

A Review: Green Life And Behavior Change for Net Zero by Non Governmental Organizations

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Abstract— global warming and environmental issues are being caused by the overuse of fossil fuels and increased industrialization around the world, which has resulted in the production of greenhouse gases. As a result, it's crucial to reach net-zero carbon emissions. By balancing the total quantity of carbon dioxide or other greenhouse gas emissions over a specific period and taking actions that are ecologically responsible, net zero carbon emissions can be accomplished. For environmental sustainability to be successful, it must be able to influence people's attitudes and behavior toward the environment. To understand NGOs' obligations in supporting net-zero carbon emissions, this paper presents a methodical debate utilizing NGOs as case studies. The method is employed in this work by reviewing the body of primary and secondary research on the study issue. This essay initially lists different environmental NGOs organizations before categorizing and outlining some of the significant GHGs reduction initiatives made by these organizations. This essay also addresses key issues that must be addressed upon to achieve the best outcomes. This report gives a broad overview of the synergizing domains that NGOs around the globe work in to assist improvement environmental security.

Keywords— Carbon Emission, Environmental Damage, NGOs, CO₂ Reduction.

I. INTRODUCTION

A. State of Problems

Economic and social progress has become a major driver of energy consumption. According to [1], [2], it allows humans to live in a certain way to achieve a prosperous level. The availability and consumption of fossil fuels, which led to the emergence of the Industrial Revolution era, became the cause of increased technical progress in all sectors. However, the positive impact of all this is that the increasing use of fossil fuels has caused the environment to be polluted due to too much greenhouse gas (GHG) and other harmful substances

released into the environment during its use. These GHGs can exacerbate the effects of climate change, such as increasing global temperatures, by trapping more heat in the atmosphere. Climate change refers to this phenomenon. The rate of global warming is directly correlated with the amount of greenhouse gases produced and increases the potential for detrimental effects such as wildfires, storms, heatwaves, floods, etc. Only CO₂ was the focus of this event and was the target of many of the reviews that appeared. Fluorinated gases (PFC, HFC, SF₆, and NF₃), H₂O, CH₄, and N₂O are just a few examples of other pollutants that also have a negative effect but are not as big as the presence of CO₂. A different connotation is attached to the term "net-zero" specification as another term has recently emerged. Cumulative anthropogenic CO₂ emissions have been identified as a major contributor to postindustrial global warming. However, since the industrial revolution, CO₂ concentrations have shown the most significant increase and have even increased by almost 50%, from 280 ppm in 1750 to 415 ppm in 2022. At the global level in 2017, 64% of air emissions were CO₂ (Figure 1).

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Over this century, there will likely be a major increase in the world's energy needs. CO₂ emissions from human activities, including the energy industry, industrial products, land use, and agriculture, must also be close to zero to moderate the rise in global average temperatures. Due to the reliance on fossil fuels to supply growing global energy demand, reducing CO₂ and other GHG emissions is more important than ever and needs to be done more rapidly. Meanwhile, at the same time, challenges arise due to energy needs in developing countries where industry is the main driving force for their country, which will continue to increase as a result of population growth and rising living standards. Energy demand in developing countries also shows a

trend that continues to increase. Even though energy that is more environmentally friendly (such as wind, geothermal, etc.) has appeared a lot, the position of coal-fired power plants as an energy source cannot be replaced because the price is much lower. Environmental and ecological problems related to climate change must be addressed immediately. It has been estimated that tropical countries, including West Africa, Southeast Asia, and northern Central and South America, will experience a decline in agricultural productivity, especially wheat and maize, if world average temperatures rise by more than 2 C from pre-industrial values.

