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Environmental Recovery in Ukraine: Assessing damages and forming solutions

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THESIS APPROVAL

I, Professor Alberto Lanzavecchia, as supervisor of the student Anna Romanovych (2038789), hereby APPROVE the thesis entitled "Environmental Recovery in Ukraine: Assessing damages and forming solutions".

Padova, 10/11/2023

Signature _____

ALBERTO LANZAVECCHIA

Declaration of Mobility

This thesis is the result of the Joint Master's degree in Sustainable Territorial Development (STeDe).

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This program has a duration of 24 months. The course started at UNIPD in Italy, followed by at Quito, Universidad Andina Simón Bolívar, Sede Ecuador. The third semester was blended with the international Winter School in South Africa. The fourth semester was spent for internship and thesis in "Banca Popolare Etica", international development office, in Padova, Italy under the supervision of University of Padova.

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Abstract of the thesis in Spanish

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Abstract in Spanish (2000 characters including spaces):

El 24 de febrero de 2022, la Federación Rusa lanzó una invasión injustificada a gran escala de Ucrania. El territorio de Ucrania es de aproximadamente 603.550 km² y, a finales de 2022, Moscú controlaba el 16,55% del territorio ucraniano. Además de la ocupación de los territorios, la invasión rusa ha dañado significativamente las infraestructuras ucranianas, los medios de subsistencia y las fuentes críticas de suministro de energía y agua. Junto a los registros oficiales de los crímenes contra la humanidad cometidos, los oficiales ucranianos hablan de la naturaleza genocida de esta guerra.

Además, las autoridades ucranianas afirman que Rusia está causando un "ecocidio" al medio ambiente ucraniano. Desde el comienzo de la guerra, el Ministerio de Protección Medioambiental y Recursos Naturales de Ucrania (2023) ha registrado más de 2.300 casos de daños medioambientales causados por las hostilidades. Se calcula que unos 2,9 millones de hectáreas de las zonas protegidas del país, alrededor de 900 lugares de reserva natural con una superficie de 12 406,6 km² (1/3 del fondo de reservas naturales de Ucrania) están amenazados de destrucción irreversible debido a la guerra

rusa, estando bajo ocupación rusa hasta el día de hoy. La rapidez y la magnitud de esta destrucción medioambiental demuestran la falta de protección de los recursos naturales por parte de la legislación internacional. En conjunto, la guerra rusa en Ucrania está contribuyendo directamente al cambio climático global, y sus consecuencias se dejarán sentir con fuerza en las generaciones venideras, si no se detiene antes de que sea demasiado tarde.

Esta tesis pretende abordar el aspecto medioambiental de esta guerra. Pretende evaluar los daños causados al medio ambiente de Ucrania, hacer un repaso de las soluciones de recuperación medioambiental disponibles y pretende elaborar un borrador de propuestas de proyectos que puedan ser de interés para los esfuerzos de restauración medioambiental de Ucrania.

UNIVERSITÀ DEGLI STUDI DI PADOVA
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UNIVERSITÀ DEGLI STUDI DI PADOVA

Master Thesis

Environmental Recovery in Ukraine: Assessing damages and forming solutions

Supervisor:
ALBERTO LANZAVECCHIA

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Registration number: 2038789

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Abstract

On February 24th, 2022, Russian Federation launched an unjustified full-scale invasion of Ukraine. Ukraine's territory is approximately 603,550 km² and by the end of 2022, Moscow controlled 16.55% of Ukrainian territory (≈128,57 km), despite Ukraine's liberation of about 700 km2 of its territory in December 2022 and 3,800 km2 in November 2022. In addition to the occupation of the territories, Russian invasion has significantly damaged Ukrainian infrastructure, livelihoods and critical energy and water provision sources. The estimated overall damage is 63 billion dollars' worth, not to mention 4,431 residential buildings, 92 factories/enterprises, 378 educational institutions, 138 healthcare facilities, 8 civilian airports and 10 military airfields, and 8 thermal power plants/hydroelectric power plants destroyed so far. Combined with the official records of the crimes against humanity committed, it makes Ukrainian officials talk about the genocidal nature of this war.

It's not only human deaths that the Russian war causes, but Ukrainian officials also claim that Russia is causing an "ecocide" to the Ukrainian environment. Since the beginning of the war, Ministry of Environmental Protection and Natural Resources of Ukraine (2023) has recorded more than 2,300 cases of environmental damage caused by the hostilities. Ministries estimate that about 2.9 million hectares of the country's protected areas, home to thousands of species of plants and animals, are under threat of irreversible destruction. Up until 1 March 2022, the aggressor has conducted hostilities on the territory of 900 nature reserve sites with an area of 12 406.6 km², which is about a third of the area of the nature reserve fund of Ukraine. Multiple ecosystems and species valuable to humanity are in danger, being under Russian occupation until this day. The speed and scale of this environmental destruction demonstrate a lack of protection for natural resources under international legislation. In addition to it all, the Russian war in Ukraine is directly contributing to climate change worldwide, and its consequences will be heavily lingering for generations to come unless stopped before it's too late.

This thesis is a response to the Ukrainian civil organisations' call to address an environmental aspect of this war by academics. It aims to assess the damage done to the environment of Ukraine, overview environmental recovery solutions available and intends to form a draft project proposals that may be of interest for environmental restoration efforts for Ukraine.

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Preface

This thesis is an academic contribution in support of the future nature restorations and environmental recovery initiatives that will have to be implemented in Ukraine by the end of the current war invasion started by the Russian Federation on the 24th of February of 2022. The author of the thesis is a Ukrainian, born in Kyiv, Ukraine. With a heavy heart, she acknowledges the significant damage that the russian war has caused to her country, its citizens and its nature, and understands that strategic vision has to be found even before the war is over, as the path to recovery may take dozens of years after the end of the war action.

This thesis is a search for understanding how the environmental and climate change-based sciences can contribute to more swift recovery of Ukraine in the long-term. It is based on the topics discussed during the Master's degree classes, as well as on conversations that the author has had with her academic and internship supervisors. The core of the ideas discussed and proposals formed are based on the author’s past practical working experiences in the field of international strategic technical support projects in Ukraine. Prior to the master’s degree, the author provided administrative support for two EU technical support projects for Ukraine in the fields of decentralisation, energy efficiency, renewables and district heating.

The author’s hope is that this thesis will be one of the many proposals and suggestions for Ukraine’s recovery from academics from around the world.

Introduction

Background of the subject of study choice and its significance

Environmental degradation, a global predicament, emerges as a product of climate change and the relentless exploitation of natural resources, exacerbated by widespread environmental pollution, largely propelled by the tenets of contemporary capitalist production. These collective forces manifest in a crisis that knows no borders, imposing profound and unprecedented challenges for governments worldwide. This dynamic reverberates, with even greater resonance, within the confines of nations possessing the most fertile soils on Earth. One such nation, standing in the East of Europe, is Ukraine. This vast land, endowed with expansive forests, steppes, mountains, fertile fields, and abundant water resources, has found itself at a critical juncture in the past decade, and especially in the past 2 years. The mix of urgency in analysing the recent environmental destructions, the need to find sustainable solutions, and taking into account exceptional conditions from the ground - it all makes Ukraine an important case study for envisioning a better future for the uncertain world we live in now.

Being the biggest country in Europe, with a territory of 603,550 km², Ukraine has 413,110 km² of agricultural area and 96 840 km² of forest area respectively. (FAO, 2019; World Data info, 2023) This makes Ukraine one of the biggest agriculture producers in Europe, as well as the fifth largest world wheat exporter that is responsible for 10% of global exports. (OECD, 2022b) Yet, the past decade has witnessed Ukraine, like the rest of the world, grapple with the consequences of climate change, deforestation, pollution, and water contamination, all by-products of an economic growth model that prevails in today's global landscape. In addition to these challenges, some regions within the Chernobyl Exclusion Zone continue to bear the scars of radiation, a legacy of the 1986 catastrophe under the Soviet Union's rule. The preservation and restoration of the environment have become paramount, driven by the profound impact of the Chernobyl disaster that extends beyond Ukraine's borders. Moreover, the year 2014 witnessed Ukraine's sovereignty being under stress as Russia illegally annexed Crimea, marking a turning point that left an indelible mark on Ukrainian civil society that was in the process of Revolution of Dignity at the time and stated its pro-EU intentions. The illegal annexation of Crimea initiated an economic recession and started active warfare in the East of Ukraine, catalysing the destruction of numerous factories and industrial complexes. These hostilities generated significant carbon emissions, although the pollution stemming from these events remains largely unexplored due to restricted access to the temporarily occupied

territories. To this day, access to data regarding population and resources within the territories of Crimea, Luhansk, and Donetsk remains limited, further complicating the challenges that Ukraine, as a nation newly independent from the Soviet Union after 1991, must confront.

Subsequently, the emergence of the COVID-19 pandemic in 2019 cast a shadow over the world, threatening millions of lives globally. For Ukraine, an economy poised for recovery, this crisis delivered a setback in its path toward economic rejuvenation. Emerging from the pandemic and years of EU-axis reforms, Ukraine confronted another momentous challenge on the 24th of February 2022, facing an ongoing full-scale illegal invasion by Russia, further exacerbating an already complex geopolitical landscape. Ukraine's multifaceted challenges encompass political, economic, social, and environmental dimensions. Politically, the nation is engaged in active warfare, seeking support from allies. Economically, it grapples with the loss of production and tax revenues due to population emigration. Socially, it must cope with significant human losses, internally displaced individuals, and the need to ensure adequate living conditions for the resident population. In the environmental arena, Ukraine faces mounting destruction and expanding environmental degradation.

These challenges, outlined thus far, are just the tip of the iceberg of complexities that Ukraine currently must deal with. Those challenges are, sadly, also common for a lot of countries in the region of East of Europe and the Middle East. What sets Ukraine apart, is how the nation and its civil actors respond to these multifaceted adversities. This is why Ukraine serves as a compelling and imperative subject of study. Despite the unparalleled challenges that have beset them, Ukrainian people and their government persist in their relentless pursuit of a brighter future, actively advancing reforms and forging innovative solutions to confront their problems. It is through their enduring spirit that Ukraine perseveres, and with it - a hope for a sustainable, peaceful future arises. Simultaneously, Ukrainian civil society and institutions labour tirelessly, crafting comprehensive recovery plans and envisioning a Ukraine brimming with fresh investment opportunities and this thesis will help to highlight their local vision. If done right, Ukraine’s recovery and reconstruction process will become a guideline for the recovery projects of the region, inspiring international donors, investors and private companies to re-consider what is important to invest in and how to do projects that will benefit future generations and not only make a profit for a few people.

Problem Statement

The central question encapsulates the essence of our endeavour: What is the environmental damage that Ukraine has suffered in 2022-2023 and what are the actions that

local actors could take to lay the ground for the environmental recovery after the war? What are local perspectives regarding how recovery and reconstruction processes should be done? And subsequently - what are the funds available for those recovery projects?

Those questions represent both the complexity and the urgency of the matter at hand. Environmental restoration is important for ensuring better living conditions for the local population of the territories affected by the war. As an added value, prompt recovery may play a crucial role in encouraging the return of Ukrainians who had to move abroad when the war started. New restoration projects will be an important input into the local economy and stimulate innovation development. In the past years, there have been a lot of international actors who have started looking into ways to arrange the recovery and restoration of Ukraine. Starting this research now by the Ukrainian and forming ideas on types of recovery initiatives needed from Ukraine's perspective means getting ahead and building plans "in-house" before someone else does it for us. Added to this all, research related to the environmental aspect of recovery is so far not a well-discovered topic that should be raised sooner rather than later. Environmental recovery requires a multidisciplinary approach, starting from an understanding of ecological systems, socio-economic dynamics, and the interplay of stakeholders. This aspect should be studied prior to suggesting any infrastructure reconstruction projects, therefore it is important to start with it first, to later find the most feasible, place-based solutions that will be relevant for the territory in question.

Thesis Organization

This research aligns with the core principles articulated by these local actors, engaging in a meticulous analysis of their vision and striving to identify the precise actions required to underpin environmental restoration efforts. As the spectre of warfare dissipates from affected territories following Ukraine's inevitable triumph, this thesis seeks to delineate the sustainable path forward for Ukraine's environment. It aspires to quantify the extent of damages already suffered and determine the paramount actors who should lead the charge in the multifaceted process of recovery. The thesis "Environmental Recovery in Ukraine: Assessing Damages and Forming Solutions" stands as a testament to Ukraine's resolute spirit and unwavering commitment to surmounting adversity, embodying a collective aspiration for a sustainable and vibrant tomorrow. In illuminating the environmental challenges that Ukraine confronts and the visionary steps taken to address them, this research endeavours to contribute not only to academic understanding but also to the practical pursuits of environmental recovery, both within Ukraine and beyond.

This thesis discovers the potential of the sustainability of Ukraine's restoration processes, attempts to identify civil society's actors that will play an important role in Ukraine's recovery, starts to summarise the damages to the environment done so far, highlights local perspectives on how the reconstruction process should be done and suggests certain actions that could be taken on a local level to launch the environmental recovery initiatives swiftly. Finally, it describes the available financing instruments for the environmental recovery projects present at this time and makes certain conclusions on what is awaiting Ukraine in the process of the recovery lying ahead.

Glossary

Decentralisation – (in the aspect of the government) the delegation of power from a central authority to regional and local authorities. (Merriam-Webster, n.d.)

Ecocide – the destruction of large areas of the natural environment as a consequence of human activity. (Merriam-Webster, n.d.)

European Green Deal – a set of proposals to make the EU's climate, energy, transport and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels, adopted by the European Commission (2021).

Famine – an extreme scarcity of food. (Merriam-Webster, n.d.)

GDP – gross domestic product. (Merriam-Webster, n.d.)

Genocide – the deliberate and systematic destruction of a racial, political, or cultural group. (Merriam-Webster, n.d.)

Military occupation – control and possession of hostile territory that enables an invading nation to establish military government against an enemy or martial law against rebels or insurrectionists in its own territory. (Merriam-Webster, n.d.)

NGO – nongovernmental organization. (Merriam-Webster, n.d.)

Saturation bombing – bombing in which a very large number of bombs are dropped to cover an entire area instead of being aimed at a specific target. (Merriam-Webster, n.d.)

Scorched-Earth technique – relating to or being a military policy involving deliberate and usually widespread destruction of property and resources (such as housing and factories) so that an invading enemy cannot use them. (Merriam-Webster, n.d.)

SDGs – Sustainable Development Goals, established by United Nations.

Shelling – to throw shells at, upon, or into, synonym to “bombard”. (Merriam-Webster, n.d.)

Verkhovna Rada of Ukraine – unicameral parliament of Ukraine, Supreme Council of Ukraine, composed of 450 deputies. (Verkhovna Rada of Ukraine, n.d.)

Chapter 1. Research Framework

1.1 Research objectives

This thesis research work has the following objectives:

1) Form an extensive list of references on the topic of environmental pollution and damage to the natural resources of Ukraine for the years of the war in 2022-2023, composed both of international and local publications.

2) Assess the extent and scope of environmental damages in Ukraine by analysing available data, reports, and publications related to pollution, deforestation, water contamination, soil degradation, nuclear, energy terrorism, and other relevant indicators.

3) Investigate the socio-economic impacts of the war in Ukraine.

4) Identify the key factors and events that have caused the most degradation and destruction of the natural resources and ecosystems, if possible - highlight the sources.

5) Analyse if there has been any direct correlation between the war actions of the russian army and major environmental destructions in Ukraine and find initial confirmation if there is a case of ecocide by gathering available data from open sources.

6) Overview the international legal framework for environmental protection of the environment during the wars, evaluate its effectiveness and find potential gaps in addressing environmental damages and remediation.

7) Identify the local stakeholders and assess their roles in the future environmental recovery of Ukraine, including governmental bodies, NGOs, private companies, and local communities.

8) Analyse environmental recovery initiatives scope from other countries and regions, drawing insights and lessons that could be applied to Ukraine's context.

9) Form initial case studies of environmental damage, identify the most affected regions of Ukraine, focusing on areas with severe degradation and urgent recovery needs.

10) Identify a set of criteria for prioritizing environmental recovery projects in Ukraine, taking into account ecological importance, cost-effectiveness, and potential for positive societal outcomes.

11) Evaluate the existing financial mechanisms and funding sources available for environmental recovery efforts in Ukraine, exploring ways to mobilize additional resources from both domestic and international sources.

12) Find information on Ukraine's civil society actors' perspective on the sustainable recovery of Ukraine and incorporate them into the whole research and proposals' formation.

13) Contribute to the existing body of knowledge on environmental recovery and management by disseminating the research findings through academic publications and conferences in the future.

1.2 Theoretical frame and literature review

Main concepts of research

There are several main topics that this thesis revolves around: environmental damage (specifically - caused by war actions), environmental restoration, place-based solutions approach application, local actors' initiatives and determining mechanisms of funding accessible for the local actors. It is important to elaborate on what stands behind those terms prior to explaining the specific details of the case study of Ukraine. In the case study terms, the timeframe of interest is past 1,5 years, in the indicative period of February 2022 - July/August 2023, based on data availability.

As research has arisen from the urgent need to assess the restoration perspectives available for Ukraine after the end of the war, the first step was to do the initial diagnostic and review what environmental damages have been caused up until the end of July 2023. This is where the term "environmental damage" caused to the environment of Ukraine is being reviewed, with greater detail on data available in chapter 2.1.3.

Environmental damage, climate change and damage to Ukraine's environment

By definition, "environmental damage or degradation is the deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the extinction of wildlife; it is defined as any change or disturbance to the environment perceived to be deleterious or undesirable." (United Nations, 2023) In the case of Ukraine, there is first environmental damage and then environmental degradation that appears as a result of the environmental damage caused. Chapter 1.3 describes in greater detail how wars have affected the environment in the past and caused environmental destruction.

War actions aside, usually there is a chain reaction of actions that starts the process of environmental damage or degradation, and in the past decade or so it is usually caused by human activity. Human activity is a main catalyser of the many recent changes happening to planet Earth, including climate change. This is confirmed by the 6th Assessment Report of the

Intergovernmental Panel on Climate Change, which mentions the following statement: “Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850-1900 in 2011-2020; global greenhouse gas emissions have continued to increase, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and among individuals (high confidence).” (IPCC, 2023)

As mentioned by IPCC (2023), climate change and environmental degradation at peaceful times originate from the actions done by men:

1) “Generating electricity and heat by burning fossil fuels”, which means more CO2 emissions, as well as carbon dioxide and nitrous oxide production, that are “powerful greenhouse gases that blanket the Earth and trap the sun’s heat”, causing the surface to overheat, which in return causes draughts, floods, and other unusual natural disasters. (United Nations, 2023a)

2) “Manufacturing goods, construction, mining and other industrial processes, transportation, packaging and distribution” (United Nations, 2023a), apart from being produced by burning fossil fuels, all those industrial processes release greenhouse gas emissions, cause pollution of nature and leave a lot of waste.

3) Deforestation and natural habitat destruction by means of “cutting down forests to create farms or pastures” (United Nations, 2023a), as well as mass agricultural production using monocultures, usage of damaging pesticides and other land use changes - all this destroyed natural resilience, causes CO2 emissions, and negatively impact climate.

4) Unsustainable diets and overproduction of food “causes emissions of carbon dioxide, methane, and other greenhouse gases in various ways, including through deforestation and clearing of land for agriculture and grazing, digestion by cows and sheep, the production and use of fertilizers and manure for growing crops, and the use of energy to run farm equipment or fishing boats, usually with fossil fuels.” (United Nations, 2023a)

Altogether, all activities mentioned above alter climate and are becoming sources of environmental degradation. Decreasing environmental degradation caused by human activity and limiting the effects of climate change is important to ensure a long-term sustainability framework to carry out ecosystem restoration.

The pollution that is caused by human activity on a daily basis is an important issue to address on a day-to-day basis, as it can end up in serious damage to the local ecosystems, diminishing their natural resilience to the perturbations. Those topics are well-studied and there

are multiple articles tackling different areas of intervention. Clear examples of how climate change, land degradation and loss of environmental resilience are interconnected are shown in a special issue of the IPCC on Climate Change and land. (IPCC, 2019) There, they mention the following statement: “Land degradation affects people and ecosystems throughout the planet and is both affected by climate change and contributes to it; in this report, land degradation is defined as a negative trend in land condition, caused by direct or indirect human-induced processes including anthropogenic climate change, expressed as long-term reduction or loss of at least one of the following: biological productivity, ecological integrity, or value to humans.” (IPCC, 2019) From their report it also becomes clear that “land degradation adversely affects people’s livelihoods (very high confidence)”. (IPCC, 2019) Therefore addressing this matter is of high importance, in Ukraine’s case especially, taking into account the volume of the geographical area affected by the destruction or degradation of the environment. Land and environmental degradation are raising concerns for the well-being of the local population staying in Ukraine at the moment.

In the older article on the matter of protection of the environment, Ruyle provides a “list of several direct and indirect examples of conflict's impact on biodiversity to support the idea that the protection of biodiversity is not only a global security issue but also that biodiversity conservation is imperative to maintaining peace and prosperity for all the people of the world”. (Ruyle L., 2018) The author listed several cases of how the environment has been used as leverage to gain a military advantage in the course of the war, damaging the civilians and the environment as a result. To demonstrate the argument, the author mentions the Iraq and Vietnam wars. In this research, Chapter 1.3 highlights similar examples of the Vietnam War, as well as Kuwait’s case, mentioning that environmental damage in the course of the war is, sadly, a recurring topic and that it requires new mitigation instruments that do not exist as of now.

It is also important to say that in the past two years, there were several articles that also raised the matter of specifically Ukraine’s environment suffering serious consequences of the russian war in the past 2 years. Some examples include the publication of Gross (2023), where he discusses a similar idea that nature very often becomes a subject of damage during the war. In his publication, he signals the concern that is also shared in this research: “Ecocide is recognised as a crime in both Russian and Ukrainian law but not yet in international law”, and he concludes that “various attempts to add a specific crime of ecocide to the list have not yet resulted in success.” (Gross, 2023) This supports the idea signalled in Chapter 2.1.3 of this thesis, pointing out that there is a dangerous gap in the international legislation on the

protection of the environment during the war conflicts. He briefly points out that “the organisation Scientists for Global Responsibility has estimated the contribution of all militaries combined just doing their peacetime manoeuvres to be 6% of global anthropogenic greenhouse gas emissions”, which confirms the deep connection that exists between climate change and war hostilities being a dangerous catalyser of the CO2 emissions growth.

Continuing the attempts to describe the global climate implications of the russian war in Ukraine is an article by Pereira et al. (2022), where the authors discuss the potential effect of this war on the ecosystems and their services in Ukraine. In the publication, they list several important aspects by the areas of the pollution, but what is important to say, is that they share the same uncertainty regarding the final implications of this war, that we may “expect dramatic environmental degradation (e.g., air, soil and water pollution) and a drastic impact on ecosystems and biodiversity loss (e.g., habitats destruction)”. (Pereira et al., 2022) In an article by Pereira et. al (2022), was uncertainty as to what will be the weight of the war on global SDGs achievement. And year later, Da Costa et al. (2023) studied how “the intersection of war and COVID-19 affect the United Nations' 2030 Agenda for Sustainable Development”. The authors conclude that given the information presented in the publication, “both COVID-19 and War “conspired” to negatively impact all the SDGs”, mentioning that in conclusion, “reclassification of SDGs may be needed, in order to strengthen economic cooperation and development, particularly, for those countries and populations with fewer resources, whilst also further investing in technological, scientific, and cultural collaborations.” (Da Costa et al., 2023) Sadly, to speak on an international scale regarding the implications war will have on the climate is too early. According to the general mood of the publications encountered, the damages and impacts may be more severe than imagined and estimated today.

Despite the uncertainty regarding the exact impacts of the war on the environment, there is for sure a need to start measuring the impacts of this war on the climate now, even in the current state of the limited data. An example of forming research on the emissions is presented in the article of Zhang et al. (2023), where the authors “assess how war affects human emission activities by observing atmospheric nitrogen dioxide (NO2) using high-resolution satellite spectroscopy”, demonstrating the capacities of satellites to “provide a unique perspective on the atmospheric consequences of humanitarian disasters”. (Zhang et al., 2023) Further research works of that type may help to clarify the uncertainty on the impacts of this war on the climate.

Article of Rawtani et al. (2022) raise a similar concern about the scale of impacts this war brings: “The war of such nature may directly hamper efforts to deal with aspects such as climate change, sustainable development goals (SDGs), conservation and protection of

biodiversity, and pollution control at local and global levels." (Rawtani et al., 2022) Despite being less technical, main conclusions of this topic-specific research are that "crisis in Ukraine, as well as the consequences to the environment, should not be overlooked", as the real effects will become visible only with time. (Rawtani et al., 2022) Authors forecast that "long-term impacts are still unknown and are going to be devastating and irreparable; the conflict's effects will likely extend beyond Ukraine's borders, affecting neighbouring nations through shared ecosystems and rivers and those further away, owing to disruptions in global food supply networks and biodiversity loss." (Rawtani et al., 2022) Similar to this research, the authors address a sensitive matter that "both intentional and collateral environmental damage" need to be held accountable and that further research in this field should be conducted, as well as that "environment should not be considered an unavoidable war casualty". (Rawtani et al., 2022)

The publications above address very valid points related to the effects of the environmental pollution caused by the russian war and summarise the main concerns of the international community on this matter. What differs this research from the others, is the deeper socio-cultural context knowledge of the author, and the local-based perspective on the reasons behind the warfare, as well as an added value to the perception of the mentioned environment, understanding its value and meaning in the local context, rather than only from the international detached point of view.

Another aspect of the environmental destruction of Ukraine is addressed in the article of Chowdhury et al. (2023), and it is the matter of the threat to food production as a result of the environmental damage. In their publication, the authors review the post-war scenario resource recovery pathway that could be taken. They suggest that added to the legislative changes, which are also mentioned in this thesis, and transition to the circular economy, Ukraine may apply the "model reported by McDonald et al., 2016 for ecosystem restoration in Australia". (Chowdhury et al., 2023) The key strategies of the proposed ecosystem restoration model are "habitat restoration, species reintroduction, controlling and managing invasive species, implementing sustainable wastewater management practices, providing safe drinking water facilities, promoting sustainable agricultural practices, protecting natural habitats" and, most importantly "local communities, stakeholders, and organisations must collaborate to build support, increase awareness, and ensure long-term success." (Chowdhury et al., 2023) In this thesis author's opinion, the further discovery of those and other suggestions, as well as forming new possible ecosystem recovery strategies is very important for Ukraine's recovery. As added to the suggested actions of the proposed model and its indicative timeline, there will be a significant delay in accessing damaged territories due to the mining of the majority of

previously occupied territories, which will significantly slow down the suggested initiatives' implementation. Partly due to this, this thesis lists some preliminary and “here and now” actions that could be taken by the local communities to start building local action and capacity to launch environmental restoration initiatives, instead of waiting for a post-war period to start.

Speaking of the initiatives proposed for the post-period, another post-war reconstruction idea is provided in the communication of Cifuentes-Faura (2023), which suggests that after the war Ukrainian cities should aim to become “smart cities”. There, the author shares the sentiment, which is expressed by Ukrainian civil society, which is that “the reconstruction of Ukrainian cities should focus on the inclusion of all citizens in public life, transparency in administration and public management, and improvement in the distribution of resources through energy-saving systems, lighting and water distribution”. (Cifuentes-Faura, 2023)

A very detailed publication on the same topic of envisioning Ukraine’s reconstruction is showcased in a report by Holovko and Haug (2023). They clearly set the expectations that are coherent with Ukraine’s civil society’s vision: “To make green reconstruction of Ukraine a reality, the reconstruction plan must be aligned with the European Green Deal (EGD) objectives, to clearly define the direction of development and avoid measures and investments that may impede the transition; the principles of domestic ownership and inclusiveness should be observed, aiming to build a joint understanding between donors, the Ukrainian government, and society.” (Holovko & Haug, 2023) They stress out that “accountability and good governance and a high degree of coordination between those involved must be provided to ensure alignment of efforts and sufficient scrutiny to minimize corruption risks”. (Holovko & Haug, 2023) Finally, they mention that “climate considerations should be included into all reconstruction investments; dedicated funding for climate-positive projects should be made available to compensate for the upfront premium of low-carbon solutions.” (Holovko & Haug, 2023) Those points are recurring topics raised within this thesis, which develops further the idea of the types of initiatives and projects that could be developed by local communities.

There are also several articles that tackle specific factors of the pollution to Ukraine’s environment. Like for example, the article of Basanets et al. (2023) discusses the “problem of chemical diseases in the military and civilians caused by exposure of air pollutants on the territory of hostilities in Ukraine”, that subsequently signals unhealthy air pollution levels.

