsequently, it was decided to declassify historical data gathered by intelligence agencies from satellite observation to make it available for sustainable development initiatives. Since 1992, the concept of environmental intelligence has evolved to become a key sustainability tool, with the efforts from the CIA and the DIA to declassify the use of historical environmental data and satellite imagery to address global security issues such as climate change, natural disasters, biodiversity loss, land degradation, international migrations, “hybrid” conflicts and terrorism (Watson & Wuxom, 2007, Deutch, 1996; Pace, O’Connell & Lachman, 1997; Adams, 2015). It is in this sense that Casas (2017) defined Environmental Intelligence, much in the same way as EIS is used in this paper, as a systematic approach and an information management tool for decision-making and planning in the fields of environment and sustainable development.

In this paper, the concept of Environmental Intelligence for sustainability (EIS) is hence defined as a strategic approach to analyze and manage the relationship between anticipated or on-going armed conflicts and sustainability. It may range from a pre-conflict strategic environmental and social assessment to governance and management. EIS is often presented as a three-dimensional framework operationalized through preventive, prospective and reactive measures (Dorsouma 2022). It is primarily viewed as an analytical tool to assess conflict-sustainability risks, and implications on the global sustainability agenda, based on pre-conflict risk analysis and post-conflict impact assessments, with the aim to mainstream sustainability into conflict prevention and post-conflict reconstruction and development processes. It further aims at complementing existing sustainability tools such as the Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) which do not consider conflict situations in their frameworks. EIS therefore represents a new conceptual and analytical process which looks at security risks posed by armed conflicts through an intelligence and sustainability prism, while decomposing them into

various sociopolitical, economic and environmental aspects, with sustainability at the center of the equation. Developed in response to some of the pressing global security and environmental challenges of our time, EIS largely relies on the use of environmental data in a wide range of areas and sectors (Watson and Wuxom, 2007; Adams, 2015) to provide leaders, decision-makers and managers with an analytical framework to anticipate and in a way, incorporate conflict risks within the existing risk management processes. While it shares many of the elements of classical strategic environmental and social assessment, EIS differs in many other ways with those tools, since it does not require or lead to a specific reporting exercise. Rather, it requires incorporating security-sustainability risks at various scales, through preventive, prospective and reactive measures based on sound environmental analytical and strategic assessments (Table 1).

Purpose	Preventive	Prospective	Reactive	Sustainability Options
Use of adequate environmental information for sustainability planning in conflict situations	Early warning	Diagnostic and Strategic analysis of security-sustainability nexus	Conflict Risk Analysis for Crisis Response	<ul style="list-style-type: none"> • Anticipative sustainability action through preventive measures • Scenario planning and strategic foresight, and recommendations for promoting sustainability as part of post-conflict assessments • Managing Sustainability risks during conflicts as a contribution to conflict resolution and crisis management
	Pre-conflict/preventive measures	Scenario building and sustainable development visioning, planning, and budgeting	Risk Management and Syn-conflict measures, including crisis response and humanitarian assistance	
	Stakeholders' awareness raising on anticipative sustainability issues	Strategic Monitoring of conflict-sustainability related scenarios, including post-conflict development and peace building	Implementation of Environmental governance during conflicts as a core aspect of crisis risk management	

Table 1: Environmental Intelligence as a three-dimensional tool (from Dorsouma, 2022)