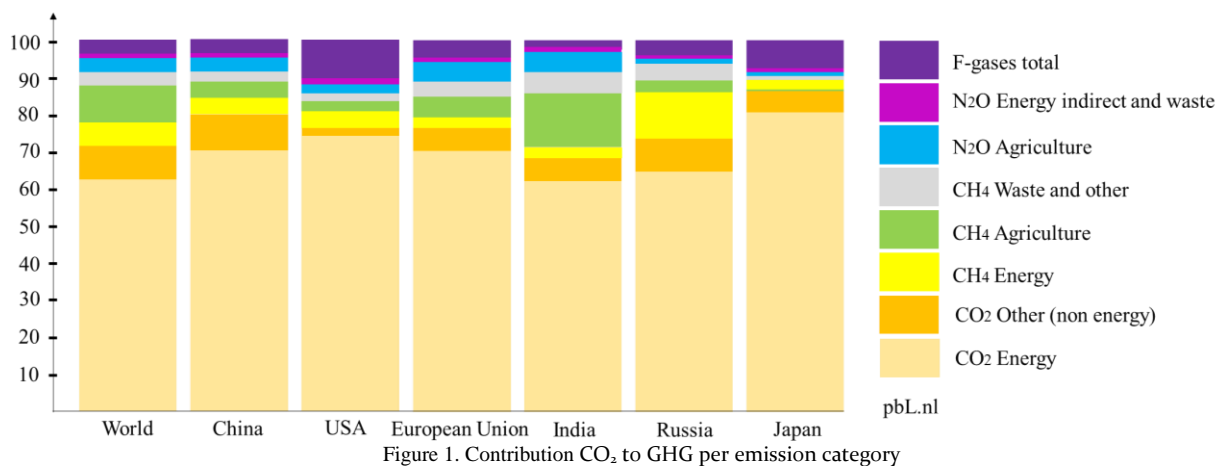


Figure 1. Contribution CO₂ to GHG per emission category

Along with a 10 cm sea level rise and a sea water temperature of 1.5 C, an average temperature of 2 C will also have this effect. In 2100, there will be a tremendous increase in the earth's temperature ($\pm 30\%$ from before), creating even worse conditions [3]. As a result, some fields are now demanding accelerated net zero efforts. The term "net zero" refers to reducing greenhouse gas emissions to practically zero, with the remaining emissions being reabsorbed from the atmosphere, for example, by oceans and forests. In terms of how we create, consume, and travel, it requires a profound revolution.

B. The Main and Specific Objectives

Many reports of environmental NGOs have focused on policy control and implementation of climate change prevention and reduction programs at local to international levels. However, to our knowledge, articles need to discuss the actions taken by various global NGOs to support GHG reduction. Schnitzer & Ulgiati (2007), Laski & Burrows (2017), Joo et al. (2023), and Smith & Christie (2021) only make NGOs a small part of the sector in their article studies so that the discussion is broad [4]–[7]. Some of the efforts made by NGOs in various parts of the world also need more detail in describing their role in reducing global emissions to achieve net zero emissions. Reduction action programs that are very ambitious, apart from advocacy to deal with substantial technological, economic, or political obstacles, are not comprehensively explained as a form of work by NGOs, so we suspect that the role of NGOs tends to be more in monitoring regulations in the actual

application, not other work. Many other articles also take a standpoint in highlighting the role of NGOs from a constellation favorable to the government in the form of progressive climate realization, such as elections to expand renewable energy and electrification of the economy while increasing energy efficiency [8]. It could be because "net zero" is a new term for reducing greenhouse gas emissions to near zero. This term has only recently been used in the last decade due to the impact of climate change which is increasingly being felt in various parts of the world due to the increase in the earth's average temperature. Some researchers have reviewed this action, but it becomes difficult to detect because they use different terms. Meanwhile, many other articles discuss studies on environmental movements that have been or are being pursued by NGOs in various parts of the world for other environmental fields far from the topic we raise. For instance, Rigolon & Gibson (2021) investigated 121 NGOs operating in green and blue spaces to further study the rising acceptance of neoliberal governance, which entails cutting public spending. Because of the issue with green and blue spaces, environmental NGOs are now concentrating on issues that have an overall influence on climate change and global warming [9]. They are currently examining the issues of distributing justice (offering fair green and blue spaces), procedural justice (including marginalized people in GBS decision-making), and interactional justice (enabling meaningful experiences in GBS). Meanwhile, several articles explore NGOs disseminating information and knowledge about environmental improvement through social media [10], [11]. By

looking at this opportunity, this article therefore aims to find out the progress and methods that have been carried out by various NGOs in relation to and to reach net zero emissions condition.

This article collects information about international NGOs in many countries for green life and behavior change for GHG reduction and related net zero issues. This summary becomes material for learning ways to expand knowledge about net zero issues beyond what most people know, NGOs only work on advocacy and campaigns. We use various methods to collect information, such as report data accessed online, local, and international articles discussing this topic, and video recordings or articles published on the websites of the NGOs concerned. Because actions like this are not the

result of work like the work of academics which must be included in a scientific article, much of the specific information we get is based on online news.

