

Topic 1: The effects of the current armed conflict on the surrounding environment

Over 80% of conflicts take place in bio-diverse hotspots. Although these hotspots only take up 2% of the world's land, they are vital for our environment as they support around half of the world's plants and many rare species. The disastrous effects of war on the surrounding populations, human rights, and political systems are widespread and well known. However, the toll armed conflict takes on its surrounding terrain is also profound, just not quite as much in the media's spotlight. Humans and nature survive in a precarious balance, and it is continually important to observe and nurture our harmony, as we are codependent and one cannot thrive without the other.

According to the International Committee of the Red Cross, in the time from 1946 to 2010, the single most important predictor for declines in certain wildlife populations was armed conflict. There are countless examples of the devastating and widespread impacts throughout the world's war-ridden areas: In Mozambique, the 15-year civil war decimated the elephant population from 2000 to 200. In the Democratic Republic of Congo, the conflict wiped out 95% of the hippopotamus population. The list goes on, with varying reasons for the declines. With all resources going to the war, anti-poaching efforts could be suspended, or maybe hunting increases to feed the military bases, or natural habitats are destroyed with or without intent, in battle or as a base, leading the animals populations to be displaced and without a proper food source. Whatever the reason, the outcome is the same: vital animal populations are damaged, sometimes irreparably.

But war does not exclusively target the animal kingdom, natural resources also get hit hard. In times of war supply for natural resources skyrockets. Populations provide the needed resources with haste, many times realizing only afterwards the deficit it created in the reserves. This can spiral into a generations long issue which sometimes never fully resolves itself, leaving the younger generations still picking up the pieces long after. Additionally, with the need of more space exponentially growing, important wildlife havens, reserves, and habitats are destroyed to make room for military bases, refugee or prisoners of war housing, and agriculture. Many times when the land is not completely cleared, monocultures are created. This unsustainable agricultural practice is when only one plant is grown in the soil, and it can greatly affect the soil quality in a negative nature. These lands are left completely barren, or at the least with a heavy loss of nutrients, and the ecosystems lost are extremely hard to retrieve. Natural resources can also be used as a weapon. In Iraq, heavy crude oil was pumped directly into a river, affecting the drinking water supply. This is an example of an instance that directly impacted the population. The negative effects aren't only felt after the war ends, the environment is such a vital part of human lives, that even a tiny action can spiral and have catastrophic effects. Nature is often a hidden victim, many times used as a stepping stone to get an upper hand within a conflict, but

without any real thought about the disastrous aftereffects, making it all the more crucial to recognize and tackle.

The war in Ukraine is and has been front-page news since its beginning in 2022, but astoundingly, the presence of the war isn't just held within our atmosphere. Military action has caused such prominent wildfires that they can actually be seen from space, and in turn have caused the destruction of critical bird breeding habitats within the largest nature reserve in Ukraine. This topic is incredibly prominent for us, especially now, with 114 active armed conflicts happening around the world. Even with the laws already created to protect the environment during times of conflict, destruction still wreaks havoc upon our vital wilderness. International Humanitarian Law already tackles some issues relating to the environmental degradation caused by wartime, with some ground rules already put in place, such as forbidding direct attacks against natural environments, taking into consideration the severity of environmental damage before going through with an attack, and for any environmental damage created, paying full reparation; however this is only when the damage was created in a way that was against International Law. These laws are significant and substantial, but they are not the solution, there are still ways to further them. As our society evolves, so should our laws.

