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Transliteration Table: Consonants

Arabic	Roman		Arabic	Roman
ب	b		ط	ṭ
ت	t		ظ	ẓ
ث	th		ع	‘
ج	j		غ	gh
ح	ḥ		ف	f
خ	kh		ق	q
د	d		ك	k
ذ	dh		ل	l
ر	r		م	m
ز	z		ن	n
س	s		ه	h
ش	sh		و	w
ص	ṣ		ء	’
ض	ḍ		ي	y

Transliteration Table: Vowels and Diphthongs

Arabic	Roman		Arabic	Roman
اَ	a		اَ، اِيَّ	an
اُ	u		اُو	un
اِ	i		اِي	in
اَ، اِ، اِيَّ	ā		اَو	aw
اُو	ū		اَي	ay
اِي	ī		اُو	uww, ū (in final position)
			اَي	iyy, ī (in final position)

Source: ROTAS Transliteration Kit: <http://rotas.iium.edu.my>

Causes of Climate Change: A Neglected Dimension

Umar Adam Musa*
Zainal Abidin bin Sanusi**
Hassan bin Suleiman***

Abstract: Climate change is one of the most disturbing challenges faced by humankind due to the profound threat it poses to human life and livelihood, affecting almost every aspect of life negatively. A comprehensive grasp of the causes of climate change is imperative for effective mitigation strategies. However, the most prevalent causes of climate change are advanced within the Western scientific perspective. This article aims to provide a cross-cultural comparison between the Islāmic and Western scientific perspectives on the causes of climate change. Based on the review of scientific literature and other relevant documents, the article argues that both the Islāmic and the secular perspectives on the impacts of climate change are in accord. However, the causes of climate change extend beyond the material scientific explanation. The mischief and sins of human beings on earth are fundamental causes that should not be ignored. The article concludes that mitigation efforts will remain one-sided unless these two dimensions of human activities are perceived as the causes of climate change.

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Keywords: Climate Change, Cross-cultural Comparison, Islāmic Perspectives, Mitigation Strategies, Western Perspectives.

Abstrak: Perubahan iklim adalah salah satu cabaran yang paling membimbangkan yang perlu dihadapi oleh manusia. Ini kerana perubahan iklim dapat memberikan ancaman serius kepada kehidupan dan mata pencarian manusia, bahkan ia hampir menjejaskan semua aspek kehidupan secara negatif. Pemahaman menyeluruh tentang punca perubahan iklim adalah penting untuk strategi mitigasi yang berkesan. Walau bagaimanapun, punca perubahan iklim yang paling popular adalah kemajuan mengikut perspektif saintifik Barat. Artikel ini bertujuan untuk menyediakan perbandingan silang budaya antara perspektif sains Islam dan Barat tentang punca perubahan iklim. Hujah menunjukkan bahawa walaupun kedua-dua perspektif Islam dan sekular terhadap kesan daripada perubahan iklim adalah selaras namun punca perubahan iklim adalah melampaui penerangan saintifik yang material. Kerosakan dan dosa manusia di muka bumi juga menjadi asbab utama yang tidak boleh diabaikan. Artikel ini menyimpulkan bahawa usaha mitigasi akan kekal berat sebelah melainkan kedua-dua dimensi aktiviti manusia ini diambil kira sebagai punca kepada perubahan iklim.

Kata Kunci: Perubahan Iklim, Perbandingan Rentas Budaya, Perspektif Islam, Strategi Mitigasi, Perspektif Barat.

Introduction

According to an extensive empirical study, the Intergovernmental Panel on Climate Change surmised that global warming emanating from climate change (CC) is one of the most disturbing challenges faced by humanity ever. This is because of the profound threat CC poses to human life and livelihood, negatively affecting almost every aspect of life (Malhi et al., 2021).

The implications of CC and its harmful effects on the ecosystem have garnered significant attention in recent decades (Zhao & Li, 2015). Its impacts on human lives, plants, and animals make it a global emergency (Gabric, 2023). Researchers, policymakers, and practitioners are focused on understanding the causes and impacts of CC, and are developing adaptation and mitigation strategies (Abbass et al., 2022). Scientifically, human activities, such as fossil fuel burning and deforestation, foster greenhouse gases (GHGs) in the atmosphere, contributing to global warming. However, another often neglected

dimension is the religious and spiritual aspects of human activities as contributors to CC.

This article argues that both the Islāmic and the secular perspectives are in consonance regarding the impacts of CC. However, the causes of CC extend beyond the material scientific explanation. The mischief and sins of human beings on earth are fundamental causes that should not be ignored. Against this background, this article aims to provide a cross-cultural comparison between the Islāmic and Western scientific perspectives on CC causes. Consequently, an effort is made to respond to the question: What are the points of convergence and divergence between the Islāmic and the Western scientific perspectives on the reasons for changes in the climate?

