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Climate Changes and Sustainable Trade Practices in Dubai.

Zia Ul Islam: Research Scholar- Shri Vaishnava Institute of Management Indore, Devi Ahilya Vishwvidyalaya, Indore, M.P

Dr. George Thomas: Professor& Director Shri Vaishnava Institute of Management Indore, M.P

Abstract

Dubai is proactively tackling climate change through the implementation of governmental policies, sustainable trade practices, and renewable energy initiatives aimed at minimizing its carbon footprint and enhancing global sustainability efforts. This strategy encompasses the adoption of renewable energy sources, improvements in energy efficiency, and the execution of sustainable urban design and transportation policies. Currently, the international community is confronted with the pressing issue of climate change, which is acknowledged as a significant threat to one of the most vulnerable cities in the nation. The objective of this qualitative study is to examine the trends associated with climate change in the region and to forecast future developments. Information was gathered through literature reviews and interviews. The findings indicate that the region is facing numerous challenges linked to the impacts of climate change, including issues related to water resources, coastal areas, and food security. Furthermore, the study has explored these initiatives and potential strategies for addressing climate change. The transboundary nature of greenhouse gas (GHG) emissions complicates climate change management, highlighting the need for global cooperation and collective action to safeguard the environment.

Keywords: Climate change, GHG, Green Energy, Sustainability, Emission

Introduction

A significant challenge currently confronting the global community is climate change. This phenomenon is characterized by alterations in weather patterns caused by both natural Earth processes, such as volcanic eruptions, and anthropogenic activities, particularly industrial practices that emit greenhouse gases. The primary contributor to this issue is the emissions of greenhouse gases resulting from human endeavors. Key sources of these emissions include waste incineration, deforestation, the burning of fossil fuels, and other activities that release harmful gases and elevate greenhouse gas concentrations. The rise in these concentrations is a direct factor in climate change, leading to various adverse effects, such as natural disasters linked to rising sea levels and detrimental impacts on agriculture. A greater emphasis on renewable energy sources, as opposed to nonrenewable ones, could mitigate the adverse effects of climate change. Historical data indicates that global temperatures have increased by 1.4°F since 1880. The expanded utilization of renewable energy can diminish harmful emissions, thereby assisting in the stabilization of global temperatures within acceptable limits. Dubai, located in the United Arab Emirates (UAE), stands as a prominent city in the Middle East dedicated to addressing climate change. The Ministry of Climate Change and Environment is the specialized governmental body responsible for climate change and environmental issues in the city. As part of its initiatives, the UAE aims to transition from fossil fuels to renewable energy sources by 2021. The ministry implements a range of programs to mitigate and adapt to the impacts of climate change. This review aims to examine the climate change trends affecting the UAE's environment, evaluate the consequences of climate change in the region, predict long-term effects, and enhance public awareness while proposing effective strategies for climate change mitigation.

Climate change

Dubai is considered one of the cities in the nation most susceptible to the impacts of climate change. It is anticipated that climate change will significantly affect the country's infrastructure, environment, and public health. Analysts suggest that the interaction of climate change with various political, economic, and social factors intensifies social and economic vulnerabilities (Hamza et al. 2011). For example, in the Middle East and North Africa, the combination of population growth and climate change is likely to affect both the quantity and quality of water resources. The region faces the threat of extended droughts and fluctuating rainfall patterns as the hydrological cycle becomes increasingly dynamic,