Preventive approach: While EIS cannot act as a conflict avoidance or resolution mechanism, a preventive component is nevertheless crucial given that the cost of ignoring conflict risks is considerable and much higher than the cost of responding to the crisis or taking corrective measures after the conflict. Therefore, it is of interest for any country, regional or international authority or organization to consider preventive measures to safeguard economic, social, and environmental sustainability. Preventive measures include capacity to detect and establish a reasonable diagnostic and strategic analysis of security-sustainability nexus within the country and within the regional, or even international, context. It involves the capacity to provide early warning and propose anticipative measures before any conflict arises, with the view to protecting vital infrastructure or critical resources that could later serve as the basis for post-conflict recovery and reconstruction. In this sense, EIS seeks to incorporate in scenario-building key strategic issues related to potential conflict situations and their implications on environmental stability and on long-term sustainability. At this stage, EIS could in fact be based on a sort of analysis that would incorporate all principles, provisions and recommendations for pre-conflict measures; however, it is hardly conceivable that a

state or local authority would have time or would judge it appropriate to mandate a working team to prepare such an analysis in the case of an imminent conflict or in the case of terrorism threats. Yet, EIS must then be used in the context of mid to long term planning for sustainability. For instance, the exercise which leads to the preparation of common diagnostic and planning documents during peace times, such as “The State of the Environment”, “Environmental Outlook Report” in each country, could be complemented by an analysis of “what if” for all components considered vital for the pursuance of sustainable development, provided the latter are clearly identified. These may include all the major issues already considered crucial in peace time but may include as well anticipated humanitarian relief situation or specific pollution and access to resources associated with the presence of refugees or Internally Displaced Persons, among others. In general, in every country, it is expected that EIS should result in the mapping or inventory of existing or potential sustainability resources, such as critical minerals, wildlife, tourism potential, land and agricultural resources, groundwater, forests, critical infrastructure, special economic zones, as well as natural habitats, wildlife, protected areas. Vital infrastructure facilities such as water adduction and treatment systems, waste management, irrigation facilities, should also be well inventoried or planned as part of the overall “environmental data” monitoring. While the existence and gathering of such environmental information is not a problem, sorting and ranking amongst those which are critical for sustainability planning and are particularly at risk should be an issue, especially in crisis situations such as a coup d’état, a terrorist attack or outward armed conflict which may raise another set of challenges. A preventive approach may also imply promoting sustainability through awareness raising and education of various stakeholders on the links between natural resources, economic, environmental and social issues.

Prospective dimension: The prospective approach is required as a reflection and imagination of the future, considering and integrating conflict risks into the sustainable development visioning and planning through security-sustainability scenarios. This includes strategic sustainability analysis, scenario planning and post-conflict strategic environmental assessments. The EIS prospective dimension enables any country, organization, or corporation to carry out a conflict-sustainability scenario analysis (including current anticipated risks and trends), with the view of identifying key risk factors and potential options to overcome them. It could be delivered in the form of future scenarios that integrate both conflict and sustainability in the sustainable development planning and programming cycles. Based on available knowledge and information on current and anticipated conflicts, EIS should contribute to preparing the ground for crisis response measures in anticipation of syn-conflict impacts, including protecting conflict-sensitive infrastructure, socioeconomic services, and natural ecosystems.

Reactive dimension: Despite forward-looking preventive and prospective measures, a country or organization cannot realistically escape from damages and losses should a conflict or crisis arise. The EIS reactive dimension therefore calls measures to cope with the consequences of the conflicts at the time of their occurrence. This will require proper integration of actual conflict-sustainability actions into crisis management approaches, with the aim to safeguard sustainability through well-prepared and orderly humanitarian assistance (including the establishment of refugees camps in safer environments), application of international conventions on protecting the environment during armed conflicts, applying minimum environmental governance standards to protect natural habitats, protected areas and physical infrastructure from the damages of war, including environmental protection and sustainability measures into peace agreements, training armies on sustainability

issues, and preparing the grounds for post-conflict environmental governance. So doing will also help identify potential unmanageable damages of conflicts on sustainability, and ways to avoid or mitigate those in the future.

