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**Informing the UAE's climate change policy development through
cross-country comparative analysis of the UAE, the UK, and Malaysia
policy frameworks**

By

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This Dissertation Report is submitted in Partial Fulfilment of the Award of
Master of Public Administration.

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Declaration

I, the undersigned, ***Mona Rashed Mohamed Al Yammahi***, declare that this Dissertation is my original work, that all material presented to Mohammed Bin Rashid School of Government is my own, and has not been previously submitted to any other university for a higher degree. I also declare that the publications cited in this work have been personally consulted. I understand that if at any time it is shown that I have significantly misrepresented material presented to Mohammed Bin Rashid School of Government, any degree or credits awarded to me on the basis of that material may be revoked.

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Abstract

Coordinated climate action depends on integrated and inclusive policy frameworks and institutional structures, which require constant research and development to cope with the complexity of economic, environmental, social and political systems. The research stems from the concepts policy/community and policy/network. It delves into a cross-country comparative analysis between the UAE, the UK, and Malaysia, looking into how contexts, geographies, and climate-induced risks shape priorities and policies on the national level, the integration of climate change policy into urban development practice, and the role of community engagement in climate policy development and action. The UAE and the UK have a distinct and ambitious vision of climate change action regionally and globally, while Malaysia focuses on addressing climate-induced risk due to its vulnerability. Regarding climate change and urban development, the UAE, the UK, and Malaysia address mitigation and adaptation as essential requirements in urban development practices. In the UAE, Community engagement prioritizes raising awareness, while in the UK, it is a legal requirement, and Malaysia is working on enhancing community engagement in climate action. Throughout the analysis, the UAE appears to have a strong drive for climate policy and action on federal and local levels. On a federal level, the UAE is vibrant with initiatives and strives for innovation; however, it is autonomous regarding institutional structure and initiatives. A better approach for the UAE is to promote institutional, spatial, operational, and policy integration across the nested hierarchies of governance structures under the national policy framework and vision for integrated, comprehensive, and coordinated climate change policy and action.

Keywords: Public administration, policy/community, policy/network, *Comparative analysis, climate change policy, community engagement, urban development policy.*

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ملخص البحث

يعتمد العمل المناخي المتناسق على أطر سياسات متكاملة وشاملة خلال هياكلية مؤسسية، والتي يتطلب البحث والتطوير المستمر لتواكب تعقيدات النظم الاقتصادية والبيئية والاجتماعية والسياسية. من خلال مفهوم السياسة و المجتمع و مفهوم شبكة السياسات، يقوم البحث على تحليل مقارن بين الإمارات العربية المتحدة، والمملكة المتحدة، وماليزيا يبين كيفية تشكيل السياقات الجغرافية والمخاطر التي يسببها المناخ الأولويات ولسياسات تغير المناخ بالمستوى الوطني و المحلي، ومدى دمج سياسة تغير المناخ في ممارسة التنمية الحضرية، ودور المشاركة المجتمعية في تطوير سياسات المناخ وإجراءاتها. في المقام الأول، تتمتع دولة الإمارات العربية المتحدة والمملكة المتحدة برؤية متميزة وطموحة لمواجهة تغير المناخ إقليمياً وعالمياً، في حين تركز ماليزيا على معالجة المخاطر التي يسببها المناخ بسبب عرضتها لآثار التغير المناخي. فيما يتعلق بتغير المناخ والتنمية الحضرية، فإن الإمارات العربية المتحدة والمملكة المتحدة وماليزيا تضع التخفيف والتكيف مع التغير المناخي من المتطلبات الأساسية في التنمية الحضرية. في دولة الإمارات العربية المتحدة، يكمن دور المشاركة المجتمعية في زيادة الوعي بالتغير المناخي، بينما في المملكة المتحدة، فإن المشاركة المجتمعية مطلب قانوني. و في ماليزيا تعتبر المشاركة المجتمعية في ركن أساسي في العمل على تعزيز التكيف المناخي. من خلال التحليل، يبدو أن الإمارات العربية المتحدة لديها حملة قوية لسياسة المناخ والعمل على المستوى الفيدرالي والمحلي. على المستوى الفيدرالي، الإمارات العربية المتحدة نابضة بالمبادرات وتوسعى لتعزيز الابتكار. ومع ذلك تفتقر إلى الهيكلية التنظيمية المؤسسية. من الأفضل في دولة الإمارات العربية المتحدة العمل على تعزيز التكامل بين المؤسسات و السياسات على مستويات التسلسل الهرمي في هياكل الحوكمة بموجب إطار السياسة و الرؤية الوطنية لتعزيز العمل المتكامل والشامل والمتناسق.