II. DEFINITION OF NET ZERO EMISSION

According to Rogelj et al. (2020), net-zero emissions are the goal of efforts to neutralize climate change [12]. As an effort to prevent the worst effects of climate change, the concept was developed. It refers to achieving net zero emissions of CO₂, CH₄, and other greenhouse gases in the atmosphere by completely removing all manufactured greenhouse gas emissions from the atmosphere through abatement measures (natural and artificial removals) and minimizing the production of emissions by removing carbon compounds.

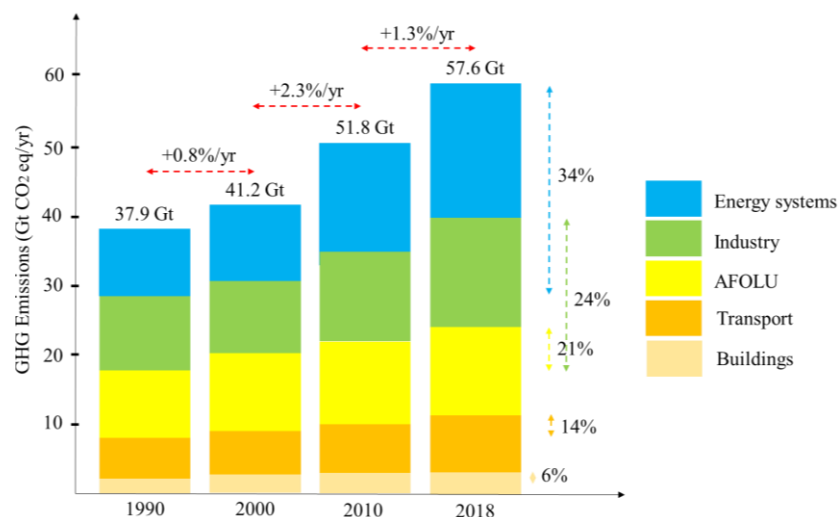


Figure 2. Global and regional GHGs emission trends for all sectors

Excess from the atmosphere (carbon balance) or carry out more environmentally friendly activities to achieve net zero. By reducing CO₂ emissions from the atmosphere to the same level as they are generated, government agencies, businesses, and society can achieve this [13] by imposing a zero carbon footprint rule is what achieving global carbon neutrality is all about. Industry groups can launch reforestation programs and assist with additional initiatives in other regions to conserve the same amount of carbon to offset greenhouse gas emissions. Energy from renewable sources, both on and off-site, is a common supply source for energy-efficient buildings. "Net-zero emissions" describe conditions under which the amount of CO₂ and other greenhouse gases released into the atmosphere equals the amount removed. CO₂ added equals CO₂ withdrawn to achieve net-zero emissions by balancing carbon and other greenhouse gas (GHG) emissions measured in carbon dioxide equivalents. The terms carbon neutrality and net zero carbon footprint are sometimes used instead of net emissions -zero [14]. The expression "net zero emission" comes from "zero emission." Despite having different conceptual bases, the two terms seek to achieve global climate balance. The zero-emission idea was first proposed by Gunter Pauli in 1991 when he found that the expansion of Southeast Asian rainforests was being held back by the increasing demand for goods made from palm oil derivatives and their by-products. In general,

"net zero emissions" refers to methods, equipment, and other energy-producing structures that do not release greenhouse gases or other pollutants that damage the environment. Bicycles, electric cars, hydrogen cars, and electric trains are common examples of zero-emission mobility technologies. Examples of zero-emission power facilities include nuclear energy, hydroelectric, solar, and wind power. To achieve the Paris Agreement's global warming goal, global emissions must be net zero by 2050 [15], [16].