Overall, the three EIS dimensions do not operate in isolation, but could easily complement each other, provided that they all contribute to safeguarding sustainability at any time of conflicts. Although the preventive and prospective dimensions take more precedence as they are critical during peace and post-conflict periods, the reactive dimension is equally important during conflicts when a minimum of environmental intelligence is required to ensure that sustainability considerations are taken into account in the crisis response and crisis management processes. The precedence taken by the preventive and proactive dimensions during pre-conflict and post-conflict periods is justified by the need to prioritize conflict prevention and peace building, in ensuring that sustainability is part of the response to avoid new conflicts and mitigate the impacts of any future conflicts on sustainable development. In this regard, the EIS framework may be useful to all African States and their development partners to address security-sustainability risks in a more integrated and comprehensive way, as far as achieving sustainability across the board is concerned.

ADDRESSING CONFLICT-SUSTAINABILITY NEXUS AT COUNTRY LEVEL: ROLE OF THE EIS IN COTE D'IVOIRE

In Cote d'Ivoire, armed conflicts, including the 2002 war and recent events such as terrorist attacks in Grand Bassam in 2016 and more recent cross-border military events from Burkina Faso as well as violent demonstrations during the 2011 and 2020 post-electoral crises have seriously shaken the foundations of country's sustainability. It should be noted that over the last four decades, Cote d'Ivoire lost more than 80% of its forest cover due to many factors such as extensive agricultural practices, deforestation and armed conflicts. In this country, evidence has shown that armed conflicts have contributed to exacerbating poverty, hampering economic performance, deteriorating social conditions, causing institutional breakdown and governance collapse, and making significant environmental damages, thus resulting in the country's inability to achieve the Millennium Development Goals (2000-2015) and compromising efforts towards achieving the SDGs by 2030 (N'Dah, 2003; N'Goran, 2010; Yebouet, 2011; Yabile, 2013; Dorsouma, 2022).

In this regard, Environmental Intelligence for Sustainability (EIS) in Côte d'Ivoire could be actualized through the involvement of, and collaboration among key national institutions and stakeholders such as public entities, the private sector and the civil society as well as local communities. There is a need for a nation-wide EIS mechanism under the responsibility of the Presidency or the Prime Minister Office to coordinate the EIS process across the country. To achieve this, the coordinating body would need to be strengthened to effectively play an oversight role through compiling environmental intelligence data from various technical bodies, including the national statistics institute, the national spatial observation agency, the national geographic information and remote sensing system, among others. The data and information gathered could be treated and transformed into a national decision-making dashboard which could provide key pointers and indicators on key conflict-sustainability risks, to allow policymakers and sustainability managers to make evidence-based and timely decisions and to take informed pre-strategic actions to secure critical infrastructure and sensitive ecological sites in the eventuality of any conflict to come. This is expected to build sustainability into national economic infrastructure, social services and ecological resources that require specific protection in case of conflict occurrence. As part of this research, a series of strategic scenarios was developed to operationalizing the EIS instrument in Cote d'Ivoire, while analyzing the possible trajectories for the country

when faced with conflict situations but committed to achieving the Sustainable Development Goals by 2030, resulting in three key scenarios Dorsouma (2022). These include (i) a pessimistic scenario of the country if caught in a protracted conflict while failing to achieve sustainability; (ii) a realistic scenario when the country faces sporadic conflicts but is able to achieve only a few SDGs; and (iii) an optimistic scenario whereby the country is in peace and is capable of achieving all the SDGs by 2030. This exercise has also shown that a specific emphasis must be placed on regional contexts, as Cote d'Ivoire is affected by its regional environment, being a key player in West Africa.