الكلمات المفتاحية: الإدارة العامة، السياسة / المجتمعية، شبكة / السياسات، التحليل المقارن، سياسة تغير المناخ، المشاركة المجتمعية، سياسة التنمية الحضرية.

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Acknowledgments

First of all, I would like to thank God for His support and blessings because of which I was able to complete this dissertation. I do not think I could have completed it without His support all this time.

Secondly, my heartfelt gratitude goes out to my advisor, **Dr. Scott Fargher**, who has been instrumental to my success in the dissertation. Several times. I was fortunate to have an advisor who always welcomed my queries and inspired me to learn, absorb, and apply more knowledge.

Thirdly, during my research, my parents gave me the emotional support I needed to stay strong and maintain my discipline when things turned tough. I doubt I would have been this consistent had it not been for their continued support, which kept motivating me to push forward.

Finally, my friends and colleagues too have played their part in helping me overcome this significant challenge. They have served as excellent camaraderie, and I look forward to working with them someday once more.

Table of contents

Contents

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Declaration.....	i
Abstract.....	i
ملخص البحث.....	ii
Acknowledgments.....	iii
Table of contents	iv
List of figures.....	vi
List of tables	vii
Abbreviations	viii
1. Introduction	1
1.1. Overview	1
1.2. Background	3
1.3. Problem statement	5
1.4. Aim and objectives.....	6
1.5. Research questions	6
1.6. Outlining the chapters	7
2. Literature review.....	8
2.1. Context.....	8
2.1.1. The UAE.....	8
2.1.2. The UK.....	14
2.1.3. Malaysia	18
2.2. Theoretical construct	22
2.3. Institutional structures and Climate change policy framework.....	23
2.3.1. The UAE.....	23
2.3.2. The UK.....	32
2.3.3. Malaysia	38
2.4. The literature on climate change policy analysis.....	44
2.5. Conceptual framework	46
2.6. Chapter Summary	47

- 3. Methodology..... 48
 - 3.1. Comparative methodology 48
 - 3.2. Research limitations..... 48
- 4. Analysis and findings..... 51
 - 4.1. Contextual review 51
 - 4.1.1. The UAE 52
 - 4.1.2. The UK 52
 - 4.1.3. Malaysia 52
 - 4.2. Policy response to climate change and urban development..... 53
 - 4.2.1. The UAE 54
 - 4.2.2. The UK 55
 - 4.2.3. Malaysia 56
 - 4.3. The role of community engagement 58
 - 4.3.1. The UAE 58
 - 4.3.2. The UK 59
 - 4.3.3. Malaysia 59
 - 4.4. Findings 59
 - 4.4.1. Similarities and differences in climate change priorities and policy..... 60
 - 4.4.2. Similarities and differences in the role of community engagement in climate change policy and action 62
 - 4.5. Chapter Summary 62
- 5. Conclusion and Recommendations..... 65
 - 5.1. Conclusions 65
 - 5.2. Recommendation..... 66
 - 5.3. Further research 68
- References 69