heightening the risk of severe desertification and flooding. An article from Gulf News indicates that the UAE is vulnerable to the repercussions of climate change and rising carbon emissions. Predictions suggest that by 2050, temperatures may rise by 2% and humidity by 10%. Construction costs are expected to increase by approximately $834 million, and energy consumption is projected to rise by 11%. This surge in electricity demand will necessitate the equivalent of 18 solar power plants, and the new energy requirements will generate CO2 emissions comparable to a vehicle making 17,455 trips to the moon, leading to significant losses. The Emirates Wildlife and Wildlife Fund (EWSWWF) has cautioned that climate change threatens the commercial, economic, and social sectors. In addition to its commitment to the Paris Agreement, which aims to limit global temperature increases to below 2°C in the coming decades, the UAE has reiterated its dedication to the United Nations Framework Convention on Climate Change (UNFCCC) to decrease electricity generation from fossil fuels and transition to renewable energy sources by 2021, targeting a 27% share. The report also highlights that increased cooling demands in buildings could create an energy supply gap, jeopardizing energy security. The report highlights that increased cooling demands in buildings may create an energy supply shortfall, jeopardize energy security, elevate consumer costs, and exacerbate greenhouse gas emissions. For example, based on future CO2 projections, the air conditioning requirements for villa models in the UAE could lead to a rise in greenhouse gas emissions by 10% to 35% by the year 2050. Additionally, rising temperatures and humidity levels may diminish worker productivity, especially for outdoor laborers, heighten health risks, and potentially result in global economic losses of up to $2 trillion (approximately Dh 7.3 trillion) due to health-related impacts on workers. This situation may necessitate longer breaks or adjustments to work schedules, shifting them to cooler times of the day, such as evenings and early mornings. The UAE's coastline possesses considerable commercial significance, not only for tourism but also for the Abu Dhabi Global Environment Data Initiative, which values coastal and marine resources in Abu Dhabi at US $141 million. Moreover, food security concerns have emerged, particularly with forecasts indicating rising food prices due to climate-related events, as previously reported. The UAE is a vital region for food exports, and climate change may lead to increased costs and decreased efficiency, further aggravated by heat stress and flooding. Companies with a substantial outdoor workforce generally establish specific standards for their employees, which must be modified to address rising temperatures to mitigate potential safety risks. Furthermore, it has been asserted that climate change will adversely affect the national economy as a whole, significantly impact the economy of citizens, and expand the global market for goods and services. Additionally, climate change will induce considerable changes in market dynamics and economic conditions regarding expenses, thereby increasing risk levels, particularly in coastal areas, and leading to a decline in the nation's financial performance. The United Arab Emirates ratified the Kyoto Protocol to the UN Framework Convention on Climate Change (UNFCC) in 2005. By 2021, the UAE aims to generate 24% of its electricity from clean energy sources, moving away from its current reliance on oil-based electricity. This transition is expected to have a substantial positive effect on the environment and mitigate various challenges, particularly climate change. The Energy and Climate Change Report (2017) indicated that rising sea levels could result in the UAE losing approximately 6% of its coastline by the century's end. A one-meter increase in sea level could submerge 1155 square kilometers of coastal land, while a nine-meter rise could inundate the emirate of Abu Dhabi and much of Dubai. This underscores the serious threat climate change poses to all aspects of life (Energy and Climate Change 2017). Additionally, the UAE faces a critical food security issue, as 87% of its food supply is derived from agriculture, predominantly through imports. This dependency renders the nation susceptible to the impacts of climate change, which disrupts the stability and predictability of the global food market. Consequently, food prices are escalating, diminishing household income and increasing vulnerability, as a significant portion of their budget is allocated to food expenses. The adverse effects of climate change on agriculture are projected to lead to a considerable decline in agricultural output. A report published by the Emirates Wildlife Society and the World Wildlife Fund (EWS-WWF) in 2017 highlighted that the anticipated rise in global temperatures by 2050 would result in losses across various sectors in the city.

Effects of Climate Changes

Effects on the Water Resources:

Climate change significantly affects water resources, posing a challenge for the Dubai in managing these resources to achieve sustainable development in the long term. The increasing demand for water due to industrial and agricultural activities, coupled with population growth, complicates water resource management. Variations in water consumption rates across different emirates, influenced by factors such as size, economic development, and population density, highlight the urgent need for national-level management of water sources. This is essential for ensuring water

conservation, improving water quality, and restoring aquifer systems. Furthermore, climate change exacerbates the challenges of water resource management by altering rainfall patterns and global temperatures, with the UAE being particularly affected. The water-energy nexus framework emphasizes the interconnectedness of water and energy systems, underscoring the importance of integrated management in light of these challenges.

