# **Introduction to committee: United Nations Environmental Programme**

The United Nations Environment Programme (UNEP) is responsible for coordinating responses to environmental issues within the United Nations system. It was established by Maurice Strong, its first director, after the United Nations Conference on the Human Environment in Stockholm in June 1972. Its mandate is to provide leadership, deliver science and develop solutions on a wide range of issues, including climate change, the management of marine and terrestrial ecosystems, and green economic development. The organization also develops international environmental agreements; publishes and promotes environmental science and helps national governments achieve environmental targets.

As a member of the United Nations Development Group, UNEP aims to help the world meet the 17 Sustainable Development Goals.UNEP hosts the secretariats of several multilateral environmental agreements and research bodies, including The Convention on Biological Diversity (CBD), The Minamata Convention on Mercury, The Basel, Rotterdam and Stockholm Conventions, The Convention on Migratory Species and The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), among others.

In 1988, the World Meteorological Organization and UNEP established the Intergovernmental Panel on Climate Change (IPCC).UNEP is also one of several Implementing Agencies for the Global Environment Facility (GEF) and the Multilateral Fund for the Implementation of the Montreal Protocol.UNEP sometimes uses the alternative name UN Environment. The headquarters of the agency is in Nairobi, Kenya.

# Introduction to Agenda Item A- Environmental regulations in areas affected by armed conflicts

The natural environment has frequently remained a silent casualty of war. The consequences of environmental damage for conflict-affected populations are severe and complex, affecting their well-being, health and survival. When environmental degradation collides with climate risks, it compounds the challenges for people trying to survive in contemporary armed conflicts. While a certain amount of environmental damage may be inherent to war, it cannot be unlimited; international humanitarian law (IHL) contains rules that protect the natural environment and that seek to limit the damage caused to it by armed conflict.

In 1994, in response to a request by the United Nations General Assembly, the International Committee of the Red Cross (ICRC) issued the first Guidelines for Military Manuals and Instructions on the Protection of the Environment in Times of Armed Conflict to assist the instruction and training of the armed forces on IHL protecting the natural environment. Since

then, the international legal framework has continued to develop. At the same time, armed conflicts have continued to cause environmental damage and destruction, highlighting the enduring need to reaffirm and promote greater respect for IHL.

As part of our efforts in relation to the environment and climate crisis, and in line with the recommendation of a 2009 expert meeting organized by the United Nations Environment Programme and the ICRC, the ICRC has updated its 1994 Guidelines to reflect developments in treaty and customary international humanitarian law. The updated 2020 Guidelines on the Protection of the Natural Environment in Armed Conflict are a collection of existing IHL rules as well as recommendations that protect the natural environment in armed conflict.

Each rule or recommendation is accompanied by a concise commentary to aid understanding and to clarify its source and applicability. The updated Guidelines underwent a process of external peer review by practitioners and academics, who contributed input in their personal capacity.

The 2020 Guidelines are a reference tool for States, parties to armed conflicts and other actors who may be called upon to interpret and apply IHL. They are intended to facilitate the adoption of concrete measures to enhance respect for IHL rules protecting the natural environment, including the promotion of these rules and their incorporation into military manuals, national policy and legal frameworks. To support implementation, the 2020 Guidelines also propose key recommendations that parties to armed conflict may adopt to reduce environmental impacts of armed conflicts, including the identification and designation of areas of environmental importance or fragility as demilitarized zones. Ultimately, better respect for IHL can limit the impact that armed conflict can have on the natural environment and the deeply interlinked consequences for conflict-affected populations who depend on it.

#### **Environmental Impact of Armed Conflicts**

Today, the world faces record levels of conflict and violence with a significant impact on people. In 2023 alone, over 170 armed conflicts were recorded. By the end of the year, nearly 120 million people worldwide were forcibly displaced due to persecution, conflict, violence, human rights violations, and events seriously disturbing public order.

While the human cost of war is undeniable and profound, the environment also suffers immense and often-overlooked consequences. Beyond the immediate destruction, conflicts disrupt ecosystems, deplete natural resources, pollute the environment, and jeopardize the health of our planet for generations to come. On the International Day for Preventing the Exploitation of the Environment in War and Armed Conflict (6 November), we examine why the environmental impact of war is a complex and urgent issue that demands global attention.