List of figures

Figure 1.1 CO2 and GHG emissions.....	2
Figure 1.2 Effects of climate change.....	3
Figure 2.1 Context map for the UAE.....	8
Figure 2.2 Monthly climatology of minimum temperature, mean temperature, maximum temperature and precipitation-1991-2020 for the UAE.....	10
Figure 2.3 Cross-sectoral Climate Change risks and challenges.....	12
Figure 2.4 The UK's GHG emissions from 1990 to 2016.....	14
Figure 2.5 Monthly climatology of minimum temperature, mean temperature, maximum temperature & and precipitation-1991-2020 for the UK.....	17
Figure 2.6 Context map for Malaysia.....	18
Figure 2.7 Daily minimum, average, and maximum temperature in Malaysia.....	19
Figure 2.8 Projections for average temperature anomaly in different seasons.....	19
Figure 2.9 Monthly climatology of minimum temperature, mean temperature, maximum temperature, and precipitation-1991-2020 for Malaysia.....	21
Figure 2.10 Malaysia's rank in the INFORM index for risk management.....	21
Figure 2.11 The UAE's federal structure.....	24
Figure 2.12 UAE's climate change policy framework.....	25
Figure 2.13 Federal and Emirate level policy framework.....	25
Figure 2.14 IPCC framework for defining climate change risks and impacts.....	26
Figure 2.15 The UAE's Climate risk priorities.....	30
Figure 2.16 Climate change adaptation cycle.....	31
Figure 2.17 Existing initiatives and proposed measures for climate risk adaptation.....	32
Figure 2.18 Institutional agreement on climate change in the UK.....	33
Figure 2.19 Spatial interventions and critical climate change policies in the UK.....	37
Figure 2.20 The role of planning in climate change.....	37
Figure 2.21 The UK Climate change policy development framework.....	38
Figure 2.22 Malaysia's National Steering Committee on Climate Change.....	39
Figure 2.23 Malaysia's climate change legislative integration.....	40
Figure 2.24 Malaysia's climate change policy integration.....	40
Figure 2.25 Laws, regulations, and policies indirectly linked to urban development in Malaysia.....	41
Figure 2.26 Summary of climate change mitigation and adaptation initiatives in Malaysia.....	42
Figure 2.27 Malaysian Framework for Climate Planning.....	43
Figure 2.28 The conceptual framework.....	46
Figure 4.1 The UK's Climate Change Policy and Goals.....	55

List of tables

Table 1.1 Cross-country summary for the UAE, the UK, and Malaysia.....	4
Table 2.1 Climate Policy Development in UAE.	28
Table 2.2 The UK's climate policy and initiatives.....	34
Table 2.3 Adaptation Programs in the UK.	35
Table 4.1 Malaysia's climate adaptation and mitigation initiatives and strategies.	56
Table 4.2 Analysis summary.	63

Abbreviations

Cabinet Committee on Climate Change	CCCC
Carbon Reduction Commitment	CRC
Clean Development Mechanism	CDM
Climate Change Knowledge Portal	CCKP
Climate Change Levy	CCL
Country Planning Framework	CPF
Carbon Capture Storage	CCS
Department of Energy and Climate Change	DECC
Department of Transport	DFT
Emirate Wildlife Society	EWS
Emissions Trading System	ETS
European Union	EU
European Union Emission Trading System	EUETS
Federal Department of Town and Country Planning	FDTCP
Greenhouse Gas	GHG
International Energy Agency	IEA
International Renewable Energy Agency	IREA
Malaysian National Communication on Climate Change	MNCCC
Ministry of Environment and Water	MOEAW
National Action Policy	NAP
National Climate Change Action Plan	NCCAP
National Committee on Sustainable Development Goals	NCSDG
National Physical Plan	NPP
National Steering Committee on Climate Change	NSCCC
National Urbanization Policy	NUP
Research and Development	R & D
Risk Assessment for Land Use Planning	LUPAr
Supreme Committee of Environment	SCE
United Arab Emirates	UAE
United Kingdom	UK
United Nations	UN
United Nations Framework Convention on Climate Change	UNFCCC
Urban Heat Island	UHI

