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A surveillance study for climate change as an environmental education model in GCC countries

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Abstract

The study aims to investigate a surveillance study for climate change as an environmental education model in GCC countries (The Cooperation Council for the Arab States of the Gulf) via comparative qualitative research methods. As a result, the GCC countries should embrace research and consultations as core tools in improving and reversing the effects of climate change in the region. In conclusion, the GCC countries have to make the following changes to their operations for safeguarding the environment. These nations should prevent the indiscriminate release of polluted fluids by oil tankers; and pollution from aluminum, petrochemical and construction industries.

Keywords: Climate change, Cooperation council, Gulf.

Un estudio de vigilancia para el cambio climático como modelo de educación ambiental en los países del CCG

Resumen

El objetivo del estudio es investigar un estudio de vigilancia del cambio climático como modelo de educación ambiental en los países del CCG (Consejo de Cooperación de los Estados Árabes del Golfo) a través de métodos comparativos de investigación cualitativa. Como

resultado, los países del CCG deberían adoptar la investigación y las consultas como herramientas centrales para mejorar y revertir los efectos del cambio climático en la región. En conclusión, los países del CCG tienen que hacer los siguientes cambios en sus operaciones para salvaguardar el medio ambiente. Estas naciones deben evitar la liberación indiscriminada de fluidos contaminados por los petroleros; y la contaminación de las industrias de aluminio, petroquímica y construcción.

Palabras clave: Cambio climático, Consejo de cooperación, Golfo.

1. INTRODUCTION

Recent years have been characterized by sustainable deterioration of the world climatic conditions, resulting in higher day temperatures, colder night temperatures, higher rainfall in wet areas, and lower rainfall in dry areas. These changes have caused unfavorable climatic conditions to get worse and favorable climatic conditions to become bad, which has had adverse effects on social, economic and cultural practices affecting communities all over the world. These changes have been attributed, in part, to natural changes occurring on the earth's tectonic plates and human activities. The condition in the GCC is more than twice as worse as the world average despite the fact that the GCC contributes to climate change in lower degrees compared to the western world. The aim of this report is to examine the causes and effects of climatic change in the GCC, the hindrances to sustainable environmental management and some mitigation measures taken by governments in the GCC. The report will then recommend

changes that these governments could implement to ensure the success of the mitigation measures.

2. BACKGROUND INFORMATION

The GCC energy sector, as is the case in most regions globally, is the principal anthropogenic contributing factor to the deteriorating climatic conditions. This mainly arises from overdependence on fossil fuels which combustion results in the release of greenhouse gases, mainly carbon dioxide, which causes a sustainable rise in global temperatures, averaged at 2-3 percent in the GCC. However, unlike other regions in the world, the GCC has the potential of using other sustainable fuels, especially if the governments make a commitment and implement the policies and strategies in existent. For instance, the year-round high temperatures found in the region make the GCC a perfect candidate for the expansive use of solar energy for domestic and industrial use. In addition, the area is characterized by high-velocity air currents, which could be exploited to provide a sustainable source of non-polluting energy (AHMAD & SAHAR, 2019). This has not been the case due to many underlying factors, including the fact that oil is easily available underground, and most technologies have been built to use oil as the only fuel (KENAWY, 2010).

The climatic change in the GCC affects different people in varying degrees, such that the people that feel the effect of the change

mostly have little or no role to play in the emission of greenhouse gases. For instance, poor people in the GCC are mostly dependent on agriculture as the only economic activity; when the climate changes and the productivity is reduced, these people lose their only source of living, as opposed to the oil merchants whose oil business is not affected as severely. In addition, poor people have little or no means of adapting to unfavorable climatic conditions, and they feel the full effect of higher temperatures, and other harsh climatic conditions (ELASHA, 2010).