And coming out of the other considerations regarding environmental degradation, there are articles that research the matter of the food security threat posed by the russian war in Ukraine. Examples of those are the publication of Pörtner et al. (2022) where authors lobby the idea that more environmentally friendly and sustainable forms of the food systems are required

globally, not to allow conflicts and wars to disrupt whole global food chains. And the research by Deininger et al. (2023) that is on "quantifying war-induced crop losses in Ukraine in near real-time to strengthen local and global food security". Research by Deigninger et al. (2023) is very interesting, as the authors attempt rather than on the supply side. They aim to "assess how the war is likely to affect Ukraine's production and thus global food security", using "Sentinel-2 imagery to construct outcome variables and indicators for the location and extent of conflict activity at different points in time." (Deininger et al., 2023) Proving the evidence outcomes of this research "already prompted several donors to establish cash transfers or investment grants targeted specifically at small farmers." (Deininger et al., 2023) Which is a great example of how focused field studies can produce meaningful local impacts, stimulating investments that will reach local actors and also will help to collect valuable data.

All the articles presented above showcase how important it is to keep on producing solutions and suggestions on how to overcome the challenges the environment of Ukraine is facing right now, in the course of russian ongoing war in Ukraine in 2022-2023. Even an initial assessment of the damages can help to start understanding what recovery path and mechanisms could be suggested to Ukraine, as it is in the world's interest to mitigate those environmental risks sooner rather than later, seeing the inevitable connection between climate change and environmental degradation. For the review of this question in greater detail based on some initial data in Chapter 2.1.3 publications of various international actors are used, as well as publications of the ministries of Ukraine, Ukrainian governmental portals, and other real-time sources of information, such as online maps, publications from Ukrainian NGOs and civil society actors.

Environmental restoration

The second term that derives as a question to be reviewed is - what are the environmental restoration actions available? Depending on the source, environmental restoration could be called either "ecosystem restoration" or "ecological restoration". Ecosystem restoration means "assisting in the recovery of ecosystems that have been degraded or destroyed, as well as conserving the ecosystems that are still intact." (UN Decade on Ecosystems Restoration, UNEP, & FAO, 2021) For example, the UN Decade on Ecosystems Restoration is one of the biggest umbrella initiatives that lobbies for ecosystem restoration worldwide, in many different ways and actions. The proposals laid out by the UN Decade initiative will be further discussed in Chapters 2.2, 2.2.1, 2.2.2, and 2.2.3, they are the guidelines for the proposals of the actions that could be taken.

An ecosystem in that case is considered to be "dynamic communities of plants, animals, and microorganisms interacting with their physical environment as a functional unit" (Society for Ecological Restoration, 2011), and it can be affected by either degradation, damage, or destruction. Ecological restoration, therefore, "seeks to initiate or accelerate ecosystem recovery following damage, degradation, or destruction" (Society for Ecological Restoration, 2011), which exactly differs reconstruction initiatives from environmental recovery initiatives. Environmental recovery initiatives take into consideration a lot of additional factors, related to nature, its behaviour, needs, as well as socio-economic relations established in the community in question and have to address multi-stakeholder matters that are needed to maintain the results of the environmental recovery initiatives long-term. Even though the solutions of the environmental restoration initiatives differ for different places and different contexts, there is a similar framework approach that can be applied in various cases, which is what the thesis focuses on.

Place-based approach, bottom-up approach

There is a specific approach taken in analysing types of environmental restoration actions available for Ukraine's local actors, and it is a "place-based approach", as well as a "bottom-up approach". As Barca elaborates, "the place-based approach has two fundamental aspects to it". (Barca et al., 2012) First, it "assumes that geographical context really matters, whereby context here is understood in terms of its social, cultural, and institutional characteristics". (Barca et al., 2012) Contrary to the space-neutral sectoral approach, that doesn't take the special local needs into account. Secondly, it "focuses on the issue of knowledge in policy intervention", assuming that underdevelopment of the potential of the regions happens as a result of forgetting to include local elites in new ideas generation for policy development, while "the purpose of development policy is to promote them through the interaction of those local groups and the external elites involved in the policy." (Barca et al., 2012) Place-based approach towards local development and policy development enables local actors to build on their strengths, be engaged in the decision-making processes, base decisions on the local data and needs, enable collaborative action and subsequently enable ownership in the projects or policies developed within this process.

Adding to the development of the policies and local initiatives, it is important to mention why exactly the "bottom-up approach" is taken into consideration. The "top-down" approach to local development is a common centralised government approach when it takes certain decisions and passes them onto the regional governments and subsequently - local

communities. While “bottom-up” is the local development approach that works in reverse- it is when community members and local representatives come up with initiatives or policies relevant to their territory and lobby them to regional governments or central government. It could apply through the ways of organising local working groups or local committees on different fields of development and building multi-stakeholder ownership for decision-making. Those are two commonly known approaches to local governance and the organisation of local initiatives.

Thesis and its connection to the main concepts

This thesis applies this concept in amplifying local actors’ voices in the matter of envisioning how future restoration and recovery processes have to be organised and how the priorities should be set. It suggests actions that can and should be carried out by various local actors on the ground - NGOs, local government, and civil society, to ensure that local needs are not overlooked by the general central government agenda and to ensure that local needs will be satisfied. Aspiring to envision the reconstruction of Ukraine after the war as an opportunity to rebuild better and provide local communities with the power of the decision-making and ensure the long-lasting positive impact of future restoration initiatives.

As synonyms of those systems of the organisation of governance, they can also be referred to as “centralised” and “decentralised” governance systems. In the past decade, more and more countries have passed to “bottom-up” decision-making, which is fuelled by the “decentralisation” process. Decentralisation is defined as “the delegation of power from a central authority to regional and local authorities”. (Merriam-Webster Dictionary, 2023) Decentralisation is one of Ukraine’s most successful reforms so far and in the spirit of supporting the efforts to empower local communities, this thesis refers to the newly acquired powers by local actors as a window of the opportunity to take advantage of drafting place-based restoration initiatives frameworks for the future projects to be carried out in their regions.

Further on, this research proceeds to identify local actors that can take over various proposed environmental restoration initiatives, by summarising the main actors involved in the field, and researching the latest publications available on the topic, reading the latest investigations, and reviewing conferences on the topic of Ukraine’s recovery held in the past year. All this is to draft an indicative list of actors who may help to build local frameworks of recovery initiatives and assist with the capacity-building of local communities. It also helped to define the main local actors for whom environmental recovery actions could be drafted for, within the limits of their legislative capacities and powers.

After this, the research attempts to identify what are the mechanisms of funding available for those types of actions and projects. This was possible as a result of a long analysis of the current information on the macroeconomic situation of Ukraine, presented in Chapter 2.1.1, reading reports of the international actors on the matter, and analysing Ukraine's National bank publications and forecasts. Though there are multiple perspectives on what are the mechanisms of funding available for local initiatives, this research attempted to narrow down the funding instruments available for the specific actors, as well as ensure that they are field-related, as environmental restoration is not as commercially attractive as infrastructure reconstruction projects. The proposed suggestions on the mechanisms of funding available and not available were formed in a process of analysing publications of Cancian, M. F. (2022), Centre for Economic Policy Research (2023), Centre for Environmental Initiatives "Ecoaction" (2023), Institute for Economic Research and Policy Consulting (2023a, 2023b), Karpinska, V. (2023), Migliorelli, M. (2021), National Bank of Ukraine (2023), OECD (2022), Reanimation Package of Reforms (2023), Trebesch, C. (2023), as well as various publications of World Bank (2019, 2020, 2022) and many more. The eligibility to get certain funding is still not guaranteed and chances depend on the local actor in question, but research still presents certain indicative suggestions on the sources of funding available and attempts to highlight where is the lack of resources, hoping that future financial commitments from the international donors will reflect more of the local needs, as well as will launch more of international aid programs as soon as more local data will be available.

It is important to address that despite the multiple claims for guaranteed funding from international governments published on the web, as well as seemingly a lot of funding ideas highlighted during the events of the international funding actors, the majority of the local reports show a different picture. The information and data presented by the local actors reflect a need for more funding for local development programs and initiatives, as the majority of the focus of the financial instruments is currently on the central government and its needs in order to ensure continuous funding of the most essential services for the population. As an initial conclusion of the analysis of the available publications, it is important to say that the concepts mentioned above have to be reinforced with upcoming funding and encourage finding more "climate-responsible", sustainable and place-based solutions. The legislation has to be improved to ensure that those financial contributions will be evenly distributed to various sectors and that possible corruption schemes will be avoided, as demanded by civil society.

Overall, despite the research question being based on the case study of a country at war, which means that there is a lot of uncertainty still, the publications reviewed may raise concerns

regarding the lack of a general framework for funding local initiatives that may not seem commercially beneficial yet. Most certainly the ideas of the organisation of funds distribution and empowerment of the local action by the means of those funds provision is something that has to be worked upon. Engagement of the civil society in the existing strategic renovation plans and local recovery strategies planning seems to be missing so far, and main comments from the civil society on this matter will be mentioned in greater detail in Chapters 2.1.2, 2.2 and 2.3.

Another general comment regarding the literature and publications reviewed is that there is seemingly a lack of literature and references for that kind of case study. Very often the countries at war are not being reviewed due to the data lack, uncertainty of the situation or lack of context knowledge, like in the case of Ukraine. But surprisingly, local actors issue a call to form the frameworks, do the hard work on the legislation and start building procedures as soon as possible, before waiting for the end of the war. The urgency of the situation which initially was a reason for forming this research is still in place, and contrary to the careful opinions of the international actors, publications of the local actors urge testing and finding solutions even "on the go". Lack of proposals on how to deal with limiting the destruction of nature and how local communities can handle its restoration during the war, and a lack of techniques on environmental preservation or conservation that can be applied in various scenarios of those unpredictable situations - the system laid out by the literature and publications reviewed is set for the countries that are not in the conditions of war. It is true that if the time frame of the military conflict is not long, those techniques may not be relevant. In case of a long-lasting emergency, there may be a need to form another type of measure that may help to save and preserve some parts of ecosystems for further restoration in a peaceful time, something that local communities and individuals could do. Despite it being a tentative hypothesis, current events in the world make the author assume that new frameworks and international environmental preservation legislation should be built to reflect the new realities of the world, as there is a very limited amount of knowledge on how to deal with those extreme situations on the site at the current time. Overall, the need for and importance of ecosystem restoration become more and more important, especially at those times. Further research on different countries at war or in long-lasting conflict will be needed to help form a scope of practical literature on that matter.

Another important matter that is hard to address due to the lack of literature on this matter is how to address the environmental damages caused during the wars, how to evaluate the financial equivalent of the value of the nature destroyed and how to add it to the reparations

that the country-aggressor have to pay to the country that is a victim of aggression. There is a need to have a scope of international standards and norms that allow local communities to define the added value that nature has provided for them, and for them to have a say in this process. Only estimating the financial value of the resources damaged may not reflect the damage caused to the local population by the environmental destruction.

Overall, despite of the volume of information available on the russian war in Ukraine, there are still very practical and real matters missing in the field of environmental restoration for that case study. Which should be seen as an opportunity to further develop the scope of international legislation and practical frameworks for environmental value evaluation worldwide.

1.3 Environmental damages caused by wars

Wars have occurred in the past and keep on occurring nowadays. They always bring major destruction to the territories where the military actions are held, countless human deaths, the division inside the society and a break between conflicting actors and leave a track of substantial mental traumas future generations have to deal with. Wars also always have a toll on the economic development of the countries involved, as a consequence of the enforced restrictions on the trade relations, limited opportunities of the business activity for the local businesses and therefore - loss of the taxes for the state, the decline in production of the goods and services, effect of the inflation and local currency's value decline. In the aftermath of the wars in the past century, the evaluation of their impacts is based on the damage done to the country's population, economy, and infrastructure and the damage caused to specific areas, keeping it all in the framework of the international laws and procedures that apply to the cases.

This study aims to focus rather on the environmental dimension, as often, the value of the environmental losses and the resources needed for its recovery are not given the proper financial value and importance when it comes to discussing the reparations that the aggressor has to pay to the victim of the aggression. Or the least - those losses are calculated with the classical capitalist approach to treating nature's value, and not according to the evaluation of the real ecosystem's benefits, or according to the local perception of the territories, or in accordance with the added value that nature provides for the economy and future generations. Therefore, further discussion on this matter is important to understand what are the lessons that humanity has already learned in the previous wars but hasn't effectively applied yet.

The environment has always been subject of the war action destructions. Despite whatever protection measures were in place when the latest wars were happening, the environment inevitably became one of the weapons and means to undermine the well-being of the nations. This section displays several cases of wars where nature's destruction has been used as a weapon in the past, to exhibit the importance of an issue.

One of the most prominent examples of using the environment as an instrument of war is 1990 Iraq's invasion of Kuwait, and in specific, the moment when the Iraqis released oil at the Sea Island Terminal and ignited the Kuwaiti oil wells, which is suggested to fall under the violation of "both international environmental law and the international law of armed conflict" (Edwards, J. P., Steinhardt, R. G., & Redtze, A. W, 1992) The situation that Edwards reviews is the Iraq's threats of causing oil spill in Kuwait if any other nation dares to enter the country, "holding the ecosystem of the Persian Gulf region hostage" and then causing an intentional oil spill of the "estimated value of between 500,000 and three million barrels of oil". (Edwards, J. P., Steinhardt, R. G., & Redtze, A. W, 1992) Though knowing that there were rules of the war and international laws in place, Saddam Hussein, who was president at that time, didn't admit the deliberate ecosystem destruction and irreversible pollution that his army caused and instead "justified using oil as a technique of self-defence in fighting the United States". (Edwards, J. P., Steinhardt, R. G., & Redtze, A. W, 1992) In Edwards' work, which was published in 1992, he highlights all violations of the international laws that Iraq's regime did and concludes that there should be a precedent of the reparations for such an extreme and unreasonable volume of nature's destruction in international law.

One of the other famous examples is the US military efforts to take over Vietnam in 1961 to prevent the communist takeover during the Vietnam War of 1955 -1975. "By 1971, the US Air Force had run over 19 905 spray operations, an average of thirty-four daily, over the forests, jungles and fields of southern Vietnam", spreading the herbicides for the defoliation called "Agent Orange". (Wilcox, F. A., 2011) Ecosystems and local animal species were massively affected, and human health and lives were endangered, and it was all due to the loophole that the US government found at that time which said that "the use of defoliant doesn't violate any rule of international law concerning the conduct of herbicidal warfare and is accepted as a tactic of war". (Wilcox, F. A., 2011) As a consequence, it became the first war "in human history where in the process of trying to defeat an adversary, a government inadvertently poisoned its own army." (Wilcox, F. A., 2011) Those actions have affected not only nature, animals, the local population, US, and Vietnamese soldiers, but also future generations, as the illnesses and damage to the trees and crops have spread widely. In addition to the unacceptable casualties

among the local population, the way nature and animals were not protected, despite already having the rules on the war in place, shows how little protection or safeguard is granted to the environment during the war affairs.

That kind of military behaviour targeted to use environmental destruction as an instrument of war is called “scorched-earth policy - the military tactic of destroying everything that enables the enemy to wage war, including crops, livestock, buildings, and infrastructure.” (Vaughan, D., 2023) The definition of this warfare technique says that it can be implemented “by an army advancing through enemy territory to punish resistance and reduce enemy capability or by a retreating army to leave nothing of military value to the opposing force.” (Vaughan, D., 2023) Another form of this technique is called “saturation bombing” or “carpet bombing”. The latest documented application of the scorched-earth technique has been observed during the ongoing russian invasion of Ukraine that started in 2022. At the beginning of this war, Russia used the majority of the precision ammunition they had, and as a result of the sanctions and therefore limited production capacities, they started to rely “on artillery to raze entire cities in an effort to dislodge Ukrainian defenders.” (Vaughan, D., 2023) The remains of the missiles were used “to strike civilian infrastructure in Ukrainian cities far outside the combat zone”, as well as for the attacks on Ukraine’s power grid that “plunged large portions of the country into darkness”. (Vaughan, D., 2023) In addition to the attacks on the civilian infrastructure, targeted massive destruction of the natural resources (such as Kahovska’s water plant destruction) and multiple war crimes against humanity committed, the russian invasion has become one of the latest cases of the scorched-earth policy application, affecting enormous natural territories that are left at the threat of irreversible destruction.

The concerns that made scientists research more about Vietnam’s or Kuwait’s case are similar to those that arise when learning more about the current situation of pollution in Ukraine. Pollution and destruction of ecosystems and nature in such volumes have immediate effects on human health, as well as affect the agricultural capacity of soils and diminish the natural resilience of the ecosystems. What is worse - the effect of pollution proves to be long-lasting, often irreversible and affects future generations almost at the same scale as the preceding generations were affected. The cases listed are meant to highlight that even now environment keeps on getting affected by wars, despite the supposed environmental protection system set for the cases of war action and therefore there is a need to rethink and reconsider the existing system, for the sake of the sustainable future and for the sake of planet’s health.

1.4 Methodology and research design

This case study employs various methods to finding information and adapting to the unique challenges posed by assessing environmental damages and envisioning recovery solutions in the context of the ongoing russian war in Ukraine (2022-2023).

1. Quantitative Data Analysis. Quantitative data analysis forms a foundational component of this research. It involves the systematic collection, compilation, and statistical analysis of quantitative information to evaluate and quantify various aspects of environmental damage and its consequences. This approach leverages data from a wide range of sources, including reports from international organizations, national ministries, governmental portals, online maps, and publications from Ukrainian NGOs and civil society actors. With help of quantitative data search, research was able to produce initial macroeconomic profile of the country, access the number of environmental damage cases to different regions of Ukraine, find an equivalent of an estimated value of those destructions, as well as to make an analysis on the financial commitments announced for Ukraine. All this was made by comparing numbers and information from various international and local publications from 2022-2023.

2. Qualitative Data Collection and Analysis. Qualitative data collection techniques are implemented to gain a nuanced understanding of the perceptions, needs, and challenges of local communities and stakeholders in Ukraine. Qualitative methods such as analysing interviews, surveys, reviewing conferences conducted on the matter, reading reports from local organisations where they showcase opinions of a diverse range of participants, including local residents, community leaders, NGOs, and governmental representatives. These in-depth qualitative insights provide a holistic view of the social and cultural dimensions of environmental damage and recovery, local point of view on the recovery path to be taken, displays main concerns, doubts and challenges faced by local actors.

3. Literature Review and Document Analysis. A thorough available literature review and document analysis are carried out to extract valuable insights from existing publications, academic articles, reports, and real-time sources of information. These sources encompass a wide spectrum of perspectives, both international and local. The analysis of academic literature aids in identifying gaps in research, potential methodologies, and theoretical frameworks applicable to the study's focus. Publications from Ukrainian governmental bodies, NGOs, and civil society actors are of particular significance as they offer real-time insights into the current state of environmental damage and recovery efforts.

4. Case Study Analysis. A comprehensive analysis of Ukrainian case study is conducted, focusing on the unique challenges posed by the Russian war of 2022-2023. It involves a detailed examination of the environmental damage inflicted during the conflict, with an emphasis on war-related damages and damages that were a consequence of the war crimes conducted by russians. The analysis considers factors such as territorial constraints and data availability for conflict-affected areas and applies a case study framework that was set based on the local actors' perspectives to understand the dynamics of environmental degradation and main challenges that will arise in the nearest future.

5. Basic geospatial analysis. In researching for the damages caused to the environment of Ukraine, the author has compared open sources of the geo-spatial information presented in the form of maps to identify the areas affected the most, as well as to geolocate the specific severe cases of environmental destruction.

6. Cross-Comparative Analysis. To provide a comprehensive perspective on environmental recovery, the research employs a cross-comparative analysis. This approach involves examining successful environmental recovery initiatives and actions taken in other countries and regions that were presented by the UN Decade of Ecosystem Recovery, drawing insights and lessons that could be applied to Ukraine's context. By comparing and contrasting approaches and outcomes, the study seeks to develop initial indicators of the actions relevant to Ukraine's unique environmental restoration needs.

7. Policy and Legal Framework Analysis. A critical analysis of Ukraine's existing policy and legal framework related to environmental protection and restoration was subtracted from the publications of the local actors who actively work in the field. Initial concerns about the effectiveness of current regulations, as well as signalling of potential gaps and areas where policy adjustments will need to be carried out, are underlined. The research also signals that current international legislative tools and regulations that are supposedly set for environmental protection during the wars don't seem to be working as planned. And this could be showcased by the volume of Ukraine's environmental destruction, despite having certain areas that are affected belonging to the register of the world's most biodiverse areas of the world. Research highlights specific areas and questions that should be addressed when implementing improvement of the legislation so that it has the capacity to address the complexities of environmental damage caused by war in a just way.

8. Community and Stakeholder Engagement. Building research on the perspectives and points of view of the local actors and stakeholders plays a pivotal role in this study. By working closely with the publications of those key actors in future recovery efforts for Ukraine, the

research gains an understanding of their perspectives, concerns, and potential contributions to the restoration process. Engaging with local actors in an informal way by attending their online events facilitates a more contextually aware and inclusive approach to envisioning and implementing environmental recovery projects.

In concert, these methods allow for a comprehensive examination of the environmental damage caused by the war in Ukraine, the available avenues for restoration, and the critical role of local actors and communities in shaping recovery initiatives. Furthermore, this multi-methodological approach helps identify practical pathways for mitigating the environmental risks associated with climate change and conflict-related damage.

The work has started by conducting an analysis of the available information on the matter of the russian war in Ukraine of 2022-2023, its advancing and the territories the most affected. This has been done by the means of processing the information available from the open sources. This includes Ukraine's official institutions' publications, such as Ministries of Ukraine websites and open databases, publications from the local governments, and publications from the Office of the President of Ukraine and the First Lady of Ukraine. Other sources of the local information have been the publications from the local NGOs and associations, local accredited news outlets and analytical magazines.

This was important for building the case on the necessity of the research, choosing the main topic to investigate, to identifying gaps in the informational field. Coming out of the statements published, it became very clear that Ukraine's future and its speedy recovery after the end of the war will be of the interest to Ukraine's population. From the perspective of sustainability, the majority of the actors have been building a case on how this recovery should be done, and which damage specifically has to be addressed. Thanks to the incredible efforts of the local actors and their restless reporting and documenting of the damages done, it was easy to conclude that one of the areas that suffered the most as a consequence of this war was the environment.

Multiple publications have reported significant damage to the cities, local population and the territories around, the most significant damage of all caused on the territories occupied by the russian forces. Reportedly, the surrounding territories damaged include national parks and biodiverse zones in the South of Ukraine, and constant damage to the energy stations and nuclear power plants keeps being reported. The number of environmental pollution cases seems to grow at least 1 new case per day, which signals the scale of the problem. This information has been analysed and finally, the conclusion was one of the most important directions that will

become at the centre of the future restoration efforts will be the environmental recovery of Ukraine.

Further, to solidify findings, international publications on a similar topic have been analysed. Those include publications from international donors and organisations that actually work on the territory of Ukraine, such as the World Bank, the European Commission, USAID, etc. In addition to that, the analysis of the publications on the topic of the recovery and the reconstruction has been taken into the account. Referential for understanding international perspective on that matter have been the conferences on the Marshall Plan for Ukraine, which have been held by USA representatives, publications from the European Commission and FAO. It became clear that Ukraine's allies also are interested in forming solutions ahead of the time, as the damages that Russia is causing now have a direct link to the well-being worldwide, as well as the emissions that come out of this war already have significantly contributed to the speed of the climate change development. Ukraine's local actors have also reported regarding the soils' degradation and, as Ukraine is one of the biggest grain suppliers of the world, the topic of environmental recovery kept on coming up in all the publications encountered, in addition to the pledges for the future funding claimed by the international organisations.

After assessing the need for such research, the author concluded that local perspectives are considered as the main references for the future recovery initiatives and often local actors are the advisors for the international actors' publications. The main principles for the envisioned recovery have been laid out in the Chapter 2.1.2 on the local actors and their potential, to highlight the importance of the local perspective in drafting their future sustainable territorial development.

That is why the structure of the thesis has taken the following form. Chapter 1 and its subchapters describe theoretical terms and methods on which the case study ideology was based on. In addition, Chapter 1.3 introduced one of the main ideas of the thesis that the environment is a subject of wars and describes other case studies where intentional environmental destruction, or ecocide, has been committed. This chapter is important to understand why environmental damages in Ukraine's case should also not be seen as a direct consequence of war action, but rather as intentional destructions caused by the aggressor in order to use the environment as a leverage for the military advance, which is prohibited by the international laws. Chapter 1.5 highlights important limitations relevant to this case and elaborates on some assumptions taken by the author while moving ahead with the research.

Chapter 2 and its subchapters showcase the case study of Ukraine, with all the relevant components of this war, with a focus on environmental destruction. Chapter 2.1.1 is a historical

and macroeconomic profile of Ukraine, which provides a wider background for a better general understanding of the country reviewed in this study. Even displaying certain gaps in the information available on the economic situation in Ukraine is important to understand what implications this war has on the country and its resilience. Describing the macroeconomic profile of Ukraine is also important as the economic situation in the country and nearest future forecasts can help to understand what challenges and funding needs Ukraine will experience by the end of the war. It builds a certain draft of the country's profile that future investors for the recovery initiatives may be interested in.

Chapter 2.1.2 attempts to highlight the main local actors in the field, mentioning a few specific examples. It also gives an overview of local actors' potential, their role in the recovery efforts, and their main visions and plans on the matter. Chapter 2.1.3 is the core of the thesis idea development. It addresses collateral damage on ecosystems and biodiversity generated by the ongoing war in Ukraine, attempts to summarise the damage caused to the environment, and identifies the territories affected the most. The verification of the environmental damage identified combines the comparison of the satellite images available online from various sources. The research also attempts to find an answer to the question if the damage to the environment by russian forces has been intentional and finds tentative evidence of the application of the so-called "scorched earth technique" Russia is famous for using. This was carried out by putting on the top of the map of the lands protected by the framework on biodiversity and preservation of specific severe cases of environmental destruction and forming tentative conclusions on the intentions behind those damages caused.

Chapter 2.2 suggests a certain framework for future recovery projects and initiatives derived from the main local actors in the field and one of the biggest movements for ecosystem restoration - the UN Decade on Ecosystem Restoration. Chapters 2.2.1, 2.2.2, and 2.2.3 suggest certain types of actions on ecosystem restoration that may be available for different types of local actors, in specific for the NGOs, local government and civil society individuals. What is important to mention, is that those actions are being more general, as providing very territory-specific proposals is complicated due to the ongoing nature of destructions, as well as due to the detailed data availability for a lot of territories, especially those that were formally occupied.

Chapter 2.3 provides a summary of the financial tools and sources of funding available for the recovery initiatives. It also attempts to assess if the funds are accessible to all the local actors mentioned, or rather only to the central government. Sub-chapter 2.3.2 provides certain

suggestions on how the financial tools and future funding should address local needs, and what kind of principles and organisation it should follow to ensure sustainable reconstruction.

Based on the research completed, Chapter 3 provides the summary of results and findings in the process of this research. Chapter 4 engages in the discussion regarding the main aspects discovered and discusses the future pathways of development that may be relevant for consideration, some aspects missing in the general perception related to this case study. Based on all the information reviewed and presented in the chapters above, Chapter 5 provides conclusions and Chapter 6 issues indicative recommendations for future further research on this topic.

1.5 Limitations and assumptions

As the topic of this research is related to the real-time unfolding events of the war, there are certain practical limitations related to the research that are relevant to this case study.

1. Data availability. The lack of consistent and reliable data from the ground. In times of war, the majority of the geo-sensitive data is not in public access. Even if some portions of it is in an open access, very often the numbers provided about actual damages are general and not necessarily place-specific. It still allows us to derive certain conclusions, but finding data and stating that it is final is impossible and will be not possible up until the end of the active warfare. The same goes for producing the maps of the territories, data provided is not enough to prepare detailed maps, only a general view of the territories discussed in the text.

Another issue with the data is that governmental bodies that provide it on their platforms in real-time can change the data availability from day to day, which is what happened with the EcoThreat database, where the numbers described in July and August 2023 during the production of Chapter 2.1.3 are not displayed on the webpage in September and October 2023, as the setting of the website has changed. While extensive efforts were made to gather data from diverse sources at specific points in time, the accessibility and quality of such data can be inconsistent, which can be explained by the nature of the situation in Ukraine now.

2. Overwhelming amount of information. Unlike some other study cases, Ukraine is constantly in the news headlines worldwide, and multiple publications around the world are discussing various aspects of this war. Even the case of environmental destruction in Ukraine and general reporting on destructions occurring there daily is a recurring topic for articles and publications appearing almost monthly. Despite a lot of various information available about the case study from various sources, there is also a lot of disinformation, fake news and

misleading publications that aim to undermine Ukraine. Selecting, systematising, and structuring necessary information is a very long process and doesn't guarantee that information encountered today will still be actual tomorrow.

3. Time constraints. This research concentrates on the environmental damage within a specific timeframe, commencing from the onset of the russian invasion on February 24, 2022, and ending by July-August 2023. This temporal constraint inevitably excludes the examination of long-term impacts and restricts the generalizability of findings to contexts beyond this timeframe. Environmental dynamics are often gradual, and some effects may not manifest within this narrow window. Another serious aspect of this is the unpredictability of the war and the lack of a certain understanding of how the events will unfold in the future. For that reason, the author decided to focus on the ideas of types of action that could be taken in restoration efforts in Ukraine based on the current knowledge, rather than suggesting very specific projects that may not be relevant in future.