Introduction .1

1.1. Overview

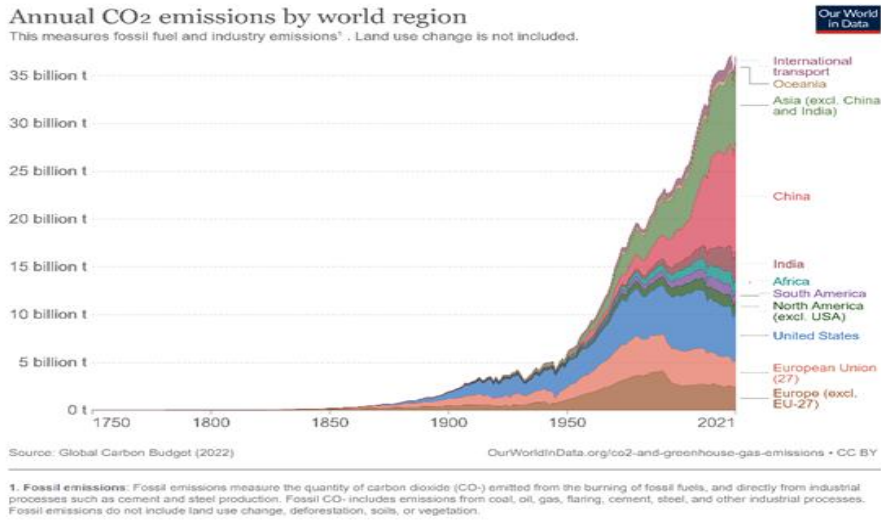
Climate change is undeniably one of the most pressing challenges facing the global community in contemporary times. It refers to alterations in weather patterns caused by the Earth's dynamic processes, including natural factors like volcanic activity, and the influence of human actions such as industrial activities that release Greenhouse Gases [GHGs] (Simon-Lewis 2017). The repercussions of climate change are far-reaching and can potentially disrupt ecosystems, economies, and societies globally. A shift towards greater reliance on renewable energy sources instead of non-renewable ones is essential to combat these negative consequences.

These effects exacerbate the challenges of rapid urbanization in cities, presenting significant threats that pose diverse challenges for future sustainability planning. The implications of climate change are projected to lead to the emergence of countless environmental refugees, confronting dire circumstances, including famine, limited water access, and homelessness (Intergovernmental Panel on Climate Change, 2007; Wilson and Piper, 2010; Otto-Zimmermann 2011; Davoudi 2009).

The United Nations [UN] is leading the response to climate change impacts, urging nations worldwide to take responsibility for safeguarding their environment and fostering peace on Earth, their shared home. This response is structured through climate change governance, with the onus on global cities to both adapt to the inevitable effects of climate change and mitigate the human-caused consequences through their spatial planning systems.

The disruption of the global state of normalcy has been substantially caused by climate change. The swift elevation of worldwide average temperatures can be linked to the significant emission of GHGs into the atmosphere. The expeditious advancement of this phenomenon can be traced back to the period of the Industrial Revolution, characterized by the widespread utilization of coal and oil, which in turn led to a notable surge in Carbon dioxide [CO₂] emissions, as shown in figure 1.1 below. The outcome of this process has been the retention of solar heat within the Earth's atmosphere, consequently giving rise to a warming trend (Bernard and Marshall, 2020).

Figure 1.1 CO₂ and GHG emissions.