III. DEFINITION OF NGOS

Especially after world war II ended, the influence of NGOs on world politics increased [17]. The quantity and variety of issues absorbed by NGOs have increased over the previous three decades. There are still differences in how NGOs are defined, and the term itself needs to be taken in a clear form. NGOs are autonomous, apolitical, non-profit entities with a mission to improve the lives of underrepresented groups of people. In contrast to being part of the government, NGOs are autonomous social organizations that operate as a bridge between the community and the government. Based on their main activities, NGOs can be classified into two groups: operations and advocacy [18]. NGOs offer customers important products and services that need to be considered in this context. An NGO that advocates for communities that do not have access to or a voice to

further their interests is known as an advocacy organization (ARO). NGOs use various techniques to carry out advocacy work, including melodies, acting as consultants and experts, conducting research, organizing conferences, monitoring and uncovering the actions of other players, holding a public opinion, sharing information with key stakeholders, and developing boycott agendas. In this climate change situation, NGOs are seen as outside critics demanding that issues and actions be recognized and as collaborators in creating frameworks and guidelines to work together when running operations. According to Gough and Shackley, NGOs involved in climate change politics can be divided into three types. Environmentally-related organizations usually have high levels of public visibility regarding campaigns. Second, scientists and analysts in policy and technical discussions form research-based organizations or "think tanks". A series of alliance companies that reflect the viewpoints and interests of the business community come in third [19].

IV. THE NET ZERO BY NGOS

NGO participation in climate change discussions has increased significantly in recent years [20], [21]. Since the UNFCCC was founded in 1992, the number of NGOs participating in the UNFCCC process has expanded by more than 2.5 times. Observers from non-governmental organizations increased from 191 at COP 1995 to 530 at COP 2000. The NGOs participate in the negotiating process by attending informal group meetings, making formal interventions during negotiation sessions, and talking about problems with national negotiators [22]. They also organize "side events" to offer in-depth information and conversations, organize an exhibition to present the study's findings, or participate directly in activities associated with a particular topic. In the global net-zero space, there are countless organizations working cooperatively and inclusively. In addition to assisting society's members, they also engage members of the arts community, families, and other community activists. Some even participate in research and serve as policymakers. A few cutting-edge groups that support net-zero emissions are included in Table 1.

TABLE 1.
LIST OF NGOS THAT TAKE PART IN TACKLING THE ISSUE OF CLIMATE CHANGE IN SOME REGIONS TO A WIDER DEGREE

No.	Name	Website	Scope
1	350	350.org	International
2	Arab Forum for Environment and Development (AFED)	afedonline.org	Arab Region
3	Asia Pacific Adaptation Network (APAN)	asiapacificadapt.net	Asia and Pacific Region
4	Biomimicry Institute	biomimicry.org	International
5	C40 Cities	c40.org	International
6	Caribbean Community Climate Change Center (CCCCC)	caribbeanclimate.bz	Caribbean Region
7	Citizens' Climate Lobby	citizensclimatelobby.org	International
8	Climate Alliance	climatealliance.org	International
9	Climate Action Network (CAN)	climatenetwork.org	International
10	Climate Cardinals	climatecardinals.org	International
11	Climate Collaborative	climatecollaborative.com	United States
12	Climate Group	theclimategroup.org	International
13	Climate Justice Alliance (CJA)	climatejusticealliance.org	United States
14	Earthjustice	earthjustice.org	United States
15	Environmental Defense Fund (EDF)	edf.org	United States
16	Environmental Working Group (EWG)	ewg.org	United States
17	Extinction Rebellion (XR)	rebellion.global	International
18	Fridays for Future (FFF)	fridaysforfuture.org	International
19	Friends of the Earth	foei.org	International
20	Gender CC	gendercc.net	International
21	Greenpeace	greenpeace.org	International
22	Health and Environment Alliance (HEAL)	env-health.org	Europe
23	Natural Resources Defense Council (NRDC)	nrdc.org	International
24	Naturefriends International (NFI)	nf-int.org	International
25	Oceanic Global	oceanic.global	International
26	Our Kids' Climate	ourkidsclimate.org	International
27	Project Drawdown	drawdown.org	International
28	Rainforest Action Network (RAN)	ran.org	United States
29	Sunrise Movement	sunrisemovement.org	United States
30	Union of Concerned Scientists	ucsusa.org	United States
31	World Wildlife Fund (WWF)	worldwildlife.org	International