Effects of Climate Change on Sea Level:

The decision-making processes in the UAE will encounter new challenges due to rising sea levels. For instance, increased tides, waves, and storms will penetrate further inland than previously observed as a result of this rise. This elevation in sea levels heightens the risk of flooding, erosion, and deterioration of groundwater quality. Furthermore, the UAE and other GCC nations are likely to be more adversely affected than any other regions globally. On a broader scale, one significant consequence of climate change is the rise in sea levels, driven by various factors including thermal expansion due to rising water temperatures, the melting of glaciers and polar ice caps, and the loss of ice from Greenland and West Antarctica (National Geographic 2017). This increase in sea levels will have numerous effects, as previously noted, with more tides, waves, and storms reaching inland. Additionally, the likelihood of flooding, erosion, and degradation of groundwater quality will escalate. However, the UAE and GCC countries are particularly vulnerable to the risks associated with rising sea levels, primarily because the Arabian Peninsula has a dense population residing close to coastal areas, coupled with a significant reliance on economic activities and tourism projects located in these coastal zones.

Effects of Climate Change on Food Security:

The global food crisis, exacerbated by increasing food prices, climate change, and insufficient water resources, is associated with diminished crop yields and increased food insecurity worldwide. A considerable share of the UAE's food imports, especially essential commodities like rice and wheat from Brazil, India, or South Africa, is susceptible to the effects of climate change. In contrast, imports of beef, mutton, and maize from Canada, Egypt, New Zealand, and Spain are regarded as highly secure. It is important to note that around 90% of food suppliers in the UAE are international, highlighting the limited local agricultural output due to the desert climate. Moreover, the UAE acts as a crucial re-export center for food, particularly to GCC nations. A significant issue concerning food supply is the escalating cost of food products. For example, cereals such as rice, wheat, maize, and oats, sourced from India, Australia, Canada, and Thailand, may face substantial price volatility. Additionally, the UAE's population is expanding at an annual rate of roughly 10.3%. According to global standards, the UAE is recognized as a food secure nation (Dougherty 2016).

Concept of Sustainability

A new wave of commercial innovation is sweeping the dynamic city of Dubai: sustainability. Dubai is becoming a leader in environmentally friendly business practices aimed at protecting our planet thanks to its contemporary skyline and rapid economic development. It is critical for businesses looking to enter the Dubai market or those that are already there to understand how to incorporate sustainability into their business development plans. Due to Dubai's dry environment and scarcity of natural resources, sustainability is a major issue. The demand for solutions to problems with energy, water, and waste management is fueled by the city's quick population expansion. Dubai prioritizes sustainability to support economic growth, maintain ecosystem balance, and protect natural resources. For firms, embracing eco-friendly methods is not only necessary for regulatory compliance but also for attracting an expanding customer base of environmentally conscious consumers. Green practices improve a brand's image, customer loyalty, competitiveness, and growth. The Dubai administration is completely dedicated to sustainability, providing laws and programs that incentivize firms to implement environmentally friendly programs. Business professionals are guided by R&D assistance and financial rewards in sustainable technology, which creates new prospects. Dubai is being scrutinized more and more for its dedication to sustainability as a global business hub. The city's image as a responsible tourist destination is improved by eco-friendly methods. Greater acknowledgment and respect in emerging markets worldwide can be gained by firms that are at the forefront of sustainability initiatives. Dubai's diverse ecosystems demand specific sustainability measures. Businesses play a vital role in safeguarding these ecosystems by lowering carbon footprints, conserving water, and taking part in programs that restore habitats. Businesses help protect ecosystem services for future generations by following sustainability practices. Because of the strict environmental laws in place in Dubai, it is now necessary for companies to adhere to sustainability norms. Businesses must keep up with these rules and incorporate compliance into their business development procedures in order to reduce risks and help Dubai achieve its sustainability targets. By putting sustainable

practices into place, firms can increase resource efficiency, lower energy consumption, and waste disposal expenses. By reducing their environmental impact, businesses may realize significant cost savings. Sustainability is vital for current businesses trying to expand since efficient resource utilization helps both the environment and commercial operations. Dubai consumers are becoming more environmentally aware, demanding sustainable goods and services. By appealing to a target demographic that values sustainability, firms that implement sustainable practices are more likely to attract and retain qualified leads, which leads to success.