An Overview of Climate Change

Climate change, sometimes referred to as global warming or the greenhouse effect, has been defined differently by scholars (Benson, 2008). However, all the definitions agreed to express CC as an adverse change in the weather. For instance, Krueger et al. (2015) defined CC as increased standard temperatures and variability in temperature and precipitation levels. Similarly, Brooks et al. (2014) defined CC as extreme temperatures beyond average that result in unexpected weather changes.

In addition, other definitions airmarked the time that the changes could be characterised as CC. It is further defined by the Intergovernmental Panel on Climate Change (IPCC) as “a change in the state of the climate that can be identified ... by changes in the mean or the variability of its properties, and that persists for an extended period, typically decades or longer” (IPCC, 2018, p. 544).

Some definitions emphasise the cause(s) of these changes (see Table 1.1). For example, the United Nations Framework Convention on Climate Change (UNFCCC) defined CC as the change that can be ascribed “directly or indirectly to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods” (United Nations Framework Convention on Climate Change, 1992). The UNFCCC tries to differentiate between CC due to human actions and one caused by natural antecedents. The latter was climate variability,

while the former was climate change (Benson, 2008). Nevertheless, this difference is disputable. Many scientists refer to climate variability as yearly changes in climate, whether it is caused by natural or human activities (Koubi, 2017).

Despite CC's several definitions, the scientific world appears to have come to an agreement that the term refers to a rise in temperature variability that causes an increase in extreme weather events, including droughts, heat waves, floods, cold snaps, etc., within a particular period (Brooks et al., 2014; Weems & Subramaniam, 2017). Thus, Benson (2008) offers a better definition of CC as "any systematic alteration or statistically significant variation in either the average state of the climate elements such as precipitation, temperature, winds, or pressure; or in its variability, sustained over a finite time period (decades or longer)" (p. 210).

Perhaps a comprehensive definition that elaborates on CC causes is offered by (Chakraborty et al., 2014). They define it as:

Drastic or secular changes in the heat balance of the earth-atmosphere system, moisture, cloudiness and precipitation caused by external factors such as variations in orbital characteristics of the earth, solar variability (fluctuations in radiation from the photosphere of the sun), tectonic processes (mainly plate tectonics, displacement of continents and ocean basins), vulcanicity, changes in atmospheric composition in terms of concentration of atmospheric aerosols and carbon dioxide contents etc. or by internal factors such as exchanges of energy between the atmosphere, hydrosphere, lithosphere and cryosphere (ice-covered surfaces of both lithosphere and hydrosphere) or by both, at local, regional and global levels.

However, the only drawback of this definition is that it underplayed the time dimension of CC. These definitions have four essential elements: causes/factors, period, spatial scope, and the changes.

Nevertheless, as we proposed, a cross-cultural approach to CC is strongly advocated. In this regard, we attempted a much more comprehensive definition of CC as any statistically significant decadal changes in the earth's atmospheric heat balance, moisture, cloudiness, and precipitation caused naturally by God through disparities in the orbital features of the earth, tectonic process, solar variability,

vulcanicity, and by other variables, such as energy exchanges between the hydrosphere, cryosphere, lithosphere, and atmosphere brought on by human activity (environmental and spiritual) at any location.

Table 1.1 Summary of Perspectives on the Definitions of Climate Change

Author	Definition	Comment
(UNFCCC, 1992)	Any change in climate ascribed “directly or indirectly to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods.”	Emphasis is on the causes/factors of CC.
Intergovernmental Panel on Climate Change (IPCC)	CC is “a change in the state of the climate that can be identified ... by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer.”	The time dimension of the changes is defined. But the cause(s) is not.
Benson (2008).	“CC is commonly used to describe any systematic alteration or statistically significant variation in either the average state of the climate elements such as precipitation, temperature, winds, or pressure; or in its variability, sustained over a finite time period	Emphasis on CC’s meaning without pointing out the causes/factors.
Krueger, Biedrzycki & Hoyerter (2015)	CC refers to “increased average temperatures and variability in the levels of both temperature and precipitation.”	The causes, space, and time dimensions were unscored.

Brooks et al., (2014)	CC refers to the extreme temperatures beyond average, that result in unexpected weather changes.	This definition restricted the meaning of CC without regard for the other elements.
Chakraborty et al. (2014).	“A drastic or secular changes in the heat balance of the earth-atmosphere system, moisture, cloudiness, and precipitation caused by either external factors such as variations in orbital characteristics of the earth...by internal factors (exchanges of energy between the atmosphere, hydrosphere, lithosphere, and cryosphere) or by both, at local, regional and global levels.”	Emphasis was on the natural process of climate change/ variability, the space dimension was considered but the time dimension was not.

The Implications of Climate Change

Experts, policymakers, and governments are greatly concerned about CC due to its far-reaching implications, both directly and indirectly, on the environment, biodiversity, socio-economic well-being, and the lives and well-being of humans (Siddiqui et al., 2022).