V. NGOS FUNCTION

A. Campaigning Issues

Through developing large-scale movements and collaborating with local communities worldwide, NGO groups want to stop using fossil fuels and switch to renewable energy [23]. Johansen & Werner (2022) hold international businesses and leaders responsible for

heeding scientific truths and the value of social justice [24]. Most include this as part of their goal organization because they consider ensuring safety and fairness for everyone to be very important. The highest safe level of 350 ppm CO₂, which is determined to be the best way to prevent extreme climatic points, is the foundation of the 350 community. The group has organized thousands of organizers contributing to more than 188 countries through internet campaigns, extensive mass actions, and

collaboration with a wide network of groups and partner organizations. The "Fossil Free" campaign, which advocates for the use of fossil fuels, is hosted in part by 350.org. The campaign for the use of fossil fuels is called Fossil Free. Since its founding in 2012, more than 1,100 institutions worldwide have divested, totaling more than \$11 trillion from coal, oil, and gas. Director of 350.org, Bill McKibben, has written articles for major publications and media outlets to spread the campaign's message. Organizational leadership also offers initiatives at conferences and through other seminars. After McKibben published his opinion pieces in *The Guardian* and the *Los Angeles Times*, his efforts finally paid off. They persuaded experts from the UN climate program and the Intergovernmental Panel on Climate Change (IPCC) to support lowering atmospheric CO₂ levels to 350 ppm. When the 350 won a Katerva award for behavior change in 2012, people started taking notice of its existence. Talking about his vision in various media helps more and more people understand the Net Zero issue, especially concerning climate change, its impact, and the steps needed.

To promote environmental education, the Arab Forum for Environment and Development (AFED) released a Green Bulletin [25], [26]. Millions of entries are submitted to the AFED school competition that promotes environmental responsibility. More than 10,000 eco-friendly books are supplied by AFED through scholarships to Arab public schools to upgrade their environmental libraries. In 2015, 22 Arab countries were also included by AFED in a survey about people's attitudes toward energy use [27]. They rely on a growing number of individuals who are aware of the scientific background of the problem to support their endeavors. Along with reading instructions for children, they also use films and guidebooks that provide strategies that can be used to champion change to be implemented in businesses, office buildings, and agriculture in the Arab region to raise awareness of the importance of energy efficiency and air resources, for industry and private players. AFED has produced twelve documentaries on environmental education since its inception. Other successful films produced by AFED that were shown on national and regional networks include *Testimony of an Old Man* (2008), *Wet and Dry* (2009), *The Last Drop* (2010), *Green Change* (2011), *Survival Options* (2012), *Powering the Arab Future* (2013), and *Feeding 400 million Arabs* (2014) [28].

B. Building A Formal Ecological School

Numerous groups have chosen to establish formal schools to make sure that children are adequately informed about the problem of climate change and Net Zero's initiatives [29]. To support environmental education initiatives at all school levels, AFED has created a comprehensive manual and official website (afed-ecoschool.org). To make sure the intended work programs can be executed successfully, it is considered if all the resources required to start ecological activities in schools and include environmental education in the academic curriculum are ready. Before being parachuted in to teach students at different educational levels, from

elementary school through high school, thousands of teachers received training in ecological education workshops. The Arab nation and its surroundings ended up being the focus of the establishment of this green school. In Lebanon, the United Arab Emirates, Saudi Arabia, Jordan, Algeria, and other Arab nations, there are several institutions dedicated to environmental education. Additionally, AFED provides funding to Arab public schools via the minister of education [30].

An environmental NGO called Biomimicry pioneers the idea and method of developing a human character that is not selfish, at peace with nature, and considerate of the generations who will follow the twenty-first century [31]. This concept incorporates many professionals, including engineers, designers, social scientists, humanists, businesspeople, and artists, and it calls for the expertise of biologists. Students and professionals from different disciplines can participate in educational programs offered by the Center for Biomimicry to learn how to build sustainable solutions by asking, "What will nature do?" Models of biological systems and creatures are used to compare the production of food, shelter, and transportation. These models have been created through billions of years of evolutionary development. They have been created to be an effective resource and won't negatively impact living things, including people, when handled intelligently and sustainably. People are taught in this school to think of themselves as being a member of a natural ecosystem, where they share the same kingdom as other species, rather than as the only monarch of the planet Earth with the authority to exploit all natural resources anyway he pleases. Everyone can use the techniques taught by biomimicry to help create solutions that work with their ecology. Additionally, this chance gives students the tools they need to tackle 21st-century tasks including sustainable design, methodical thought, creativity, and cross-disciplinary cooperation. More specializations are now available for two graduate-level programs that are offered online.