Sustainability Initiatives

Dubai sets a global benchmark through its comprehensive approach to sustainability, creating exciting opportunities for businesses looking to grow in this vibrant market. By aligning with current market trends and prioritizing sustainable practices, companies can effectively tackle the challenges of the modern economy while contributing positively to society and the environment. With a deep understanding of the market and the essential resources to implement a successful business development strategy, organizations can identify and convert potential leads, achieving their business goals in this promising new landscape. The focus on sustainability not only meets customer expectations but also positions companies for long-term success, fostering social equity and economic activities that benefit all.

1.COP23 and COP28 in Dubai: The biggest event of its kind was the UN Climate Change Conference, known as COP28, which took place in Dubai, United Arab Emirates. Over 150 heads of state and government were among the roughly 85,000 attendees, along with representatives from national delegations, civil society, businesses, Indigenous Peoples, youth, philanthropy, and international bodies. The event ran from November 30 to December 13, 2023.

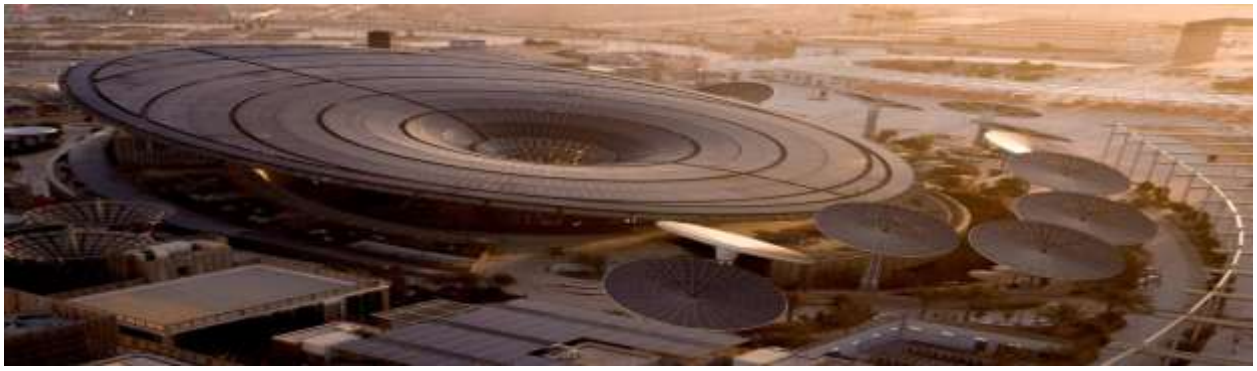
The COP28 conference was particularly significant since it marked the conclusion of the first "global stock take" under the Paris Agreement, which assessed the world's climate change initiatives. According to the results, there has been insufficient advancement in many areas of climate policy, including reducing greenhouse gas emissions, enhancing climate resilience, and providing financial and technical support to vulnerable countries. In response, nations agreed on strategies to accelerate action across all sectors by 2030, pressing governments to accelerate their transition from fossil fuels to renewable energy sources, such as wind and solar, in their upcoming climate commitments.

COP28 Agreement Signals “Beginning of the End” of the Fossil Fuel Era

II. Mohammed bin Rashid Al Maktoum Solar Park:

The Mohammed bin Rashid Al Maktoum Solar Park, which operates under the Independent Power Producer (IPP) model, represents the largest solar installation on a single site worldwide. This ambitious project is projected to require an investment of AED 50 billion and aims to achieve a production capacity of 5,000 MW by the year 2030. Upon completion, it is expected to contribute to an annual reduction of over 6.5 million tons of carbon emissions. The achievements of the Solar Park played a significant role in DEWA being awarded the Best Sustainable Project of the Year at the 2014 MEED Quality Awards, marking the first time a renewable energy initiative in the Middle East and North Africa received such an esteemed recognition. Utilizing innovative and transformative technologies in the generation, transmission, and distribution of electricity and water, DEWA is leading the charge towards the future of energy. This initiative is in line with the Dubai Clean Energy Strategy 2050 and the Dubai Net Zero Emissions Strategy 2050, with the objective of generating 100% of its energy from clean sources by 2050. The ongoing development of the Mohammed bin Rashid Al Maktoum Solar Park is crucial to realizing this vision, with the ultimate aim of producing 5,000 MW through photovoltaic and Concentrated Solar Power (CSP) technologies.