Warfare disrupts the delicate balance of nature in many ways. Environmental damage brings devastating consequences for natural resources, critical ecosystems, and people's health, livelihoods, and security. When forests are cleared for military purposes, fertile lands and vital water resources can become contaminated.

Militaries often clear vegetation or otherwise disrupt ecosystems to remove cover for enemy combatants or make areas uninhabitable and force local populations to leave, with major impacts on nature. Local communities reported the use of such tactics during Sudan's civil war and in Iraq, where wetlands were drained.

In Ukraine, large swathes of land are at risk of contamination with landmines and unexploded ordnance. Its soil, waterways, and forests have been polluted by shelling, fires, and floods. Clearing landmines and unexploded ordnance often takes decades and requires significant investment. In Ukraine, costs are expected to be around US\$34.6 billion.

In Gaza, there has been complete degradation of the soil, water, land, and agriculture. Sewage, wastewater, and solid waste management systems and facilities have collapsed. The destruction of buildings, roads, and other infrastructure has generated millions of tons of debris, some of which is contaminated with unexploded ordnance, asbestos, and other hazardous substances.

One indicator of the impacts is the increasing rates of communicable diseases in Gaza. In the three months following the escalation of conflict, the World Health Organization reported 179,000 cases of acute respiratory infection and 136,400 cases of diarrhoea among children under five a clear indication of the impact of the destruction of public works.

Moreover, in some countries, the abundance of natural resources has fueled armed conflict. Unsustainable mining, logging, and poaching practices both perpetuate violence and devastate the environment in countries like the Democratic Republic of Congo, where mining cobalt and coltan for rechargeable batteries continues to fuel the conflict in the east.

According to a study by Scientists for Global Responsibility and the Conflict and Environment Observatory, militaries account for an estimated 5.5 percent of global greenhouse gas emissions.

The heavy energy use resulting from conflicts exacerbates the climate crisis, both through direct greenhouse gas emissions from military activities and indirect effects at the global level. Emissions from military activities—both in maintaining militaries and actual engagement in conflict—were not fully covered by the 1997 Kyoto Protocol or the 2015 Paris Agreement, with states having reservations on the grounds of national security concerns.

Damage to chemical industrial sites causes fires and releases pollutants into the air, water, and soil, creating significant immediate and longer-term human health and ecological hazards through contamination. During the first Gulf War in 1991, hundreds of oil well fires burned uncontrollably in Kuwait and affected air quality on a global scale. More than 600 oil wells were reportedly destroyed or set on fire, resulting in the daily release of up to 500,000 metric tons of pollutants that affected the air quality of surrounding states.

During the 34-day war between Israel and Lebanon in 2006, the bombing of the Jiyeh power plant in Lebanon resulted in the release of 10,000 to 15,000 tons of oil into the Mediterranean Sea, affecting most of the Lebanese coastline and partly extending into Syria. The spill resulted in the deaths of seabirds and marine life.

Armed conflicts use large quantities of munitions containing heavy metals and depleted uranium, and explosive chemicals, all toxic even in modest quantities, with devastating impacts on human health and the environment.

From contaminated lands and polluted waterways to the release of toxic substances and greenhouse gases, the environmental toll of war is immense and far-reaching. Recognizing this impact is the first step towards mitigating harm, promoting environmental remediation, and ultimately, preventing future conflicts.

Research for the explainer is largely from the UN Environment Programme's reports on the Environmental Impact of the Conflicts in Ukraine and Gaza.

# 1949 Geneva Conventions and Additional Protocols

The Geneva Conventions are international humanitarian laws consisting of four treaties and three additional protocols that establish international legal standards for humanitarian treatment in war. The singular term Geneva Convention colloquially denotes the agreements of 1949, negotiated in the aftermath of the Second World War(1939–1945), which updated the terms of the two 1929 treaties and added two new conventions. The Geneva Conventions extensively define the basic rights of wartime prisoners, civilians and military personnel; establish protections for the wounded and sick; and provide protections for the civilians in and around a war-zone.