On the other hand, for the case study purpose, the following assumptions were adapted.

1. Assumptions on stakeholder involvement. The research operates under the assumption that the involvement of a variety of stakeholders, coordinated and guided by the local actors, is both feasible and desirable for successful environmental recovery in Ukraine. Local actors are considered as the main driving force for change in Ukraine, supported by their local governments that should have all necessary capacities given the successful implementation of decentralisation reform. However, the actual extent and effectiveness of stakeholder participation may vary significantly based on the prevailing political, social, and economic conditions in the country at a specific point in time. This assumption requires a flexible interpretation, recognizing the realities of the specific local context.

2. Policy and funding assumptions. The thesis rests on the assumption that an integrated approach to environmental restoration is practically attainable and desirable both by the civil society and the central government of Ukraine. The proposed framework encompasses an ideal scenario where the ideas for action that local actors will move on with are supported by policy change on the governmental level. The hope will be that the policies will ensure the support of comprehensive restoration initiatives and establish the funding mechanisms required to ensure initiatives' longevity. While this theoretical basis is instrumental for designing innovative approaches, its realization may face obstacles and challenges at the policy and implementation levels.

3. Hope for the gradual stabilisation of the situation in Ukraine and faith in Ukraine's victory in this war. This research assumes that the end of the war and Ukrainian victory is just

a matter of time, but also recognises that the timeline for the stabilisation is not set yet. Therefore, despite staying positive in the perspectives and potential of local actors-led actions for the recovery, the timeline will depend on Russia ceasing fire and starting the peace talks, judiciary proceedings on their war crimes and subsequently - solving the matter on the reparations they owe to Ukraine. Taking into account the recent news about the possible extension of the war initiated by the Russian government, the reality on the ground, however, may differ significantly. There may be some new political developments, security concerns, and unforeseen events that can disrupt or reshape the course of launching the recovery process.

4. Financial constraints. While discussing funding mechanisms, the research assumes that financial resources will be available as needed for environmental restoration projects. However, the actual allocation of resources is influenced by numerous factors, including national budgets, international aid, and donor priorities. Economic uncertainties may impact the availability of funds for environmental recovery initiatives.

These limitations and assumptions collectively define the contours of this research and reflect the complexity of the subject matter. Recognizing these constraints is crucial to ensuring that the conclusions drawn are interpreted within their specified context and that any suggestions are being seen as those that are relevant to be proposed considering the real-time data availability and knowledge on the topic at a defined moment in time.

Chapter 2. Case study of Ukraine, its environment, and its recovery needs

2.1 Country profile of Ukraine

2.1.1 Macroeconomic situation and political context

The economic situation of Ukraine in 2022-2023 is very complicated due to multiple reasons. On one hand, there is a historical struggle that took its toll on Ukraine's economic growth between 1991 and 2023, related to the establishment of the independent political governance of Ukraine after its break from the Soviet Union on August 24, 1991. This struggle of the establishment of a newly independent state, making governmental reforms and having to manage an upcoming economic crisis that came post-break separation, became even more challenging for Ukraine due to the weakness of its government and economy at that time.

On another hand, there was significant political tension between Ukrainian and Russian governments, which originated from all the historical events preceding the illegal russian annexation of Ukraine's Crimea in 2014 and the full-scale russian invasion of Ukraine on the 24th of February 2022. Moreover, there is an immediate effect of economic, social and energy crises on Ukraine's economy that followed the russian invasion and state of war on Ukraine's territory that Ukraine has to deal with now. Massive infrastructure and natural destructions, human deaths, lack of production force, energy and nuclear terrorism, and dangers for food production - this is all just a brief recap of the challenges modern Ukraine has to face and to address. But before proceeding to discuss Ukraine's economy in 2022 and 2023, there is a need to explain the historical and political context that preceded it, with a focus on the economic implications.

After the Second World War termination in 1945, Ukraine's government representatives have still been dependent on political decisions made in Moscow. Russian state started massive in-migration of their citizens into Ukrainian cities and towns, taking advantage of the human losses and presence of the now empty living infrastructure, this period is being referred to as the "period of Russification". (Encyclopedia of Ukraine, Markus, V., & Stebelsky, I., 1993) This was the beginning of social tensions that added to the situation of modern relationships between the 2 countries and their populations.

The first challenge Soviet regime has faced an issue of reconstruction of the economy, that has suffered major losses in the aftermath of war: "16,000 industrial enterprises, 2,000 railway stations, 28,000 collective farms, 872 state farms, 714 cities and towns, 28,000 villages, and 2 million buildings had been destroyed; 10 million people had been left homeless; more

than 12 million tons of agricultural products, over 14 million head of cattle and sheep, and a large amount of agricultural machinery had been taken to Germany." (Encyclopedia of Ukraine, Markus, V., & Stebelsky, I., 1993) The Soviet Union has created "Fourth Five-Year Plan (1946–50) and allotted 20 per cent of Soviet capital investment for the reconstruction of Ukraine; over 2,000 plants and the electric power system were rebuilt and expanded, and the natural gas industry was developed in Western Ukraine." (Encyclopedia of Ukraine, Markus, V., & Stebelsky, I., 1993) Another important for Ukraine industry - agriculture, has been reviving more slowly, due to the "the opposition to collectivization in Western Ukraine, the lack of farm machinery, population dislocation, and a drought in 1946", and due to the Soviet authorities' decision not to lower the agricultural procurement quotas in Ukraine at this time caused second Soviet-caused Famine ("Holodomor") of 1946–1947. (Encyclopedia of Ukraine, Markus, V., & Stebelsky, I., 1993) The first Famine, also referred to as "The Great Famine" ("Holodomor") was in 1932-1933. By 2023, over 26 countries around the world have recognised "Holodomor" caused by Soviet regime as a genocide against Ukrainian nation that has killed between 3,9-4,5 million Ukrainians. (Wikipedia, 2023)

By 1991, after becoming independent again, Ukrainian government had to face that country had significantly reduced numbers of the Ukrainian population, was fighting for the establishment of the Ukrainian identity and culture that was previously banished by the russian Soviet regime and had a significant loss of the productive powers and capacities. World Bank demonstrates the decay Ukraine was facing by 1991 with the help of the GDP growth indicator, presented in Annex 1. (World Bank, 2021)

In 1991, the GDP of Ukraine has been -8,7% of annual growth, getting to its lowest in 1994 and resulting in -22,9% annually. (World Bank, 2021) The first stabilisation of the economic situation happened in the year 2000, resulting in 5,9% of annual growth. (World Bank, 2021) And to exhibit the correlation between the political situation in Ukraine and its macroeconomic indicators in the light of before mentioned tensions that were present between the government of Ukraine and Russia, we can compare the GDP growth of two specifically sensitive years for Ukrainian independence.

Since the end of 2013, there has been a significant push from Ukraine's pro-Russian ex-president to sign a trade deal with Russia and to avoid the signature of the EU integration deal. This caused massive protests from Ukrainian people, who in November 2013 "took to the square to express their protest against pro-Russian President Viktor Yanukovych's refusal to sign the association agreement between Ukraine and the European Union." (Ukraïner, Tsekhosh, I., 2023) Later this month hired pro-Russian military organisations and local police

serving the pro-Russian president have beaten up peaceful students that were protesting, which caused a major national uprising and caused a Revolution of Dignity. As Ukraine's research project describes it: "This turned into a struggle for the renewal of the state system, the defence of democratic ideas, and the refusal to submit to the pro-Russian regime." (Ukraïner, Tsekhosh, I., 2023) The year 2013 has resulted in 0% GDP growth in Ukraine. (World Bank, 2021)

The year 2014 was more challenging for Ukraine due to the "adoption of "dictatorship laws" by the Verkhovna Rada of Ukraine on January 16, 2014, which limited the rights of citizens and expanded the powers of special officers to punish participants in protest actions." (Ukraïner, Tsekhosh, I., 2023) Eventually, hundreds of protestors were punished and murdered by the police that has been supplied with ammunition from Russia. Clashes between the armed forces and civil society have continued and intensified. On February 20, 2014, the "Bloody Thursday" happened. "On this day, snipers killed 48 at Euromaidan. On the same day in 2014, Russia began the occupation of Crimea, and in the spring, they invaded Eastern Ukraine." (Ukraïner, Tsekhosh, I., 2023)

Despite winning the battle with pro-Russian movement representatives and making the ex-president escape to Russia, Ukraine's economy has significantly been damaged. Exactly then Ukrainian citizens majorly started to reject doing any trade or business with russian companies and their government. A lot of civilians had to leave their working positions and leave to the frontline of the East of Ukraine, thousands of internally displaced civilians have fled Crimea, Donets and Lugansk regions and moved to central Ukraine. Dozens of factories and productions have had to be abandoned because of the russian invasion of 2014. Ukraine's GDP growth in 2014 has been -10,1%. (World Bank, 2021) Despite a lot of events following up the invasion of 2014, in 2016 Ukraine managed to recover economic growth, having 2,4% GDP growth, and keeping it growing steadily, resulting in 3,2% of annual GDP growth in 2019. (World Bank, 2021) When the Covid-19 pandemic hit the world, Ukraine finished 2020 with negative GDP of -3,8%. (World Bank, 2021) Despite it all, Ukraine's economy kept on following its steady growth of the past few years, managing to get 3,4% of GDP growth in 2021. (World Bank, 2021)

The year 2021 is the last year of any international data available for Ukraine's economic situation after the russian full-scale invasion of Ukraine on February 24th of 2022. Despite of occasional availability of the latest indicators, they are inconsistent, that data is summarised by author in the Annex 2. Therefore, the main reference for the national operations and indicators after 2021 is considered to be the National Bank of Ukraine. According to the NBU's preliminary estimates, "Ukraine's economy shrank by around 30% in 2022" as a result of the

full-scale invasion of Russia. (NBU, 2023) They estimate that there is a possibility to avoid recession and even achieve 0.3% GDP growth in 2023, hoping that this would help to "demonstrate the economy's resilience in the face of difficult challenges." (NBU, 2023) But they make sure to highlight that this will heavily depend on the resilience of the energy system and the constant in-flow of international financial aid. (NBU, 2023) Current financial aid is being received in the form of concessional loans and grants worth over USD 38 billion and is being seen as one to help to "finance critical state budget expenditures, including education, social and healthcare, and thus support the economy as a whole". (NBU, 2023) As well as it will help to "support Ukraine's international reserves, so the NBU will be able to continue to balance the foreign exchange market through its interventions." (NBU, 2023)

From then on NBU expects Ukraine's real GDP to grow by 4-6% annually in 2024-202, which also may be seen as an example of the economy's resilience for the potential investors, hoping that there will be "increased domestic demand, including due to the return of Ukrainians from abroad, the restart of enterprises in the de-occupied territories, the full resumption of the Black Sea ports, and increased harvests" (NBU, 2023) They also mention a specifically important role that "accelerated European integration and Ukraine's reconstruction projects, which the NBU does not currently take into account in its forecasts" can have for Ukraine's post-war recovery. (NBU, 2023) Reconstruction and recovery projects will play an important role in Ukraine's economic recovery, as well as they will be very important for the civil society, as those will be aimed for the infrastructure's recovery, strengthening democracy and local governments. They also are seen as a possible boost for future employment, as over the past year, "the unemployment rate rose from 9.8% to 25.8% in 2022" and those who will suffer from it the most are those who were internally displaced due to the war, as well as those who left their jobs for the military service and will require post-war society integration. (NBU, 2023)

NBU hopes that "Ukraine's recovery will require hiring more workers and as a result, the NBU expects the unemployment rate to start declining in 2024, and for real income growth to accelerate; personal incomes will also increase due to the continued high level of budget support, including social spending." (NBU, 2023) All in all, NBU hopes that in 2023 "inflation will slow below 19%: 18,7% and in the coming years, as security risks decline and Ukraine begins to rebuild, inflation will slow even more significantly - to 10.4% in 2024 and 6.7% in 2025", hoping that full-scale renewal of logistics and increase of the harvests will play their role. (NBU, 2023)

As to the forecasts for the future, NBU has mentioned that the macro-forecast is based on the possibility of a decrease in safety risks in the year 2023. But they admit that there are certain risks that will affect the possibility to implement this forecast: “In case sea ports won’t be unblocked, intensification of the military action will occur and war may be prolonged - economic activity will be limited and inflation risk will intensify; additional budgetary needs and formation of significant quasi-fiscal deficits in the energy sector due to the unpredictable character of the war; delays with the return of a significant part of citizens to Ukraine and potential additional migration abroad may limit the demand, and in the long perspective - will threaten the intensification of the structural problems in the labour market, decrease of the economic potential; having inconsistency of the incoming external funding; complications of work for “Grains corridor”; climate-related threats - reduced harvests, etc; russian threats of energy and nuclear terrorism; “ (NBU, 2023)

2.1.2 Local actors and society’s potential

Ukraine’s modern active society has been formed during the events of the Revolution of Dignity of 2013-2014, and new collaborations have risen between governmental and non-governmental actors, international actors, local associations, and non-governmental organisations that unite their forces and do their best to launch positive changes in Ukraine together.

Ukraine’s civil society potential is well recognised among the key international partners and donors working in Ukraine, and it has been even remarked by the European Commission in their Communication №407 where they provided an Opinion on Ukraine’s application for membership of the European Union, submitted on 28 February 2022: “Ukraine has a vibrant civil society that plays an active role in the promotion and oversight of reforms; the expertise of Ukrainian civil society organisations on key sector reforms makes them a valuable partner for the government and an important actor in local service provision.” (p.6, Directorate-General for Neighbourhood and Enlargement Negotiations, 2022).

A lot of Ukrainian non-governmental and non-profit organisations, and local communities indeed are partnering up with international donors in big-scale projects related to Ukraine’s EU-integration reforms. As an example, Ukraine’s one of the most successful reforms - decentralisation reform couldn’t have worked that well without the collaboration provided to the central government by the local community associations, and local authorities, without mayors’ proactivity, hard work of the local staff and contribution and guidance from

multiple activist organisations, such as “Reanimation Package of Reforms”, “Association of Ukrainian Cities”, “Covenant of Mayors”, etc. (Reanimation Package of Reforms (RPR), 2018; Association of Ukrainian Cities, 2023; Covenant of Mayors Eastern Partnership, 2023). As a rule, those non-governmental organisations and local associations always take the lead in assisting international actors coming to Ukraine with development projects in various fields. Their representatives are capable of providing insights into the local legislation, are very well versed on the problematics of the current system and are capable to provide high quality and deep integrity professional guidance, which will inevitably become a key for the success of the future recovery projects in Ukraine.

As for the Ukrainian government-civil society collaborations, the most outstanding organisations are of President Zelenskyy’s office and First Lady’s office that has shown unprecedented leadership and unity in supporting the nation: United 24 and Olena Zelenska Foundation. (UNITED24. The initiative of the President of Ukraine, 2022; Olena Zelenska Foundation, 2022) Both are fundraising organisations that aim to gather funds for supporting Ukraine throughout the war period. Up until May 2023, United 24 alone has gathered over $ 337 438 053 for projects in the fields of “Defence, Humanitarian Demining, Medical Aid, Rebuild Ukraine or Education and Science”. (UNITED24. The initiative of the President of Ukraine, 2022) Those fundraising campaigns are good examples of the new form of civil society’s financial support adopted by the Ukrainian community.

Current mechanisms of fundraising and gathering savings for specific purposes, as well as practices of high-quality monitoring after those funds’ spending can potentially transform into the new funding mechanism for recovery projects and become a strong leverage mechanism of civil society on the matter of rebuilding Ukraine. After the victory in the war, those new saving and fundraising habits of the Ukrainian population can become a basis for the appearance of new format community-saving schemes or rotating loan systems regulated by the community itself.

Overall, the current contribution of Ukrainian civil society and organisations is well beyond anyone’s expectations. It doesn’t only express in financial support of the humanitarian and military causes, like in the case of supporting the President’s fund, but also in the direct support of the military by contributing unimaginable sums to the charity funds.

A good example of how much help Ukrainian society has provided to the Ukrainian army could be the fundraising project “People's Bayraktar” that took place on 22-24 June 2022. According to the Serhiy Prytula Charity Foundation which held this fundraising initiative, “more than 1.3 million transactions were made by Ukrainians during this campaign, and

according to an approximate estimate, almost 3 million Ukrainians took part in this large-scale fundraiser". (Serhiy Prytula Charity Foundation, 2023, January). Thanks to the efforts of Ukrainian civil society, as well as the contributions from international society, over UAH 600 million were raised in 2 days during this campaign, which is roughly over 15 million EUR. The determination and deep sense of duty expressed by the public towards supporting their country will inevitably receive equal feedback from the government in the post-war period.

The bonds of trust made between both sides during the period of the war have the potential to strengthen civil society-government relationships and will become a basis of the new era of governance in post-war Ukraine. In the frames of being an EU candidate, with a memory of the community's contribution to Ukraine's victory, the government will inevitably become even more interconnected with civil society to reflect its needs and respond to their requests, following the course set by the current President's administration.

Apart from all the financial support and informational support relationships between local actors mentioned before, there is one more aspect that will play an important role in Ukraine's recovery in the future. It is about the new relationships built between civil society and governmental institutions and new channels of gathering crucial information from the grassroots level that appeared in the past 3 years.

Pre-war Ukrainian ministries and local governments didn't have enough information from the ground level to build high-quality development forecasts for cities in different regions. It was due to the lack of technologies, professionally prepared local staff and due to not having a common methodology in place. In 2020, the Ukrainian Ministry of Digital Transformation had the ambition to make Ukraine a "world champion in being digital", following a "state in your smartphone" concept which transformed into the creation of the digital application called "Diia". As Minister of the Digital Transformation has described it himself: "Governments are created to solve citizens' problems, not to create them: we have rethought the expectations of Ukrainians from the government, we have built a process of interaction between the state and the citizen from the point of view of the end user, not the officials." (Ministry of Digital Transformation of Ukraine, 2023) "In every project, our team focuses on people and solving their problems, this brings us back to our core idea of taking care of people, Ukrainians are at the centre of everything that happens at Diia". (Ministry of Digital Transformation of Ukraine, 2023)

Currently, "Diia" and other services of the Ministry of Digital Transformation of Ukraine ensure that every Ukrainian has a digital document to prove their identity, even of the originals have been lost due to the war action, that every possible administrative service could be

provided online, that every victim of russian aggression will be able to apply for financial support from the government. In addition to this, those services work in the other way as well. With their help, Ukrainians can report the presence of the russian military in their city; the quality of the air, water, soils, forests and report illegal activities that may be carried out on the territory; and lately - environmental crimes committed to the nature of Ukraine. (Ministry of Environmental Protection and Natural Resources of Ukraine, Ministry of Digital Transformation of Ukraine, 2023). Thanks to this online registry, Ukrainian institutions and international donors who would like to enter the Ukrainian scene can develop better-quality recovery projects in the future that will respond to local needs. And those channels of communication will be a very valuable on-the-ground source that makes a huge difference in the quality of the implementation of future recovery projects.

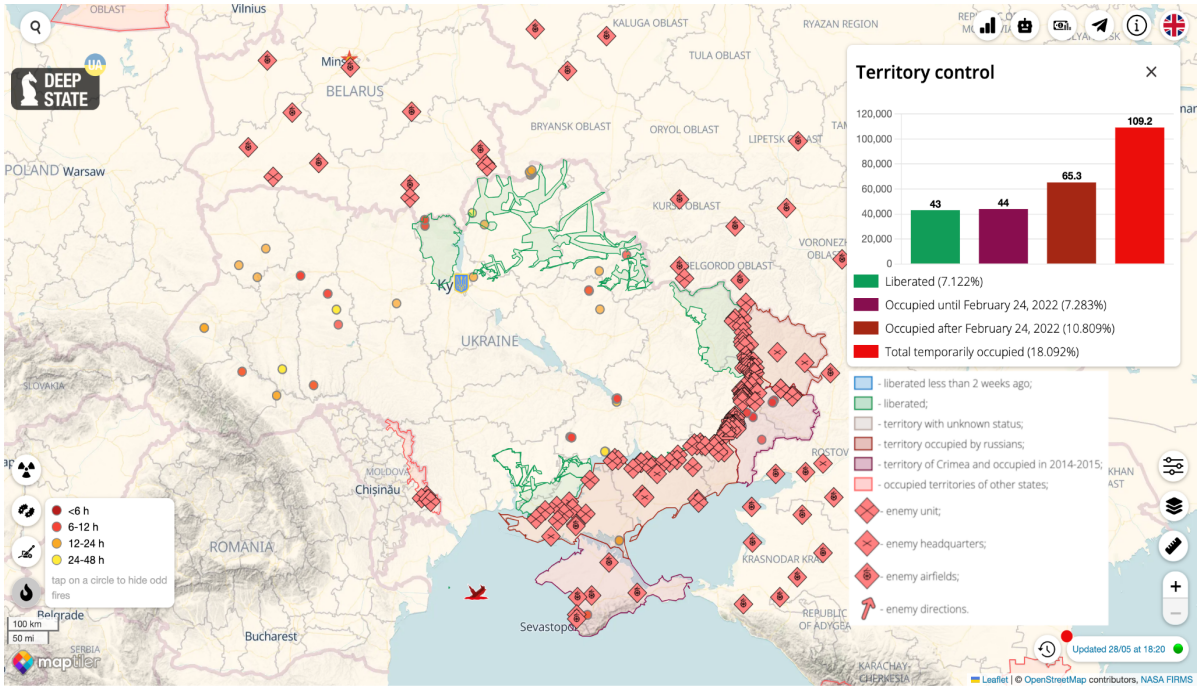
All in all, those local actors and their experiences, and practices will be valuable resources for building future recovery projects in Ukraine, structuring investments better and building high-quality monitoring after the spending.

2.1.3 Damages to the environment of Ukraine

To talk about the recovery projects, it is necessary to elaborate on the territorial aspect of the country and map the affected territory. As in general military information is secret information of the state, there are few less formal sources regarding the invasion scale that can't be used as a reference for planning actions on the ground but are providing a general idea about the state of the action. One used for the references regarding the scale of invasion in this work is called a "DeepState map" (2023), demonstrated in the Figure 1.

Figure 1

Map of territories occupied in the course of the russian invasion of Ukraine and fires on the territory of Ukraine dated 28.05.2023



Note. From the DeepState map real-time website, dated 28.05.2023. (DeepState map, 2023)

Ukraine's territory is approximately 603,550 km² and by the end of 2022, Moscow controlled 16.55% of Ukrainian territory (approximately 128,57 km), despite Ukraine's liberation of about 700 km2 of its territory in December 2022 and 3,800 km2 in November 2022. (Breteau, 2023; DeepState map, 2023; World Data info, 2023). Territorial dimension aside, the russian invasion has significantly damaged Ukrainian infrastructure, livelihoods and critical energy and water provision sources. Estimated direct damage is 63 billion dollars' worth, not to mention "4,431 residential buildings, 92 factories/enterprises, 378 educational institutions, 138 healthcare facilities, 8 civilian airports and 10 military airfields, and 7 thermal

power plants/hydroelectric power plants" destroyed so far. (Kulish, H., 2023) Russian soldiers have tortured, raped and murdered thousands of civilians on the occupied territories, sent people into filtration camps, kidnapped kids and illegally deported them to russian territory. (Wille, B., 2023) The aftermath of those atrocities will result in nationwide inter-generational trauma and physical and mental issues for the population, which also have to be taken into account when drafting recovery projects. The genocidal character of the russian war has first been reported by Ukrainian representatives and is now up to be confirmed by other international institutions in the fields of human rights protection. (Law, T., 2023) Among all crimes, the russian army has reportedly used prohibited weapons, including prohibited for usage land mines and white phosphorus bombs against the unarmed civil population kilometres away from the frontlines. (Bénézit, J., & Slavicek, M., 2022; Human Rights Watch, 2023; Wareham, M., 2023)

In addition to the significant number of human deaths that the russian war causes, Ukrainian government officials claim that russia is causing an "ecocide" to the Ukrainian environment. (Ukrinform, 2023; Watts, J., 2023) Since the beginning of the war and until the end of May 2023, the Ministry of Environmental Protection and Natural Resources of Ukraine has recorded nearly 2 412 cases of environmental damage caused by the military action of the russian invasion, their consequences already resulted in estimated overall damage to the environment equal to 441 billion UAH, approximately over 11 billion EUR. (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023) But approximate damage calculations calculated by the State Environmental Inspection in accordance with approved methods account for an even bigger sum of "1 966 billion UAH" (almost 50 billion EUR). (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023) This sum includes the damage to the air worth 994 352 billion UAH total (approx. 26 billion EUR), of which 50 653 million UAH (approx. 1285 million EUR) of damage has been caused by fuel fires, 938 028 million UAH of loss (approx. 24 million EUR) as a result of wildfires and 5 644 million UAH (approx. 143 million EUR) as a result of ignition of other objects. (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023)

Another important sub-component of the damage caused to the environment of Ukraine is damage to the soils, estimated to be 12 billion UAH (approx. 3 billion EUR), the result of spillage of 31 486 tons of oil products and 2 000 m^3 of other poisonous substances leaking into the soils; in addition to the 19 billion UAH damage to the water resources (approximately 5 billion EUR), with 2 tons of spillage of oil products into water, as well as 3350 m^3 of other poisonous substances. (Ministry of Environmental Protection and Natural Resources of

Ukraine, 2023) Damage to the forests is estimated to be 224 million UAH (approximately 5 million EUR), reporting 13547 hectares of fire in forest plantations, 7948 hectares of mass deforestation or felling of the forest, in addition to 480 hectares of negative impact on the nature reserve fund of Ukraine. (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023)

Even estimated financial equivalents of the damage to the environment are significant, but it is important to understand that those numbers only correspond to the immediate damage that was accounted for, they are not final and will increase every day for as long as this war will last. Moreover, those losses don't even include the future toll of those destructions, behind the presented numbers there are multiple ecosystems destroyed or disrupted, some beyond the restoration. And with the current rate of destruction and occurrence of the events to forest and nature reserve fund, soils, water, and waste, which is approximately almost a case a day, the Ministry of Environmental Protection and Natural Resources of Ukraine has only managed to form liquidation plans for 30% of all reports received as of the end of May 2023. (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023)

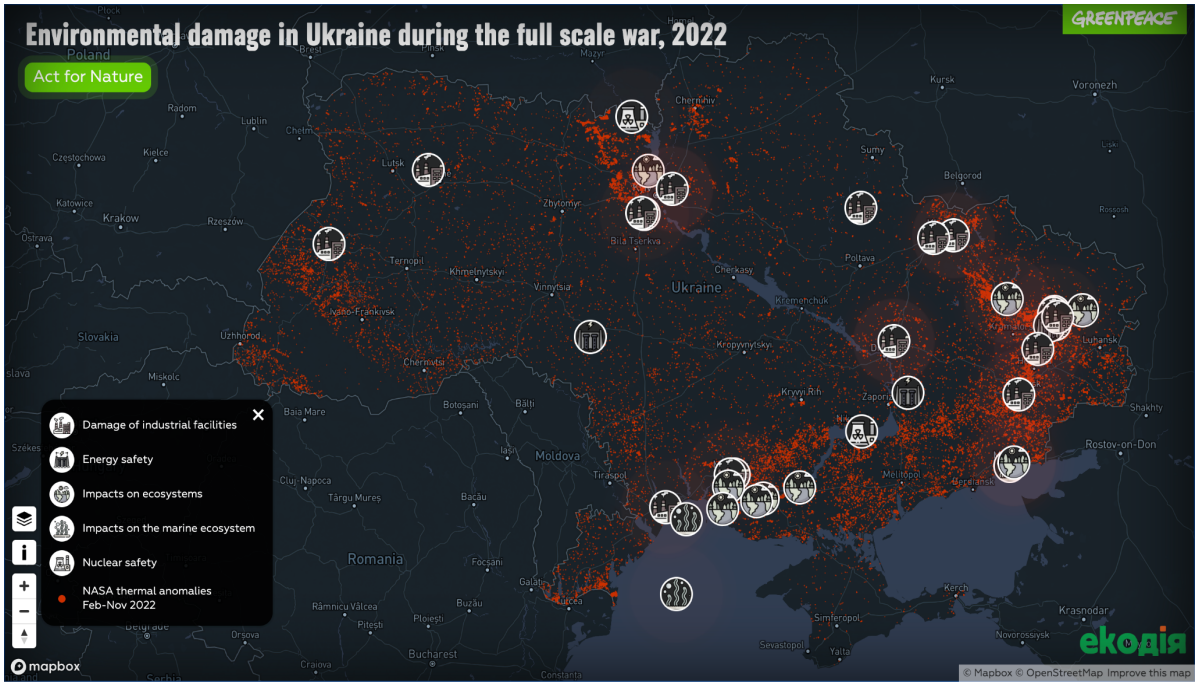
Negative consequences of that pollution and nature's destruction already caused damage that will last for generations to come and the real consequences of this invasion on the planet's "health", including the acceleration of climate change, will only be known after the end of the war that russians started. Still, it is worth attempting to estimate the initial scale of the environmental damage, attempt to visualise it and compare some of the maps to confirm the geolocation and general tendencies behind the alleged ecocide actions.