III. Expo 2020 Sustainability Pavilion the Sustainability Pavilion, Terra, which showcased cutting-edge ideas for a sustainable future, was the focus of Expo 2020 Dubai. Businesses and people were encouraged to embrace environmentally friendly practices by this pavilion.



IV. Green Building Regulations: Sustainable construction practices are required by Dubai's Green Building Regulations. By guaranteeing the energy efficiency and environmental friendliness of new structures, these regulations contribute to lowering the total carbon footprint.

V. Green Economy for Sustainable Development:

The goal of the UAE's Green Economy for Sustainable Development program is to position the nation as a role model and center for the green economy worldwide. The UAE aims to be a global leader by establishing itself as a hub for the export and re-export of environmentally friendly goods and technologies, all while preserving a sustainable environment that fosters long-term economic development. The UAE seeks to diversify its income beyond oil as part of Vision 2021. The Green Economy initiative, a green economy for sustainable development, was introduced by Sheikh Mohammed in January 2012. The goal of the project is to transform the United Arab Emirates into a center for the green economy worldwide by increasing its competitiveness and sustainability while also protecting the environment for future generations. The initiative encompasses programs and policies in several industries:

a. Encourage the usage of renewable energy.

b. Promote investments in the green economy and make it easier to trade green goods.

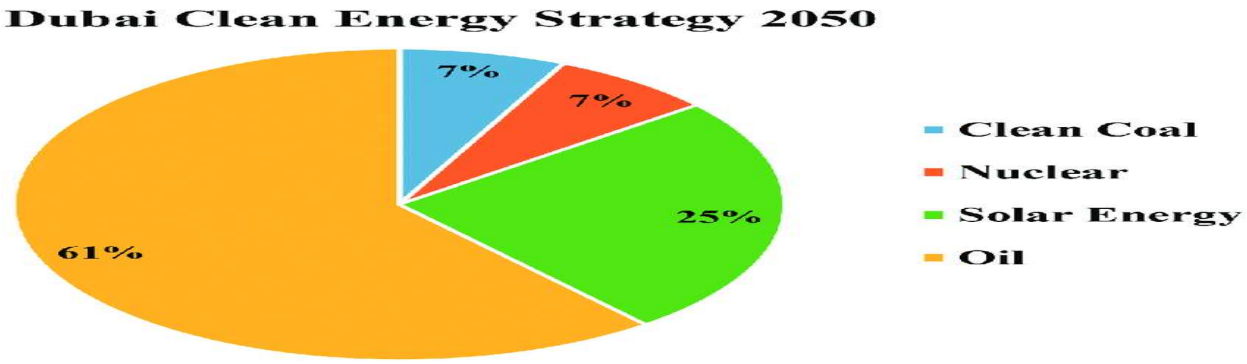
c. Create urban planning laws that improve the environmental efficiency of homes and buildings.

d. Protect biodiversity, encourage organic farming, and address the effects of climate change.

e. Utilize water, electricity, and natural resources rationally, and recycle trash.

f. Create and market environmentally friendly technology.

VI. UAE Clean Energy Strategy 2050: Initiated in 2015, this strategy seeks to establish Dubai as a worldwide center for clean energy and to achieve the lowest carbon footprint globally by the year 2050. The initiative outlines a goal of sourcing 75% of Dubai's energy requirements from clean energy sources by the middle of the century.