APPLYING THE EIS FRAMEWORK IN AFRICA: A REGIONAL PERSPECTIVE

In Africa, armed conflicts have recently taken a regional dimension, and it is therefore imperative to promote a comprehensive regional approach on top of the national responses. Hence, a regional approach may help promote a coordinated sustainable investment beyond the traditional country-led military efforts which have so far proven to be inefficient, ineffective and unsustainable. Addressing the security and sustainability challenges at regional level requires a more structured and holistic approach through a robust regional cooperation process among countries to share relevant information and build strong coalitions and regional synergies. Such synergies could include various groupings and regional economic communities, including the Economic Community of West African States (ECOWAS) and the Lake Chad Basin Commission (LCBC), with the view of addressing regional transboundary issues and avoiding disintegration of the regional system. To be efficient, a regional EIS approach for West Africa, for instance, needs to be established under the ECOWAS and expanded to the Economic Community of Central African States (ECCAS), given the interconnectedness of armed conflicts in these two regions and the critical need for cooperation between the two regional groupings. To ensure that the ongoing regional security threats do not lead to a failure to achieving sustainability, national governments and regional groupings need to mainstream conflict risks as an integral part of their common regional sustainability agenda. This implies revisiting the existing regional development planning, budgeting and programming models as well as prioritizing investments in key sustainability initiatives across the region. In this regard, Environmental Intelligence for Sustainability (EIS) could provide a framework to rethink the current practices and strategies shifting the focus on regional approaches rather than the confine of national borders. This will complement the existing ad hoc military and security responses with clear emphasis on economic, social, environmental and financial sustainability. It is evident that the current emphasis on security and military solutions by national governments has relegated sustainability solutions at the background. In response, environmental intelligence could help focus on preventive and early warning measures, by maximizing regional synergies and emphasizing regional cooperation. Given that addressing the security-sustainability nexus goes beyond the capacity of national governments taken individually, the EIS framework provides a unique opportunity for strengthening existing regional institutional frameworks towards a regionally based environmental intelligence approach that prioritizes environmental stability at a regional scale, focusing on common and shared goals. Practically, an EIS model for West Africa will build on and strengthen the existing ECOWAS Early Warning and Response Network (ECOWARN) created in 2008 as a structural conflict prevention and resolution instrument between the 16 West African States. The initial goal of the system was to provide a strategic response to conflict situations in West Africa through an early warning mechanism based on “systematic collection and analysis of relevant information on countries in crisis” (Gnanguênon, 2018). However, this regional system failed to operate effectively and optimally due to some technical and financial obstacles, the theoretical nature of the exercise, the reluctance from national governments to share information

due to national security issues, and the long lead time from early warning to decision-making. Though it has proven to be a key tool for conflict resolution in West Africa as was the case in Gambia in 2017 when the former President Yaya Jammeh did not want to quit power despite re-election defeat. In response to the lack of regional cooperation and information sharing among countries, the mechanism has shifted in 2018 into the creation of national coordination centers being piloted in a few West African countries, with the aim to “reduce the gap between early warning and response” (Gnanguènon, 2018). Clearly, the EIS approach for West Africa will help consolidate the regional ECOWARN mechanism through innovative approaches addressing the security-sustainability nexus refocusing on the system-wide regional approach. As it addresses sustainable development challenges compounded by armed conflicts and insecurity in West Africa, the EIS would timely early warning in a more integrated way to both national and regional decision-makers, focusing on sustainability as a vision and guiding principle.