While these laws bring current conflicts in the direction of creating less damage, another side of the issue still shines through in the lasting effects of old conflicts. The toxins, pollutants, and active weaponry left after war can pose a risk for humans and nature for far longer than you'd think. Many areas are uninhabitable or have lasting negative effects, years after a conflict was resolved on paper. In 2006, the explosions of the Jiyeh power plant, due to a bomb from Israel, caused the release of 10,000 to 15,000 tons of oil into the Mediterranean Sea. This resulted in the deaths of many seabirds and marine life. These populations were so gravely damaged that it impacted the Lebanese tourism and fishing industry. Furthermore, not all of the oil has been recovered, even today. According to the United Nations Office for Disaster Risk Reduction, "in the first Gulf War, when 700 of Kuwait's oil fields were set ablaze, the smoke plume initially stretched for 800 miles. In addition, approximately 11 million barrels of crude oil poured into the Persian Gulf, creating a slick nine miles long. Inland, nearly 300 oil lakes formed on the surface of the desert, polluting the soil for decades. An international coalition of firefighters fought the fires for months until the last well was finally capped in November 1991. Even now, more than 30 years later, the effects of those fires are still felt, with more than 90 per cent of the contaminated soil still exposed." This excerpt shows the web of causality, one instance is never just one instance, the effects spiral outward, and without attention, continue to be left rampant. These issues often fall into the background, as in post-war efforts, much more focus is given to displaced peoples and rebuilding infrastructure and government. Many places are forgotten, abandoned, or the population just has to adapt.

Guiding Questions:

1. Are there ways to strengthen compliance with already created international law?
2. Is there a way to work more closely with militaries to bring education and conservation to a more recognized and important light?
3. If the natural damage was done without intent, should there still be a punishment?
4. Are there uncovered areas/holes within preexisting laws?
5. Is awareness a powerful enough tool to make a difference within such a widespread issue?
6. How can we use our more recent developments, especially within technology, to help with the lasting impacts of wars that came before them?

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Topic 2: Spreading awareness of technology-based environmental solutions to less developed areas

The role of technology-based environmental solutions has become increasingly important in the past few years; however, its roots lay in the late 1830s. The Industrial Revolution sparked the need for alternative energy sources and efforts to mitigate environmental harm. Environmental movements in the 1990s pushed this cause further, resulting in the creation of Earth Day (April 22nd, 1970) and the Clean Air Act of 1970, which stated efforts to control emissions of harmful pollutants into the air. Other important landmarks include the 1997 Kyoto Protocol, which established a global agreement to reduce greenhouse gas emissions, setting the stage for innovative solutions. However, a much bigger shift happened between 1980 and 1990; solar, wind, and hydroelectric technologies became viable.

The first US wind turbine company was created in 1850, and in 1890, wind turbines were used to help farmers irrigate fields and generate electricity for homes and businesses. Also, a steel blade was invented for the wind turbine. Additionally, Charles Fritts created the first solar cell (a device converting solar radiation into electricity) by coating selenium — a non-metal chemical semiconductor, meaning it can either convert light into electricity or not depending on how it is used — in a thin layer of gold. Its conversion rate was 1 to 2%, whereas modern solar panels can convert 10 to 15%. In 1950, Bell Laboratories realized that other non-metal semiconductors, such as silicon, were much more effective, and were able to design a solar panel with a 6% conversion rate. While conversion rates were improving, solar panels were still extremely expensive, especially to the public, which did not make them accessible and widely used. After the 1970 energy crisis, the US Congress passed the Solar Energy Research, Development and Demonstration Act of 1974, showing a deeper commitment solar energy accessible to the public. The creation and use of Solar One from 1982 to 1988, created by Southern California Edison (a major electricity and utility company), demonstrated the efficiency of solar energy and finally made solar energy available to the public. Solar One was a 100-meter-tall tower made from heliostats — mirrors used to concentrate light onto a receiver, which converted heat into steam to power a turbine. It was able to store thermal energy, allowing it to supply electricity for long periods of time.

Improvements and advances in technology, increased government incentives and support, and increased demand over the past few years have all decreased the cost of solar panels and improved efficiency. Recently, researchers have developed solar panels with 20% efficiency, and in 2025, the average efficiency of solar panels lies between 18% to 22%. The Federal Solar Tax Credit allows homeowners to deduct 30% of installation fees from their taxes, making it an appealing investment. While the efficiencies of wind turbines vary based on wind speed, design, and location, most wind turbines in the US reach efficiency levels of 50% or more. Additionally, new technologies such as Superconducting Generators are taking efficiency levels past the Betz limit — a limit saying wind turbines can't capture more than 59.3% of the wind's energy due to

their unsolvable inability to slow down all the wind without it preventing further airflow, making energy conversion impossible. These three things have made solar panels and wind turbines some of the most widely accessible and efficient sources of renewable energy in the past decade.