Environmental impacts

Climate change has globally impacted almost every region. Extreme weather events like heat waves, droughts, storms, floods, and cold snaps are more frequent, severely affecting lives and livelihoods. These events have led to numerous environmental disasters. Rising temperatures have caused glacier and ice melt, excess rainfall, rising sea levels, flooding, and community destruction, forcing migration. Higher temperatures also result in heat waves, wildfires, droughts, wetland loss, and desert expansion. These factors contribute to biodiversity loss, water shortages, saltwater intrusion, declining agricultural output, and increased pests and diseases (Benson, 2008; Fankhauser & Stern, 2016; Reay et al., 2007; Zegeye, 2018).

In tropical areas, climatic changes will likely cause significant reductions in water levels and the salinisation of inland freshwater. However, this trend may be countered in regions with higher anticipated precipitation or those affected by the overflow from melting glaciers. These changes will significantly impact the structure, productivity, and biodiversity of inland aquatic ecosystems (Jeppesen et al., 2023; Lemi, 2019).

Socio-economic impact

The socio-economic effects of CC include food insecurity, displacement, poverty, health challenges, and conflicts. Extreme weather events and natural disasters such as floods, earthquakes, hurricanes, and landslides often destroy human settlements, leading to displacement and an increase in climate migrants or internally displaced persons. This results in the loss of lives, livelihoods, and assets, subjecting individuals to desperate conditions and increasing government expenses to alleviate suffering (Dupont, 2008). Alterations in rainfall patterns and rising temperatures affect food production, as most agricultural outputs depend heavily on climatic variables. Consequently, changes in temperature and rainfall can threaten food availability and survival (Lemi, 2019; Malhi et al., 2021).

Researchers found that CC can lead to conflict through migration, large-scale climate-induced displacements, food shortages, and poverty (Busby, 2018; Ghimire et al., 2015; Ghimire & Ferreira, 2016; Koubi, 2019). Variations in average rainfall patterns, associated with droughts and floods, impact political behaviour and increase the likelihood of disruptive activities such as protests, riots, strikes, inter-communal strife, and anti-government violence (Busby, 2021; Hendrix & Salehyan, 2012).

Climate change also adversely affects human health. It increases the risk of illnesses related to high temperatures, air pollution, vector-borne diseases, allergies, and other ailments (Adamo et al., 2022; Siddiqui et al., 2022). The IPCC (2021) attributes global warming to various health changes, including the prevalence of tropical diseases like dengue and malaria, heat exhaustion, starvation-related illnesses, and storm-related injuries and drownings worldwide.

Biodiversity

Climate change has caused irreversible effects such as extreme weather events, wildfires, and rising sea levels, devastatingly affecting biodiversity, food security, species displacement, ecosystem function changes, and even extinction (McElwee, 2021; Muluneh, 2021). Species are becoming extinct because of CC, caused by climatic factors that heavily influence the distribution patterns of several species and communities (Saklani & Khurana, 2019). According to Muluneh (2021), the accelerated rate of species extinction is estimated to be 100 to 1000 times faster than usual. Consequently, the natural distribution boundaries for species or communities will shift due to changing climatic trends (Bhaskar, 2022). Lemi (2019) suggests that some detrimental consequences of temperature change on soil quality are the rise in insect and disease cases.

Climate change also affects crop cultivation, leading to losses in some regions and gains in others, and decreasing crop yields increases the risk of hunger and affects food prices. For example, Sintayehu (2018) observed that smaller habitats and fragmentation hinder species' ability to adapt, leading to potential extinctions and decreased genetic diversity in Africa. Moreover, economic growth is linked to biodiversity loss, but good governance practices can help reduce it (Habibullah et al., 2022). Addressing these challenges requires policy reforms, land use changes, and investment in mitigation measures limiting global temperature to below 1.5°C (Nunez et al., 2019).

How Climate Change Occurs: The Scientific Overview

Regardless of CC's causes, researchers have a near consensus about how climate changes occur. The debate centres on the "why," some attributing it to natural phenomena and others to human activities. Nonetheless, understanding the scientific rationale behind the "how" of CC is crucial.

According to well-established scientific consensus, earth's surface is warmed by solar radiation, with about 30% of sunlight reflected into space. The oceans, atmosphere, and land absorb the remaining energy, creating life-supporting conditions. Greenhouse gases regulate earth's thermal equilibrium by managing infrared radiation transmission in the atmosphere. However, human activities have increased greenhouse gas

emissions, leading to global warming (Abouelfadl, 2012; Arora, 2020; Means & Lallanilla, 2021; Pandit, 2020).

Western Perspectives on Causes of Climate Change

CC theories can be broadly categorised into natural and human-induced explanations. Natural causes include the Bio-thermostat, Cloud Formation and Albedo, Ocean Current, Planetary Motion, and Solar Variability theories. These attribute CC to factors like oceanic circulation, solar radiation variations, plate tectonics, volcanic eruptions, earth's shape, Milankovitch Cycles, land and water distribution, differential heating of land and water, ocean currents, air masses, and hurricanes (Bhaskar, 2022; Harris, 2023).