Other Initiatives

✓ In 2019, the United Arab Emirates (UAE) became a member of the Climate & Clean Air Coalition (CCAC), demonstrating its dedication to mitigating air pollution and the emissions of short-lived climate pollutants (SLCP). The UAE is situated in a region highly susceptible to the adverse effects of climate change, including increased temperatures, reduced rainfall, droughts, rising sea levels, and more frequent dust and sandstorms. Consequently, the benefits of reducing SLCP emissions will be increasingly vital for the nation in the coming years. Her Excellency Mariam bint Mohammed Almheiri, the Minister of Climate Change and Environment, remarked, 'The UAE is a staunch advocate for international efforts to address climate change. As a proud participant in the Climate & Clean Air Coalition, we recognize the urgent necessity for multilateral cooperation in this domain and reaffirm our commitment to decreasing SLCP emissions across all sectors through the implementation of domestic policies and the development of innovative approaches. Reducing the atmospheric levels and effects of these pollutants will contribute to decelerating the progression of climate change.

✓ In December 2020, the UAE unveiled its second Nationally Determined Contribution (NDC), which set forth a more ambitious greenhouse gas (GHG) reduction goal of 23.5% by 2030 relative to the business-as-usual scenario for that year. The revised commitments focus on emissions from key sectors, including energy, manufacturing, product usage, waste management, agriculture, land use, and forestry.

✓ In 2020, the Abu Dhabi National Oil Company (ADNOC) set an objective to decrease its emission intensity by 25% by the year 2030, supported by its zero-flaring policy and initiatives such as resource efficiency, carbon capture, utilization, and storage (CCUS), along with the use of advanced optical imaging technology for leak detection across the value chain.

✓ The introduction of UAE Vision 2021 initiated the collection of data and monitoring of air quality, which were subsequently enhanced to support the objectives outlined in the UAE's National Air Quality Agenda 2031 (NAQA). This agenda serves as a framework addressing noise pollution, ambient odors, and both indoor and

outdoor air quality. Additionally, the first UAE National Air Emissions Inventory, completed in 2019, provided valuable insights into the sources of various significant outdoor air pollutants within the UAE.

- ✓ In September 2022, the UAE updated its second Nationally Determined Contribution (NDC), raising the emission reduction target to 31%, with substantial contributions anticipated from sectors such as electricity generation, industry, transportation, carbon capture, utilization, storage (CCUS), and waste management.
- ✓ As a Group 2 Article 5 party to the Kigali Amendment, the UAE is projected to cease the use and production of hydrofluorocarbons by 2028 and to achieve an 85% reduction in baseline consumption and production by 2047.
- ✓ Furthermore, the UAE and the United States jointly launched the Agriculture Innovation Mission for Climate (AIM for Climate) initiative during the 26th United Nations Climate Change Conference (COP26) in 2021, aimed at promoting innovation in climate-resilient agriculture and food systems to address the interconnection between global hunger and the climate crisis.

Conclusion and Recommendations:

In summary, climate change encompasses a variety of causes, impacts, and adaptive strategies. Since Greenhouse Gas (GHG) emissions transcend national boundaries, addressing climate change requires international collaboration and action to protect the planet. However, this does not imply that local efforts are ineffective; instead, they should initiate change within specific communities and gradually expand to a global level. It is essential for governments to integrate any adaptation strategies into community actions. Additionally, comprehending the primary drivers of climate change is vital for effectively mitigating its impacts. With the key contributors to climate change identified, it is imperative to take action to reduce its effects. The combustion of fossil fuels, waste incineration, deforestation, industrial production, and transportation emissions all contribute to greenhouse gas emissions. Focusing on each factor individually will lead to an immediate change in the projected future outcomes. Currently, countries like the UAE are emphasizing renewable energy sources for transportation, such as solar-powered vehicles, in place of fossil fuels, which will help decrease fossil fuel consumption and lower transportation emissions. Conversely, afforestation is a strategy to combat climate change; however, unfortunately, trees continue to be cut down through unsustainable practices. Ongoing deforestation will lead to an increase in carbon dioxide levels, a significant greenhouse gas. As demonstrated, the level of awareness is critical for implementing the proposed solutions to mitigate the effects of climate change. Despite the UAE's extensive efforts, a significant portion of its population remains uninformed about the country's initiatives. The UAE has introduced various programs, including the role of carbon ambassadors in several initiatives. The objective of the carbon ambassador program is to educate students about carbon emissions so they can take proactive measures to reduce them.

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