The Geneva Conventions define the rights and protections afforded to those non-combatants who fulfill the criteria of being protected persons. The treaties of 1949 were ratified, in their entirety or with reservations, by 196 countries. The Geneva Conventions concern only protected non-combatants in war. The use of wartime conventional weapons is addressed by the Hague Conventions of 1899 and 1907 and the 1980 Convention on Certain Conventional Weapons, while the biological and chemical warfare in international armed conflicts is addressed by the 1925 Geneva Protocol.

P.S: As your under secretary general I don't want to make add all clause in the protocol so I just explain what is that Convention aim and add 2 links at the end of the paragraph and highly suggest to take a look at them because they are important for the unity of agenda item

https://www.icrc.org/en/law-and-policy/geneva-conventions-and-their-commentaries https://www.ohchr.org/en/instruments-mechanisms/instruments/protocol-additional-geneva-conventions-12-augu st-1949-and-0

#### **Challenges in Implementing Environmental Regulations**

There has been a marked rise in cooperative international efforts to protect and preserve the global environment in the last few decades. This trend is evidenced by agreements such as the 1972 Stockholm Declaration on the Human Environment, the 1987 Montreal Protocol banning the use of Chlorofluorocarbons (CFCs), the 1997 Kyoto Protocol seeking to reduce greenhouse emissions and combat climate change, and its successor, the Paris Agreement. Moreover, the need for international cooperation in environmental protection and regulation becomes even more salient when one considers the existential threat of anthropogenic climate change and the potentially catastrophic consequences that humanity will face in the twenty-first century and beyond. According to a United Nations (UN) report, despite continued effort by international bodies at setting global standards for environmental protections and greenhouse gas reduction, these international environmental laws are facing a problem that is relatively common to international legal frameworks—lack of sufficient enforcement methods.

In January of 2019, the UN released a global assessment on the environmental rule of law, the first ever report of this kind. What they found was that despite a substantial increase in the amount of environmental protection agencies and laws, widespread failure to adequately enforce regulations has impeded the international effort to combat numerous environmental threats. While the news issued by this report is undoubtedly concerning for the future of the planet, it is unlikely to be surprising to those familiar with the history and operation of international law. Lack of sufficient enforcement mechanisms is an issue that has affected international bodies and agreements throughout the twentieth century and this issue continues to frustrate the international community's efforts to implement effective global policy in the twenty-first century.

The UN report uses stark language to describe the failure of states to enforce the existing international environmental standards, going so far as to suggest that environmental laws, which have multiplied in number dramatically in recent years, nonetheless "exist mostly on paper" due to insufficient implementation and enforcement. This problem can be seen as one that has two layers. On the top layer are international bodies like the UN and the difficulty such international organizations face in enforcing international rules on individual member states. The second layer of this issue is the individual states, who arguably suffer less from lack of ability to enforce environmental regulations, but more so a lack of motivation to implement potentially costly regulations with no guarantee that other states will follow suit.

The international community's lack of ability to enforce global environmental law stems, at least in part, from the reluctance of individual states to surrender sovereignty to international organizations. Because of this reluctance, international environmental agreements, like the Paris Agreement, are often voluntary in nature and thus the UN does not have the authority to compel individual signatories to follow the provisions of such agreements. Moreover, the governments of individual states who signed on to the Paris Agreement may be reluctant to vigorously enforce its provisions knowing that there is no guarantee that all signatories will do the same.

# **Case Studies and Examples**

Also I will ad some links and case about this situation you can check what happened in the past years for expand your horizon

#### Iraq War and the burning of oil wells

https://www.ebsco.com/research-starters/history/iraq-burns-kuwaiti-oil-wells

https://www.gulflink.osd.mil/owf\_ii/owf\_ii\_s03.htm

#### Syrian Civil War and the destruction of water resources

https://genevasolutions.news/explorations/the-water-we-share/war-or-peace-in-syria-wat er-flows-both-ways

https://pmc.ncbi.nlm.nih.gov/articles/PMC9972299/

# Ukraine-Russia War and its impact on agricultural lands

https://openknowledge.fao.org/server/api/core/bitstreams/8c2a59a8-50b3-4e6b-9605-e00 5a4f28c1c/content

# Introduction to Agenda Item B- Transformation of Food Systems to Prevent Biodiversity Loss

Food security and nutrition depend on biodiversity. Biodiversity – including the genetic diversity across and within species and ecosystems – and the ecosystem services it provides are key to addressing food insecurity and malnutrition, from domesticated crop varieties and livestock breeds to wild species and whole ecosystems. Equally crucial is biodiversity's role in building resilience to multiple shocks, including climate change, and in supporting livelihoods.