Essentially, climatic changes are driven by natural forces such as continental drift, significant volcanic eruptions, and earth-ocean-atmosphere interactions (Adamo et al., 2022). Earth scientists, oceanographers, and geographers collectively show that differential solar heating produces processes that redistribute heat, resulting in a more uniform climate across the earth's surface (Harris, 2023).

In contrast, the anthropogenic CC theory focuses on the effects of atmospheric carbon dioxide and attributes climate changes primarily to human activities (Harris, 2023). According to the IPCC (2014), about 95% of CC incidents are human-induced. This theory, now predominant, suggests that activities in sectors such as agriculture, transportation, mining, and industry drive global warming (Harris, 2023). The primary GHGs include water vapour (36-90%), carbon dioxide (CO₂) (1-26%), methane (CH₄) (4-9%), and ozone (O₃) (3-7%). Recently, human activities like burning fossil fuels and deforestation have increased atmospheric CO₂ levels by about 50%. If these activities continue, CO₂ levels could double in the next 100 years unless natural sinks increase proportionately (Abouelfadl, 2012).

Climate change is also influenced by external factors such as solar radiation and earth's orbit. However, anthropogenic global warming (AGW) proponents argue that these factors alone do not explain the steady temperature rise over the past thirty years. AGW theory suggests positive feedback mechanisms amplify greenhouse gas effects by two to four times. Even a minor increase in temperature can lead to more atmospheric water vapour, intensifying warming. Additionally, global

warming causes ice and snow to melt, exposing less reflective surfaces that absorb more heat from the sun. Advocates of AGW assert that the temperature increase of 0.7°C over the past 150 years and 0.5°C over the last 30 years is mainly due to human greenhouse gas emissions. They reject the idea that this increase could be attributed to the recovery from the Little Ice Age (1400-1800). Using computer models based on scientific principles, they predict that doubling atmospheric CO₂ will lead to an additional 3°C increase in global temperature by 2100 (Forster et al., 2021).

In addition, there are three primary ways human actions contribute to global warming: industrialisation and consumption patterns, deforestation and land-use changes, and other pollutants such as those from transportation and electricity generation.

Industrialisation and Consumption Patterns

The increased industrialisation and changing global consumption patterns have led to significant emissions of fossil fuels and greenhouse gases. Over the past 800,000 years, levels of carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄) have never been higher than they are today, primarily due to human activities. Industrial activities, crucial for producing goods and raw materials to meet human needs, significantly contribute to these emissions. Burning fuel for electricity and heat and chemical reactions during the production of chemicals, metals, and minerals result in direct emissions from industrial facilities. Additionally, leaks from these facilities release GHGs. Off-site activities, such as power plants using fossil fuels to generate industrial electricity, also indirectly impact global warming.

Commercial and residential activities, including heating, cooking, waste management, and power use, also contribute to CO₂, CH₄, and N₂O atmospheric emissions. Methane is produced through the anaerobic digestion of organic waste in biogas facilities during wastewater treatment. Fluorinated gases are emitted from leaking machinery while servicing air conditioners and refrigerators. Energy use for equipment, external lighting, and buildings further contributes to emissions in the commercial and residential sectors.

Deforestation and Land-Use Changes

Deforestation and land-use changes contribute to warming in several ways. The release of CO_2 is sourced from biological sequestration when fields are cleared of vegetation for human use. Land management practices, such as converting farmland to grassland, result in emissions of CH_4 and N_2O . Using biological feedstocks, such as wood or energy crops, for building, manufacturing liquid fuels, or generating electricity can also lead to emissions or CO_2 sequestration (Yoro & Daramola, 2020).

Historically, agricultural practices are a significant source of emissions and still account for up to one-third of all anthropogenic greenhouse gas emissions (Gabric, 2023; Malhi et al., 2021). Crop production and livestock rearing contribute to greenhouse gas emissions using synthetic and organic fertilisers emitting N_2O , and ruminant animals, particularly cattle, produce CH_4 through enteric fermentation. Similarly, manure management and storage release N_2O and CH_4 . Other agricultural emissions arise from rice cultivation, crop residue burning, and liming and urea application emissions. The decomposition of biomass, animal waste, and landfills produces methane, while various nitrogen-based fertilisers contribute to nitrous oxide emissions (Arora, 2020; Siddiqui et al., 2022).

Other Pollutants: Transportation and Electricity Generation

Other sources of pollution, such as transportation and electricity production, are significant contributors to greenhouse gas emissions and global warming. The use of automobiles, trucks, trains, ships, aeroplanes, and other types of transportation leads to the release of CO_2 when petroleum-based goods like diesel and gasoline are burned in internal combustion engines (Aminzadegan et al., 2022). The generation of electricity for homes, businesses, and industries is another major contributor. Fossil fuel burning (coal, oil, and natural gas) for electricity production, transmission, and distribution results in CO_2 emissions (Dehner et al., 2023).

The main contention remains whether human activities on earth are scientifically significant enough to cause climatic changes. The evidence from various studies suggests that these activities are an important factor in global warming and CC trends.