First to review is the map of the damage to the environment from the international source, which is presented in Figure 2. This map is a production of the project called "Greening the Reconstruction of Ukraine" launched by "Greenpeace" in collaboration with the Ukrainian NGO "Ecoaction" in 2022. ("Greenpeace", NGO "Ecoaction", 2022) In order to collect all necessary data for sustainable reconstruction, they started to keep account of environmental damage caused by the russian invasion and as a result, produced a real-time map of the "Environmental damage in Ukraine during the full-scale war 2022". ("Greenpeace", NGO "Ecoaction", 2022) The registered cases present on the map were proved with satellite imagery from various sources. But some were still not confirmed with the satellite images either "due to a lack of satellite imagery data", either as a result of "low temporal or spatial resolution" and on average, just about 10% of cases can be proved with satellite data. ("Greenpeace", NGO "Ecoaction", 2022) In fact, the lack of satellite imagery is reasonable, as the spatial data is sensitive information that could be strategically used at the time of the war. But this also creates

a challenge related to the recovery efforts, as for creating good quality recovery initiatives there is a need of understanding the depth of the damage caused and its spatial parameters, which most probably will be possible only after the war.

Figure 2

Image of the real-time map of environmental damage in Ukraine during the full-scale war by Greenpeace and NGO "Ecoaction", last time updated on 05.06.2023



Note. From the NGO "Ecoaction" real-time map. ("Greenpeace", NGO "Ecoaction", 2022)

The map in Figure 2 helps to localise certain cases of crimes against the environment, dividing it by the subcategories of the danger that comes from the damage to the industrial facilities, damage coming from the lack of energy safety, lack of nuclear safety, as well as damage caused to the ecosystems and to the marine ecosystems. ("Greenpeace", NGO "Ecoaction", 2022) We can see that the most intense damage starting from the beginning of the war and until June 2023 has been concentrated around the areas Russia attempted to invade first, and the cases there keep on multiplying in a scary progression as russians are unable to move any further.

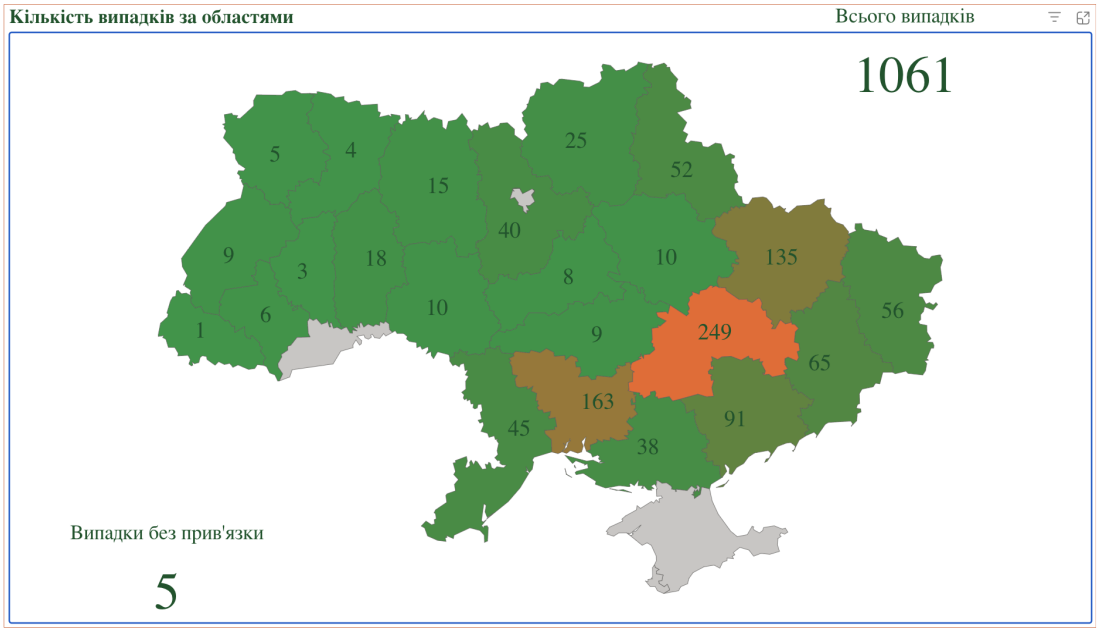
On the currently occupied territories in the South of Ukraine, as well as in the East of Ukraine, we can see multiple indications of the ecosystems and marine ecosystems in danger, as well as multiple damages to the industries, nuclear plants, and energy plants. It seems to be a sort of military tactic of holding onto the territory and creating a very hostile environment

that will slow down the counter-defence of the Ukrainian side. But it also seems to be related to the ultimate desire to cause as many civilian deaths as possible, as well as to cause severe damage to the nature that is under their control. While in the North of Ukraine and West of Ukraine, we can see that the tactics of threats to the nuclear and energy infrastructure occur and because of the shelling and aggressive attempts to bomb the territory, damage to the ecosystems is being caused. This correlation of how the territories are treated is important to understand the depth of the environmental damage. The territories in the South and East of Ukraine are under severe attack and are suffering from all types of pollution to the environment.

This hypothesis of the ecocidal actions on the russian-occupied territories, in addition to the intense military actions, could also be confirmed with a map of NGO "Ecoaction", that attempts to summarise indicative numbers of the ecological damage by regions in Figure 3. (NGO "Ecoaction", 2023) What we see is also that the number of the environmental damage cases varies depending on the source.

Figure 3

The number of cases by the regions, by NGO "Ecoaction", until 07.06.2023



Note. From the NGO "Ecoaction" website. (NGO "Ecoaction", 2023)

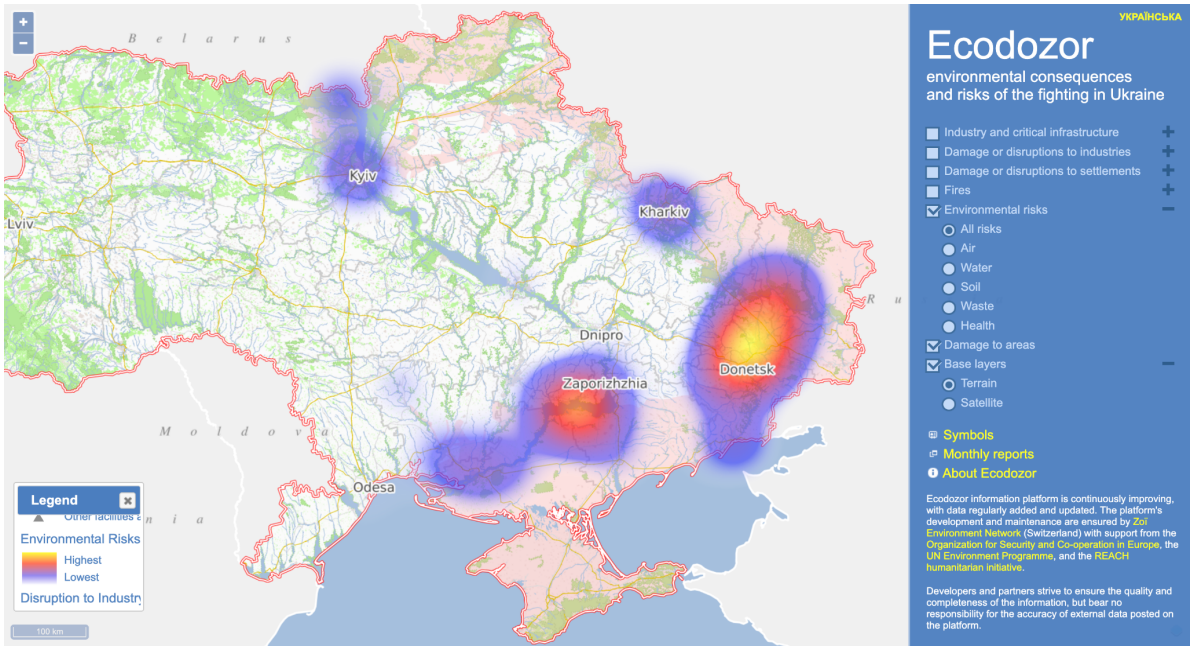
Ministries of Ukraine use the governmental application "Diia" and the chatbot of "EcoThreat" for the population to report cases of environmental damage, as well as military movements of the enemy, therefore there are more of them according to the governmental platform. Another pro of the governmental platform's reporting is that it is updated in real-time

mode, which allows tracking the rate of destruction. On the other hand, NGO "Ecoaction" doesn't have such an extensive database and collects the cases from both Ukraine's government's platforms, as well as from international sources, leaving the remark that they can't verify independently all the cases reported. Still, at least half of the cases reported by the Ukrainian government are confirmed by the other 2 sources, which can help to distinguish some general tendencies.

Another map that will help to assess the depth of the damage to the environment by the categories is a map of the United Nations Environmental Programme (UNEP) in Figure 4. (UNEP, Zoï Environment Network, REACH humanitarian initiative, 2022) UNEP and their partners have composed a map to help localise and analyse the damages caused by parameters of the risks to the environment by the subcategories of air, soils, water, waste, health, as well as the disruptions of the settlements, and fires. The final product is presented in Figure 4.

Figure 4

Environmental damage caused to the nature of Ukraine, including air, water, soil, damage caused by the waste and threats to the health of the population, accessed on 07.06.2023



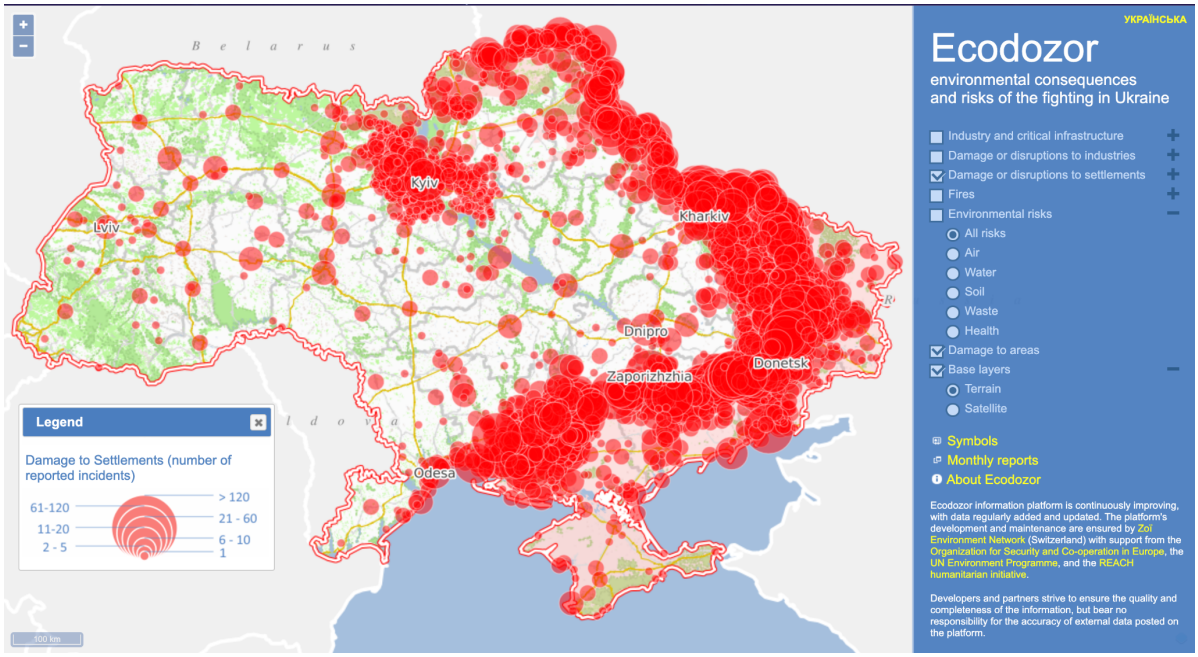
Note. Retrieved from the real-time map of UNEP and their partners. (UNEP, Zoï Environment Network, REACH humanitarian initiative, 2022)

High environmental concentrations are based in the South of Ukraine, East and North, which are at the centre of the attention of the invaders. Detailed examples of the geographical location of the damages to the different environmental components according to the UNEP are

presented in Annexes 3, 4, 5, 6 and 7. But apart from direct or indirect damage to the environment, this environmental destruction and military action has caused major disruptions to the settlements, map from UNEP (2023) presented in Figure 5.

Figure 5

The geographical location of the damage that caused disruptions to the settlements in Ukraine as of information accessed on 07.06.2023



Note. Retrieved from the real-time map of UNEP and their partners. (UNEP, Zoï Environment Network, REACH humanitarian initiative, 2022)

It seems that the destruction of nature and the severity of the damages caused to the settlements have a correlation. It is clear that the territories occupied by russians are suffering from major environmental damage, as well as the lives and health of the population and ecosystems located there are under major threat. This doesn't seem to be a reasonable approach that the occupying government would adopt to keep the territories under control in the long term and it raises a reasonable doubt regarding the reason behind this occupation. Air, water, and soil pollution, including the intense flooding of the lands caused by russians in the South of Ukraine, on the occupied territory on 06.07.2023 - this all will make the land unacceptable for life for generations to come and an impossible place for healthy ecosystems to exist.

This general strategy of the destruction of life and nature on the occupied territories resembles the tactics of the "scorched-earth policy". The author of the article that describes

this technique directly mentions that the russian government followed this strategy, listing it as the latest example of its usage after the Persian Gulf War that finished in 1991. (Vaughan, 2023) Russian occupation always results in unimaginable numbers of dead civilians and the violence of the treatment of those is beyond any international laws of human rights protection, a horrifying example of which is the Bucha massacre, when it was occupied by russians for less than a month at the beginning of the invasion, and the local population " had limited access to water, food, electricity, heating, and mobile phone service during the occupation", as well as have been violently murdered in the process of committing crimes against humanity, resulting in multiple illegal civilian deaths. (Human Rights Watch, 2023) Apart from that, we can see that their actions cause multiple damages to the environment, which are localised in the occupied territories.

The "scorched-earth policy" has been prohibited by the international laws of war as it causes destruction that long outlast the duration of the war itself, and in the frames of the Human Rights framework, it is stated as the prohibition to:

1) "Attack, destroy, remove, or render useless objects indispensable to the survival of the civilian population, such as foodstuffs, agricultural areas for the production of foodstuffs, crops, livestock, drinking water installations and supplies and irrigation works, for the specific purpose of denying them for their sustenance value to the civilian population or to the adverse Party, whatever the motive, whether in order to starve out civilians, to cause them to move away, or for any other motive". (ICRC Database, 2023)

2) "Starvation of civilians as a method of combat is prohibited. It is therefore prohibited to attack, destroy, remove, or render useless, for that purpose, objects indispensable to the survival of the civilian population, such as foodstuffs, agricultural areas for the production of foodstuffs, crops, livestock, drinking water installations and supplies and irrigation works". (ICRC Database, 2023)

3) "Intentionally using starvation of civilians as a method of warfare by depriving them of objects indispensable to their survival" is a war crime in international armed conflicts." (ICRC Database, 2023)

In the frames of the Protection of the Environment, which are derived from the same international Human Rights laws, but with a focus on the rules that are directly related to the environment, the International Committee of the Red Cross (ICRC) summarised the rules as follows:

1) “Rule 1. Due regard for the natural environment in military operations. Methods and means of warfare must be employed with due regard to the protection and preservation of the natural environment.”; (International Committee of the Red Cross, 2020)

2) “Rule 2. Prohibition of widespread, long-term, and severe damage to the natural environment. The use of methods or means of warfare that are intended, or may be expected, to cause widespread, long-term, and severe damage to the natural environment is prohibited.” (International Committee of the Red Cross, 2020)

3) “Rule 3. Prohibition of using the destruction of the natural environment as a weapon. A. Destruction of the natural environment may not be used as a weapon. B. For States party to the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD Convention), the military or any other hostile use of environmental modification techniques having widespread, long-lasting, or severe effects as the means of destruction, damage or injury to any other State Party is prohibited.” (International Committee of the Red Cross, 2020)

4) “Rule 4. Prohibition of attacking the natural environment by way of reprisal. A. For States party to Protocol I additional to the Geneva Conventions (Additional Protocol I): i. Attacks against the natural environment by way of reprisal are prohibited. ii. Reprisals against objects protected under the Protocol are prohibited, including when such objects are part of the natural environment. B. For all States, reprisals against objects protected under the Geneva Conventions or the Hague Convention for the Protection of Cultural Property are prohibited, including when such objects are part of the natural environment.” (International Committee of the Red Cross, 2020)

Those are the rules of the war to which the Russian Federation agreed and broke during their invasion of Ukraine. And though in some cases it may seem that the destruction caused has been just a side-effect of the war action, but even initial observations seem to prove that the destructions caused have been intentional.

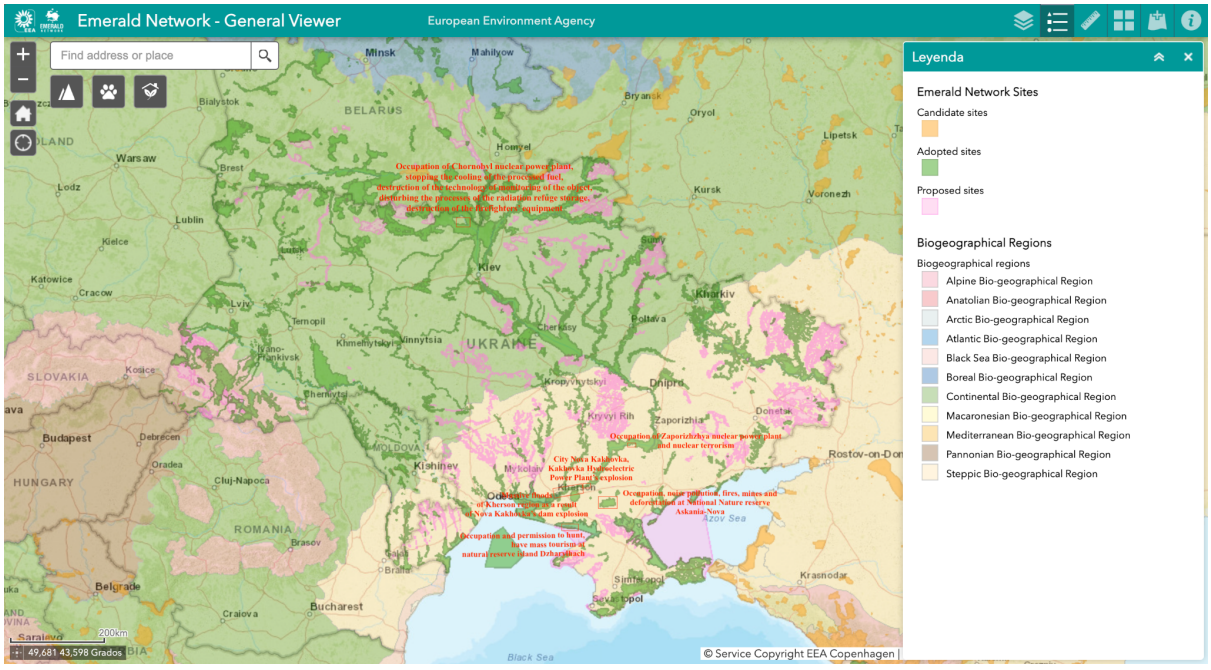
Specific proofs of the deliberate damage to the nature of Ukraine are the cases of Askania Nova’s Natural reserve, the occupation of the Island Dzyrylgach, Nova Kahovka dam’s explosion, as well as the occupation of Zaporizhzhya’s Nuclear Power Plant and Chornobyl Nuclear Power Plant. (Kolesnyk, A., 2023; Koloda, Y. & Ukrinform, 2023; Shamina, T., 2023; Yankovskyi, O., & Badiuk, O., 2023) According to the on-the-ground reporting of Ukrainian journalists, all of those cases represent major environmental damage caused to the nature by russian military, which includes deforestation, hunting of endangered species, noise pollution, destruction of natural ecosystems, oil pollution of the natural sources of water, location of the

mines and military bases in the natural reserve territories and in cases of the Nuclear Power Plants - radiation terrorism of the population and endangering the existence of the natural resources located nearby. (Kolesnyk, A., 2023; Koloda, Y. & Ukrinform, 2023; Shamina, T., 2023; Yankovskyi, O., & Badiuk, O., 2023)

We can see a link that proves that those actions against the environment are intentional, as those environmental damage cases' locations overlap with the internationally recognised Emerald Network sites that are officially registered in the territory of Ukraine, as shown in Figure 6. The base map used for the map of the Emerald Network sites is taken from the official website of the European Environment Agency (EEA) and on the top of it the author manually indicated locations of the occurrence of the specifically mentioned cases. (European Environment Agency, 2022)

Figure 6

The map of the official Emerald Network sites according to the EEA overlapped with the geolocation of the major environmental damage cases caused by the russian invasion of the territory of Ukraine



Note. Retrieved from the official real-time website of the European Environment Agency (2022) and overlapped with indicative areas indicated by the author.

Emerald Network is "an ecological network made up of areas of special conservation interest (ASCIs) located in 18 Contracting Parties and Observer States to the Bern Convention

in the neighbouring areas of the European Union (EU)", which includes Ukraine. (European Environment Agency, 2021) As an ecological network, the Emerald Network is a "system of coherent interconnected areas that are subject to management, monitoring and reporting measures; its objective is to ensure the long-term survival of the species and habitats of this treaty that require specific site protection measures." (European Environment Agency, 2021) It is an extension of the EU's Natura 2000 Network and covers over 977 000 km². (European Environment Agency, 2021) Not to mention that the russian government is aware of such Network's existence, as they themselves have submitted environmental sites to be recognised in December 2022, as we can see in Fig.6, are listed as "one of the 18 Contracting parties" and Russia is enlisted as "currently working on the establishment of the Emerald Network" on the official Council of Europe website. (Council of Europe, 2022) As a consequence of Russia's government actions, at least 5 of the internationally protected important biodiverse environmental areas of Ukraine are in danger at this exact moment and more are to be affected as a result of Nova Kahovka's dam explosion in June 2023. This pattern of deliberate nature destruction indicated above makes Ukrainian officials refer to such actions of the russian military as ecocide, and according to the international rules of the war, such formulation should be recognised internationally.

All the environmental damage and specific cases indicated within this Chapter are aimed to explain the depth of the destruction that nature in Ukraine is under. The effect of such will inevitably affect the health and well-being of the population living in those territories, making whole cities and areas uninhabitable and polluted. Military actions since February 2022 alone already caused over 53 758 t emissions into the atmosphere, 501 211 t waste polluting soils, air and water, and the effect of just those multiplies every day. (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023)

And in the middle of it all, the most vulnerable and unable to protect themselves is the civil population of Ukraine, as well as its nature. Contrary to the population, that at least has a government, ministries, and organisations to represent itself, nature doesn't have such means. That is why it is important to make a stand and search for new, fair, and innovative ways of ensuring that the russian government will be held responsible for the damage to the environment caused. First, not to set an unpleasant precedent for any future war or conflict, where war criminals will be allowed to slide over their actions. Second, to start a quality dialogue among the international community of finding new financial and non-financial equivalent expressions' of how all nature's dimensions and benefits are to be valued, so that this could be applied both to the court cases of the aftermath of the war, as well as to the court

cases of any corporate or governmental damages caused to any environment. As for now, the system of nature's preservation doesn't seem to have any superiority, nor to provide formal protection for the most biodiverse areas of the planet, would it be for the natural reserves of Ukraine or the Amazon's forests in Ecuador.

This lack of nature's value in the global economies also results in a lack of political action on battling climate change worldwide. Despite years of work from various international organisations to close this gap of representation and attempting to make the world's biggest economies seriously take nature into account, the Intergovernmental Panel on Climate Change's (IPCC) AR6 Synthesis Report's p.10 states that "there are gaps between projected emissions from implemented policies and those from nationally-determined commitments (NDCs) and finance flows fall short of the levels needed to meet climate goals across all sectors and regions" in 2023. (Intergovernmental Panel on Climate Change, 2023) Taking a stand for environmental protection and looking for solutions for nature's recovery is one of many ways of fighting climate change and ensuring that we don't harm Earth even more.

In the case of Ukraine, it means attempting to understand what environmental recovery projects will be needed after the end of the war; how to address long-term issues that the war is going to leave, such as mines across all the territory; how to ensure that recovery and reconstruction projects won't cause more greenhouse and carbon emissions; as well as to understand how to address the pollution already caused and recover some of the resources lost, preferably building action on the local and national level so that local communities that suffered the most will have a say in building their own future and environment.

2.2. Project proposals for environmental recovery for different types of local actors

Before providing an outline of the project proposal types available to different types of local actors it is important to set up general principles that proposals are based upon.

1) Project proposals are drafted for different types of local actors, as Ukraine's civil society scene is only getting stronger and civil society representatives are as proactive as ever. Even pre-war it was very common that local government representatives, NGOs and civil society were taking more initiative in territories' development than the central government. This tendency only intensified after the beginning of the russian full-scale invasion.

As highlighted in the study made by RTI Centre for Governance (2023), the main changes on behalf of Ukrainian society after 2022 are "large-scale mobilization of civil

society" that includes "extensive financial support of Ukraine's Armed Forces through fundraising efforts by public figures, NGOs, volunteer groups, and the government", "increased levels of volunteering among Ukrainians", "high levels of trust between Ukrainians and their civil society, including NGOs and public figures." (RTI Center for Governance, Leonchuck, L., Zetina-Beale, R., & Johnson, E. M., 2023) RTI concludes that "strong levels of trust; speedy, effective mobilization of civil society; and increased levels of civic engagement point to democratic strengthening and capacity in Ukraine that is already playing an important role in the country's reconstruction." (RTI Center for Governance, Leonchuck, L., Zetina-Beale, R., & Johnson, E. M., 2023) Therefore we can confidently consider civil society actors as a moving force of change for Ukraine's recovery, during the war and post-war.

2) Ukraine's civil society organisations already have developed principles according to which Ukraine's recovery and reconstruction plans should be formed. As a reference, 2 public statements are used. First is the statement of 41 Ukrainian civil organisations involved in environmental protection and other democratic activities that have released a common statement regarding their vision for Ukraine's recovery in May 2022. They start with that "Ukraine's reconstruction is not a return to the pre-war state, but a full-fledged development and integration into the European Community, based on the principles of sustainable development and taking into account the European Green Deal, which is also a prerequisite for meeting the Copenhagen criteria for EU accession." (NGO "Ecoaction", 2022)

They express the need for incorporation of "cross-cutting environmental and climate policy in all sectors, the provisions of which should be taken into account in all strategic and programme documents in all spheres of public life and at all levels." (NGO "Ecoaction", 2022) They envision that "priorities of the European Green Deal (EGD), including the modernisation and decarbonisation of the economy, cleaner industrial production, biodiversity conservation and the transition to sustainable agricultural practices, should be the key objectives of Ukraine's post-war recovery." (NGO "Ecoaction", 2022)

They believe that "investment policy and fundraising for economic recovery should be consistent with sustainable development goals and focus on the development of high value-added production chains rather than a resource-export economy; green economy should be developed and has to be low-carbon and energy efficient, nature-based, with efficient and clean production, balanced consumption, and based on the following principles: shared responsibility, innovation, cooperation, solidarity, flexibility, and interdependence." (NGO "Ecoaction", 2022) All governmental institutions and regulating bodies should ensure that all

the standards of environmental protection are followed by all parts involved, with an ultimate goal “to ensure a safe and desirable state of the environment.” (NGO “Ecoaction”, 2022) Moreover, they insist that Ukraine’s reconstructions must comply with “environmental legislation, in particular with regard to strategic environmental assessment (SEA) of plans and programmes and environmental impact assessment (EIA) of planned activities, to ensure that environmental priorities are taken into account in development and recovery planning in Ukraine.” (NGO “Ecoaction”, 2022)

Public, communities, civil society organisations and local governments should be at the centre of decision-making, as well as be engaged in the “development of important documents, such as post-war recovery strategies or plans”, “decisions, strategies and action plans should be made on the principle of subsidiarity (bottom-up), contributing to the further development of the successful decentralisation reform.” (NGO “Ecoaction”, 2022) They state that “local governments should be given a leading role in the recovery process in communities; public developments, initiatives and analytical studies should be considered and taken into account in decision-making.” (NGO “Ecoaction”, 2022)

The second statement considered was published in February 2023. Some of those NGOs collaborated with a few of the most influential Ukrainian analytical centres that work in the field of human rights, democracy, and legislation, and issued recommendations that aimed at “mitigating harm immediately, at preventing further environmental degradation, and at ensuring the future restoration of Ukraine’s environment”. (NGO “Ecoaction”, 2023) The recommendations they issued were aimed at the international community and were signed by 12 organisations.