Source: Earth System Research Laboratories NOAA (2022)

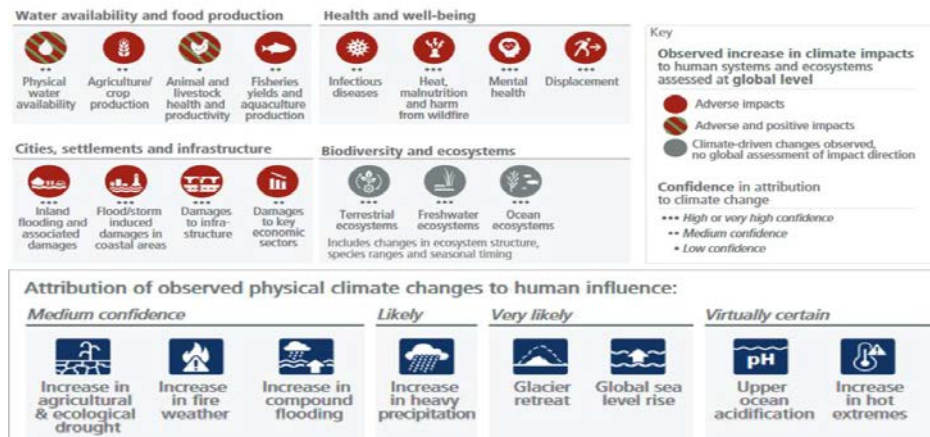
Annual total production-based emissions of CO₂ excluding land-use change are measured in tons. CO₂ data is based on territorial emissions, which do not account for emissions embedded in traded goods.

The observed changes and impact of climate change rendered weather and climatic and extreme events around the globe, leading to adverse risks and damage to natural and man-made systems. Figure 1.2 below illustrates the diverse effects of climate change.

The effects of climate change depend on the local geography, climatic zone, and resilience of natural and man-made systems to climate change. To this end, national governments developed diverse adaptation and mitigation action plans to combat the effects of climate change. The IPCC 2023 report affirms progress in adaptation plans and implementation across regions, but gaps still exist, which can be summarized as:

- Maladaptation in some sectors and regions.
- Insufficient financial flows constrain implementing adaptation, especially in developing countries (Intergovernmental Panel on Climate Change 2023)

Figure 1.2 Effects of climate change.



Source: Intergovernmental Panel on Climate Change, (2023, p. 7)

From an urban development perspective, the effects of climate change seep into the built and the natural environment within the urban system. As illustrated in figure (2) above, climate change affects the built-environment including cities, settlements, and infrastructure; the natural system, including water, vegetation, and animals; and the immaterial aspect of the urban systems, such as health and well-being, economy, and displacement (Intergovernmental Panel on Climate Change 2023).

Although climate change is a global concern, the diverse geographies and regional differences rendered various manifestations of climate change across both natural and man-made systems ranging from macro to micro scales. Due to this local nature of climate change, the Intergovernmental Panel on Climate Change [IPCC] adopted universal principles and strategies in response to climate change. These principles can be integrated into any development process to ensure a common understanding among nations (ibid).

1.2. Background

The international community is witnessing escalating global concerns regarding the impending consequences of climate change on urban environments. Core elements of a city's sustainability, encompassing economic endeavors, physical structures,

infrastructure, energy provisions, and various service sectors, stand threatened by the adverse effects of climate change. The concentrated presence of population, infrastructure, commodities, and goods renders these entities susceptible to the impacts of these shifts. In contrast to other environmental dilemmas, climate change is the most intricate challenge facing contemporary policymakers. The endeavors aimed at mitigating these effects necessitate a consensus on an international scale, collaborative efforts, and coordination and integration on a local level. However, achieving such unity is hindered by conflicting economic interests inherent among countries worldwide (Otto-Zimmermann K 2011).

This research delves into climate change policy and the worldwide response to its effects in the UAE, UK, and Malaysia, incorporating climate-related factors into their spatial planning strategies and inclusive development and action. The study explicitly examines the UAE's approach to climate change policy in three key areas: policy framework and institutional structures, integration into urban development practice, and the role of community engagement in policy development and action. This assessment takes place in the context of a prevailing global trend and bears particular importance as the UAE holds personal significance to the researcher as their hometown. Table 1.1 below provides a brief context for the research focus; more detail is provided in -and- section 2.1.4 elaborate with more details.

Table 1.1 Cross-country summary for the UAE, the UK, and Malaysia.