Adding the idea of biomimicry education to kindergarten through high school curricula has several benefits, including encouraging students to explore nature, learn STEM, work in teams, and be creative. Although it will be helpful to introduce Biomimicry to a range of age groups, it is crucial to first determine the academic standing and interests of the children involved in this education [32], [33]. A concept of biomimicry that is appropriate for their age and level is given, together with examples, to encourage youngsters to pursue education [34], [35]. Afterward, students were asked to describe the traits and prowess of the creature and to think about what lessons we might draw from it [36], [37].

a. Kindergarten through fifth grade (K-5 elementary school): At this age, education only aims to instill in children a respect of nature via observation and experience. Each day, students are expected to set aside some time to view wildlife (preferably with the use of binoculars or a magnifying lens), keep a personal Biomimicry Nature Journal, walk outside, utilize their senses, and record their observations in

writing or drawing. Students were required to share their findings from the observations in front of their peers when the observation session was finished. Each child's presentation will be accepted by the teacher. Give them instances they may relate to to expand their grasp of biomimicry.

- b. Grades 6–8 (middle school): High school students might expand on their observations by using what they have discovered to address certain problems in their community or state. This age group is welcome to participate in the Youth Design Challenge. More than ever, high school students need to get back in touch with nature, particularly as social media usage increases within this age group. They were questioned about the processes that take place in nature, what it requires, what it offers, and how people may help close the gap between nature and society.
- c. Grades 9–12 (high school): By looking at natural symptoms, students in this age range may better appreciate the connection between biological function and the use of technology to solve issues. Reiterate that the goal of biomimicry is "to learn from and mimic the long-term solutions provided by living systems for particular functional problems." High school students are being exhorted to translate their findings into climate change solutions.

First, to learn from nature, we must observe it. The creation of a Biomimicry Nature Journal allows students of any grade level to create a notebook that will act as their individual "offline" search engine. It is fully up to each learner's choice as to how they choose to document their learning in nature, and they are free to write or sketch their findings there. All the activities are age-appropriate, although some can be especially good for young children who are just learning about hearts and wish to go deeper into their studies. Here are some activities for building up a biomimicry nature journal provided:

- a. The participants were instructed to sit in a relaxed position and spend 15 to 20 minutes examining their surroundings using their five senses. Following that, the observations are written down in observational notes or sketches, such as pictures of what was observed. Participants are typically at least asked to respond to a few questions in observational notes, such as 1) What do you see around you?, 2) What sounds do you hear near and far?, 3) What do you feel with your touch or what touches you?, 4) What smell is in the air?, 5) Is there a particular taste in your mouth?, 6) Try to create useful diagrams around you, 7) What you see, and 8) How close or far they feel to you.
- b. Participants were invited to select two species and one design concept inspired by nature from the collection and dig further for the project 30 Animals That Made Us Smarter. They were instructed to record fascinating examples of the adaptations they had learned about in their journals, along with justifications for why those adaptations are appropriate for the organism's environment. Participants were instructed in this section to

"Mention one of the benefits of this innovation that he made for the environment."

- c. A New World: During this pandemic, schooling was developed using a novel idea, with the goal of achieving sustainable development. Regenerative and resilient concepts were proposed. This idea is like the idea that we are all related and must take responsibility for our actions. To provide a picture of how the future world will interact with nature is the aim here.

C. Organizing and Participating in Scientific Conference

Until the conference and the United Nations (UN) session, representatives of NGOs from various nations may attend. The existence of NGOs is extremely beneficial and has a positive impact, particularly as a source of information, as an advocate for public policy, and as a watchdog for humanitarian and environmental concerns. The government and the UN regard non-governmental organizations to be one of their information sources. Government agencies frequently do not have access to the data and information given by these firms. They often carry out independent study or research in the neighborhood. When numerous nations are being discussed in a UN conference, this sort of study might occasionally serve as a reference or evaluation. NGOs also participate in international relations by promoting several pertinent public policies. This organization can offer evaluations and suggestions in relation to the formulation and execution of public policy. Here are some summaries of conferences that NGOs attended or organized to present Net Zero and climate change initiatives.