Many GCC countries have adopted adaptive and corrective and mitigation measures to curb the adverse effects of climate change; though these changes have been uncoordinated due to various underlying factors. First, the GCC does not have dependable and detailed information on the current climatic conditions and future projections of likely changes, data that is pertinent in policy and strategy formulation. Secondly, in the GCC it is not clear on the roles that individuals, agencies, governments, and nations have to play in climate change mitigation. Thirdly, most of the countries in the GCC have few or no channels that the public can use to participate in decision-making on matters that concern the environment. Fourthly, stakeholders in the GCC have little or no coordination and cooperation among them in their efforts at mitigation of the effects of climate change. Finally, there are conflicts of interest in the exploitation of natural resources. Stakeholders in the GCC have to overcome these

challenges for their efforts towards environmental conservation to bear any fruits (ELASHA, 2010; NICHOLLS, 2004).

The Gulf Cooperation Council (GCC) nations have been burning increasing quantities of hydrocarbon-based fuels. In addition to being major producers of oil and gas, these nations depict high rates of urbanization and industrialization. Consequently, these countries have emerged as major consumers of energy. The GCC countries, being the major energy consumers cause greenhouse emissions, resulting in climate change. The concept of carbon footprint owes its origin to the debate on climate change. It has acquired the status of a device to quantify and estimate greenhouse gas emissions pertaining to human activities. In addition, it cautions nations to implement integrated climate and energy policies. The carbon footprint measures the emission of gases that result in the heating of the earth. This is in terms of CO₂ equivalents per unit of time or product (ALHORR & ELSARRAG, 2015).

A major hazard posed to the environment by the GCC nations is the indiscriminate release of polluted ballast water from massive oil tankers. This is a palpable threat to the marine life of that region, and the situation is exacerbated by the fact that the circulation rate is sluggish and the cyclic outflow of dense water from the Gulf takes two years. In addition, the extensive offshore exploration and drilling activities pose a major threat to marine life and the integrity of the coastal shelf. Another cause for concern is the presence of aluminum

production units, petrochemicals industries, and electric power generation plants, which are major pollutants of the atmosphere (JASSIM & COSKUNER, 2007).

The policy agendas of the Gulf Cooperation Council (GCC), namely, Oman, United Arab Emirates (UAE), Saudi Arabia, Bahrain, Qatar, and Kuwait, commenced placing emphasis upon domestic energy, food and water security in the late 2000s. This was the consequence of several years of strong economic, population and energy demand growth, low pricing of domestic utilities, global upheavals in food prices. These novel internal pressures, in the context of utilizing natural resources in a manner that would promote the prosperity of the environment and humans, compelled these states to increase their focus upon the environmental and economic imperatives for enhancing natural sustainability (AHMAD & AHMAD, 2019).

The GCC nations have an abundance of renewable energy resources. All the same, their economy is powered by fossil fuels. These nations contain 23.5% of the natural gas and 40% of the oil reserves of the world. The gross domestic product and per capita energy consumption of these countries is much higher than that of the other developing nations. The energy requirements of these nations are met by fossil fuels, and this explains their higher per capita greenhouse gas emissions. For instance, whilst these nations are host to just 0.61% of the population of the world, they contribute 2.4% of the global greenhouse emissions (REICHE, 2010). In addition, the GCC nations

are among the top 25 nations of the world with regard to carbon dioxide (CO₂) emissions per capita. Moreover, the natural gas and oil fields of Oman are scattered to a much wider extent and could be depleted in 40 to 20 years, respectively.

Across the world, buildings in the developed nations consume 30% to 40% of energy for cooling, heating, and other purposes. All the same, a third of the energy relating to greenhouse gas emissions pertains to the building sector. Enormous quantities of water, energy, and other natural resources are consumed by the building and construction sectors. As a result, these sectors generate greenhouse gas emissions, air pollution, and waste.

For instance, Qatar has undertaken rapid expansion in construction activities, including the Qatar Integrated Railway Project, the development of new cities and the construction of multi-storeyed buildings. Between the years 2004 and 2010, Qatar had experienced a 50% increase in the number of buildings located in it. Moreover, natural gas is almost exclusively employed for the generation of electricity and energy in these buildings. Consequently, the use of energy in buildings proves to be a major source of greenhouse gas emission in Qatar.