Country	The UAE	The UK	Malaysia
Governance	Federal state	Constitutional monarchy governed via parliamentary democracy	Federal state
Climatic zone	<i>Arid</i>	<i>Temperate</i>	<i>Tropical</i>
Climate change challenges	<ul style="list-style-type: none"> • Infrastructure and utilities • Ecosystem and biodiversity • Health and well-being • Economy and business • Food security 	<ul style="list-style-type: none"> • Flooding and coastal erosion • Increasing temperature • Water and food security • Natural resources • Ecosystems, soil, and biodiversity • Emerging pests, diseases, and invasive non-native species 	<ul style="list-style-type: none"> • Floods • Tropical cyclones • Drought

Source: Author's Own Work (2024)

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Fortunately, with the UAE's government leading, the broader Gulf region has recognized this impending risk and initiated efforts to foster sustainable development aligned with their strategic developmental objectives. Active participation in international agreements and conferences such as the UN Climate Change conferences, the establishment of energy-focused forums such as the Dubai Global Energy Forum, which introduced discussions on climate change, and the commitment to diversify energy sources, including oil, solar, and nuclear options, all signal positive intentions toward a sustainable future (UAE Ministry of Foreign Affairs Undated; Dubai Supreme Council of Energy 2014).

Sustainable development has garnered significant focus, leading to the emergence of diverse sustainability concepts formulated by various entities. Drawing upon policy choices and action-driven approaches to address environmental challenges, examples encompass sustainable industry, tourism, and transport (Day and Cai, 2012).

1.3. Problem statement

Climate change is a global phenomenon that poses significant challenges to urban development policy and strategies worldwide. Comprehensive climate change action requires a robust policy framework, effective institutional structures, a holistic approach to mitigation and adaptation of the built-environment, and effective community engagement in climate change policy and action. Climate change policy in the UAE is manifested in the UAE 2050 vision under the Kyoto Protocol and the Paris Agreement. A nation characterized by arid climatic conditions and high greenhouse gas emissions per capita, the UAE strives to balance economic growth, urbanization, and climate change concerns, understanding the similarities and differences in its climate change policy framework, institutional structures, and climate change issues in urban development approaches is crucial. A comparative analysis of these similarities and differences between the UAE, the UK, and Malaysia can provide valuable insights into policy framework, institutional structures, climate change-conscious urban development, and the role of community engagement in climate change action for the UAE.

Addressing the gaps in knowledge regarding the distinctions and intersections between climate change policy framework and the urban development approaches in the UAE, UK, and Malaysia, this research seeks to provide a nuanced analysis to foster successful

climate-responsive urban development strategies. The outcomes of this study can guide policy and decision-makers, urban planners, and stakeholders to refine existing approaches and implement more effective strategies that address the multifaceted challenges of climate change while fostering community ownership and resilience.

1.4. Aim and objectives

The primary purpose of this research is to inform the UAE's climate change policy and action through conducting comparative research to highlight the similarities and differences in how the climate change policy and institutions in the UAE, the UK, and Malaysia are structured and operate, and how climate change is integrated among the different players of the urban development practice and explore how community engagement is integrated into climate policy development and action. This aim could be obtained through the following:

- Review the basic facts, settings, and concerns of climate change and its links to the climate change policy framework.
- Revise and compare climate change risks and impacts within the UAE, UK, and Malaysia.
- Demonstrate the cross-country comparative approach in highlighting similarities and differences in policy frameworks, institutional structures, the integration of climate change into development planning, and the role of community engagement in policy development and action.

1.5. Research questions

Research Questions related to the Effects of Climate Change on Urban Development in the UAE, the UK, and Malaysia:

- To what extent do climate change policy and institutional structures in the UAE compare to the UK and Malaysia?
- What are the key similarities and differences between the UAE, the UK, and Malaysia in urban development practice?

- What roles does community engagement play in fostering the successful implementation of climate-responsive policy and action?
- In what ways can the UAE benefit from identifying the key similarities and differences between the UK's and Malaysia's climate policy and action in promoting coordinated and inclusive climate change policy?