They start by highlighting that “it is vital that the international community translates this visibility” of the environmental damage and its consequences for all the spheres of life “into meaningful policy measures and accountability mechanisms to prevent, minimize and address further consequences for the environment and people depending on it.” (NGO “Ecoaction”, 2023) They list 10 following recommendations on what is important to do in Ukraine in order to set a framework of protection for the already damaged environment, but in fact, those recommendations can be considered by other governments to establish environmental protection mechanisms. Strengthening Ukraine’s emergency response capacity is a “crucial step to prevent and mitigate serious pollution incidents at hazardous facilities, which includes the repair of damaged critical infrastructure, the clearance of mines and unexploded ordnance, and land remediation measures at affected sites.” (NGO “Ecoaction”, 2023) Ensuring that all Nuclear Power Plants (NPP), an in specific Zaporizhzhia NPP, are demilitarized, de-occupied,

and not used for military purposes will be the most effective way “to prevent a catastrophic nuclear accident.” (NGO “Ecoaction”, 2023)

The organisations issued a call to “support ongoing work to identify, document and assess environmental damage and its impact on public health”, as multiple local and international actors currently work hard on monitoring the harm, but systematic improvement of “coordination of this work and complementing it with an on-site assessment of contaminated areas and health surveillance is crucial to address current and future environmental and related public health issues.” (NGO “Ecoaction”, 2023) The recommendations issued urge “humanitarian actors and demining organizations” to “address environmental factors in their field operations”, which “should include the identification and integration of environmental risks, as well as the unintended environmental consequences of response operations.” (NGO “Ecoaction”, 2023)

In addition to all that, they state that there is a deep need to “develop mechanisms and structures to ensure accountability for the damage to Ukraine’s environment”, which includes “support for the collection and archiving of evidence, the identification of best practices for environmental reparations, as well as developing the international architecture required for state accountability for environmental damage.” (NGO “Ecoaction”, 2023) They urge to do the best to “ensure Ukraine’s recovery is green and sustainable” and that all the financial contributions and pledges issued by the international community for recovery and reconstruction of Ukraine will address “concerns about climate change, biodiversity loss and pollution, and that the reconstruction is carried out in a way that prevents the further degradation of Ukraine’s environment.” (NGO “Ecoaction”, 2023)

More than that, they suggest starting “to mainstream environmental protection in military doctrine”, saying that “Ukraine’s military and supporting international actors should ensure that policies aimed at minimizing damage to the environment are integrated into training and planning, and share targeting data, where possible, with relevant authorities and organizations to improve effective environmental response.” (NGO “Ecoaction”, 2023)

They expect Ukrainian and international actors to amplify the “visibility of the environmental dimensions of the war”, to include this topic in “all relevant international agreements” and to address the global “impact of the war in the climate”, as war causes major direct emissions that are contributing to the raising of the temperatures worldwide. (NGO “Ecoaction”, 2023)

In the frames of this lobbying action they suggest “addressing military and conflict emissions in the context of the United Nations Framework Convention on Climate Change,

and in debates on climate change and security"; as well as to "develop a Global Environment, Peace and Security agenda" to address "the risks that armed conflicts create for both the local and global environment", and to include "lessons" that could be "used to underpin a more coherent and coordinated UN-wide approach to the environmental dimensions of armed conflicts." (NGO "Ecoaction", 2023)

To summarise, the project proposals expressed below will take into account the vision expressed in the 2 public statements from Ukrainian civil society actors, NGOs, and analytical centres. The recommendations issued by those manifests urge us to consider local communities as the main actors in the environmental protection and future recovery projects of Ukraine. They ask to focus on empowering local communities and local response. They urge to build future recovery projects on the basis of the current environmental protection procedures, such as EIA and SEA assessments, as well as to make sure that national legislation will adapt to the European Green Deal principles and follow the path of sustainable development, which will take into the account local needs. (European Commission, 2021)

They call for support in building an environmental damage recovery framework that will help to evaluate the environmental damages caused and need to suggest environmental reparations principles that could be applied to the countries at war. They address the need to ensure that the recovery funds will be used to build the new, more sustainable economy of Ukraine, as well as that recovery projects' implementation won't bring more environmental damage and emissions into the atmosphere. They ask to ensure that all environmental protection is considered in the international agreements and in all the recovery plans. All those principles will be considered to suggest various types of projects and actions that could contribute to the environmental recovery in Ukraine within this thesis.

3) Ukraine's environmental recovery and restoration initiatives must be in line with the world's best practices for ecosystem recovery. Due to the volume of Ukraine's ecosystems destroyed or under threat, ecosystems' restoration could be the only "on the ground, here and now" way to slow down environmental degradation caused by war. Ukraine has a great potential to become one of the few pioneers in the ecosystem restoration efforts and become one of the leaders of the global initiative of the United Nations called "UN Decade on Ecosystem Restoration". Coherent with Ukraine's need, the UN Decade of Ecosystem Restoration "is a rallying call for the protection and revival of ecosystems all around the world, for the benefit of people and nature; aims to halt the degradation of ecosystems and restore them to achieve global goals." (UN Decade on Ecosystems Restoration, UNEP, FAO, 2021) They acknowledge that "only with healthy ecosystems can we enhance people's livelihoods,

counteract climate change, and stop the collapse of biodiversity", therefore the objectives of the global movement are very much in line with future Ukraine's environmental restoration efforts. (UN Decade on Ecosystems Restoration, UNEP, FAO, 2021)

The projects proposed for Ukraine must incorporate the best practices implemented by various communities worldwide, be focused on the local needs, be feasible, green, and relatively easy to implement, as environmental degradation of Ukraine's ecosystems is happening at a faster rate than average.

2.2.1 Project proposal for NGO representatives

The speciality of the organisational form of an NGO and its legal scope of work permits it to perform a wide spectrum of activities. Due to their members' composition principles and local action approach, NGOs are being considered key actors of the future recovery projects activities organisation.

According to Ukraine's current legislation, "a Non-Governmental Organisation (NGO) is a public association whose founders and members are individuals who have united to satisfy and protect their legitimate social, economic, creative, age, national, cultural, sports and other common interests", its main purpose is not based around making a profit. (IGOV, 2023) NGOs may be formed by individuals, or have member legal entities, but they may operate with or without the status of a legal entity. (IGOV, 2023) NGOs are meant to operate according to the principles of "voluntariness; self-governance (non-interference of public authorities or local self-government bodies in the activities of the CSO); free choice of the territory of activity; equality before the law; absence of property interests of their members/participants; transparency, openness and publicity." (IGOV, 2023) Founders of NGOs can be "citizens of Ukraine, foreigners and stateless persons who are legally residing in Ukraine and have reached the age of 18." (IGOV, 2023) Therefore, we can draw a conclusion that even if there is no specific NGO on the territory or in the municipality of the future recovery project, it's possible to have it created within approximately 2 months, with a group of at least 2 people who are legally residing in Ukraine, aged 18 or older.

NGOs have a wide scope of rights. According to Ukrainian legislation, NGOs of any type have the right to: "freely disseminate information about its activities and promote its goals; to address state and local self-government authorities, their officials and employees with proposals (comments), applications (petitions), and complaints; receive public information held by public authorities and other public information managers in accordance with the

procedure established by law; participate in the development of draft legal acts; hold peaceful assemblies after informing local authorities about them." (IGOV, 2023)

Moreover, NGO with a status of legal entity in the frames of the current legislation can: "be a party to civil law relations, acquire property and non-property rights; carry out an entrepreneurial activity, if it is provided for by the charter of a non-governmental organisation; to establish mass media; participate in the implementation of the state regulatory policy; participate in the work of consultative, advisory and other auxiliary bodies established by state authorities or local self-government bodies to consult with public associations and prepare recommendations on issues related to their activities." (IGOV, 2023)

Adding to the existing scope in the frames of the future recovery initiatives NGOs also have various types of actions available to contribute to the cause, depending on the NGO's experience and the technical competencies of its workers.

The first option would be taking a leading role in setting up recovery projects and coordinating their implementation. When local governments and local communities can be overwhelmed with the volume of immediate problem-solving on their hands, NGOs need to step up and be the lead in the action. This will take the form of the project writing by an NGO staff and application of this project proposal for receiving the funds from the international donors. Even in case of the lack of skills in project writing, NGOs' staff has plenty of tools for capacity building available up until this day. Those include cooperation with other NGOs with such experience and co-writing the application; application for the local and international capacity-building trainings when eligible, such as SALTO youth and Erasmus+ programs; reaching out to the local professional capacity training centres and requesting the specific training; or even reaching out to the existing consulting agencies and enterprises in the field and asking for the help on the "pro bono" basis.

As for the search for funds and open calls for funding available, there are multiple prominent international actors present in Ukraine. Some of the biggest ones are the European Endowment for Democracy (EED), the National Endowment for Democracy (NED), USAID, GIZ, the International Renaissance Foundation, Embassies of Norway, Sweden and Japan, the EU Commission, and its agencies, etc. Other funding possibilities could be reaching out to the banks and existing funds, examples of which are the World Bank, E5P Fund, Energy Efficiency Fund, etc. Those donors often publish calls for projects on specific topics and without a doubt will open relevant calls related to the environmental initiatives funding.

In the conclusion of the analysis of the documents available on UN Decade (FAO, SER & IUCN CEM., 2023; FAO & UNEP, 2021; UN Decade on Ecosystems Restoration, UNEP,

& FAO, 2021), the main suggested actions were selected for each of the local actors. And while choosing the type of project to apply in the frame of supporting environmental restoration initiatives, NGOs can propose several project types:

1) The awareness campaign on the environmental restoration of the territory where they are based. This will first include preparation of the initial assessment of the territory: damage done to it at the moment of the project application (or, as mentioned by UN Decade, "ecosystems degraded"), species present on the territory and then choosing the most relevant environmental restoration techniques for the specific type of terrain and species present (which could be possible by consulting the UN Decade guide on the ecosystem restoration techniques called "The Standards of practice" that "are scheduled to be released on the UN Decade website in the fourth quarter of 2023" and promotion of those techniques and practices among the local population. (FAO, SER & IUCN CEM., 2023) The information campaign can take the form of a social media campaign, physical advertising campaign, organising master classes and trainings for the local population; spreading the word in collaboration with other local stakeholders, local community groups and local government.

2) The actual environmental restoration project, drafting of its practical components, coordination and monitoring of the actors involved. The scope of work with this type of action will require substantive preparations on behalf of the NGO and their partners. As in the previous type of action, this will require an initial assessment of the territory, damage caused and species present. For a technical project of that type, there may be a need to involve independent experts from the field for the profound initial assessment of the territory.

Therefore, NGOs will need a partner's coalition to support them with the expenses for this action. This means that there is a need to establish cooperation with other local actors, such as local government, local businesses, donors present on the territory, as well as local community groups. Based on the initial assessment, the coalition will need to define the goals for the restoration activities, divide responsibilities between them, detect the main components of the work, choose a time framework, and identify resources needed and funds required to carry out the project. Important to do will be to identify the benchmarks and indicators for the project's success.

When the project application is finished - it has to be submitted for the relevant funding call available and such a united local actor's action has a high chance of being selected and funded. NGOs should be the main coordinators of such action, even being the holder of the funding received, ensuring the quality of the monitoring over the implementation, and making

sure that sustainability, equity, local participation, co-management, democracy, and inclusivity criteria are not overlooked while performing the project.

3) Becoming a driving force for the legislation change to ensure environmental recovery initiatives' implementation possibility. The legislation framework is a baseline for any action taken on the territory. Ukraine's legislation related to energy efficiency, renewable resources usage and environmental protection is far from perfect. Sometimes it is due to flaws in the existing structure of how the responsibilities for different areas are divided between the actors, even if they are all related to the one specific sector. Sometimes it is due to the amount of contradictory secondary legislation, or even just due to the lack of up-to-date legislative acts that reflect the current situation.

In any case, there is a lot of work that has to be done to ensure that Ukraine's legislation is not only responding to the quality criteria set by the EU, but also making sure that the procedures adopted by the EU are legally obligatory in Ukraine, such as obligatory Strategic Environmental Assessment (SEA) procedure and Environmental Impact Assessment (EIA), collecting a Free, Prior, and Informed Consent (FPIC) from the local communities while drafting any project on their territory. All those procedures are obligatory in the EU and have to become obligatory in Ukraine, to ensure that the recovery funds pleaded will be used in a sustainable and ethical way, which is what local communities actively lobby for.

SEA adaption means incorporating into the local and national policies or strategic plans "a systematic process for evaluating the environmental implications of a proposed policy, plan or programme and provides means for looking at cumulative effects and appropriately address them at the earliest stage of decision making alongside economic and social considerations." (European Union, 2010) EIA assessment is a similar procedure, but related to the specific projects, and is aimed to "evaluate the effects of public and private projects on the environment". (European Commission, 2014)

Further on, there is a need to lobby for the power of the local communities and indigenous people to have control over their land. That is why it is also relevant to address the matter of FPIC adaption in Ukraine. FPIC is a procedure that "allows Indigenous Peoples to provide or withhold/ withdraw consent, at any point, regarding projects impacting their territories; allows Indigenous Peoples to engage in negotiations to shape the design, implementation, monitoring, and evaluation of projects." (FAO, 2014)

Local NGOs can learn more about those procedures, lobby for their implementation in Ukraine, attend the policy-making meetings in their local governance representation, prepare peaceful gatherings, organise discussion tables with experts and local communities, and write

petitions and legislation draft proposals to the local governance. In addition to that, if expertise and capacity allow - NGOs' personnel can review current legislation and identify the gaps to further send remarks to the government and talk directly to the parliament's representatives. They can draft a project that will consist of the proposed baseline and framework of their future lobbying activities, resources needed and can further be submitted as a request for financing those activities and hiring relevant personnel.

All in all, NGOs have plenty of options on how they can support further environmental recovery initiatives on their territory. The action plan will differ for every type of project, as well as funding available will differ depending on the territory chosen and the funds for it available. Territories that will most certainly require more attention than others will be the South of Ukraine, mostly regions that have experienced occupation and have the highest rates of environmental degradation, as mentioned in the previous chapter. Some cities and areas where NGO support will be needed could be cities of Kherson, Zaporizhia, Nova Kahovka, Donetsk region, Lugansk region, Kyiv region and Crimea. But those are indicative areas where such efforts should be addressed forward. In reality, those are just a few of the cities that suffered the biggest damage and were indicated just due to the availability of some information about those areas. As soon as extended information about environmental damages will be publicly available - the areas of focus should be defined then.

2.2.2 Project proposal for the local municipality representatives

Environmental restoration projects can be of different scales. The size of the action depends on the capacity of the stakeholder and the area of the influence actors have. Municipalities and their local authorities certainly have more power over getting all necessary regulatory approvals and getting work permits to perform more complex works, as well as they often have certain fixed local budgets on their hands. All that, added to the existing experience in governance and coordination, local influence and reputation, presence of the designated physical infrastructure, and permanent personnel - puts local authorities and their representatives into a position that allows them to become active forces in the environmental recovery projects in the future.

Still, Ukraine's local authorities are relatively new to the relatively independent decision-making role. The decentralisation process was launched in Ukraine in 2014 only, "with the adoption of the Concept of Local Governance Reform and Territorial Organisation of Power in Ukraine (01 April 2014), Law of Ukraine "On Local Community Cooperation" (17 June

2014), Law of Ukraine "On Voluntary Consolidation of Local Communities" (05 February 2015) and financial decentralisation-related amendments to the Budget Code and Tax Code." (Government Portal of Ukraine, 2023).

In the frames of the above-mentioned laws and in accordance with the European Charter of Local Self-Government principles, Ukraine has allowed the formation of the "United Local Communities (ULC) system". (Government Portal of Ukraine, 2023) As a result of the decentralisation reform, "1,070 ULCs have been formed, including 4,882 communities which joined voluntarily; then first local elections took place in 936 of the newly created communities." (Government Portal of Ukraine, 2023)

Then Ukrainian government "has approved the long-term plans to form community areas in 24 regions covering 100% of their territory, and as a result, newly formed ULCs occupy nearly 47% of the total area of Ukraine."(Government Portal of Ukraine, 2023) To solidify this new regional system, the Law of Ukraine No. 562-IX of 16 April 2020 "On Amendments to Certain Laws of Ukraine on Defining Areas and Administrative Centres of Local Communities" has been adopted and "the Cabinet of Ministers of Ukraine has defined administrative centres and approved the areas of 1,470 empowered local communities where the 2020 elections will be held on a new territorial basis." (Government Portal of Ukraine, 2023) As a result, the communities "were able to consolidate their efforts and implement joint projects due to inter-municipal cooperation; in particular, 1,354 local communities signed 604 cooperation agreements." (Government Portal of Ukraine, 2023)

All those efforts of the decentralised reform implementation have provided local authorities and their communities with a range of new capacities and power over their own territories. According to the Government portal of Ukraine (2023), Ukrainian local authorities have received the list of significant benefits from the reform:

1) New financial tools. In addition to "an increase in the financial potential of the united local communities", decentralisation has offered them other tools of economic development such as external borrowing, choosing institutions for servicing local budgets for development purposes as well as own revenues of budget-funded entities." (Government Portal of Ukraine, 2023)

2) Power of the local planning and organisation. Decentralisation has also "concerned the powers of architecture and construction control and improvement of urban planning legislation, and local governments have been given the right to define the town-planning policy at their own discretion." (Government Portal of Ukraine, 2023)

3) Control over the land. After some “laws for decentralisation of powers and regulation of land relations, local communities will have the right to manage the land located outside their settlements.” (Government Portal of Ukraine, 2023)

4) Local administrative services provision in communities. The central government has ensured local “provision of basic administrative services, including registration of real estate, business, place of residence, by delegating such powers to communities.” (Government Portal of Ukraine, 2023)

5) New dynamic of the power relations between various governmental levels. “Bills have been prepared to clearly delineate education, healthcare, leisure, socio-economic development and infrastructure powers between local governments and executive bodies at each of the territorial levels of the territorial structure of the state’s administration.” (Government Portal of Ukraine, 2023)

Altogether, this decentralisation reform has given a new scope of power to the local authorities of Ukraine. It became one of the first major contributions of Ukraine in its commitment to become a member of the EU and is still widely recognised as one of the most successful ones yet.

But despite that success, according to the latest research done by “Transparency International Ukraine”, the findings are that Ukraine’s population and businesses have significant concerns over the corruption present in central and local authorities, saying that “the population places corruption third” in the list of the main problems of Ukraine in the light of the prospects if the rebuilding, while “businesses list it as second”. (Karpinska V., 2023) This study concludes that “business representatives complain significantly more often about corruption, lack of professionalism of the authorities, the injustice of the judicial system and are concerned about population migration and the lack of investment in the economy”, which is to say that there is still a lot of issues that have to be addressed prior to claiming local authorities as a main reliable actor to take the responsibility for Ukraine’s recovery plans formation. (Karpinska V., 2023) This study also mentions that despite the fear of corruption schemes' comeback, the population of Ukraine supports local recovery plans’ formation and supports individual project funding over the general financing schemes. (Karpinska V., 2023)

Considering the new executive and planning capacities of the local authorities, as well as the challenges and limitations they have, in the frames of the environmental recovery initiatives municipalities can take over a few of the following types of projects:

1. Initiating big-scale physical project restoration on its territory. It is in the municipality’s interests to form a coalition with the local community, NGOs’ representatives,

and local businesses' representatives and co-write large-scale environmental recovery projects to be based on their territory. Due to the scale of the destruction, the most efficient for the smaller and medium-sized cities will be to consider the formation of extensive green zones in the natural areas, which could be forests, peatlands, or any other type of previously vibrant natural territory restoration.

The main focus should be on the improvement of the health of soils, ensuring the creation of the most suitable conditions for the healthy ecosystems' reappearance and making sure that no more harm will be done to the chosen area. For the South of Ukraine and all the natural reserves affected - it could also be created of the newly re-defined natural protected territory and formation of the eco-tourism camp to raise necessary funds for the territory's full recovery. The project could also concern the creation of the relevant environmentally friendly infrastructure in the chosen area of the municipality. Depending on the field towards which the recovery action will be aimed, when finished this project can be submitted to the international donors' call for funding, submit the project for the private businesses' funding consideration, or submit the project to the governmental fundraising platform.

But project type aside, the main and real challenge that municipalities will have to address from their side will be to initiate the demining of the territory. This has to be done in parallel with the process of the project proposal formation and this will be the main role of the municipality at this point. Another important thing that they have to take care of will be creating and adapting new nature-protecting and preservation legislation, to ensure that the project proposal that the coalition will come up with will be able to last long-term without a threat of disruption and will be able to scale up when necessary.

2. Creating new legislation, adopting new environmental policies, and developing new local plans and strategies. Municipalities have to work hard on the legislation and local policies to reflect the need for environmental recovery as a main priority. All types of environmental protection should be granted to the local natural areas that remained unaffected by the war, while affected areas' recovery projects should be assisted to get necessary permits and receive cooperation from the local government.

Municipalities should hold community meetings, during which theory has to define new goals and objectives for local governance and local planning. Participative governance techniques have to be adopted even in the smallest municipalities, giving a place at the table for any and every citizen who is willing to participate in the governance process. New development strategies have to be adapted and they should follow the axis of sustainable territorial development, not to allow any return to the old ways of natural resource depletion

and deforestation. Municipalities have to take a firm stand towards the direction that their territories should take and this has to be reflected in every regulative measure they can implement.

They also need to ensure that the spending of the funds on the recovery projects will be transparent and to make sure that communities' fears regarding the corruption schemes return won't be true. All tenders for the local procurement have to be published on "Prozorro" tender platform and only environmentally sustainable providers and suppliers should be encouraged by the tender winner procedure. New incentives should be created to support restoration practices over the degradation ones. All in all, municipalities should ensure the creation of all the possible favourable conditions for the environmental recovery projects and make sure that their procedures and legislation will only encourage future investors and reassure them of the safety of their investment into this new sustainable local economy.

3. Implementation of the extensive study of the affected territories and their monitoring. Though other actors can and should do relevant environmental assessment studies, in some cases only municipalities have resources and personnel with relevant experience in the field. Municipalities should attempt to form a working team to conduct detailed research on their local territories affected, which will ensure the longevity of the future recovery project. Very often in Ukraine's history, local soils have been abused either with agricultural overproduction or with the new atypical for the territory species' plantation, which resulted in the soil's fertility degradation. Another case, especially in the Carpathian Mountains region, is illegal deforestation.

An additional factor that raises significant concerns and is the main reason for the need for intensive research on the territories' health is the effects of the explosions of the mines and general warfare action's consequences. Considering the indicative figures of the environmental pollution displayed in Chapter 2.1.3, the scale of the pollution is significant and keeps on growing. Up to August 2023, over "61 417 tonnes of the emissions" have been released into the air and soils, "14 589 tonnes of the oil have been spilt into the soils", "1 240 113 ha of the Nature Reserve Fund objects damaged" - all this means that even the territories that didn't seem to be physically affected by the war have actually been affected one way or another. (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023)

New studies of the environmental health of the local territories must be conducted by the experts in the fields and further benchmarks and recovery strategies need to be developed accordingly. As well as there is a need to establish a well-functioning monitoring system for

the state of the environment, to ensure that there will be data that will be used for local decision-making.

Generally speaking, there are more technical actions that municipalities could do for the environmental recovery and this list is not exhaustive. But what is important to summarise - local governments need to become reliable partner for any upcoming recovery initiatives and support local communities with their intention for sustainable recovery in every way possible. Even to encourage formation of the recovery projects on their territories, by spreading awareness about such needs.

As mentioned above, all of Ukraine is in one way or another affected by environmental pollution. Therefore, any and every city can be considered for the implementation of any type of environmental restoration action. Local communities should initiate the call for the development of those local recovery plans already, to prevent long periods of waiting for those projects' formation and this is what municipalities should get prepared to do as soon as possible on their behalf.

2.2.3 Project proposal for civil society actors

Civil society is the core and main beneficiary of the environmental recovery projects to be organised in Ukraine. By the common understanding, those are the communities that live on specific geographical territories belonging to the state's national territory, individuals that act in the interest of their communities or self-organised groups composed of active citizens that can be registered under various legal statuses.

In Ukraine, the official definition of this term is the following: "Civil society is a society based on an extensive network of institutions, associations and organisations independent of the state, created by citizens themselves to identify and implement various public initiatives, meet their social needs and defend their collective interests". (Riabchuk M., 2006) In the everyday use, "civil society is often understood as the level of civic consciousness of a particular society, the active participation of citizens in the creation of civil society organisations." (Riabchuk M., 2006) Subsequently, civic society is defined as "a socially active part of society that participates in the social and political life of the country on a voluntary basis; it acts both directly and through various associations of citizens." (State Border Guard Service of Ukraine, 2023) Officially, civil society organisations could be "public organisations, trade unions, employers' organisations, charitable organisations, religious organisations, creative unions and other organisations registered in accordance with the current legislation,

whose activities are not related to the exercise of power and the generation of profit for distribution." (State Border Guard Service of Ukraine, 2023)

Civil society is envisioned to have specific functions, that are characterised as "the main activities of civil society institutions and the scope of their impact on public life." (State Border Guard Service of Ukraine, 2023) Those above-mentioned civil society organisations and institutions: "-are means of self-expression of individuals, their self-organisation and independent realisation of their own interests; solve a significant number of socially important issues on their own or at the level of local self-government, facilitating the performance of state functions; -act as a guarantor of inviolability of personal rights of citizens, give them confidence in their abilities, serve as a support in their possible confrontation with the state, form "social capital" capable of cooperation and effective solidarity actions; - systematise, order and regulate protests and demands of people that could otherwise be destructive, and thus create favourable conditions for the functioning of democratic government; - protect the interests of a particular group in its confrontation with other interest groups so that each group gets a chance to be heard by the authorities." (State Border Guard Service of Ukraine, 2023)

In general - civil society and its actors are local mediators of the relationships of the community with the state, they make sure that individuals' rights are protected, that their interests are lobbied to the decision-makers, and they help to organise and manage local action. Ukraine reportedly has a very prominent civil society and that is why those individuals, groups and institutions have to be considered as important actors in the environmental restoration efforts in Ukraine. Local support actions in other fields didn't go unnoticed, and it is expected that civil society will show a similar level of engagement in future rebuilding and recovery efforts. (Ukrainian Center for Independent Political Research, 2023)

Civil society has vast power over the actions taken on their territories, the issue comes only when they don't realise that. Therefore, civil society actors have a variety of actions that they could do in the field of environmental recovery projects.

1. Realising the role of political lobbying. National and local authorities and their representatives have been chosen to be servants of the people who voted for them. Therefore, it's a role of civil society to remind people in power to make choices that reflect this assignment. Civil society needs to take a stand in their own vision for how the processes have to be organised on their territories and lobby their interests and needs by means of organising and signing petitions to the local government, sending individual letters to the members of the authorities and institutions, establishing civil society supervisory board and making it a part of

the local decision-making process. Even organising local gatherings and protests could be a way of expressing concerns over certain things happening or not in specific territories.

Added to this, civil society has to demand strict market surveillance over the products and appliances circulating in the local markets. They have to require the national government to allow only energy-efficient appliances and products that have EU-level quality labels to be sold on the national market. Until this is regulated by the adoption of relevant political decisions and legislative acts, the local population will be in danger of procuring goods that are dangerous for the already damaged or vulnerable environment.

2. Holding a local assembly in collaboration with local authorities and selecting a board of public representatives to participate in drafting the environmental recovery projects and initiatives. Those publicly selected representatives will become a monitoring force for the recovery projects, ensuring that those initiatives are accountable. They will be able to issue honest feedback and report on the state of projects' implementation, as well as monitor public spending in order to avoid corruption in the process of organising logistics and procurements of materials for those projects. This board will support the realisation of principles of accountability and transparency, as well as ensure an inclusivity factor in those projects. Such a board of local public representatives will be necessary for every environmental recovery project, at least one board per city, to make sure that the local population has representation.

3. Every community that is physically located next to the territory that will require environmental restoration will have to lobby for the observation of the requirement of Free, Prior, and Informed Consent (FPIC). As of now, this requirement is not adopted in Ukrainian legislation as an obligatory form to be submitted together with project proposal files, which is why civil society lobbying on this matter is very important and has to be incorporated into environmental recovery projects.

4. Civil society and its actors are individuals that have various professional formations and depending on their capacity, they can themselves collaborate with various local and international actors to draft and submit environmental restoration projects to various funding calls.

5. As individuals, civil society members need to adopt a proactive civil position. This may include volunteering for the existing local or national restoration initiatives and projects to get practical skills and replicate them on their own territories; and signing up for the courses offered by various NGOs on environmental conservation, agroecology, sustainable agriculture, and environmental management; reaching out to local businesses and institutions and informing them on the need of holding a seminar, local event or discussion panel on those

matters. Generally speaking - speaking up about the need to receive information on their territory and ways to preserve or restore the lands affected by the war and climate change.