Islāmic Perspectives on Causes of Climate Change

Like the scientific world, there are two main perspectives on CC's causes: natural and anthropogenic. However, the explanation differs.

The natural causes of climate change: the Islāmic perspective

At the onset, evidence from the Islāmic perspective does not entirely reject the scientific explanation of how CC occurs. However, science neglects a dimension that counts most in the Islāmic or theological viewpoint: divine intervention. It could be argued that, while sciences explain the 'how' of CC, only theology provides adequate reasons for the 'why' of CC.

In the Islāmic creed, everything including CC, is under the control of Allāh, and therefore, nothing changes without His consent and approval. Several verses buttress this assertion, including His saying, "And He it is Who sends down the rain after they have despaired and spreads His Mercy. And He is the Wali (Helper, Supporter, Protector, Lord), Worthy of all Praise" (Q 42: 28). In another verse, He says:

See you not that Allāh drives the clouds gently, then joins them together, then makes them into a heap of layers, and you see the rain comes forth from between them; and He sends down from the sky hail (like) mountains, (or there are in the heaven mountains of hail from where He sends down hail), and strikes there with whom He wills, and averts it from whom He wills. The vivid flash of its (clouds) lightning nearly blinds the sight (Q24:43) (Al-Hilālī & Khān, 1983).

From the verses above, it could be deduced that regardless of any human activity on the earth or engaging in any environmentally friendly practice, it is only by the will and control of Allāh that climate became stable or adversely affected in any part of the universe. At the same time, this does not mean that Islām encourages a careless attitude towards the environment.

It is a fundamental pillar of the Islāmic creed that the world will some time come to an end. Consequently, the end of time's signs include changes in the earth's climatic conditions. In the Qur'ān (Q86: 1-5), the end of time was described as follows:

When the heaven is cleft asunder. And when the stars have fallen and scattered. And when the seas are burst forth... (Then) a person will know what he has sent forward and (what he has) left behind (of good or bad deeds) (Al-Hilālī & Khān, 1983).

It is explained in another set of verses (Q87: 3-14).

And when the seas become a blazing fire or overflow... And when the heaven is stripped off and taken away from its place; ... (Then) every person will know what he has brought (of good and evil) (Al-Hilālī & Khān, 1983).

In the verses above, environmental disasters and global warming will reach a stage where rivers will be ablaze. The sun, the principal source of light and energy to the earth, will be lost, and the environment will freeze, making existence impossible. However, these events must have some signs and signals to lay the foundation for their occurrence.

To this extent, as time moves on, climatic conditions will worsen, and environmental disasters will keep increasing. In a hadith transmitted by Al-Bukhāri (1036) and Muslim (157), the Prophet (ﷺ) said,

“The Hour (Last Day) will not be established until (religious) knowledge will be taken away (by the death of religious learned men), earthquakes will be very frequent, time will pass quickly, afflictions will appear, murders will increase, and money will overflow amongst you.”

Perception of CC causes based on this viewpoint suggests that since CC is merely the fulfilment of end-time prophecy, humans are not to blame. This opinion is prevalent among the local populace in Sub-Saharan Africa (Koehrsen, 2021; Shehu & Molyneux-Hodgson, 2014).

The anthropogenic causes of climate change: the Islāmic perspective

Islāmically, everything created on the earth was meant for the benefit of humans. Allāh says (Q2: 29): “He is Who created for you all that is on earth, then He rose over towards the heaven and made them seven heavens and He is the All-Knower of everything”(Al-Hilālī & Khān, 1983). However, the use of such things must be without extravagance. Islām, therefore, discourages wastage of any kind, including natural resources. Allāh says (Q17: 26-27), “...But spend not wastefully (your

resources) in the manner of a spendthrift. Verily, the spendthrifts are brothers of the Shayāṭīn (devils), and the Shayṭān (Devil – Satan) is ever ungrateful to his Lord (Al-Hilālī & Khān, 1983). In another verse (Q7: 31), Allāh prohibits extravagance and any kind of destruction. He says, "... eat and drink but waste not by extravagance; certainly He (Allāh) likes not Al- Musrifūn (those who waste by extravagance)" (Al-Hilālī & Khān, 1983). Allāh says (Q6: 56), "And do not do mischief on the earth, after it has been set in order, and invoke Him with fear and hope. Surely, Allāh's Mercy is (ever) near unto the good-doers" (Al-Hilālī & Khān, 1983).

Simultaneously, Islām encourages the protection and conservation of the environment and enjoins its cleanliness (Arauf, 2021). For instance, indiscriminate logging and bush burning are discouraged in Islām, whereas planting trees and plants is a rewardable act. Anas ibn Malik reported: The Messenger of Allāh, peace and blessings be upon him, said, "Even if the Resurrection were established upon one of you while he has in his hand a sapling, let him plant it." Similarly, in a letter Abu Bakr (Allāh be pleased with him) conveyed to his army while sending it on a mission, He said:

"Stop, O people, that I may give you ten rules for your guidance on the battlefield... Bring no harm to the trees, nor burn them with fire, especially those which are fruitful. Slay not any of the enemy's flock, save for your food. You are likely to pass by people who have devoted their lives to monastic services; leave them alone..." (Abdul Hamid, 2008).