Yet wild food species and many species that contribute to ecosystem services vital to food and agriculture are rapidly disappearing. For example, around 20% of over 13,000 wild food species that are monitored are considered at risk of loss. Pollinators, soil organisms, and natural enemies of pests are also facing stress and declining numbers.

If we do not address the drivers of biodiversity loss – unsustainable agriculture among them – we risk lives and those of future generations. Already over 828 million people suffer from hunger. Two and a half billion people depend on agriculture for their livelihoods. And over three billion can't afford a healthy diet. As populations grow, we must transform our agrifood systems to supply more people with healthier and nutritious food, while conserving and restoring our ecosystems and natural resources. That is why the post-2020 global biodiversity framework will not succeed without the active involvement and actions from the food and agricultural sectors.

Unsustainable production and consumption patterns that contribute to biodiversity loss need to be reversed – including by addressing inefficient use of natural resources like water, soils and inputs for production, water scarcity, floods and pollution, land degradation and desertification, soil nutrient depletion, large-scale deforestation, overexploitation of fishery resources and pasture, and of course, climate change. If managed sustainably, agrifood systems contribute to the conservation and restoration of biodiversity.

There are many components to creating diverse, environmentally friendly agrifood systems. We need to back smallholder farmers with the funding, inputs, and knowledge to grow a more varied range of nutritious and resilient crops and other species – including neglected traditional and indigenous foods.

To do this, we need concerted actions that address the multiple and interconnected drivers of biodiversity loss. We must promote agroforestry and sustainable use of biodiversity – including through agroecology, sustainable management of forests and agroforestry production systems and grasslands, ecosystem-based fisheries management, and restoration of degraded landscapes and coastal and seascapes, including mangroves. We need to ramp up effective actions across the entire food value chain – including processing, packaging, and handling – from production to our plates.

Shifting to more sustainable and diverse production systems should go hand-in-hand with encouraging consumers to move to a more balanced and diverse diet consisting of a variety of locally produced foods, including legumes, vegetables, and fruits. This would help sustain healthy local food systems – and healthy consumers. We need to reduce the rampant food

waste that sees hundreds of millions of tonnes of edible food spoiled and discarded every year. This, and more, is what a strong post-2020 global biodiversity framework must deliver.

For our agrifood systems to thrive, we need healthy biodiversity and thriving ecosystems. And for this, negotiators must ensure the framework puts in place all the right elements so that inclusive, resilient, low-emission, and sustainable agrifood systems are part of the solution – for nature, for climate, for food security, for health, for jobs, and for all the SDGs.

#### The Impact of Current Food Systems on Biodiversity

Climate change and biodiversity loss are deeply interconnected global crises, each exacerbating the other. Climate change accelerates biodiversity loss by disrupting ecosystems, while declining biodiversity weakens ecosystems' ability to regulate the climate and provide essential services such as carbon sequestration. These links are especially pronounced in agriculture and food systems, which are both major drivers of biodiversity loss and highly dependent on biodiversity for stability.

The global food system is the leading cause of biodiversity loss, with agriculture responsible for 80% of all global land-use changes in the past 50 years. Habitat destruction—through deforestation, land conversion for crops and pastures, and fragmentation—has reduced biodiversity intactness beyond safe limits in 65% of terrestrial ecosystems. Agricultural expansion also threatens freshwater and marine ecosystems, affecting water quality through extraction, runoff, erosion, and chemical pollution. Overexploitation in marine systems, combined with climate change and pollution, further accelerates biodiversity decline.

Additionally, livestock farming has drastically altered global biomass distribution, with livestock accounting for 60% of all mammal biomass, compared to just 4% for wild mammals. The dominance of a few species like cattle and pigs contributes to biodiversity homogenization. These pressures are expected to worsen, with agriculture projected to account for 70% of terrestrial biodiversity loss by 2050 and placing 24,000 of 28,000 threatened species at risk of extinction.