6. Civil society can organise local action events, such as a river or territory's clean-up in cooperation with the municipality, setting up the community garden or promoting recycling or composting practices. For example, setting up a community garden where everyone can plant various plants will mean creating common ownership zones that will be beneficial not only for practising various sustainable agriculture practices but also for boosting the community's engagement in local action. Physically gathering people for the territory's clean-up will help to learn more about the area, its vegetation, and the species present and will teach an appreciation of the resources that nature there provides. Small local actions make a difference not only in the health of the environment but also provide first-hand information on the space, support building trust among the members of the local communities and overall provide additional motivation for taking ownership of the territories. Local communities may also start the "greening up" process by planting local species of plants on public territories, their private properties and in specially designated zones.

7. Individuals need to exercise their consumer power and prevent procuring and producing products that don't follow the sustainability requirements and ensure the environment's preservation. As consumers, individuals can boycott the products that may cause damage to the environment. This may mean taking a stand against sales of pesticides that damage soils or rallying against mass plantations and the production of soil-destructive crops.

Added to this, as a consumer, every individual has to review their dietary preferences and consider their food consumption. The topic of individual preferences in food consumption and its effect on the environment and climate change is important to be considered on the individual level and change in food habits needs to be encouraged to prevent humanity from being a driver of the even more intense climate changes and, subsequently, further environmental damage. (Bryngelsson, David & Hedenus, Fredrik & Johansson, Daniel & Azar, Christian A & Wirsenius, Stefan, 2017) Lastly, local communities have to encourage local food production and local farmers to adopt sustainable agricultural practices while producing food. Choosing local production over the one sourced from abroad has to be encouraged to reduce the pollution coming from the logistics involved in the food production chain.

Overall - local communities and active civil society are key in the implementation of the local environmental recovery projects. They need to get physically involved in such, express their opinions about the proposals of those projects, lobby for their interests and needs to be represented on the political and decision-making level. They have a great potential to take over

the role of monitoring those projects' implementation. To succeed in ensuring the longevity of those restoration environmental protection efforts, civil society also has to adopt certain environment-friendly knowledge and practices, otherwise, all the environmental restoration efforts will go to waste.

All the suggestions for the local actions to be taken can be adapted to any territory of Ukraine, except for currently occupied territories, where life conditions are significantly worse than in the other parts of Ukraine and where a limited amount of the local population is present. Those currently occupied territories will require special restoration projects after their de-occupation and new, locally relevant practices have to be adopted for the communities that will first need to recover from the life under the occupation. The inspiration for new local actions can also be taken from those that have been recently launched on certain territories, on the examples of projects that local NGOs are currently supporting. (NGO "Ecoaction", 2023c)

2.3. Financial tools available to fund recovery projects

Since the russian full-scale invasion of Ukraine in 2022, there have been multiple claims of financial support for Ukraine, either to support its economy and its institutions, as humanitarian support, as well as forward-looking promises of funding the recovery and reconstruction projects in Ukraine. All those financial contributions aim to ensure swift recovery of the country after the significant damages that war has caused to civilians, infrastructure, and food supply chains, as well as to aid the inflation which affects Ukraine's currency daily. Ukraine's government and its institutions, meanwhile, are interested in creating the best conditions to attract as many investors into the recovery projects, as possible. This chapter aims to summarise the claims of financial support for Ukraine from the international actors until this day, as well as suggest indicative sources of financial support available for different types of recovery projects in the timeframes of creation of this thesis.

2.3.1 Financial sources to fund recovery projects in Ukraine

First, it is important to address the matter of the financial support Ukraine has received in the years 2022 and 2023 and what it has been directed towards. National Bank of Ukraine has summarised international aid received in 2022-2023 in their March 2023 report as follows: "In 2022 Ukraine has received around 32 billion US dollars of international aid, out of which more than 14 billion US dollars of which were grants"; adding that "in conclusion to the already

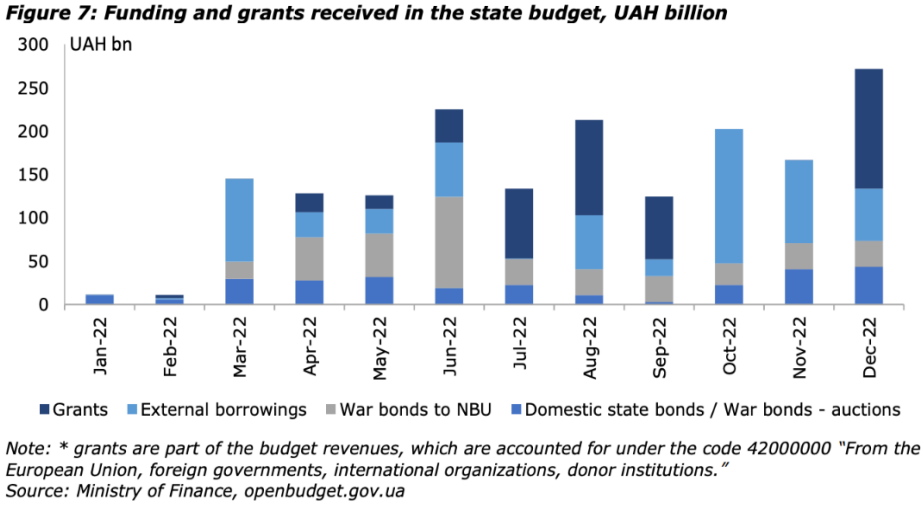
announced volume of international aid and progress in discussions with the International Monetary Fund overall volume of financing in 2023 can be more than 38 billion US dollars." (p.6) (National Bank of Ukraine, 2023)

Majority of those funds were used for supporting the government in paying pensions, social payments, salaries, and for the military needs of Ukraine, in addition to the overall economic and humanitarian relief. Professor Trebesch, C. from Kiel University summarised information available on the incoming financial aid in presented infographics of Annex 8 and Annex 9, where we can observe the financial pledges distribution between countries who express their support, as well as the types of directions those funds aimed to support. (Trebesch, C., 2023)

The author also mentions that there were other types of support provided, but not displayed in the attached figures and those concern the expenses of various countries related to acceptance of the refugees and the creation of conditions for temporary protection for citizens of Ukraine who had to flee Ukraine due to the war. Above mentioned funds were distributed in the form of loans, grants, and disbursements. Ukrainian analytical centres "Reanimation Package of Reforms" (RPR) and "Institute for Economic Research and Policy Consulting" summarise the following numbers of aid in various forms received in the state budget, shown in Figure 7. (Institute for Economic Research and Policy Consulting, 2023a)

Figure 7

Funding and grants received in the state budget in the year 2022, in UAH billion



Note. A production of Institute for Economic Research and Policy Consulting (2023a), extracted from their report.

This volume of contributions was important to keep Ukraine's economy afloat and ensure that the country has enough funds to support its essential sectors. Later, in the other review published in August of 2023 Institute for Economic Research and Policy Consulting mentions that in 2023 "more than half of the State Budget expenditures are directed to defence and security, and international assistance is channelled as previously for social expenditures and salaries." (Institute for Economic Research and Policy Consulting, 2023b)

They also mention future funding perspectives for Ukraine and the works that Ukraine is doing to make sure that those forecasts will come true: "The government has launched the elaboration of a four-year Ukraine Plan (full name: Action Plan within the framework of the implementation of the European Commission's Proposal for a Regulation of the European Parliament and of the Council on Establishing the Ukraine Facility), which should become the basis for the provision of macro-financial assistance from the EU in the total amount of EUR 50 bn." (Institute for Economic Research and Policy Consulting, 2023b) They mention the following division of the funds within this macro-financial assistance package: "Of the EUR 50 bn, 78% (the Parliament suggests 75% with amendments) will be directed through the budget: these funds will primarily be spent on financing recurrent expenditures of the state, as in 2023; these are most likely primarily concessional loans from the EU, although the parliament stresses the need to increase the share of grants." (Institute for Economic Research and Policy Consulting, 2023b) They mention that "17% of the funds are provided for the Investment Guarantee instrument, particularly military risk insurance" and state that they "hope that insurance will be provided not only to EU companies but also to Ukrainian businesses". (Institute for Economic Research and Policy Consulting, 2023b)

What is interesting is that "the remaining amount (respectively 5% or 8%) is international technical assistance and a subsidy for the interest on the loans provided under the first component of the support program." (Institute for Economic Research and Policy Consulting, 2023b) The final version of this document is expected to be adopted in November 2023, so it is not clear if those percentages mentioned are going to be final. Personal income tax meanwhile funds the local budgets of the municipalities, but it seems that local authorities spend it on the current emergency repairs and when having a surplus, try finding a way to forward it to "supporting territorial defence units and military units registered in communities". (Institute for Economic Research and Policy Consulting, 2023b)

As a conclusion of this overview of the financial incomings to Ukraine's budget on the example of EU-Ukraine cooperation, we can see that current international financial pledges are covering major emergency needs of the state related to the national security, military efforts

required to defend sovereignty and aim to support the most vulnerable social groups, provide necessary incentives to cover civilian's basic needs.

So, what is left for the recovery funds and what is claimed to be contributed to the future recovery and rebuilding efforts? From the side of the nearest neighbours - the EU and its future "Ukraine Facility" soon to be created by the European Commission will seem to help to address that matter in the future. (European Commission, 2022) In their latest published intentions regarding provision of the financial support to Ukraine, they mention possibility of holding around 8 EUR bn for "Ukraine investment framework for recovery" and mobilising around 17,8 EUR bn for "investments in Ukraine's private sector by providing guarantees and blended finance", as well as holding 3 EUR bn for "assistance and capacity building programmes" in various fields related to the reforms related to local governance and civil society and "supporting Ukrainian government and civil society in achieving EU acquis and standards". (Annex 10) One of the assumptions coming from those pledges would be that if lobbied enough by relevant ministries, local governments and other civil society organisations, those priorities will also include environmental efforts support, which will be on the side or blended with funds required for Ukraine's reconstruction efforts.

Another opportunity and platform for local actors to request funding for specific local environmental recovery initiatives could be submitting the application via the newly created governmental platform for the investments of the local reconstruction projects called "DREAM". DREAM is an abbreviation for "Digital Restoration EcoSystem for Accountable Management", and it aims to "collect, organize and publish open data across all stages of reconstruction projects in real time, implementing the highest standards of transparency, and accountability." (DREAM, 2023) By submitting suggested restoration or recovery projects on the platform different local communities get a chance to receive various technical support and funding from investors who will be listed in the part of "contributors". (DREAM, 2023)

The list of current investors on the platform so far only lists EIB (European Investment Bank) and the government of Ukraine, but with time the plan is to have more actors added. (DREAM, 2023) Possible future investors include the European Bank for Reconstruction and Development (EBRD), the International Finance Corporation (IFC), the European Union (EU) in the face of the European Delegation of Ukraine, GIZ, the U.S. Agency for International Development (USAID), UK Aid, etc.

The pros of this platform are that it responds to civil society's demand for creating transparent reconstruction procedures, as the website displays the numbers of the funding needed for various phases of the project, as well as has a section of updates on the progress of

the project implementation. The challenge could be for communities to get support with technical proposal documentation, as projects that local communities will be interested in would be related to the reconstruction of the destroyed infrastructure and recovery of the territories and their potential. Those types of projects require field-specific professional knowledge and usually, they would need above-average budgets, depending on the level of the destruction caused.

Altogether it still is a good tool and opportunity for the municipalities and local actors to learn from the applications of others and the least - this platform allows to register that there is that type of project needed, which already will ensure that government and international investors will notice the need from the ground-up.

And, out of other more recent opportunities, another Ukrainian governmental portal is currently open for the various local projects and initiatives, and it already has a substantial number of various environmental recovery projects - a platform called “Recovery of Ukraine” (Recovery of Ukraine, 2023) There, communities and various civil society actors can view the latest updates on the governmental platforms, see the previously implemented and current projects. As well as there is also a chance to reach out to the governmental team by filling in a form on the website and providing a description of the idea. This means that applicants can establish an initial contact and receive support and guidance on the opportunities available for the project of interest.

Lastly, there are multiple individual funding calls from international investors and donors that are in Ukraine that are open seasonally, which means that there is a chance for various local actors to register as an NGO or civil society organisation and submit an individual application for funding by major funds, embassies, banks, and technical support organisations.

Taking it all into account, the only challenges awaiting the local actors would be collecting data from the ground, forming a clear vision of what is needed for their communities and drafting an initial project proposal. After having the initial draft, there are several sources of funding available, as well as there are multiple technical assistance projects from EU, GIZ and USAID that could support communities with further technical proposals development.

2.3.2 Suggestions for organisation of the funds' distribution

At this moment it seems that the financial commitment for the environmental recovery projects is still very uncertain. So far different civil actors may access different sources of financing and the probability of getting it will depend on the knowledge and capacities that

they possess, as well as their willingness to work on improving their technical capacities. It also seems that big international donors count on Ukraine's government to make their financial commitment and define their priorities first. A good example of this approach is the case of Ukraine Facility, when "underpinned by a Ukraine Plan to be presented by the Government of Ukraine, Ukraine Facility will support Ukraine's efforts to sustain macro-financial stability, promote recovery as well as modernise the country whilst implementing key reforms on its EU accession track." (European Commission, 2023b) It is probable that after the publication of the Ukraine Plan by the government, international donors will make special financial proposals for different sectors of the recovery efforts, and those financial commitments will then be split into dedicated financial thresholds. It's still not clear how this funding will be distributed, as the final form is not set yet, but it is probable that some part of the funding will be devoted directly to the government of Ukraine and its institutions that provide critical support for the population. And some parts will probably be transformed into grants and loans that will be distributed according to the current needs on an annual basis.

Derived from the previous chapters, it seems that the main concerns expressed by the civil actors are about the transparency of the funding distribution, fear of corruption in the process of procurements and services provision, concerns about the possible abuse of the power by the central institutions in the process of setting priorities. Moreover, it is not clear yet what will be the interest rate on the loans and the credit provided during wartime. And a big question is how much money from the reconstruction will actually stay in Ukraine with its suppliers and what part of this will actually be spent in the EU, taking into account certain procurement criteria in place by the EU standards that Ukraine producers may not currently comply with. But despite the uncertainties, Ukrainian civil society and other international actors try to look ahead and therefore there are already some ideas of how funds should be distributed and what principles they should follow.

On the matter of the Ukraine Facility funds that will most probably be the biggest financial commitment in the long-term, on the 11th of October 2023, President of the Congress of the Local and Regional Authorities Leendert Verbeek, "called on Ukrainian national authorities to support cities and regions as indispensable actors of Ukraine's reconstruction", saying that they "have to be provided with means for action and with their own exclusive powers rather than only with delegated competences" and said that "this could be ensured through further decentralisation and local government reforms, in line with the European Charter of Local Self-Government." (Council of Europe, 2023) In this speech, he highlighted

that there is a need to have European representatives supervising and coordinating certain technical aspects of the reconstruction process, some institution that will be “ensuring complementarity with other donors, international organisations and European associations”, suggesting it to be European Alliance of cities and regions for the reconstruction of Ukraine. (Council of Europe, 2023)

Though it is not clear who will take over this role yet, it is clear that Ukraine’s local governments will be playing a crucial role in the funds' distribution and that there will be some European counterparts that will provide technical support for those interactions. Congress President stated that “an adaptive multi-level governance system could facilitate the constructive and sustainable dialogue between different levels of government, to ensure balanced and co-ordinated contribution of local and regional authorities, and their national associations to the recovery of the country”. (Council of Europe, 2023) In conclusion, decentralised adaptive multi-level governance, high levels of local cooperation, and functional powers for Ukraine’s local authorities should be a requirement for the future fund’s organisation and distribution. This may facilitate current decentralisation reform and also ensure that future funds reach the regions and areas that are the most in need. And Ukraine’s central government should ensure that local authorities have enough rights and capacities to receive the funding and benefit from the funds to be invested into the Ukraine Facility.

Another important aspect is that for the long-term well-being of Ukraine and for the sake of not causing more environmental harm, it will be better if only projects that are sustainable, following principles of green economy and low-emission development, will be granted funding, and encouraged to apply. It may mean that local and European market regulators must get involved and set certain energy classes and ecolabels to be required, as well as local government should ensure that those investments will assist Ukraine on the EU Green Deal path. (European Commission, 2021) This need for green and sustainable reconstruction is also displayed in Ukrainian Government efforts. According to OECD, Ukraine has already established the National Council for Recovery from the War, which is preparing a “Post-war Recovery and Development Plan for Ukraine”. (OECD, 2022)

The Working Group on Environmental Safety has identified five priority areas for the sustainable reconstruction of Ukraine: “reforming public environmental administration; climate mitigation and adaptation policy; environmental safety and effective waste management; sustainable use of natural resources; and conservation of natural ecosystems, preservation of biological diversity and restoration and development of protected areas.” (OECD, 2022) Those principles and priorities should also be reflected in the future

requirements for application for funding and in the organisation of funding distribution. As OECD highlighted it: “since significant funds are expected to be available for the reconstruction efforts, the emphasis should be placed on ensuring that the financial flows also contribute to achieving environmental and green objectives”, and this is what Ukraine’s civil society also supports in their vision for Ukraine’s recovery. (OECD, 2022)

Additionally, to the funds planned for the direction of ensuring sustainable reconstruction, there should be substantial costs included for the environmental clean-up, as well as demining of the affected territories and disposal of the military waste. Current pollution is significant, and this should be reflected in the funds' distribution and organisation. Environmental damage reduction projects, as well as system restoration projects, have to be given priority in the first years to ensure that all the efforts of the reconstruction will not be wasted.

Overall, funds distribution must be organised in a way that local actors and local governments will be able to access funding, receive required technical support and assistance and move towards green and sustainable reconstruction. Adoption of EU green principles in public procurements, getting up to speed with ecolabels and energy certificates, adopting principles of energy efficiency in the reconstruction - all those have to be included in the principles of the funds' distribution in forms of the requirements of the guidelines that projects have to follow. Central government receiving funds should be encouraged to bring all the necessary legislation and policies up to EU standards, as well as to adapt new legislation that will ensure the longevity of the recovery projects and reflect society’s sentiment and need for transparent, sustainable, and long-term changes. All in all, funds should play the catalyst role in guiding Ukraine to the side of sustainable recovery, both in terms of the environment, as well as the economy.

Chapter 3. Results and findings

This section provides a detailed description of the research's findings without offering conclusive or interpretative observations. It aims to present the raw information relevant to the research topic. The results and findings encompass several key aspects related to the environmental damage assessment and the perspectives of restoration initiatives for Ukraine.

1. Complex historical background of the war, its origins, and the impact of those historical events on Ukraine's modern economy. Historical records demonstrate that Ukraine was dependent on Russia during the Soviet Union's time in an unhealthy dynamic and the consequences of events that occurred during this time are still affecting the country's economy after Ukraine's independence. Multiple events recognised internationally as genocide, caused by the Russian government at the time, have occurred in Ukraine. The biggest of them is the "period of Russification" (1945), the adoption "Fourth Five-Year Plan" (1946–50) and subsequently the "Holodomor" (1946–1947) that resulted in a genocide of 3,9-4,5 million Ukrainians. The later tragedy of Chernobyl in 1986 created a Chernobyl Exclusion Zone and caused massive radioactive pollution in Ukraine and the countries nearby. The events during the years of being part of the Soviet Union led to Ukraine's devastated economy by 1991, the loss of most of the production force, major human losses and unprecedented environmental radiation pollution at the time. After Ukraine's independence in 1991, it faced the illegal annexation of Crimea by Russia in 2014 and in 2022, a russian full-scale invasion that is still ongoing.

The combined impact of those events on the economy is demonstrated by the World Bank's GDP chart in Fig. 1 where between 1988 and 2021 the fall in GDP growth correlates with the dates of historical events under Soviet Union rule and the russian government's direct interference. This and other graphs represented in Chapter 2.1.1 provide a reader with an understanding of Ukraine's macroeconomic profile in accordance with the classical economy index to measure economic development - GDP.

Historical events and their correlation with the state of Ukraine's economy demonstrate to the reader the complex relationships between the two countries and display the origins of the 2022-2023 war, providing economic insight into the nature of this war. The origins and intentions of the war usually correlate with the scale of the destruction that it causes.

2. Local actor's potential analysis. Initial analysis of Ukraine's local society potential based on independent reviews from the publications of international donors demonstrates the

rise of Ukraine's active society after 2014. European Commission has issued an official statement in their communication in 2022, concluding that "Ukraine has a vibrant civil society that plays an active role in the promotion and oversight of reforms; the expertise of Ukrainian civil society organisations on key sector reforms makes them a valuable partner for the government and an important actor in local service provision." (p.6, Directorate-General for Neighbourhood and Enlargement Negotiations, 2022) The rise of the number of local community associations, individual NGOs, NGO coalitions, growth of numbers of independent civil society funds established and multiple new governmental initiatives have been observed since 2014's Revolution of Dignity, and the new wave started after 2022 russian invasion.

Chapter 2.1.2 lists several references to the prominent civil society organisations and funds that are currently active in fundraising and in the launch of the local territorial initiatives. The list of the civil actors is being considered as an "active civil actors" database that can be engaged in further projects and initiatives. Chapter 2.1.2 additionally provides an overview of Ukraine's ongoing key reforms' progress, as well as elaborates on the vision regarding the pathway of the upcoming reforms envisioned by the central government of Ukraine. Elaboration of how the reforms and latest achievements of civil society and the central government of Ukraine connect to the reconstruction and recovery plans is provided. The basis of the current situation in the field is being set for the general understanding of the reader on the local capacities in the field of civil society mobilisation.

3. Extent of the environmental damage caused. Chapter 2.1.3 provides an extensive explanation of the destruction caused to Ukraine since the beginning of the russian full-scale invasion that started on 24th of February 2022. The spatial aspect of the country's territory and a map of territories affected by the full-scale invasion are provided in Fig. 2. Indicative numbers of the infrastructure destroyed, as well as its first estimated cost of the direct damages, are mentioned to be 63 billion dollars' worth. Overall, the number includes the cost of approximately "4,431 residential buildings, 92 factories/enterprises, 378 educational institutions, 138 healthcare facilities, 8 civilian airports and 10 military airfields, and 7 thermal power plants/hydroelectric power plants" destroyed so far. (Kulish, H., 2023)

The motion of the possibility of ecocide committed on the territory of Ukraine is being mentioned and elaborated, voiced by the informational sources from Ukrainian side and academics in the field from around the world. The initial overview of the environmental damage caused is provided, estimated for the period between 24.02.2022 and 31.05.2023. From the data discovered, within the mentioned period Ministry of Environmental Protection and Natural Resources of Ukraine (2023) recorded nearly "2 412 cases of environmental damage"

caused by the military action of the russian invasion. The consequences of those actions have been estimated to have caused overall damage to the environment equal to approximately 11 billion EUR, in accordance with the methodology on the financial estimation of the value of damages by the Ministry of Environmental Protection and Natural Resources of Ukraine (2023). Damage value has also been estimated by the State Environmental Inspection, and in accordance with their methodology, the final sum resulted in almost 50 billion EUR. (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023)

According to the data and estimations of the Ministry of the Environmental Protection and Natural Resources of Ukraine (2023), the overall damage to the air at the time was estimated to be around 26 billion EUR, with the main factors of the destruction being fuel fires, wildfires and fires that were as a result of ignition of other objects. Damage to the soils has been estimated to be approximately 3 billion EUR, the main factors of the destruction at the time were spillage of 31 486 tons of oil products and 2 000 m^3 of other poisonous substances leaking into the soils. Damage to the water resources has been estimated to be around 5 billion EUR, with 2 tons of spillage of oil products into water, as well as 3350 m^3 of other poisonous substances. Damage to the forests was estimated to be approximately 5 million EUR and had a register of 13547 hectares of fire in forest plantations, 7948 hectares of mass deforestation or felling of the forest, in addition to 480 hectares of negative impact on the nature reserve fund of Ukraine.

The number of environmental destruction cases has increased since then, therefore those values provided by the Ministry of Environmental Protection and Natural Resources of Ukraine (2023) should be considered as an indicative measurement of the financial equivalent of destruction and should only serve to demonstrate the scale of the destruction, not the final overall damages financial equivalent.

4. The progress of forming recovery and liquidation plans by the central government and the intensity of the destructions caused. By the end of May 2023, the central government have only managed to form liquidation plans for 30% of all reports received. This doesn’t respond well to the high rate of destruction intensity recorded, which at the time was +1 cases/day, which was defined by accessing the real-time database of the Ministry of Environmental Protection and Natural Resources of Ukraine daily during the month of May 2023. From the other unofficial data sources from the civil society actors in the field, only 10% of the cases could be directly validated with the help of satellite data, and the overall number of environmental destruction cases is half of the presented by the official sources, recording approximately 1061 cases by the 07 June 2023.

5. Geo-localisation of the environmental destructions and their nature. In accordance with the data accessed in June 2023 from the real-time database website launched by the collaboration of the international organisation “Greenpeace” and Ukrainian NGO “Ecoaction” (2022), displayed in Fig.3 of chapter 2.1.3, the vast majority of the entries on the damages caused to the environment have been in the regions of Ukraine that have been invaded and temporarily occupied by russians in the course of the war.

The types of damages caused to the environment on the territories occupied by the time of accessing the data were damage to the ecosystems on the ground and marine ecosystems, damage to the industrial production complex, damage to the nuclear power plants and energy power plants, as well as damage to one of the biggest hydroelectric power plants in Ukraine. The highest concentration of nuclear and energy infrastructure damages, as well as subsequent pollution of the surrounding ecosystems, is recorded in the North and West of Ukraine. Territories of the South and East of Ukraine have recorded all types of pollutants. The geographical concentration of pollution and damages is confirmed by another international source - UNEP (2022) real-time map, accessed in June 2023. The areas highlighted in the maps also suggest possible areas for the environmental initiatives focus.

6. The notion of the presumable ecocidal nature of the war. Data presented in Fig. 5 and Fig. 6 driven from the real-time map of the UNEP (2022) exhibit the same geographical location of the environmental damages and the recorded disruption to the settlements, with main hotspots in Kyiv, Kharkiv, Zaporizhzhia, Donetsk regions, as well as all along the river Dnipro. The confirmation of the investigated destructive nature of the russian occupation of Ukrainian settlements has been derived from the official publications of Human Rights Watch (2023). Because of the aligning information on the environmental destruction and high civilian death rates as a result of occupation recorded by the various sources, the notion of intentional application of the “scorched earth” technique by the russian army arises.

In case the intentional destruction of natural resources for military advantage and for the control over the population on the occupied territories will be proven as one of the possible outcomes during the bigger ongoing investigation by the International Court of Justice of the UN into human rights violations caused by Russia in Ukraine, the application of the causing of the “ecocide” may officially be recognised. Until then, the application of the term “ecocide” refers to the intentional destruction of nature by the russian military on a big scale.

The records of the environmental damage cases presented in the publications reviewed within this research, so far demonstrate the violations of Human Rights established by the Geneva Conventions of 12 August 1949 relating to the Protection of Victims of International

Armed Conflicts, derived from the publication of the International Committee of the Red Cross (1998). Publicly accessible records about the environmental destructions caused by the russian army during the invasion of Ukraine also violate the rules regarding the environmental protection of the territories affected by the international armed conflicts laid out in a separate publication by the International Committee of the Red Cross (2020).

The supporting argument to the idea of causing "ecocide" in specific cases recorded until the end of June 2023 was produced by the author and is exhibited in Fig.7. It showcases several major cases of environmental destruction that seem to have been caused by the intension of causing intentional damage to the territory, rather than for the process of military advancing. Those cases are indicated to seem to be overlapping with the Emerald Network sites in Ukraine. Based on overlapping this available data, the author argues the intentional nature of destruction caused to those specific sites, as Russia is one of the participants of the agreement on forming the Emerald Network for biodiversity preservation, has submitted areas to be included in this network in 2022, and therefore has a knowledge of those sites being a part of the network as well. The coincidental nature of having those internationally defined bio preservation sites being a subject of military destruction with no direct military purpose makes the author argue the intentional nature of destruction, therefore adding to the motion of naming the cases reviewed as "committing ecocide". This is an addition to already recorded concerns voiced by Ukrainian authorities and civil society actors on the matter, presented in the same chapter of the work.

Despite being presumable, those arguments showcased by the author are important to be mentioned as results of the review, as this demonstrates the nature of environmental destructions caused and taps deeper into the reasons behind the main narrative used by the local actors on the notion of ecocide caused on Ukrainian territories.

7. Issues with an evaluation of the damages caused in the financial equivalent. As a result of the overview done, there seems to be no conclusive idea of fixed criteria for how to form the financial equivalent of the environmental damages caused. Moreover, due to the scale of the destruction, the issue of ecosystem degradation may appear not only in Ukraine but also in nearby countries over time. All literature reviews, as well as initial observations of local actors, signal that the impact of this war on the global climate remains unknown and may also have its toll on restoration initiatives in the future. Overall, the sources reviewed signal a general uncertainty on what will be the final environmental destruction and pollution caused, what will be its scale and there seems to be no clear idea on how to put financial value for those damages for now.

8. High level of motivation and social responsibility in Ukraine's civil society. Research conducted by Ukrainian analytical centres demonstrates an overall high level of civil society mobilisation, increased levels of civic engagement, an increase in the fundraising initiatives, as well as the re-activation of volunteer organisations in the past 2 years.