Building on this experience, one can expect that an Africa-wide approach would be necessary to address conflict-sustainability challenges across the continent in the current context of regionalization of conflicts and internationalization of the terrorism threats and global impacts of the Ukraine war. This situation clearly appeals for an African coordinated response beyond one particular country or sub-region, as armed conflicts in Africa are now interconnected, as shown by the recent expansion of terrorist attacks in Southern Africa. The terrorist attack by the Islamic State Organization in the coastal city of Palma in the Cabo Delgado province of Mozambique constitutes a significant threat for Africa as a whole, with possible implications on other countries such as Tanzania, Rwanda, Burundi, Uganda and Kenya with connection to the ongoing conflict situations in the Horn of Africa where the Somali terrorist group “El Shebabs” is still active. This combines with the most recent volatile situation in the Tigray region of Ethiopia and conflict in Sudan. As a matter of fact, the terrorist attack in Mozambique has caused considerable human losses and significant economic and social damages on key development sectors such as tourism and energy, causing economic decline in the touristic city of Palma, with negative impacts on the most important natural gas project worth US\$ 24 billion operated by the French company Total Energy. This investment which was viewed as an important economic opportunity for Mozambique and for Africa, is under threat and will prevent further investments in major projects across the continent, while raising some important concerns about reconciling development and sustainability goals in Africa. Mindful of this, an Africa-wide EIS framework will assist in screening the levels of sustainability associated with conflict risks in the continent, with the aim to identify opportunities to invest in strong sustainability projects, including conflict prevention systems, post-conflict reconstruction and sustainable development programmes such as sustainable and resilient infrastructure, social and environmental services, etc. Such a tool will lead to building a robust security infrastructure, with a particular emphasis on preventive, prospective and reactive measures. It would likely assist African countries in strengthening their security architecture, enhancing national and regional institutional frameworks and operational capacity to maintain peace and stability. The Africa-wide EIS could be resourced and linked to ongoing initiatives such as the Security-Indexed Investment Bonds (“SIIBs”) being developed by the African Development Bank and could provide sovereign guarantees to de-risk sustainability-linked investments in conflict-affected countries. This may be a critical opportunity for attracting private investors who are still reluctant to invest in risky countries, investing in reconstruction programmes including rehabilitation of damaged infrastructure and building new resilient infrastructure. This can be an opportunity for job creation in conflict-affected countries and those emerging from conflicts, with focus on key sustainable development programs and creating enabling environments for de-risking and investing in riskier projects. The EIS could also help African countries alleviate the burden on

limited national budgets whenever there is a conflict situation while reorienting resources towards prioritizing strong sustainability programmes away from unsustainable, expensive and ineffective military and security expenditures.

INSTITUTIONALIZING THE EIS APPROACH: WHOM DOES THE COLONEL TALK TO?

Achieving sustainability in crisis situations is not an easy task in the context of complexity associated with the integration of security agenda into the sustainable development framework. The EIS appears to be a useful multi-dimensional tool to devise fit-for-purpose measures and solutions in the form of conflict-sustainability linked scenarios and policy recommendations while drawing some possible futures for a country, a region, a continent, or a system. Therefore, an adequate institutional line is required to operationalize the EIS through its tri-dimensional structure, through mapping the key institutional stakeholders and players involved in the process, including both at the supply-side and demand-side of environmental intelligence. In addition to clearly outlining the roles and responsibilities of the said stakeholders, it is equally critical to be clear about the financial resources needed to carry out EIS assessments in any given situations. It is worthy to note that EIS is a tool for policy makers, development partners and practitioners, businesses, regional organizations, and global institutions involved in security and sustainability agendas to consider conflict associated risks and make informed decisions which put sustainability at the center stage. It leads to conflict-sustainability assessments, scenarios, policy recommendations and measures relevant to achieving sustainable development in conflict situations. Therefore, institutionalizing the EIS at country level requires some arrangements both at strategic and operational levels in the context of national development planning and budgeting processes. As indicated earlier, for a country like Cote d'ivoire, institutionalizing the EIS framework will help bring together relevant administrative bodies and ensure coordination among institutions such as the national security council, the national crisis committee and the national center for early warning and prevention coordination and response, which report to the Presidency and the Prime Minister Office, respectively. It will also help better promote interministerial and interdisciplinary approaches as most line ministries are represented and involved in the strategic decisions made by these bodies. This will also help restructure and consolidate these institutions and align their agendas around promoting sustainability. It is also important to bring on board non-state actors such as civil society and private sector as well as humanitarian agencies and regional/international organizations which play a key support role to these bodies. At operational and technical levels, EIS needs to be viewed as a pragmatic tool for sustainability risk management. As such, it must be considered in existing sectorial and operational processes at various levels, including at the levels of government bodies (such as Civil Protection Agency, National GIS and Spatial Planning Agency, National Environmental Monitoring Agency, Natural Disaster Risk Management Body) and businesses while questioning the adequacy of the existing risk management models in relation to addressing emerging security-sustainability risks and trends. The EIS framework will enable these bodies to collect and generate relevant data that could be translated into critical information to guide decision-making in considering conflict risks. Institutionalizing the EIS will result in the development and adoption of a consolidated security-sustainability risks analysis dashboard from which analytical, strategic and operational risk analysis will be developed with targeted policy recommendations to a wide range of decision-makers on key aspects such as conflict prevention, humanitarian risk management, ecological monitoring, disaster control and prevention, etc. The EIS products will be structured and framed in the form of national or local maps, with key indicators on the state of environment, security and ecological hotspots, which will be delivered to decision-makers. In this regard, the EIS dashboard needs to be decentralized based on existing local observatories across different localities which will play an important role on