Therefore, the Islāmic perspective and the Western view on anthropogenic CC are aligned, recognising that excessive human exploitation of the environment, such as burning fossil fuels and deforestation, causes CC. Adebayo (2012) argued that CC results from humans' excessive exploitation of nature, likening it to embezzlement. He suggested that if humans exert their technological power on nature, they must be prepared to face its consequences, stressing that anything that "worships" God should not be exploited. Muslim scholars (Hussain, 2007; Khalid, 2010) also blame the contemporary economic system for excessive production for profit and extravagant consumption. Koehrsen (2021) found this viewpoint to be the most common among Muslim leaders regarding the causes of CC.

Views that ascribe CC to divine retribution blame human immorality for environmental deterioration. This viewpoint holds that God responds to mischievous actions by local communities (such as theft, lying, greed, and injustice) or political leaders (such as corruption, war, and destruction of the environment) with various natural calamities or degradations. Studies have noted that Muslim populations in many Sub-Saharan African regions and parts of Asia have this opinion (Abegunde, 2017; Haron, 2017; Merli, 2010; Shehu & Molyneux-Hodgson, 2014; Watson & Kochor, 2012). Even where the environment is preserved, but sins are persistent, the wrath of Allāh is bound to befall such communities. Therefore, for the climate to be fully preserved, humans must observe two things: preserve the environment and abstain from major sins.

Broadly, the fundamental causes of CC are ascribed to the mischiefs of human beings on earth. In other words, change in climatic conditions and its accompanying negative impact is a consequence of the sins incurred by humans. According to the Islāmic theological perspective, Sins could be categorised broadly into major sins (*al-kabā'ir*) and minor sins (*al-aṣghā'ir*). *Al-Kabā'ir* are considered the most dangerous sins contributing to environmental disasters. Al-Dhahabi (1988) provided a relatively long list of the major sins. However, the most common and as well rampant around the globe include *Shirk* (polytheism), murder, homosexuality; *zinā* (adultery and fornication); consumption of intoxicants; taking or paying interest (*ribā*); gambling, etcetera.

Islamic scholars have extensively discussed the effects of sin and transgression on societies and nations (Askary, 1997; Attuwaijiry, 2006). Evidence from the Qur'ān, citing examples from past nations, clearly shows extreme weather events such as floods, famine, earthquakes, hurricanes, etcetera, are caused by human mischief on the earth. The emissaries of Allāh to nations and towns warned their people of the wrath of Allāh that could follow if they did not repent from disbelieving in Allāh, evil acts, and wrong doings. For example, Nuh and Hud (peace be upon them) admonish their people to repent from their sins and mischiefs on the earth to avert environmental disasters (famine, drought, etc). Allāh says (Q71: 10-13).

“I [Nuh (Noah)] said (to them): ‘Ask forgiveness from your Lord, verily, He is Oft-Forgiving. He will send rain to you

in abundance. And give you increase in wealth and children and bestow on you gardens and bestow on you rivers.’
 “What is the matter with you, that [you fear not Allāh (His punishment), and] you hope not for reward (from Allāh or you believe not in His Oneness)?” (Al-Hilālī & Khān, 1983).

However, they did not heed his warnings and persisted in disbelieving until Allāh destroyed them with the great deluge of *Tufan* (Q54: 9-16).

Similarly, the people of Hud (AS), ‘Ād, were enriched with agricultural advancement in food and livestock, industrialisation, building technology, physical strength, and population (Q26: 128-135). However, they were the first to introduce polytheism in the form of idol worshipping after the great *Tufan* deluge (Ibn-Katheer, 1988). Prophet Hud was sent to them, calling them to monotheism, but was rejected (Q7:65-71; Q11:59; Q41:15).

Consequently, they experienced drought causing famine and food insecurity. That was why Hud admonished them, saying (Q11: 52), “And O my people! Ask forgiveness of your Lord and then repent to Him, He will send you (from the sky) abundant rain, and add strength to your strength, so do not turn away as *Mujrimun* (criminals, disbelievers in the Oneness of Allāh)” (Al-Hilālī & Khān, 1983). Nevertheless, they rejected his advocacy and persisted in their sins. Hence, ‘when they saw it as dense clouds coming towards their valleys, they said (Q46: 24): “This is a cloud bringing us rain!” Nay, but it is that (torment) which you were asking to be hastened - a wind wherein is a painful torment!’ (Al-Hilālī & Khān, 1983). Instead of rain, an intense hurricane with an unprecedented sound, non-stop for a week, was sent to destroy them for their sins (Q51:41-42; Q54:18-22).

Equally, the people of Lūṭ (Lot) rejected monotheism and were the first to introduce sodomy among humankind besides their bad attitude of robbing the wayfarer (Q 29: 28-29).