Efforts to address biodiversity loss and climate change have historically been fragmented. The three Rio Conventions—the UNFCCC (climate change), CBD (biodiversity), and UNCCD (land degradation)—acknowledge the need for integrated policies, but their implementation remains largely separate. While the Paris Agreement recognizes biodiversity's role, it lacks specific integration strategies. Conversely, the Global Biodiversity Framework (GBF)under the CBD includes climate-focused targets, and the UNCCD promotes sustainable land management to support both climate and biodiversity goals.

However, these synergies must be translated into national and local actions, requiring collaboration between governments, civil society, and the private sector to effectively address these crises.

Integrating these approaches into National Biodiversity Strategies and Action Plans (NBSAPs) and Nationally Determined Contributions (NDCs) can maximize environmental benefits while enhancing food security and societal well-being. These efforts align with GBF Targets 7, 10, and 16 and the climate goals of the Paris Agreement.

# **International Agreements and Frameworks**

# 1-Convention on Biological Diversity (CBD)

The notion of an international convention on biodiversity was conceived at a United Nations Environment Programme (UNEP) Ad Hoc Working Group of Experts on Biological Diversity in November 1988. The subsequent year, the Ad Hoc Working Group of Technical and Legal Experts was established for the drafting of a legal text which addressed the conservation and sustainable use of biological diversity, as well as the sharing of benefits arising from their utilization with sovereign states and local communities. In 1991, an intergovernmental negotiating committee was established, tasked with finalizing the Convention's text.

A Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity was held in Nairobi, Kenya, in 1992, and its conclusions were distilled in the Nairobi Final Act. The Convention's text was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit"). By its closing date, 4 June 1993, the Convention had received 168 signatures. It entered into force on 29 December 1993.

The Convention recognized for the first time in international law that the conservation of biodiversity is "a common concern of humankind" and is an integral part of the development process. The agreement covers all ecosystems, species, and genetic resources. It links traditional conservation efforts to the economic goal of using biological resources sustainably. It sets principles for the fair and equitable sharing of the benefits arising from the use of genetic resources, notably those destined for commercial use. It also covers the rapidly expanding field of biotechnology through its Cartagena Protocol on Biosafety, addressing technology development and transfer, benefit-sharing and biosafety issues. Importantly, the Convention is legally binding; countries that join it ('Parties') are obliged to implement its provisions.

The Convention reminds decision-makers of the finite status of natural resources and sets out a philosophy of sustainable use. While past conservation efforts were aimed at protecting particular species and habitats, the Convention recognizes that ecosystems, species and genes must be used for the benefit of humans. However, this should be done in a way and at a rate that does not lead to the long-term decline of biological diversity.

The Convention also offers decision-makers guidance based on the precautionary principle which demands that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat. The Convention acknowledges that substantial investments are required to conserve biological diversity. It argues, however, that conservation will bring us significant environmental, economic and social benefits in return.

# 2- Sustainable Development Goals (SDGs)

The 2030 Agenda for Sustainable Development, adopted by all United Nations(UN) members in 2015, created 17 world Sustainable Development Goals(SDGs). The aim of these global goals is "peace and prosperity for people and the planet" – while tackling climate change and working to preserve oceans and forests. The SDGs highlight the connections between the environmental, social and economic aspects of sustainable development. Sustainability is at the center of the SDGs, as the term sustainable development implies.

The short titles of the 17 SDGs are: No poverty (SDG 1), Zero hunger (SDG 2), Good health and well-being (SDG 3), Quality education (SDG 4), Gender equality (SDG 5), Clean water and sanitation (SDG 6), Affordable and clean energy (SDG 7), Decent work and economic growth (SDG 8), Industry, innovation and infrastructure (SDG 9), Reduced inequalities (SDG 10), Sustainable cities and communities (SDG 11), Responsible consumption and production (SDG 12), Climate action (SDG 13), Life below water (SDG 14), Life on land (SDG 15), Peace, justice, and strong institutions (SDG 16), and Partnerships for the goals (SDG 17).

These goals are ambitious, and the reports and outcomes to date indicate a challenging path. Most, if not all, of the goals are unlikely to be met by 2030. Rising inequalities, climate change, and biodiversity loss are topics of concerns threatening progress. The COVID-19 pandemic in 2020 to 2023 made these challenges worse, and some regions, such as Asia, have experienced significant setbacks during that time.