data collection and information dissemination, while ensuring a close coordination with the centralized EIS system. Relevant EIS information will be disseminated not only to policymakers but also to the public and end users via mobile phone messages, social medias and traditional messages (radio, television). This will also require a close collaboration with mobile phone companies, national and local broadcasting agencies, internet service providers which will all have a critical role in the wider dissemination of EIS information, with focus on preventive measures such as early warnings, general public awareness on sustainability issues.

Furthermore, with Cote d'Ivoire as an example, the strategic scenarios on geopolitical, socioeconomic, and ecological threats and trends developed through the EIS model will need to be included in the national foresight process managed by the national foresight and strategic monitoring committee under the development planning ministry in coordination with the national sustainable development commission which leads on the SDG agenda. The three EIS conflict-sustainability scenarios (pessimistic, realistic, and optimistic scenarios) developed through this process in Cote d'Ivoire aimed at guiding the trajectories towards achieving sustainability in Cote d'Ivoire in taking into consideration the security threats and challenges. The EIS framework will hence allow for a better institutional coordination between the national development planning process and the national sustainable development process while integrating a security/conflict lens.

In an ideal situation, human and financial resources needed to conduct EIS assessments could be budgeted for in any national budgeting processes, provided that national governments are empowered and made aware of the need to make such provisions as part of their national security and sustainable development programming. To finance the EIS framework, it is useful to establish a dedicated national funding vehicle in a form of a sovereign fund resourced from national budget through taxations, with additional contributions from key development partners and businesses as well as the resources mobilized from Security-Indexed Investment Bonds when issued. These resources can also be used to finance large-scale sustainability programs in key sustainability sectors, prevention programs, sustainable infrastructure investments, promoting environmental governance, investing in peace building, security, and stability. In the absence of provisions in national budgets, EIS assessments could still be carried through regional and global processes such as global humanitarian bodies and organizations responsible for global sustainability such as the United Nations and relevant bodies such as UNDP, the global SDG Fund or the UNEP which conducts post-conflict environmental assessments. To ensure proper budgeting for such an important process at continental level, it should be also integrated in the regional security-sustainability frameworks such as the African Union Commission's Peace Fund and the security bodies under Regional Economic Communities.

BARRIERS TO EIS APPLICATION

As the EIS framework will be primarily based on exiting and/or yet to create institutional arrangements in a country, it will be confronted with a number of barriers which include the lack of political will, weak institutional governance capacity as well as other technical implementation and financial challenges. In relation to the political will, the main concern is that a well-functioning EIS model and related decision-making processes could be affected and delayed by political interests. To address this challenge, it is important to place the leadership and governance of the system at the highest decision-making level in the country such as the national security council, or the national crisis committee or the national prevention and early warning