The Arab Forum for Environment and Development presented its 13th annual report on Health and the Environment in Arab Countries during an international virtual conference hosted by the American University of Beirut in October 2020. There were more than 400 delegates in attendance from 45 different countries, representing universities, international organizations, government and commercial entities, and civil society. With input from the WHO Regional Centre for Environmental Health Action (CEHA), the paper features contributions from more than 150 experts from Arab and international universities and research organizations, including AUB, researchers from the Arabian Gulf University in Bahrain, Cairo University and Alexandria University in Egypt, and Saint Joseph University of Beirut.

The first regional adaptation network is called APAN, and it was established directly by the UNEP in 2009 as part of the Global Adaptation Network (GAN). Through the creator of the execution of the APAN Forum, APAN is an NGO that aims to provide adaptation actors with the knowledge to create and execute capacity-building into national development policies, strategies, and plans. The forum brings together non-governmental organizations, media outlets, youth community-based practitioners, non-governmental organizations, multilateral and regional organizations,

government agencies (such as the environment, planning, and finance ministries), academia, engineering and other professional associations, donor and financing institutions, relevant private sector and business, and government agencies [38]. The triennial C40 World Mayors Summit is a gathering of mayors from various cities to discuss climate action. The 2022 World Economic Forum Summit was held in Buenos Aires from October 19–21 with a hybrid format (live and online activities). The conference will bring together mayors from the top cities in the world along with business executives, influential people from around the world, donors, campaigners, youth groups, scientists, and community representatives to highlight the work each city is doing to deliver efficient solutions for improving the climate in their respective cities and to demonstrate the strength of a unified global coalition. To combat climate change and achieve social and racial justice, more than 1,500 civil society groups from more than 130 countries collaborate as part of the CAN. CAN unites civil society and organizes it to participate in UN climate talks and other international forums. Climate webinars are periodically held by CAN as part of its advocacy efforts. Several industry specialists were asked to speak at the webinar. Not only did the discussion take place digitally, but this webinar was also held before the offline presentation of the COVID-19 Pandemic. Participants are given an explanation of their experiences by business leaders, academic researchers, and affected public personalities [39].

D. Participate in Climate Improvement Project

The REETA project was started in 2013 and is funded by Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ). It is located at the CARICOM Energy Unit in Georgetown, Guyana. The initiative helps to strengthen regional and governmental frameworks for renewable energy and energy efficiency on a larger scale. The Energy Unit of the CARICOM is strengthened. The initiative fosters regional networks of technical institutions at the secondary level in the fields of industry, education, and cross-sector collaboration. The program's main objective is to increase access to training in renewable energy and energy efficiency at the University of the Caribbean and technical institutes. The initiative supports projects using bioenergy models that are highly visible and dependable at the micro level. The whole project's objective is to provide a long-term contribution to stabilizing energy prices and safeguarding energy supply in the Caribbean area [40], [41]. One of the project's key priorities is bioenergy, and REETA has supported the construction of a biogas laboratory in Belize. Reading resources, including encyclopedias, modules, tests, and online training, are given to partners and communities to ensure continuing usage and increased understanding of bioenergy. Some studies have concluded that bioenergy can suppress the release of greenhouse gases into the atmosphere (Fankhauser et al., 2021).

VI. FUNDING

Donors support NGOs while they carry out their programs. This is since NGOs are not businesses. Donors can come from national governments, partnerships between regional and global NGOs, as well as individuals providing both indirect aid and collaboration. Additionally, NGOs have access to funding from official government assistance organizations like the Department for International Development (DFI), Norwegian Agency for Development Cooperation (NORAD), German Organization for Technical Cooperation (GTZ), United States Agency for International Development (USAID), and Australian Agency for International Development (USAID), as well as from international organizations like the United Nations (UN), the World Bank, and the International Monetary Fund (IMF). APAN Community is one of the non-governmental organizations (NGOs) whose goal aim is to advance institutions, knowledge, and abilities to create human civilization, ecosystems, and a resilient and sustainable economy as a means of coping with climate change. This organization strives to provide communities with the necessary knowledge to create and execute adaptive climate change measures, develop the capacity to access technology and funding, and include climate change adaptation into policies, strategies, and plans [42], [43]. Naturally, all of these adaption measures are taken to stop climate change that is worsening; therefore, society's actions must prioritize the wellbeing of all living species on the earth as a whole rather than just themselves or certain groups (Prayogo et al., 2021). In carrying out its mission, APAN is assisted by many donors such as COPIA, GROVE, GOOGLE, ALBIRDS, and many more.