Nevertheless, the GCC nations function via several international and regional bodies, with respect to environmental issues. These bodies coordinate activities and determine the system for undertaking

regional initiatives. Significantly, at the state level, environmental agencies, councils, and ministries are envisaging an onerous task in addressing the principal environmental challenges, threats, and problems of the GCC nations and the region. In addition, the environmental authorities of the GCC countries are devoid of the experience and institutional capacity to deal with these issues. As a consequence, it has become commonplace for the majority of these nations to initially join international agreements and then search for solutions to fulfill their commitments. All the same, there have been certain local developments, which have been enumerated in the sequel.

First, recognizing the significance of the influence of climate change, Oman altered the name of its Ministry of Environment and Regional Municipalities to the Ministry of Environment and Climate Change. Second, on account of the absence of reliable data regarding environmental issues, the Environmental Authority in Abu Dhabi collaborated with the WWF-UAE and Global Footprint network to collect and prepare the ecological footprint for UAE. Thus, the 18 October 2007 initiative, namely the Al Basama Al Beeiya has been undertaken and constitutes its endeavor to reduce its ecological footprint and to achieve a sustainable future (NICHOLSON, 2005).

Furthermore, the GCC nations experience severe water shortage on account of the scanty rainfall and dearth of natural drinking water reservoirs (AL-ZUBARI, 2003). There has been a rapid expansion in the growth of the local population and a huge influx of foreigners has

occurred. This has been caused by the rapid economic growth of this region, and it has increased demand for water manifold. The excessive exploitation of groundwater resources has ensured its irreversible deterioration in quality and quantity (ATTAHER, MEDANY, ABDEL-AZIZ & EL-GINDY, 2006). The concept of wastewater recycling has not been utilized in these nations.

The internalization of external costs is central to climate protection policies. For instance, Germany, in order to fulfill its Kyoto protocol obligations, introduced an ecological reform tax. This enhanced taxes on electricity and fuels, and served to diminish greenhouse gas emissions. As such, in the GCC states, there are several structural impediments to climate protection policies. These include the absence of civil society and the policy of minimal taxation. Climate protection can be achieved by diminishing the human interventions with the climate change rate. However, this demands worldwide attention.

Climatic changes in the GCC have had effects on water resources, sea level, and coastal areas, human health and development, food production, biodiversity, land use and urban planning, tourism, and national security and conflict control among other aspects of daily life. All countries in the GCC suffer from acute water scarcity, with less than 1000 cubic meters per capita all year round; with the whole region having less than 1 percent of the world's freshwater resources despite occupying 10 percent of the planet. Climate change results in

higher temperatures, which are likely to put a strain on the already desolate situation, compromising both the quality and quantity of the available water resources. Rivers experience flooding and water shortage due to high rainfalls over a short period and extensive and intense dry spells respectively (TOLBA & SAAB, 2009; ARNELL, 2004).

The countries have adopted farming practices that reduce water consumption and conserve the limited water resources and exploit the little available water by changing crop patterns. In addition, GCC countries have developed drought resistance crops to improve food security in the region (TOLBA & SAAB, 2009).

Global warming results increase in glacial melting, which causes sea levels to rise beyond the safe tide levels; a situation that is made worse by the erosion caused by water as it flows to the sea. The coastlines of many countries in the GCC are close to, lower than or on the sea level; and a slight change in sea levels usually has devastating effects on the coastlines. Qatar, the United Arab Emirates, Kuwait have up to 5 percent of their landmass at less than 1 meter above the sea level, which makes them vulnerable, especially since these areas are centers for economic activities. For instance, if the sea level was to rise by 1, 3 and 5 meters, the other countries would be affected by the destruction of beaches and infrastructure, resulting in loss of economically productive areas (TOLBA & SAAB, 2009).