There are cross-cutting issues and synergies between the different goals; for example, for SDG 13 on climate action, the IPCC sees robust synergies with SDGs 3 (health), 7 (clean energy), 11 (cities and communities), 12 (responsible consumption and production) and 14 (oceans).:70 On the other hand, critics and observers have also identified trade-offs between the goals,:67 such as between ending hunger and promoting environmental sustainability.:26 Furthermore, concerns have arisen over the high number of goals (compared to the eight

Millennium Development Goals), leading to compounded trade-offs, a weak emphasis on environmental sustainability, and difficulties tracking qualitative indicators.

The political impact of the SDGs has been rather limited, and the SDGs have struggled to achieve transformative changes in policy and institutional structures. Also, funding remains a critical issue for achieving the SDGs. Significant financial resources would be required worldwide. The role of private investment and a shift towards sustainable financing are also essential for realizing the SDGs. Examples of progress from some countries demonstrate that achieving sustainable development through concerted global action is possible. The global effort for the SDGs calls for prioritizing environmental sustainability, understanding the indivisible nature of the goals, and seeking synergies across sectors.

# **Challenges in Transforming Food Systems**

Overly dependent on fossil fuels and polluting chemical inputs, industrialized food systems are all too often at the root of eroding human health, social cohesion, rural livelihoods, and important social, cultural, and spiritual traditions. The current model promotes an economic system that hides the true cost of food, creates global trade vulnerabilities, undermines rural economies and, ultimately, increases inequality. By comparison, agroecology and regenerative ecological practices offer integrated pathways to food systems that enhance the well-being of people and the planet.

Food systems are significant contributors to, and are heavily impacted by, climate change. It is estimated that food systems account for approximately 30 per cent of global emissions. Coordinated action across food and agriculture sectors to tackle climate change could simultaneously improve food security and nutrition, and, if managed well, reduce pressure on land, sequester carbon, and support biodiversity and conservation. To achieve these transformations we need cross-sector dialogue, systems-thinking, safeguards, and equity and rights-based approaches in place.

One of the most pressing reasons to transform food systems lies in improving public health. Many of the most severe health impacts of food systems trace back to some of the core industrial food and farming practices, such as chemical-intensive agriculture, intensive livestock production, the mass production and mass marketing of ultra-processed foods, and the development of long and deregulated global commodity supply chains. New narratives, policies, practices, and business models need to be systematically designed to enhance good human, ecological, and animal health.

Simplistic economic productivity metrics like 'yield-per-hectare' mean that negative impacts created by food systems — like habitat destruction, soil erosion, water contamination, displacement of Indigenous Peoples, diabetes, and more — go unaccounted for in the final price of food, in policy documents, and on balance sheets. This also means that positive impacts — carbon sequestration, insect pollination, resilience to natural disasters, and vibrant

communities — are also hidden and can't be enhanced. Changing the tools and frameworks used to assess food systems is an immediate way to transform food systems.

# **Case Studies and Examples**

#### Sustainable Agriculture Policies in the Netherlands

https://agriculture.ec.europa.eu/system/files/2024-01/csp-at-a-glance-netherlands \_\_en.pdf

# **Initiatives for Rainforest Protection in Brazil**

https://www.climatepolicyinitiative.org/wp-content/uploads/2021/10/REL-AMZ2 030-EN-Protecao-Florestal.pdf

# **European Union's Green Deal Strategy and Agricultural Policies**

https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/09/policies -for-the-future-of-farming-and-food-in-the-european-union\_6e5f9e60/36b04d2ben.pdf

#### **Sustainable Rice Farming Practices in Asia**

https://snrd-asia.org/wp-content/uploads/2024/08/Sustainable-Agriculture-in-Asia .pdf

#### EXTRAS

Note from under secretary general: Firstly I hope everyone of you read this study guide carefully. I won't add any "question to ponder" part in this guide because I already add the "case studies and examples" parts for each agenda. You can take a look to take inspiration for your debates, motions and resolution papers etc. Also I keep this study guide as much as I can. I only add what you need for your research. Consequently I really want to study from here to make unity for the committee. Thereby we prevent infollution.