9. Existing locally defined principles for the recovery and reconstruction of Ukraine. Ukrainian civil society organisations and NGOs have commonly issued two important statements with the main principles and ideas according to which the reconstruction of Ukraine should be organised. The highlights of the statements are shown in the introduction of Chapter 2.2. The main voiced ideas on principles that recovery and reconstruction should be based on around adapting principles of sustainable development, getting in line with the European Green Deal, as well as adapting instruments for control over the construction projects, as well as infrastructure projects in accordance with the tools already used in EU. Overall, the opinion of the 41 civil organisations and NGOs who issued both statements is that the reconstruction should become an opportunity for the EU integration of Ukraine, a push for necessary reforms and all changes made will only benefit Ukraine's civil society and the environment. The awareness and clear ideas demonstrated in both statements signal the important standpoint of the publication - Ukraine's civil society organisations are ready to support this work and even take the lead in certain fields to monitor the progress or reforms.

10. Potential types of the local ecosystem restoration initiatives defined. Due to the limited information from the ground, as well as uncertainty in what future development would take place in the upcoming months of the war, the author was not able to prescribe certain types of projects to specific territories.

Following the recommendations on the global UN Decade for Ecosystem Restoration campaign, various types of potential actions to be taken were suggested for 3 different types of local actors - for the NGO, local governance representatives, and other civil society actors as individuals or an informal group. The possible main areas of the intervention are defined to be policy intervention and lobbying, preparation and writing of bigger recovery projects for the purpose of applying for grants or specific funds allocated for the area, capacity-building activities, drafting awareness campaigns and individual physical actions. Actions defined and allocated for 3 different types of actors coincide with their legal capacities and rights, as well as vary on the technical capacity they may have. All of the actions suggested were adapted to the local context and indicated in Chapters 2.2.1, 2.2.2, and 2.2.3.

11. Outcomes of the financial tools available to fund potential recovery initiatives. The analysis has been conducted on finances available or potentially allocated for local recovery

initiatives in the field of the environment. Main financial pledges issued by various international donors so far are devoted to the maintenance of Ukraine's government functions of social protection of the population, while the expenses of the Ukrainian state are focused on security and military matters. The future distribution of the sums devoted to other areas remains unknown.

The latest ledges demonstrate the interest of international donors to maintain constant financial support of Ukraine, with the recent news of the Ukraine Facility establishment by the EU, which currently awaits the specific plan to be provided by Ukraine's central government prior to EU. So far environmental restoration matter is not being included in the preliminary document.

Certain existing governmental programs and initiatives support individual environmental restoration initiatives. However, as an outcome of the analysis, it seems that the Ukrainian government aims to find international donors and investors to fund specific infrastructure restoration projects and to include an environmental component on a case-by-case basis, rather than a stand-alone matter to fund.

12. Suggestions for how the funds that will be allocated should be structured. The author provides a review of the main issues to be addressed when providing funding for Ukraine's recovery projects, based on the local actors' opinions and in accordance with the issues that are distinctive for Ukraine's environmental damage volume and the nature of those destructions.

Chapter 4. Discussion

Evaluation of findings. This thesis research has been built on the initial understanding that there is an issue of extremely intense and almost unaccounted-for environmental destruction in Ukraine as a consequence of the russian invasion since 2022, which will inevitably affect the outcome of the future recovery efforts in Ukraine, and already has an impact on the global climate and global food chains. Ukraine and its environment became the subject of this thesis research, based upon the initial understanding that there are already a lot of publications and analytical reports on the other matters related to this war. After choosing the subject of the research, jumping into finding answers to the urging questions, maybe even slightly ahead of time, or at least indicating various actions that could smoothen this transition was in author's priority. Personal interest in the case study, belonging to Ukrainian society and having deep knowledge of the local context have encouraged the author to form a very local approach towards the topic, prioritising local perspectives, and visions, as well as taking an initiative to represent country of origin in a great detail. After an initial literature assessment of the latest articles related to Ukraine, its environment, and its economy, the main questions forming this research work have appeared.

The first main part formed in this research originated from the very simple questions: "How to explain this war to the foreigners?", and "What does this war mean for Ukraine's economy and environment?" Out of this, the extensive analysis of the literature on the topic has appeared, summarising the main points on the historical background of Ukraine, its macroeconomic situation, as well as political context. The main hypothesis for the macroeconomic part of the country profile was that Ukraine's economy was affected by the interference of the russian government throughout its independence and that that interference has affected Ukraine's capacity to fund its recovery now. Coming out of the final macroeconomic profile formed, the hypothesis seems to be proven to be true. There is a direct correlation between the events happening in Ukraine caused by russian interference and the periods of economic decline. This proves that Russia has systematically worked on undermining Ukraine's financial autonomy and economic development, which can threaten future recovery efforts.

The historical part of the macroeconomic country profile presented in the Introduction and Chapter 2.1.1 have built an indicative understanding of the reader about what events happened in Ukraine during the Soviet Union period and within its years of independence. First

of all, this information helped to fill in the gaps in the dry economic indicators' description, built a connection between historical events and their economic implications, and provided the general reader with an initial basic understanding of the geopolitical dynamics formed between Ukraine and Russia. But most importantly, with the help of this basic information provision, the reader gets to understand the socioeconomic impacts of the current russian war in Ukraine.

This information is also very important for the second hypothesis reviewed in this research - the nature of the war started by Russia in Ukraine is colonialist, genocidal, a payback for Ukraine's exit from the Soviet Union and for its independence. The violent nature of this war would then explain the scale of the destruction caused, according to this hypothesis. Though the sources reviewed so far are cautious to call it a genocidal war, there are already multiple human rights violations and international rules of war violations that have been recorded, accounting for thousands of innocent civilian deaths. The tactics used in this war are violent, and destructive, with the application of the scorched-earth technique. The ideologies behind the conflict are deeply disturbing and seem to express a deep denial of Ukraine's existence as an independent state, despite the international agreements signed and recognised by both countries. All the publications reviewed signal deep concern about the depth of destruction that could be unveiled with time. All the historical background, added with the most recent publications, raised similar to the author's concerns regarding what the future of Ukraine will look like after the war.

Despite of lack of clear understanding regarding the future outcome of this war, the decision has been made to work with the data available. Prior to the deeper analysis of the environmental damages and jumping into indicating some types of actions that could be taken, this thesis provides another important overview of the local resources available for the recovery projects, elaborating on who could be the actors leading the recovery initiatives, and what capacities do they have. The hypothesis related to that was that due to the complicated historical context and the need to take a proactive position in the decision-making in the country, Ukrainian society actors have gained enough capacity to respond to the challenge that recovery projects impose. After a thorough analysis, the findings have confirmed the hypothesis. Ukraine's civil society organisations and NGOs frequently figurate in the analytical reports of the international donors and are being included as local partners for the big international projects in Ukraine. Ukraine's local governments are actively collaborating with the technical assistance projects funded by international donors, providing drafts of the projects and initiatives. From all the reports and conferences reviewed, the high level of local participation and local motivation is often considered a driving force for Ukraine's development and EU

integration. This confirmed not only strong local mobilisation in place but also the willingness of Ukrainian local actors to gain capacity and launch initiatives. Those findings led to the further development of the ecosystem restoration action proposals exactly for the local actors and not for the central government in the frames of this research.

Focusing on the main subject of this research, the hypothesis that has been considered for the environmental damages in Ukraine was that there are a lot of them and that they may not be just indirect outcomes of the war actions; that some, if not all, were caused intentionally, correlating with the nature of the war. The objective related to this hypothesis was first to identify the extent and scope of environmental damages in Ukraine by analysing available data, reports, and publications related to pollution, deforestation, water contamination, soil degradation, nuclear, energy terrorism, and other relevant indicators. The findings demonstrated that despite the register of environmental destruction cases is still not complete, the outcome of the destruction caused is already very damaging in the long term. The maps found, as well as information extracted from local sources show the geographical dispersion of intensity of destruction. The majority of the environmental destruction cases are based on the Russian-occupied territories, as well as territories that were strategically interesting for the russian invasion and where they failed to establish at the beginning of the war. Without getting deeper into the data for every environmental damage indicator as there is still a need for the data from the ground and deeper studies to confirm the data for each of them, the financial estimations of the damages caused to the soils, water, air, ecosystems of Ukraine are indicated. Despite the lack of consistency in the methodologies for the financial equivalent evaluations, the numbers indicated by the central government are incredibly high and very concerning.

An important observation was made in the process of assessing damages caused to the environment of Ukraine. First of all - there is no clear procedure set worldwide on how to evaluate the environmental damages caused during the war. This is also signalled by the initial introduction of the environment systematically being a subject of wars worldwide. There are still gaps in the international legislation on environmental protection during the conflicts. There are still no procedures on how the evaluation of the damages to the environment should be carried out and how it should be compensated by the aggressor country after the end of the war. There are also no fixed procedures of how to estimate the current financial value of the environmental resources, as well as its future added value in times of crisis. In Ukraine's case, the country is undergoing a lot of various types of crises - war, an economic and humanitarian crisis, climate change, and post-COVID-19 recovery. Assuming that every natural resource has a financial equivalent defined by the market price is not enough to form the final financial

equivalent of the damages caused when taking into the account increased value of those natural resources for the country.

This question is very relevant for the matter of building a baseline for issuing future reparations that should be paid by Russia to Ukraine. Further discussion and analysis of this matter should be launched to set up precedents in the international legislation on how to treat those environmental damages caused during military conflicts, as well as to include the proper environmental financial equivalent evaluation that will be ethical, sustainable and will consider the future added value of those resources for the next generations.

After assessing the scale of destruction, a few of the most well-known environmental damage cases were considered for deeper revision. A few cases selected were those that caused most of the outcry from Ukrainian society, and subsequently - those that had analytical articles and reports produced about them. Cases chosen were the occupation of Askania Nova's Natural reserve, the occupation of the Island Dzyrylgach, Nova Kahovka dam's explosion, as well as the occupation of Zaporizhzhya's Nuclear Power Plant and Chornobyl Nuclear Power Plant. The hypothesis was that the intense destruction that had been caused to those areas was intentional. And that the russian army was specifically aiming at the biodiverse areas, or that they had chosen the objects that would cause the most environmental pollution and destruction to the surroundings.

From the publications analysed, it became clear that the damage caused in those cases was severe. In the case of the natural reserve occupation, the deaths of various locally preserved species and plants were recorded, and limitations on the work of the local personnel were imposed. Natural terrain has been destroyed and military trenches were dug. Constant noise pollution impacted the health of the animals and birds on the territory, and the quality of the water and air, as well as soil, has decreased due to the constant use of weapons and other military equipment. Russian occupation of the nuclear power plants meant a lack of control over the correct functioning of the nuclear power plants and further analysis of the radiation levels in the areas of the occupation is required. But the worst of all cases was the destruction of the Nova Kahovka dam. The damage caused by the intense flooding of the territories was incredibly high, causing countless civilian deaths, and wiping out local ecosystems and local species of animals. There didn't seem to be any direct military advance for the russian army in any of those cases, the destructions caused were mainly to the most biodiverse areas and those territories where environmental destruction may cause most of the civilian deaths.

To demonstrate this hypothesis, the author has taken the map of the internationally recognised bio-conservation network of the geographical region that Ukraine belongs to -

Emerald Network, which is located in 18 Contracting Parties and Observer States to the Bern Convention in the neighbouring areas of the European Union and attempted to highlight indicative geographical locations of the above-mentioned environmental damage cases. The locations of Ukrainian "adopted sites" that were included in the Emerald network coincide with the geographical locations of where the environmental damage cases have occurred. Despite not being a direct accusation due to the lack of definitive data about the cases, the initial review indicates that military actions taken in those cases seem to be intentional, and possibly be aimed at the most biodiverse areas of Ukraine on purpose.

This was important to identify and clarify to confirm or deny the next important hypothesis that the environmental damages caused can be officially called ecocide - mass damage to the environment and ecosystems and be classified as an intentional crime against nature and subsequently, the local population inhabiting the territory. The complications appear to confirm the hypothesis, as there doesn't seem to be a clear working framework for those types of crimes even during peaceful times. The precedents of establishment that crimes against nature still qualify as crimes and should have a relevant legal punishment defined are being made only now, in the motions of the youth against the state in the USA and other countries of the world. But still, no legal framework is in place to assign specific legal measures that could be taken to qualify those intense environmental destruction cases as ecocide. Therefore, this question remains open and requires further investigations and involvement of the legal experts in the field, as well as more lobbying to provide the natural resources with at least some sort of "safeguarding" in the frames of the current legal system and to keep the guilty ones accountable.

After understanding the country's background and the conditions on the ground for the environment of Ukraine, the author has focused on the information available on the restoration and reconstruction initiatives from the local perspective. Understanding the depth of the damages caused, the author acknowledges the need to form actions that will be quick to implement, effective and long-lasting. One of the most important components of the long-term impact of the project is the engagement of the local actors in the project writing and the formation and presence of the local ownership. Therefore prior to looking into the general international framework available for environmental restoration initiatives, the author has first reviewed what is Ukraine society's local perspectives on the matter.

The hypothesis that has been considered for the assessment of the local perspective about the recovery and reconstruction of Ukraine was that there is already a clear vision regarding the pathway and steps that Ukraine should take. Author follows the one of the main principles

of this thesis - basing the general environmental recovery initiatives proposals on the local perspectives and vision, and therefore very high priority is given to the principles and guidelines identified by the local actors. As a result of the research, the main principles and concerns expressed by the civil society actors were identified. The vision set by the civil organisations and NGOs is very clear and coherent with the ideas of the EU. The main concerns expressed indicate similar issues to those voiced by the international donors in the field - a need for further reforms of Ukraine, work on the national legislation, etc. Contrary to the limited local capacity expected from the countries at war, local actors in Ukraine have a very clear vision for how the reconstruction efforts should be arranged, and what areas require the most attention, and they express deep professional knowledge in various fields.

As an outcome of this analysis, it is fair to consider Ukraine's civil society organisations, NGOs, activist groups, and local governments to have enough capacity to take over the coordination and supervisory position on the recovery initiatives formation and implementation. Contrary to the central government of Ukraine which may change with time, especially after the war due to the requirement to hold legitimate democratic elections, civil society actors are a constant support and partners for various international donors and international organisations for almost 10 years already, ever since the Revolution of Dignity. Certain recognition of the professional capacities and certain mechanisms of participation in decision-making should be put in place to ensure that even with the change of the government local actors will have a legitimate right to intervene on the matters of the recovery and reconstruction, as well as regional development.

The next hypothesis reviewed has appeared as an answer to the question on what the types of actions are available for those active civil society representatives to launch local environmental restoration and recovery initiatives. The hypothesis was that the current time it may be too early to talk about the physical ecosystem restoration projects, as the conflict is in continuous development. The territories that were damaged in the past year may be damaged again, as well as territories experiencing just degradation one day may experience total destruction the next day. From the point of view of the international publications reviewed, as well as after the review of the conferences held so far, the hypothesis is correct. From the local point of view, it is not, though. A lot of NGOs and civil organisations in the field speak about forming solutions already, even launching recovery and reconstruction projects as soon as possible. It can be explained by a deeper understanding of the current local context and local needs. For as long as the country rebuilds itself and keeps on providing the best conditions for

its population, with greater resilience it can withstand the current military aggression and has higher chances of maintaining stability in its daily life.

Launching environmental recovery initiatives earlier than later seems to be important also due to the economic value of starting those projects. Launching and funding environmental recovery or reconstruction projects on the territories affected by the war provides the local population with job opportunities that they were deprived of, and local suppliers with the work and money inflow. This keeps professionals in the field in the country, boosts the search for innovative solutions and truly can be a game changer in the sense of the motivation and support of the local population. This proves the hypothesis about the need to wait until the end of the war to launch the environmental recovery initiatives to be wrong, as launching those initiatives earlier will only benefit the local population.

While reviewing the types of actions for the projects available, the ideas on the initiatives collected worldwide have been taken from the framework of the UN Decade for the Ecosystem Restoration. The choice of a bit more general action types that could be launched was due to the hypothesis that the current state of the financial affairs won't allow the speedy launch of the bigger on-the-ground projects of ecosystem restoration, like those promoted for the areas post-conflict or during the peaceful time.

Local actors selected represent the most active counterparts on the ground. Despite that the UN Decade short guidebook provides only general types of actions available, the author recognises the limitations that may be set for different types of entities chosen. To suggest a specific type of action, the legal background on the rights and capacities of the chosen actors has been conducted. The findings coming out of this research demonstrate that in case if on the affected territory the local government is not willing to adapt certain changes needed for the environmental initiatives launch and general individual mobilisation is low for various reasons, there is a chance to create an NGO with even the most limited amount of people in a relatively short time. The same goes for civil society individuals who can form a group and lobby for their interests and have certain rights and capacities to make changes to their community. Lastly, local governments have a lot of legal rights and possibilities to implement various types of local environmental restoration projects. It all comes down to the willingness, professional capacity and funding, which can all ultimately be solved. The only limitation currently may be the martial law in place, which doesn't work as in the peaceful time, but the central government hasn't so far imposed any serious restrictions on the local actors.

From the actions that can lead to the launch of the environmental restoration initiatives, the main scope of actions is defined as appropriate for the local context - legislative changes,

interests' lobbying, local activism, writing and launching physical local initiatives and projects, networking, capacity building, launching promotional campaigns, local assembly meetings, smart consumer choices making, etc. Despite the lack of a very explicit methodology for the environmental restoration initiatives launch for the areas affected by the military conflict or other types of crises, a wide variety of actions is available for various local actors. Therefore, the theoretical development of those local recovery initiatives is being considered necessary, according to the author.

As an outcome of this analysis for different local actors, the indicative list of actions for each of the actors has been produced and could be used as an indicative guideline on how the local action can be built starting today, to ensure that as soon as necessary finances will be devoted for this field - physical local restoration projects can start immediately without any further delay.

Lastly, one of the most interesting and critical questions is being considered - how would those initiatives be funded and if there are any funds already allocated for this field? The hypothesis in this regard was that the environmental initiatives would receive appropriate funding and that there most probably already are multiple pledges in this regard. Prior deep research on the financial pledges was made, clarifying that though current relief funding and investments seem to be substantial, they are, in fact, funding only the emergency needs of the state and keeping Ukraine's economy afloat. Sadly, even for the future Ukraine Facility of the EU that will be supporting Ukraine with continuous funding, the category of environmental restoration is not on the list of priorities and is not included explicitly in the pledges given by international donors so far.

This means that there is an urgent need to create more financial instruments to fund those initiatives and to better address the local needs for recovery and restoration Apart from providing direct support and expressing solidarity with Ukraine's population, launching those types of projects in Ukraine will benefit the global climate, enforce a restoration of important biodiverse zones and generally will be an important step to building new types of the sustainable businesses instead of just growing commercial activity. The main principles and ideas regarding the needs to be addressed while forming those new funding instruments are also presented in Chapter 2.3.2.

Overall, the only few ways to fund new environmental recovery initiatives now are either to submit a physical person's personal project for funding within the frames of Ukraine's central government financial support program or to write projects and submit them during the calls for funding of the various international donors. Another more challenging option is to

open the call for investors to fund those projects. Certain considerations should be set in place and possible new incentives could be created to involve more investors in those types of project investments, for example - certain tax benefits, national insurance for the projects, etc. This sentiment requires further research and more consideration on the matter.

Answering the few main questions guiding this thesis research, Ukraine does have an incredible potential to become a hotspot of innovations and creativity in the field of environmental restoration, it certainly has active local actors that can carry out and launching various local projects. With the financial support for this specific field, local actors and local governments can make a fast and efficient recovery. This financial support can come from international donors, potential investments from various organisations, as well as from the environmental damage and other reparations that Russia is due to pay to Ukraine. The volume of environmental destruction is significant and must be addressed, empowering local action already today. Further research on the global impacts of those environmental damages is required, to mitigate the risks those environmental destructions pose to the world.

SWOT analysis of the topic Environmental Recovery in Ukraine

Strengths:

1. Diverse data sources: Availability of multiple data sources, including governmental reports, some satellite imagery from international organisations, local observations and publications on the topic, availability of academic literature on related topic, and NGO reports, which altogether enables a comprehensive understanding of the recorded environmental damage and restoration needs. It also provides an understanding of different visions and strategies towards environmental recovery.

2. Real-time observations: Integration of the information from the local, real-time observations provides more accurate and detailed insights into the extent of environmental damage, its localisation, and the development of the matter. Multiple real-time maps are available for tracking changes daily.

3. International collaborative opportunities: The potential for international collaborations offers avenues for significant financial and technical support for comprehensive restoration initiatives. Existing projects and activities of international donors on the ground only add to the increased chances for further extent in cooperation and collaboration.

4. Growing community engagement: Increasing community engagement and activism signal a rising local interest in recovery actions, including environmental, fostering potential

grassroots-level restoration efforts. The willingness of the local population to rebuild is incredibly high.

Weaknesses:

1. Limited access to the zones affected by the conflict: Restricted access to the areas affected by the conflict limits the depth and accuracy of environmental damage assessment, leading to incomplete data.

2. Conflict in constant development: The ongoing conflict and its ever-evolving nature impede consistent data collection, potentially impacting the accuracy and continuity of assessments. Data accessed yesterday may not be actual today, every day there are new developments and conditions on the ground are constantly changing and evolving.

3. Reliance on secondary data from external sources: Dependency on secondary data sources due to restricted access may lead to potential biases and gaps in the analysis.

4. Technological data collection limitations: Generally limited access to precise satellite data, as well as limitations in satellite imaging resolution and periodicity, may hinder precise and updated environmental assessments.

Opportunities:

1. International support and funding: Though Ukraine's environmental recovery needs are not envisioned for the funding currently, overall, it receives ongoing support and funding for its emergency needs. The hope is that those emergency relief funds will further be transformed into another type of financial aid and will be distributed evenly upon the recovery needs voiced by the local population.

2. Community engagement and activism: Increasing local interest in environmental issues creates opportunities for community-driven and sustainable restoration initiatives, as well as increased ownership levels for projects' longevity.

3. Policy reform and innovation: The urgency of environmental restoration in conflict-affected regions presents an opportunity for innovative policy formulation and legislation supporting ecosystem revival. This will only benefit further reforms ongoing in Ukraine, as well as support the country on its way of EU integration path.

Limits/Constraints:

1. Security and access limitations: Ongoing security and safety concerns in certain conflict-affected regions limit access to those areas for comprehensive environmental

assessment and restoration planning at the current moment. Also, those areas may not be safe for access for the years following the end of the war, due to the extensive mining efforts of the russian army.

2. Incomplete data availability: Gaps in data due to the inaccessible areas affected by the conflict restrict the formation of complete restoration strategies and comprehensive assessments.

3. Volatile environmental conditions: The unstable and unpredictable dynamic of the conflict creates a challenge in maintaining consistent and reliable data collection over time. 4. Possible financial resource constraints: Prioritisation of economic recovery initiatives over environmental concerns might limit the investment in restoration activities.

This SWOT analysis underscores the strengths, weaknesses, opportunities, and constraints associated with the research on the environmental recovery in Ukraine. It emphasizes the need to capitalize on available strengths, address weaknesses, and leverage opportunities while navigating and mitigating existing limitations and constraints to ensure a more robust and successful restoration process.

Inferences and implications brought by the research

Research conducted on the topic "Environmental Recovery in Ukraine: Assessing damages and forming solutions" contribute significantly to the ongoing discussion by providing nuanced insights and implications in the realm of environmental restoration within the local context. This contribution stands out through several key inferences and implications derived from the study.

Contextual insights: The study reveals the unique local challenges and complexities associated with environmental recovery based on professional knowledge and a deep understanding of the local actors in Ukraine. By comparing these findings with other international publications on environmental damages assessment for Ukraine in the frames of the theoretical framework, it presents more local context-specific nuances and identifies distinctive challenges faced by people on the ground.

Addressing gaps in literature: The research identifies previously underrepresented elements within the field. It underscores the scarcity of literature that specifically focuses on environmental damage and recovery in conflict zones like Ukraine, offering some suggestions and critical points for the review of this topic.

Policy focusses recommendations: The research narrows down a few topics relevant to the current revision by the local policymakers. It identifies the direction in which targeted

policies could focus to support swift and sustainable environmental recovery in Ukraine, emphasizing the importance of a nuanced and holistic approach to address the specific needs of regions affected by conflict.

Local community involvement: Highlighting the significance of community participation, the research emphasizes the active role that local actors can play in restoration initiatives. It suggests the need for a more comprehensive framework that integrates local expertise and community initiatives into the broader recovery strategy.

International support and collaborations: By outlining the potential for international support and collaboration, the research recommends leveraging partnerships of the local actors with global organizations and international aid agencies. This underscores the importance of collective action in ensuring effective, sustainable, and durable environmental restoration efforts.

Actions that can be implemented by local actors: By prescribing certain types of actions that could be launched by various local actors, the research can be seen as suggestive restoration initiatives guidelines, that will start building local capacity to carry out bigger restoration projects.

A revision of the potential ecocide intentions behind the environmental destruction cases in Ukraine: Research builds certain hypotheses regarding the existing environmental destruction cases and attempts to provide an introduction into the deeper research regarding the war crimes caused to the environment of Ukraine. It contributes to current investigations on this matter and supports building accountability of the aggressor state.

In summary, the research's unique value lies in its specific focus on the environmental recovery of Ukraine based on the local vision and ideas. By addressing gaps in existing working frameworks in the field, offering practical actions and policy recommendations, and emphasizing community engagement and international collaboration, it contributes to the broader discourse on the global post-conflict environmental recovery, thereby enriching the understanding of strategies needed to address environmental damage in similar contexts worldwide.

Chapter 5. Conclusions

The research on "Environmental Recovery in Ukraine: Assessing damages and forming solutions" culminates in a comprehensive understanding of the multifaceted challenges and potential pathways for restoring the damaged environment of Ukraine in the aftermath of conflict. The key summary points are presented below.

The research opens by discussing that the environment often becomes a subject of military action during wars, despite the international legislation in place. It continues the topic by delineating the severity of environmental damage, particularly in regions affected by conflict, emphasizing the pressing need for urgent restoration efforts and limiting the scale of the damages.

For the purpose of further development of this idea, Ukraine and its current situation become the guideline of this research. Highlighting Ukraine as a specific case study, the research unravels the unique challenges that the nation faces concerning environmental recovery due to the ongoing russian war of 2022-2023.

The thesis delves into theoretical and methodological approaches available for addressing the matter of environmental degradation, laying the foundation for a nuanced understanding of the subject matters such as environmental value evaluation, environmental damages assessment and building accountability for environmental destructions. All to build an understanding of the urgency of the relevant reparations to be paid by the aggressor state, as well as showing the need to form funding for those environmental restoration initiatives.

The conclusions drawn from this research underscore the imperative nature of immediate action to mitigate environmental damage in areas affected by the conflict. Furthermore, it emphasizes the essential need for innovative, place-based, and community-driven approaches to ensure sustainable and effective recovery.

One of the few important points derived from the thesis is about the importance of the role of the local actors. The study emphasizes the critical role of local actors, encompassing NGOs, civil society, and local government bodies, in driving the restoration process. It underscores their pivotal role in shaping policies and initiatives tailored to the specific needs of communities, ensuring that any territory affected by the military conflict stands a fair chance to launch local ecosystem restoration initiatives.

In forming the restoration initiatives research reassures the significance of local and international collaborations and partnerships to support and fund the environmental recovery

process. These alliances play a crucial role in ensuring adequate resources and expertise for successful project implementation.

In the conclusion of the review of publications from the local actors and various international reports, it becomes clear that Ukraine has all the local potential and motivation to launch local ecosystem and environmental restoration initiatives and that it will require a separate funding instrument to support those initiatives' launch. The current macroeconomic situation and the intensity of the ongoing war don't allow the central government of Ukraine to allocate substantial funds for that, therefore it will rely on future donors' support in specific local recovery and restoration processes. Local governments, NGOs and civil society organisations could become valuable counterparts for those projects.

The thesis underlines the need to search for innovative and context-specific methodologies to bridge the information gaps within areas affected by the conflicts and mentions a few successful academic research that have managed to do that for Ukraine's case. It stresses the necessity of advanced data collection techniques to facilitate comprehensive and accurate assessments that should become the basis of the local recovery plan building. It also addresses the critical points and potential for the further development of the topic.

The thesis overall calls for more strict international legislation on environmental protection during armed conflicts in order to put the responsibility for intentional nature's destruction. The research adds more to the existing discourse on the need to include reparations for the environmental destruction during the war into the global environment recovery framework, to ensure a well-functioning framework on nature restoration and preservation.

The conclusions presented above serve as a definitive endpoint for the thesis, summarizing the research's central points of attention and analysis, hoping to provide a comprehensive understanding of the complexities and potential solutions concerning post-conflict environmental recovery for the general reader on the case of Ukraine. The research was conducted to provide critical local insights into the subject matter and to pave the way for further discourse and action in the domain of environmental restoration in Ukraine and other conflict-affected regions of the world.

Chapter 6. Recommendations for future research

Coming out of the research conducted for this thesis, the author signals the need to conduct further research on the following matters:

1. Development of a comprehensive methodology for assessing the environmental damages during the war, considering both qualitative and quantitative approaches to measure ecological, social, and economic impacts.