And (remember) Lūṭ (Lot), when he said to his people: “You commit *Al-Fahishah* (sodomy - the worst sin) which none has preceded you in (committing) it in the ‘*Alamin* (mankind and jinn).” “Verily, you practise sodomy with men, and rob the wayfarer (travellers)! And practise *Al-Munkar* (disbelief

and polytheism and every kind of evil wicked deed) in your meetings...” (Al-Hilālī & Khān, 1983).

Consequently, unusual rain was sent down on them, destroying them. Allāh says (Q27: 58), “And We rained down on them a rain (of stones). So evil was the rain of those who were warned” (Al-Hilālī & Khān, 1983).

Likewise, the people of Madyan rejected Prophet Shu’ayb, who warned them about a series of mischievous practices they were doing, including polytheism, shortening of measurements and weights, robbery, injustice, and denying others to accept Allāh. Thus, they were destroyed by a strong earthquake accompanied by a thunderous sound. Qur’ān relates (Q 29: 36-37),

And to (the people of) *Madyan* (Midian), We sent their brother Shu’ayb. He said: “O my people! Worship Allāh (Alone) and hope for (the reward of good deeds by worshipping Allāh Alone, on) the last Day (i.e., the Day of Resurrection), and commit no mischief on the earth as *Mufsidun* (those who commit great crimes, oppressors, tyrants, mischief-makers, corrupters). And they belied him [Shu’aib]: so, the earthquake seized them, and they lay (dead), prostrate in their dwellings (Al-Hilālī & Khān, 1983).

Also, Pharaoh and his people were warned by Musa (Moses) to stop oppressing/enslaving the Children of Israel, believe in Allāh, and administer justice. Instead, Musa was rejected and threatened. What followed was a series of environmental disasters, namely, flood, crop failure, and famine, so they repent. In the Qur’ān (Q7: 130-133), it was mentioned that:

“And indeed, We punished the people of *Fir’aun* (Pharaoh) with years of drought and shortness of fruits (crops), that they might remember (take heed) So, We sent on them: the flood, the locusts, the lice, the frogs, and the blood (as a succession of) manifest signs, yet they remained arrogant, and they were of those people who were *Mujrimūn* (criminals, polytheists, sinners) (Al-Hilālī & Khān, 1983).

Another striking example is the nation of Saba’ (Sheba), which lived in peace and prosperity. However, they turned down by disbelieving in

Allāh and committing prohibited acts. Qurʾān relates (Q34: 15-16) the case thus:

Indeed, there was for Sabaʾ (Sheba) a sign in their dwelling place - two gardens on the right hand and the left; (and it was said to them:) “Eat of the provision of your Lord and be grateful to Him.” A fair land and an Oft-Forgiving Lord! But they turned away (from the obedience of Allāh), so We sent against them Sail Al- ‘Arim (flood released from the dam), and We converted their two gardens into gardens producing bitter bad fruit, and tamarisks, and some few lote-trees (Al-Hilālī & Khān, 1983).

In the same vein, when the people of Makkah rejected the message of Muhammad (ﷺ), environmental disaster was part of the punishment they faced. Qurʾān says (Q16:112),

And Allāh puts forward the example of a township (Makkah) that dwelt secure and well-content: its provision coming to it in abundance from every place, but it (its people) denied the Favours of Allāh (with ungratefulness). So, Allāh made it taste extreme hunger (famine) and fear, because of that (evil, i.e., denying Prophet Muhammad) which they (its people) used to do (Al-Hilālī & Khān, 1983).

Likewise, in the sunnah, evidence buttresses the idea that human sins are factors in CC. It was narrated that ḲAbdullah bin ḲUmar said:

“The Messenger of Allāh (ﷺ) turned to us and said: ‘O Muhajirun, there are five things with which you will be tested, and I seek refuge with Allāh lest you live to see them: Immorality never appears among a people to such an extent that they commit it openly, but plagues and diseases that were never known among the predecessors will spread among them. They do not cheat in weights and measures, but they will be stricken with famine, severe calamity, and the oppression of their rulers. They do not withhold the Zakah of their wealth, but rain will be withheld from the sky, and were it not for the animals, no rain would fall on them. ... Unless their leaders rule according to the Book of Allāh and seek all good from what Allāh has revealed, Allāh will cause them to fight one another.»

The above examples demonstrate that climatic and environmental disasters are not limited to the activities of humans in the form of burning fossil fuels, deforestation, etcetera, but engaging in mischievous acts such as polytheism, atheism, murder, injustice, robbery, homosexuality, adultery, etcetera, are also causes of adverse climatic conditions in the past and the present.

This critique of the AGW theory suggests expanding the scope of anthropogenic causes of CC to include human misdeeds and sins. Therefore, climate mitigation strategies should also advocate for reducing such behaviours. Actions like injustice, greed, embezzlement, mass killings, promoting atheism, corruption, and unjust wars should be curtailed as part of these strategies. Thus, a comprehensive understanding of CC causes, including moral and ethical considerations, is essential for an effective solution.