VII. LIMITATIONS

This part focuses on the issue of whether NGOs' expanding impact on global environmental governance strengthens already powerful players or offers voice to those who have been silenced. The research by Nasiritousi et al. (2014) found that while mainstream voices predominate at climate change conferences, the diversity of actors ensures that some marginalized perspectives are heard that would otherwise risk being left out, possibly showing that these two scenarios are not mutually exclusive [44]. To fully comprehend how NGO participation in international environmental governance affects the legitimacy of developing governance institutions, further empirical research is needed. Concerning the effects of NGOs' expanding participation in international environmental governance on environmental results, there are still many significant questions that need to be resolved. One may argue that the additional ideas, information, and resources provided by NGOs result in improved environmental outcomes. But not all NGOs tend to operate in the same way since there is so much rivalry among them [44]–[46]. Global environmental governance may benefit from greater opinion variety, but the intense competition may also cause conflict between various NGO programs, decreasing overall effectiveness. More empirical research is thus needed to provide a solution to this

problem. Given how deeply ingrained NGOs are in the existing system of international environmental governance, it is difficult to assess their effectiveness. The role of NGOs in global environmental governance is expected to grow as the world faces more pressing environmental issues for which the international system is unprepared. Policymakers and scholars will thus continue to be interested in how NGOs engage with other actors in the international system as they take a more active role in global environmental regulation. Future research must concentrate on examining the effects of NGOs' expanding influence in this area and continue to map the power dynamics and conflict among the diverse NGOs community. The competitive and cooperative patterns that NGOs employ ultimately increase the complexity of the global system. Future research should focus on how greater NGO involvement will change the political environment over the long run. The world is confronted with a daunting challenge: turning the little promise of net zero into a realizable reality. To reach net-zero emissions by 2050, efforts must be made to disseminate the Net Zero idea to replace fossil fuels, as well as to lower overall energy consumption through increased energy efficiency and changes in consumer behavior. Massive energy supply for the stationary energy and transportation sectors may depend on the generation of carbon-neutral and energy-dense liquid fuels like hydrogen and ammonia, biofuels, synthetic hydrocarbons, and direct diesel fuel. To attain net-zero emissions, business and individual behavior must change to protect the environment. Policy direction changes are also needed at all levels, as well as technology advancements that are suited to global climate goals. In response to government regulations and international accords, different NGOs can fight three fundamental methods to attain net-zero emissions. These strategies are discussed in this article. The Community, the government, and corporate players may all benefit from a deeper knowledge of this, and the findings can be promoted more widely through education at international conferences.

- a. Reducing or eliminating CO₂ or other GHG emissions in one area to make up for emissions in another, more controllable industry. To do this, money might be invested in low-emission technology, renewable energy, or energy efficiency.
- b. The term "emission reduction" describes the process of limiting the quantity of CO₂ and other GHG emissions by modifying industrial, agricultural, and other operations to employ renewable energy sources and emission-reducing techniques. Energy sources based on non-fossil fuels have extremely low emissions.
- c. Carbon removal is the process of removing CO₂ from the atmosphere and storing it there for a long time to lessen the consequences of global warming. Both naturally occurring carbon sequestration and manmade carbon sequestration are possible. Through biological, chemical, and physical processes, CO₂ is naturally removed from the atmosphere and stored mostly in plants and greenery, soil as organic debris, inactive geological

formations, and oceans. This is the most life-supporting manner that nature has managed to maintain a balance of CO₂ in the atmosphere. Approximately 600 megatonnes of GHGs CO₂ equivalent, or 10% of 1990 emissions, may be caught and removed from the atmosphere annually through improved land-use practices.

VIII. CONCLUSION

NGOs have collaborated in real-world, educational, and practical contexts to achieve net-zero carbon emissions targets in addition to lobbying and campaigning. By establishing facilities for environmental improvement and information dissemination, particularly to the younger generation today, many government officials, community people, and leaders work together to avert environmental disasters. NGOs are utilizing campaigns and instruction in the educational setting to spread awareness of net zero carbon emissions and the damage they cause to the environment. Moreover, in real-world scenarios, NGOs are invited to assist government initiatives to address environmental disasters and live sustainably. So that the earth is not polluted by carbon emissions in the air, soil, and air, humans must work together to realize this net zero concept in the future to be even more perfect.

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