There has been an increase in pulmonary infections and allergic reactions in Saudi Arabia and the United Arab Emirates, all attributed to climatic change. In addition, scientists have found a link between high temperatures and mortality; heat waves are nowadays stronger and last longer resulting in higher mortality rates. Finally, there has been an increase in the incidence of infectious diseases, all attributed to the weakening of immunity resulting from climate change (PAERL & HUISMAN, 2009). Countries have responded by adapting their health systems to deal with the increased disease incidence due to climate change (TOLBA & SAAB, 2009).

Most of the farming in the GCC is rain-fed, which makes the region's food security vulnerable to climatic changes. With reducing lengths of the period that rain falls in the GCC, agriculture has been characterized by low quality and quantity production. In addition, most of the land in the GCC is not arable for agricultural use due to water unavailability, widespread grazing, high population growth, and little or no knowledge of technological food production systems (TOLBA & SAAB, 2009). Countries have responded to climatic change effects on food production by the adoption of irrigation and other sustainable practices on the use of water, and the development of crop varieties that are resistant to drought.

In addition to the adaptive measures discussed above, many GCC countries have adopted various mitigation measures that could reverse the climate change situation if the countries are consistent and

effective enough. These measures aim to improve the sustainability of environment management, mainly by increasing the quantity and quality of renewable energy sources used in the region. Though disjointed, isolated and disorganized, these measures have managed to reduce the levels of anthropogenic greenhouse gas emissions, and enhanced carbon dioxide sinks in the region.

The industrial sector is the second-largest energy consumer in the GCC countries, and the sector is in the process of implementing changes that result in the reduction of the volume of carbon dioxide emissions. The industrial sector is adopting the use of machinery with high combustion efficiency to reduce the number of wasteful emissions. In addition, the sector is adopting waste heat recovery measures where heat from industrial components is used for other purposes instead of being released into the atmosphere. Finally, the industrial sector is adopting the use of machinery with high power factor, and energy-efficient lighting to prevent wastage of energy (TOLBA & SAAB, 2009).

The building sector accounts for more than 36 percent of the carbon dioxide emissions in the GCC. Countries have adjusted their building codes to adhere to high efficiency and reduced energy consumption; including changes in heating and insulation of buildings. In response to climatic, economic, and certification factors, GCC countries have adopted green building concepts and strategies to

minimize energy consumption, carbon dioxide emission and maximize efficiency (TOLBA & SAAB, 2009).

The United Arab Emirates has an extensive program that has seen the forestation of vast tracts of land in the country, which is sure to change the climatic conditions due to the role that trees play as heat sinks. Abu-Dhabi is doing what seems like an environmental experiment, by having Masdar as a zero-carbon city, which if sustainable will have a tremendous effect on environmental conservation worldwide.

3. CONCLUSION

The GCC countries have to make the following changes to their operations for safeguarding the environment. These nations should prevent the indiscriminate release of polluted fluids by oil tankers; and pollution from aluminum, petrochemical and construction industries. Moreover, efforts should be made to improve the skill of their authorities to prevent damage to the environment. Furthermore, these nations should comply with the provisions of the various international environmental treaties. As such, increasing penalties for non-compliance with such treaty obligations will have a substantial controlling effect on this problem.

Climate change is a problem of global concern, especially considering the adverse effects of climate change on economies all over the world. Despite its destructive ability, climate change is relatively easy to control and reverse if individuals, communities and countries work together as a team. The GCC is at a disadvantage compared to other regions since its climate was bad enough even before the advent of climate change, and other underlying factors hinder the ability of the region to achieve considerable progress in its attempts on adaptive and mitigation measures. Countries have adopted various mitigation measures including increased efficiency in energy consumption and switching from the use of oil as the primary fuel among other attempts to reduce the volume of greenhouse gas emissions. However, countries have approached these measures as separate entities, undermining the importance of global cooperation for the world to reduce the ill effects and reverse the climate change situation.

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