Similarities and Differences between the Islāmic and Western Perspectives on the Causes of Climate Change.

The preceding section analysed the differing perspectives of Islam and science on CC causes. Thus, this section compares the two perspectives.

While both agree that natural and anthropogenic activities contribute to climate change, they interpret these causes differently. From a scientific standpoint, “natural causes” refer to earthly phenomena such as variations in earth’s orbit, tectonic movements, solar radiation variations, and volcanic eruptions. Conversely, the Islāmic interpretation of “natural” implies that CC is a creation of God, occurring either by His will or as a sign of the world’s end.

Both viewpoints concur that human activities—such as excessive use of fossil fuels, GHG emissions from transportation, industry, residential buildings, modern agriculture, deforestation, and land use—contribute significantly to CC. However, the Islāmic perspective adds that CC is also a result of transgressing God’s moral and spiritual laws. It emphasises that extreme weather events, indicative of CC, are caused by committing major sins (*alkabā’ir*) by both leaders and the public. These include *Shirk* (idolatry), *zinā* (adultery), *ribā* (usury), murder, unjust wars, gambling, alcoholism, drug abuse, and pornography, among other transgressions.

Table 1.2: Similarities and Differences between the Western and The Islāmic Perspective

Similarities	Differences
Both perspectives believe that the activities of humans induce CC.	CC causes are not only restricted to human physical activities but are caused by their spiritual and immoral behaviours towards the laws of God.
Natural forces could cause CC.	God naturally causes CC.
Both perspectives agree that the excessive burning of fossil fuels and other activities, such as deforestation, agriculture, and industrial activities, are the primary causes of CC.	The Islāmic perspective also added that besides these human activities, mischievous acts such as disbelieving in God, blasphemy, murder, unjust wars, usury, pornography, fornication/adultery, etcetera, are fundamental causes of extreme weather events resulting from CC.

Source: Compiled by authors.

Conclusion

In conclusion, this study has aimed to bridge the gap between the Western scientific perspective and the Islāmic viewpoint regarding the causes of CC. Comparative analysis shows that while both perspectives recognise the severity of CC and its harmful impacts on humanity and the environment, they differ in their understanding of the root causes.

The Western scientific perspective focuses on materialistic explanations, attributing CC mainly to greenhouse gas emissions, deforestation, and industrialisation. While these factors are significant, the Islāmic perspective adds a complementary dimension by emphasising human behaviour's moral and spiritual aspects as contributing factors to CC. Islāmic teachings highlight that actions such as mischief on earth, greed, and neglect of environmental stewardship contribute to environmental degradation.

This study highlights the importance of a holistic approach to addressing CC by integrating both perspectives. Relying solely on scientific explanations and technological solutions may be insufficient for effectively mitigating the crisis. A comprehensive strategy that incorporates ethical considerations and emphasises the responsibility of individuals and societies towards the environment is essential.

Mitigation efforts must go beyond technological interventions to include profound human behaviour and transformations of societal values. Embracing principles of sustainability, conservation, and ethical conduct, as advocated by both Islāmic and secular worldviews, is crucial for fostering a harmonious relationship between humanity and the environment.

Future research should focus on cross-cultural comparative studies exploring religious and cultural perspectives on CC. Community-based research initiatives, policy analysis, and environmental education within religious and cultural communities can help cultivate a deeper understanding of the moral imperatives for environmental stewardship, contributing to inclusive strategies for environmental conservation and sustainability.

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Book

In-text citations:

Al-Faruqi & al-Faruqi (1986)

Reference:

Al-Faruqi, I. R., & al-Faruqi, L. L. (1986). *The cultural atlas of Islam*. New York: Macmillan Publishing Company.

Chapter in a Book

In-text:

Alias (2009)

Reference:

Alias, A. (2009). Human nature. In N. M. Noor (Ed.), *Human nature from an Islamic perspective: A guide to teaching and learning* (pp.79-117). Kuala Lumpur: IIUM Press.

Journal Article

In-text:

Chapra (2002)

Reference:

Chapra, M. U. (2002). Islam and the international debt problem. *Journal of Islamic Studies*, 10, 214-232.

The Qur'ān

In-text:

(i) direct quotation, write as 30:36

(ii) indirect quotation, write as Qur'ān, 30:36

Reference:

The glorious Qur'ān. Translation and commentary by A. Yusuf Ali (1977). US: American Trust Publications.

Ḥadīth

In-text:

(i) Al-Bukhārī, 88:204 (where 88 is the book number, 204 is the ḥadīth number)

(ii) Ibn Hanbal, vol. 1, p. 1

Reference:

(i) Al-Bukhārī, M. (1981). *Ṣaḥīḥ al-Bukhārī*. Beirut: Dār al-Fikr.

(ii) Ibn Ḥanbal, A. (1982). *Musnad Aḥmad Ibn Ḥanbal*. Istanbul: Cagri Yayinlari.

The Bible

In-text:

Matthew 12:31-32

Reference:

The new Oxford annotated Bible. (2007). Oxford: Oxford University Press.

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