Beyond wind and solar, Hydroelectric Power is another important source of renewable energy created around the same time as solar and wind energy. Hydroelectric power plants use the kinetic energy water produces when falling to turn turbines built within dams, which turn generators to produce electricity. It can be stored and used later on. The very first hydroelectric power was used to power a single lamp in Northumberland, England, in 1778. In 1882, the first power plant was created to power private and commercial customers in Wisconsin. Since then, hydroelectric power plants have increased in popularity, and there are now around 6,500 plants globally. Brazil and China have become especially prominent. For example, the Itaipu Dam in Brazil opened in 1984, which today can produce 14,000 megawatts of energy; the only plant that overpowers it is the Three Gorges Dam in China, capable of producing 22,500 megawatts of energy. Today, it produces around 15% of total electricity generation worldwide (these numbers may vary based on water flow and other environmental factors).

These three methods of renewable energy have allowed electric cars to gain popularity due to their environmental sustainability and efficiency. Gridserve is an electric car charging company founded in Wales, a country that hopes to reach 100% renewable energy goals by 2035. Gridserve is using solar panels and wind turbine farms to provide charging stations for all electric vehicles. The company promises that no matter where you plug in, a third of the electricity used to power your car will be from renewable energy sources. They point out that since 2022, 29% of energy in the UK came from wind, 6% from solar, 7% from biomass, and 1% from hydroelectric. Using renewable energy to charge EVs (electric vehicles) can save money, reduce CO2 emissions, and provide relief for the electric grid from constant use.

Aside from renewable energy and electric transportation, innovative technology has provided new sustainable housing and farming solutions. Sustainable housing is built, operated, and maintained in a way that decreases the owner's carbon footprint. There are 3 major methods of sustainable housing. First, prefabricated homes. These homes are built in factories, transported, and then permanently assembled in the desired location. They are extremely fast to make, and the use of sustainable, high-quality materials makes them energy-efficient and cost-effective. Second, tiny homes are convenient, and due to their size, have a significantly lower carbon footprint due to less need for electricity and heating. This makes them very cost-effective for the homeowner and for the companies providing the utilities. Finally, straw bale or concrete homes. Straw bales provide excellent insulation for walls and are covered with plaster and clay. They take less time to build, use low-impact materials, and do not require major maintenance. Concrete homes have the option of being made of recycled materials, and are built using molds, or are pre-built and assembled.

Furthermore, there are many new sustainable farming methods. The newest technology allows vertical farming—farming on vertical surfaces rather than traditional horizontal— to be more efficient than ever. Farmers can produce much more food on the same amount of land as traditional farming. Often, these vertical farms can be integrated into skyscrapers, warehouses, or greenhouses. There are X benefits to vertical farming. First, they use less water and space; farmers can use 98% less water and 99% less land. Vertical farms have increased production all year round, they are pesticide-free—making it safer for consumers— and have a significantly decreased carbon footprint compared to regular farms.

Even though these renewable energy sources and new sustainable alternatives exist, how accessible are they to less developed countries? The United Nations Department of Economic and Social Affairs has been working on five initiatives to spread awareness and ensure access to technology through education and community programs. First, mobilising people and funding tree plantation drives for soil conservation. Second, organizing information sharing sessions in schools, community centres, and government offices, third, access to technology by linking corporates/industry with government and society, fourth, mobilising young students for voluntary work, and finally organizing talks on Blue Economy. But are these measures effective enough? Are all countries involved with the UN complying? These questions are becoming increasingly important as new technological solutions to environmental problems arise, each with its own set of ethical and practical considerations.

Guiding Questions:

1. How can renewable energy technologies be made more accessible and affordable for less developed countries?
2. To what extent should international corporations be involved in spreading awareness about new environmental solutions?
3. What ethical, social, and environmental concerns arise from relying heavily on technology for environmental solutions? How is AI being used in new environmental solutions, and is it ethical?
4. How can a system of incentives and rewards be used to ensure compliance with international environmental laws?
5. How effective are current environmental solutions and what new innovative technologies exist, how effective are they?
 - a. How are they used?
 - b. Are they being used and where?
 - c. How ethical are they?

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