coordination unit while ensuring that the membership of such a committee is not based on political belonging but on political neutrality, high ethical standards as well as sound technical and managerial competencies. Another challenge may be associated with the limited bilateral or regional cooperation between countries to share relevant information due national sovereignty issues. To overcome this challenge, it is important for every country to build adequate and strengthen their bilateral or regional agreements, as the security-sustainability may have significant transboundary considerations. The implementation of an EIS model may also be hampered by institutional governance challenges since it will involve a variety of stakeholders with different mandates, including both state and non-state actors. It might therefore become difficult to coordinate among these institutions if there is no willingness to cooperate and exchange information. It is for this reason that the leadership of such a system needs to be at the highest inter-ministerial decision-making structure in order to facilitate coordination and build cross-sectoral and cross-ministerial synergies. Other implementation barriers are of technical and operational nature, including the limited technical expertise on security and sustainability issues in various institutions. This may result in challenges in devising common methodologies for data collection and management from different structures and in a difficulty to connect decentralized EIS structures with the centralized body. It is therefore crucial to clearly define roles and responsibilities of the key institutions involved in the EIS process, including both supply-side (data providers) and demand-side (end-users and beneficiaries). Finally, the EIS framework will be limited by budgetary constraints faced by African governments which still find it difficult to prioritize the sustainability agenda in their national budgeting process, despite adopting the Sustainable Development Goals six years ago and despite the deadline for achieving these goals is fast approaching.

CONCLUSION

Africa is currently at a crossroad faced with complex conflict situations and confronted with difficult choices to rebuild economies based on business-as-usual development models or choose to develop more sustainably. Addressing regional and global security-sustainability challenges in Africa calls for innovative ways of investing in, and prioritizing the sustainability agenda, in order to avoid that conflict and security issues set back efforts towards achieving sustainable development in Africa by 2030. While the EIS framework could play a critical role in helping Africa address the security-sustainability nexus, operationalizing it will require not only a clear institutional line but also important financial resources. In this regard, the government needs to build strong institutional arrangements and prioritize funding allocation or reallocation to the system given its strategic importance for achieving both national security agenda and sustainability outcomes. To make it more stable and sustainable, a taxation mechanism could be considered to generate revenues for the EIS system and use the proceeds of the security-indexed and sustainability-linked issuances being considered in many African countries. Setting up a dedicated financing vehicle with budgetary reallocations from relevant institutions complemented by additional resources mobilized from development partners and businesses, will be critical.

The concept of Environmental Intelligence for Sustainability (EIS) appears to be an essential building on its three-dimensional approach comprising preventive, prospective and reactive management and solidly based on appropriate sustainability risk assessments. For instance, in Cote d'Ivoire and West Africa at large, such a framework needs to build on existing mechanisms to provide a framework for assessing sustainability risks associated with conflict situations.

Moving forward, the Environmental Intelligence for Sustainability (EIS) presented in this paper helps safeguard environmental stability in Africa which is often associated with social stability which in turn may lead to economic growth without environmental degradation, while promoting an Africa's security-sustainability agenda. The paper further highlights the need for a more holistic, systematic and coordinated approach for Environmental Intelligence for Sustainability involving key stakeholders such as African governments, regional organizations, businesses and global entities as part of the international community which all have a key role to play in peace building and security, as a primary condition for sustained economic development and sustainability as a whole.

At regional and global levels, it is crucial to anticipate any financial challenges from governments especially when confronted with crisis situations and any other unexpected challenges. While EIS should be a national endeavor, and a sovereign responsibility, most of the actions and solutions of "plans" for sustainability in conflict-affected context will most likely escalate to regional scales, and we strongly believe that EIS should involve regional and continental structures. Therefore, the EIS and related assessments need to be supported through regional and global structures such as the African Union Commission under existing instruments such as the Africa Peace Fund or the "Silencing the guns" program, or under a Regional Economic Community such as ECOWAS , or through the UN system, provided that these institutions make adequate institutional and financial provisions for such a model in their budgetary processes, while addressing the political, institutional and other implementation barriers which may affect the successful operationalization of the EIS framework in the African continent.

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