2. A pilot project to test the methods of the defining financial equivalent of the environmental resources value for the territories affected by armed conflicts.

3. Further review of the current international legislation to reinforce the study of the ecocide crimes incorporation into the legislation, based on the example of Ukraine case study.

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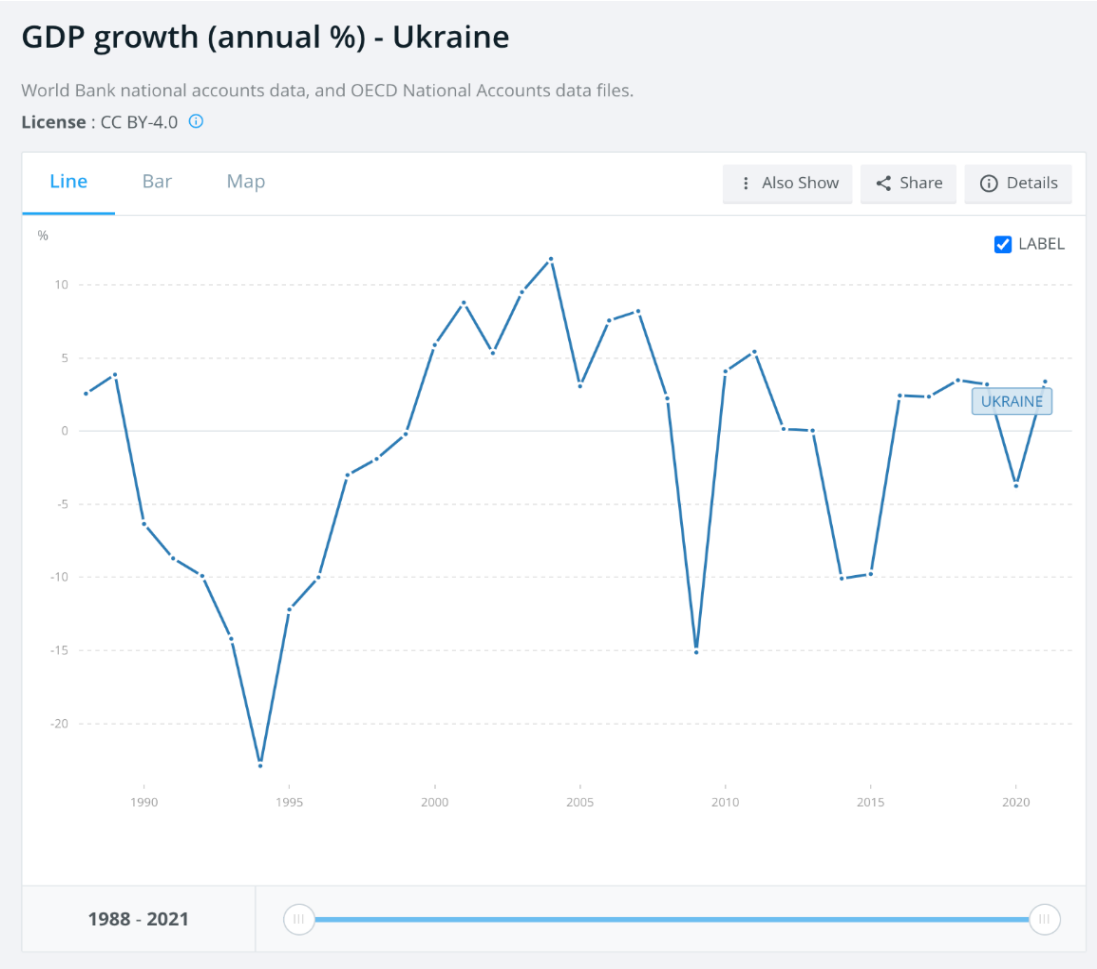
Annexes

Annex 1

Ukraine GDP growth (annual %).



Source: World Bank, (2021)

Annex 2

Compilation of the latest data available for Ukraine's economic situation until March 2023.

Ukraine					
"Development" status	In decline due to the war state imposed because of full-scale invasion from Russian federation on 24.02.2022	GNI PPP (latest - 2021) WB	13 860 USD current	GINI index (latest - 2020) WB	25.6
Population on 01.02.2022 (pre full-scale invasion) SSSU:	41 130 432	Population that has been recorded to leave the country after 24.02.2022 (after full-scale invasion), data on 28.03.2023 UNHCR:	8 173 211	Refugees from Ukraine registered for Temporary Protection or similar national protection schemes in Europe, data on 28.03.2023 UNHCR:	5 008 482
Border crossings from Ukraine (since 24 February 2022), data on 28.03.2023 UNHCR:	19 740 849	Border crossings to Ukraine (since 28 February 2022), data on 28.03.2023 UNHCR:	11 200 087	Approximate **population residing in Ukraine** up until 28.03.2023:	+-33 000 000
Economic structure of the country		**Competitiveness / Trade / FDI Data**		**Growth and Development Evidence**	
GDP (latest - **2021**) WB Sectors in % from GDP:	200,085,537.74 USD	WEF's Global Competitiveness report ranking 2019, WEF:	56.99 points out of 100	HDI ranking 2021, ST:	0.773 77th ranking
Agriculture, forestry and fishing WB: Water	10.6%, rising	BTI Transformation index 2022, BTI:	6.76/10, 26th out of 137 countries	Poverty data in 2023, NBU	Approximately 26%

management, sewerage, waste management, remediation ST:	0.35%				
Industry WB: Manufacturing WB: Mining and quarrying ST:	23.5%, rising 10%, in decline 6,44%	Political transformation index, BTI: Economic transformation index, BTI:	6.80/10, 36th of 137 countries 6.71/10, 26th out of 137 countries	Inequality data, 2023, World Economics	84,7
Services all together WB:	51.8%, in decline	Business and trade data		Minimum wage, 2023, State Tax Service of Ukraine	6700 UAH monthly 40,46 UAH per hour
Main growth sectors/industries (% from GDP), 2021		Indicator of business confidence in the industry, March 2023, SSSU:	-9,4%	Life expectancy, 2023, unofficial, Macrotrends Life expectancy, 2020, WB	72.50 years 66 years
1	Wholesale and retail trade, repair of motor vehicles and motorcycles (13,5%) ST	Business climate indicator in industry, March 2023, SSSU: Manufacturing industry, March 2023, SSSU:	-0,5% -0,4%	Gender inequality, 2020, UNDP	0.234 52nd of 162 countries
2	Agriculture, forestry and fishing (10.6%) WB	Assessment of the current volume of orders for production (demand) in industry, March 2023, SSSU: Manufacturing industry, March 2023, SSSU:		-49% -52%	
3	Manufacturing (10%) WB	Expectations regarding the volume of production in the next three months in industry, March 2023, SSSU:		+7%	

		In the manufacturing industry, March 2023, SSSU:		+14%
Key recent macroeconomic data (2021)		Assessment of the current volume of foreign orders for the production of goods (export demand) in industry, March 2023, SSSU: In manufacturing, March 2023, SSSU:		-35% -42%
GDP growth, annual %, WB:	3.4%	Industrial enterprises has following expectations of respondents regarding their business activity: - A slowdown in the growth rate of selling prices for industrial products in the next three months. - Decrease in the number of employees at industrial enterprises in the next three months. - Order intake, as in February 2023, is expected to be sufficient for an average of 4 months of work. March 2023, SSSU.		
GDP per capita ($) WB:	4,835.6			
Inflation, annual %, WB:	25.1%			
Unemployment, % of total of the labor force, national estimate WB:	9.8%	Main export countries/ markets, March 2023, Forbes:		Agriculture, mining, metals. Commodities include cereals, sunflower oil and ferrous metals. "Grains from Ukraine" initiative, IT sector. All together 60,3 Billion USD in 2023
Current account balance, BoP, current US$ WB:	- 3,35 Billion USD	Main countries who exported from Ukraine in 2022, March 2023, Forbes:		Poland - 15,1%, 6,7 Billion USD Romania - 8,7%, 3,8 Billion USD Turkey - 6,7%, 2,9 Billion USD China - 5,6%, 2,5 Billion USD Hungary - 5,1%, 2,3 Billion USD Germany - 5,1%, 2,3 Billion USD Italy, Spain, Netherlands and Slovakia with less than 4%
Government debt (% of the GDP) (2020) WB:	58.7% of the GDP	WEF Nexus Index, 2021:	59.7, 81st of countries accessed. Approximately in the middle of general data distribution	
Portfolio Investment,	-1,024,000.00 Billion (falling, in	Water pillar (access and	60.7	Exchange rate:

net (BoP, current US$) WB:	comparison with 2020)	availability)			
Foreign direct investment, net (BoP, current US$) WB:	-6,885,000.00 (falling, 58 billion was in 2020)	Energy pillar (access and availability)	56.2	To EUR, April 2023, NBU	40,0152 UAH to 1 EUR
Portfolio investment, bonds (PPG + PNG) (NFL, current US$) WB:	1,189,395.00	Food pillar (access and availability)	62.1	To USD, April 2023, NBU	36,5686 UAH to 1 USD

Indicators for the source of the information:

WB - World Bank[1]

ST - Statista[2]

WEF - World Economic Forum[3]

WEF Nexus Index - Water-Energy Food Nexus Index[4]

BTI - Bertelsmann Stiftung's Transformation Index[5]

SSSU - State Statistics Service of Ukraine[6]

UNHCR - The UN Refugee Agency[7]

NBU - National Bank of Ukraine [8]

UNDP - United Nations Development program[9]

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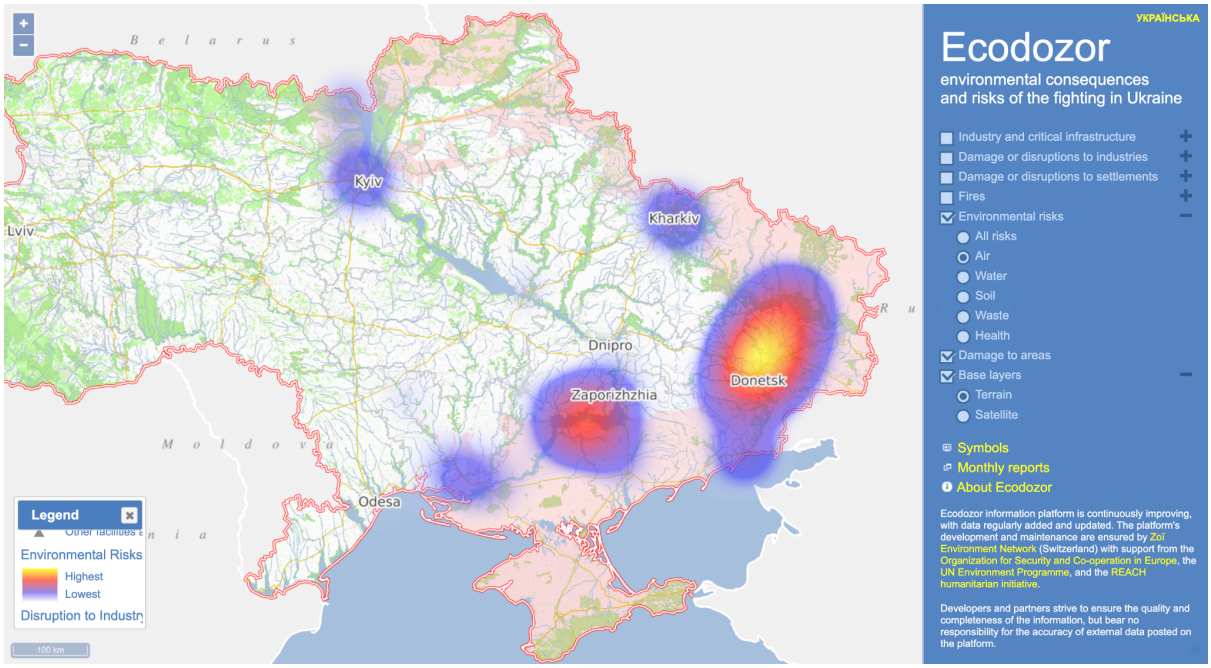
Annex 3

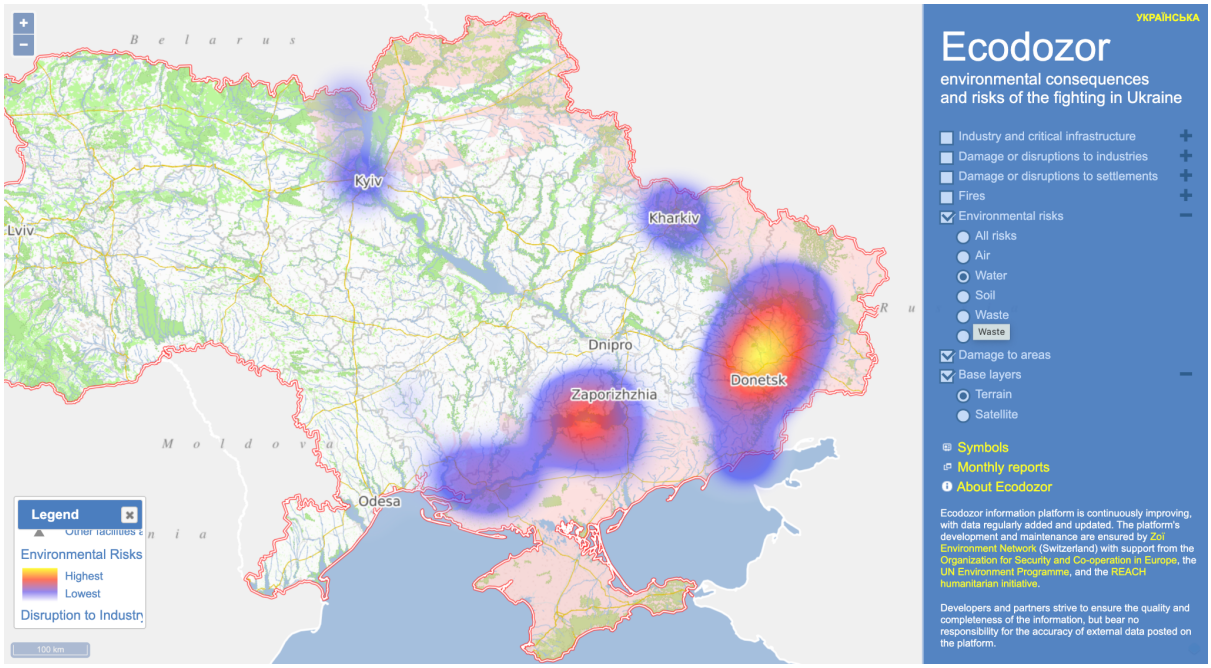
The geographical location of the damage to the air in Ukraine as of information accessed on 07.06.2023.



Source: UNEP, Zoï Environment Network, REACH humanitarian initiative, (2022).

Annex 4

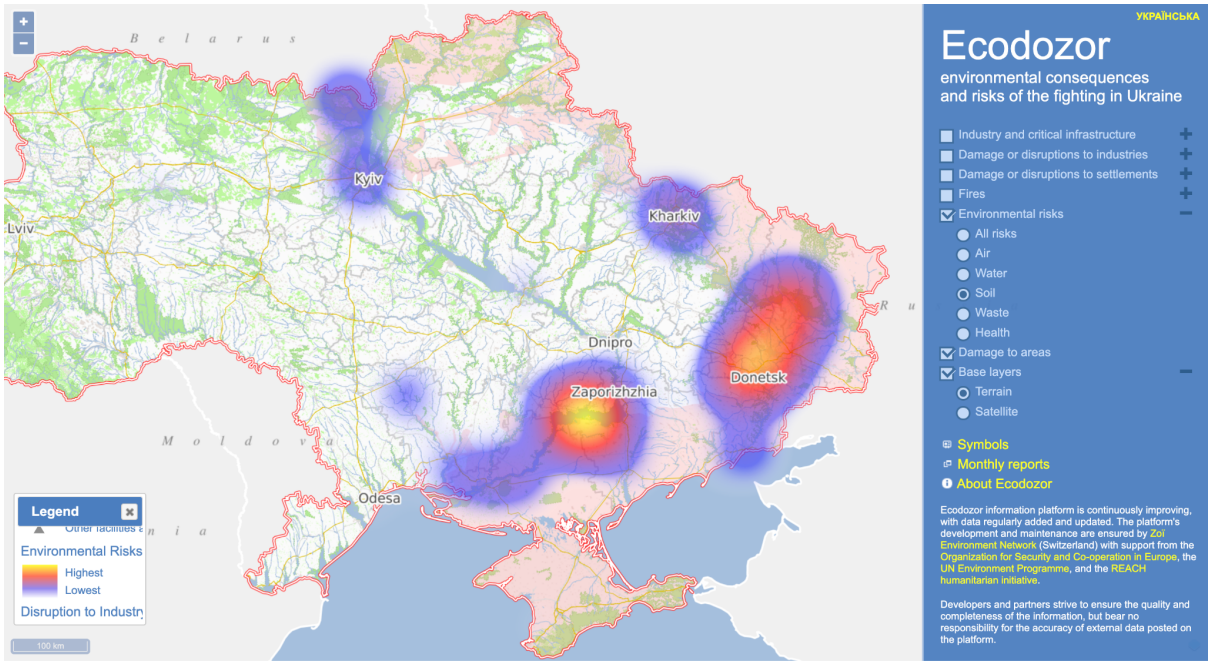
The geographical location of the damage to the water in Ukraine as of information accessed on 07.06.2023.



Source: UNEP, Zoï Environment Network, REACH humanitarian initiative, (2022).

Annex 5

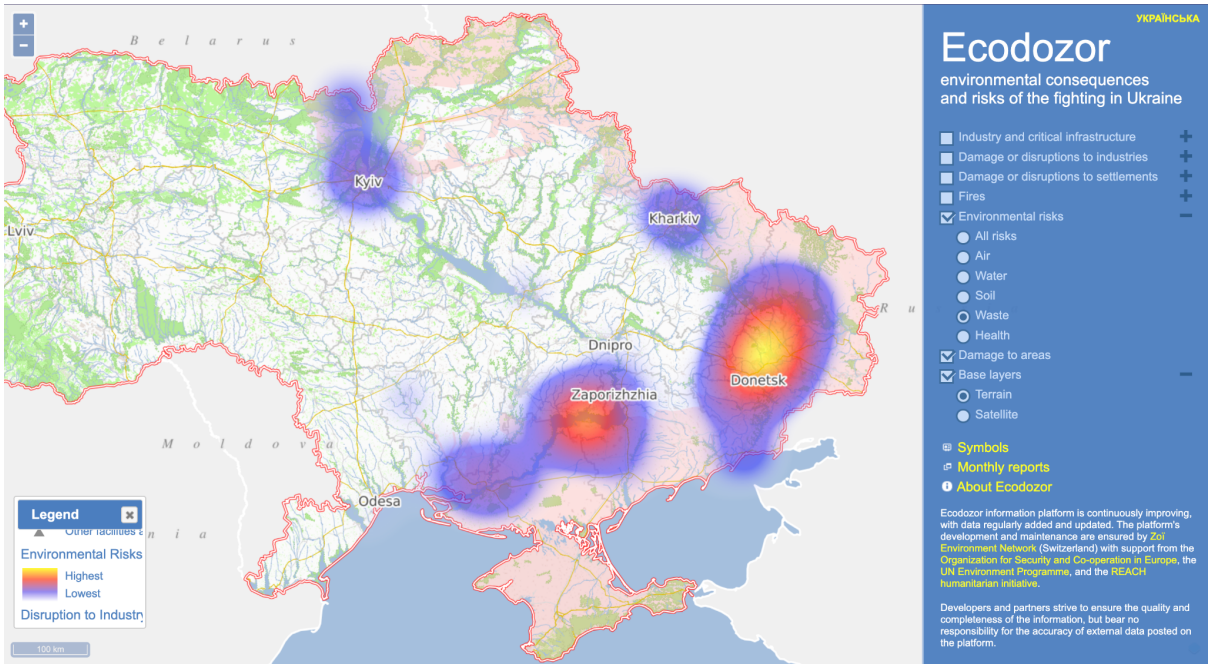
The geographical location of the damage to the soils in Ukraine as of information accessed on 07.06.2023.



Source: UNEP, Zoï Environment Network, REACH humanitarian initiative, (2022).

Annex 6

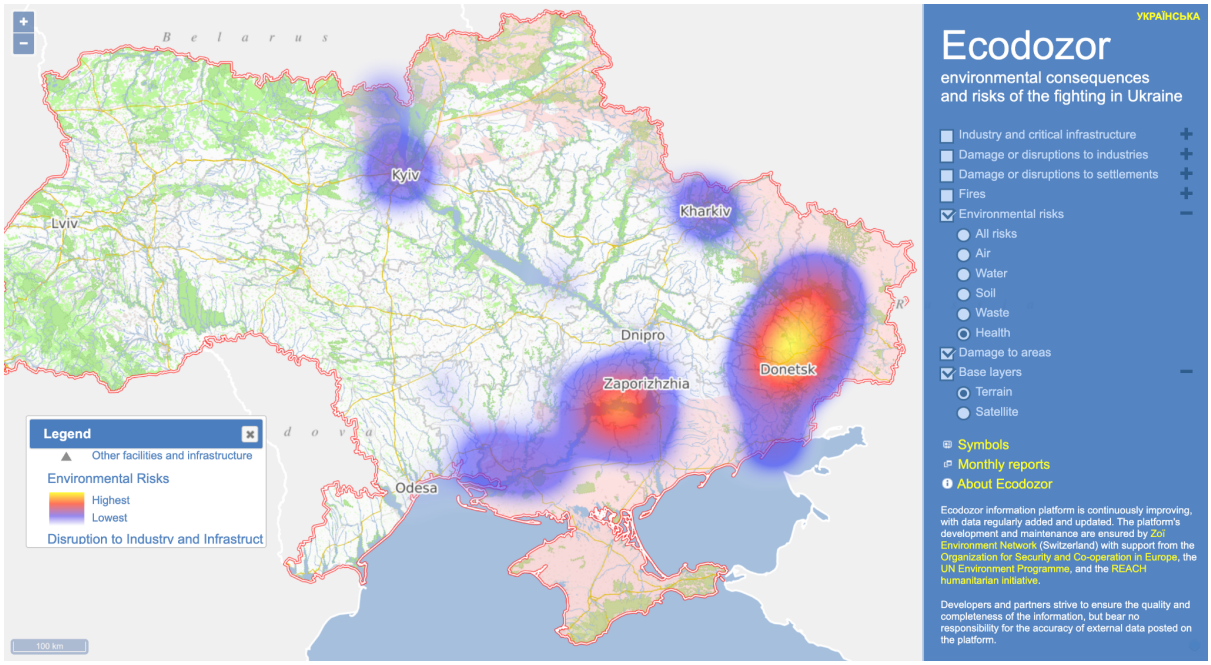
The geographical location of the damage caused by the waste in Ukraine as of information accessed on 07.06.2023.



Source: UNEP, Zoï Environment Network, REACH humanitarian initiative, (2022).

Annex 7

The geographical location of the damage that causes danger to health in Ukraine as of information accessed on 07.06.2023.

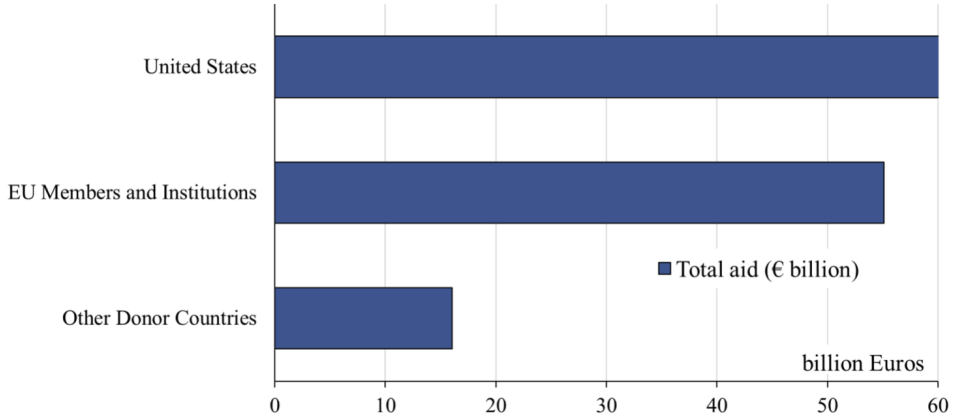


Source: UNEP, Zoï Environment Network, REACH humanitarian initiative, (2022).

Annex 8

Aid commitments to Ukraine across donor groups, 24 January 2022 to 15 January 2023 in EUR billion.

Figure 1 Aid commitments to Ukraine across donor groups, 24 January 2022 to 15 January 2023 (in € billion)



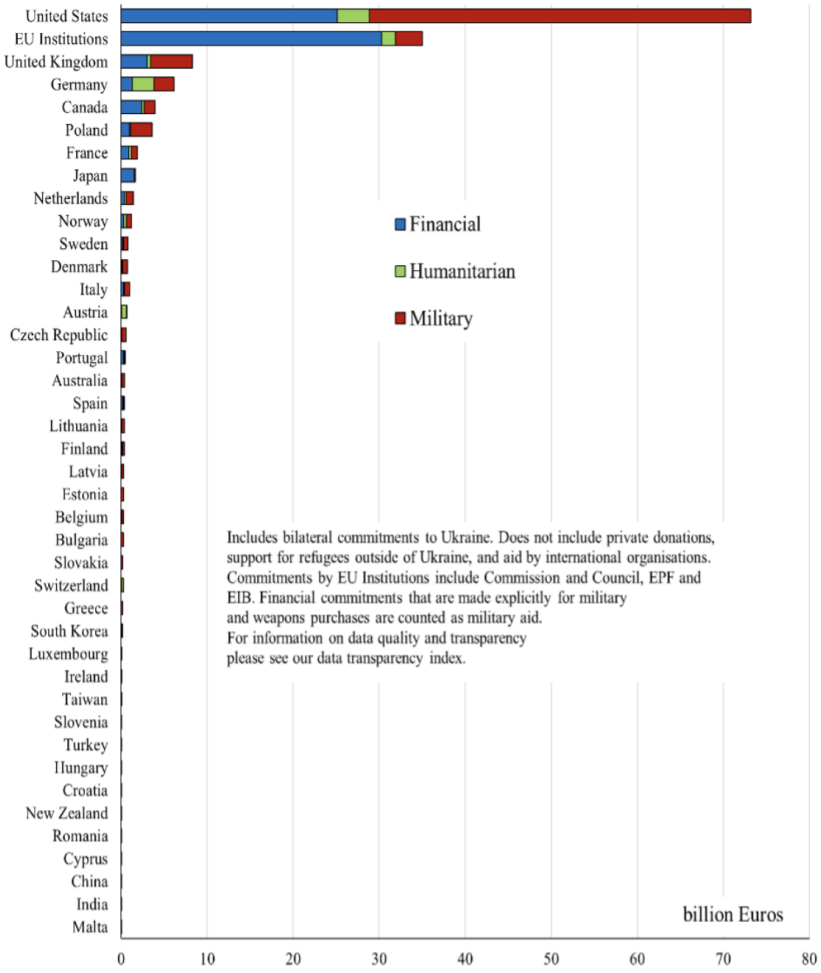
***Note*: This figure shows total bilateral aid commitments to Ukraine across different donor groups between 24 January 2022 and 15 January 2023. Other donor countries include the Anglo-Saxon countries (except the US), as well as China, Japan, South Korea, Taiwan, Turkey, Norway and Switzerland and India.**

Source: Trebesch, C., (2023)

Annex 9

Total bilateral commitments by type of assistance, 24 January 2022 to 15 January 2023 in EUR billion.

Figure 2 Total bilateral commitments by type of assistance, 24 January 2022 to 15 January 2023 (€ billion)



***Note*: This figure shows total bilateral aid commitments to Ukraine across donors in € billion (covering 24 January 2022 to 15 January 2023). Each bar shows the type of assistance, i.e., financial (blue), humanitarian (green), and military (red) aid. Cost estimates for hosting refugees are added in Figure 7 below.**

Source: Trebesch, C., (2023)

Annex 10

Ukraine Facility and its three pillars of the financial organisation.

Table 1 – Ukraine Facility: Up to €50 billion for 2024 to 2027 (1/3 grants and 2/3 loans)

Pillar I **€39 bn**	**Pillar II** **€8 bn, to mobilise €17.8 bn**	**Pillar III** **€3 bn**
Grants and loans to support the Ukrainian state, conditional on reforms. The Ukrainian government will have to prepare a 'Ukraine plan' for recovery and reconstruction.	Ukraine investment framework for recovery	Assistance and capacity building programmes such as for reform expertise, for central, regional and municipal government and civil society comparable to the Instrument for Pre-Accession Assistance
Enable Ukraine to deliver uninterrupted public services	Mobilise investments in Ukraine's private sector by providing guarantees and blended finance (de-risking)	Support Ukrainian government and civil society in achieving EU acquis and standards

Source: European Commission, (2023).