1.6. Outlining the chapters

This section briefly describes the chapter's contents and what the reader can expect to learn from each chapter. This dissertation consists of five chapters. Chapter One precludes the topic regarding context, background, research aim, and research questions. Chapter Two presents the research materials used to address the research questions in section 1.5, along with the discourse of policy analysis methodologies and fields, and concludes with a conceptual framework for the dissertation. Chapter Three details the methodology in addressing the research issue, highlighting the limitations encountered. Chapter Four reviews and compares the policy frameworks and institutional structures, the integration of climate change policy into urban development practices, and the role of community engagement in policy development and action. Chapter Five concludes the dissertation with a summary of findings that answer the research questions, followed by recommendations for the UAE's climate policy and suggest some aspects beyond the dissertation's scope.

Literature review .2

2.1. Context

Climate change is one of the contemporary global policy landscape and diplomacy priorities. Global warming, as the main drive for climate change, results from fossil fuel combustion, waste management, agricultural production, and industries. Globally, the earth's temperature has increased since late 1950, especially between the 1980s and 2000s. The UNFCCC obliged developed and emerging economies to reduce GHG emissions and implement climate change into economic and urban development policies. In the following section, the researcher provides an overview of the UAE's, the UK's, and Malaysia's climatic conditions and trends.

2.1.1. The UAE

The UAE, shown in figure 2.1 below, transformed its economy from traditional to modern with the discovery of oil reserves, which account for 10% of the global reserve; the UAE vowed to diversify the economy, and the product of UAE's diverse service sector is larger than the entire oil and gas industry (Ministry of Energy 2006). In the UAE, the economic transformation took place in the context of a fragile natural environment and acute water resources as most of the UAE populated the coastline. In addition to climate change being the challenge of the 21st century (Radunsky 2006), climate change action in the UAE has become necessary (Ministry of Energy 2006).

Figure 2.3 Context map for the UAE.



Source: The World Bank Group (2023)

2.1.1.1. The UAE's climate

The climatology of mean temperatures in the UAE for 1991-2020 indicates a hot desert climate typical of the region. The UAE experiences high temperatures and low rainfall throughout the year.

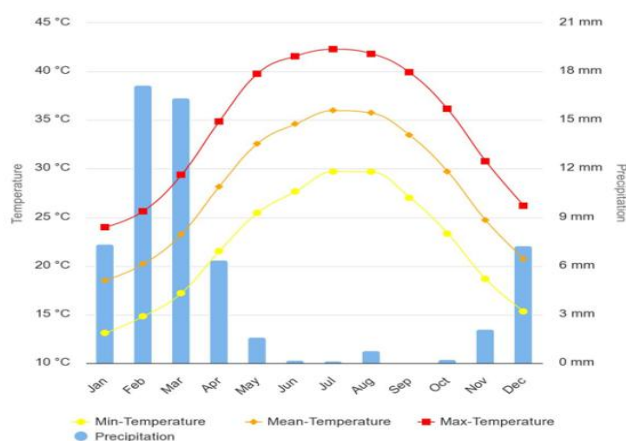
2.1.1.1.1. The observed changes for the UAE from 1991 to 2020

- **Hot Summers:** The UAE has sweltering summers, with mean temperatures frequently exceeding 40°C (104°F) during the daytime. July and August are typically the hottest months, with average highs often reaching 45°C (113°F) or more.
- **Mild Winters:** Winters are relatively mild compared to the scorching summers. Mean temperatures during the winter months (December to February) range from around 18°C to 25°C (64°F to 77°F).
- **Diurnal Temperature Variation:** The UAE experiences significant diurnal temperature variation, meaning there is a notable difference between daytime and night-time temperatures. While daytime temperatures can be sweltering, nights are relatively cooler, offering some relief from the heat.
- **Low Precipitation:** The UAE is characterized by low annual rainfall, with most precipitation occurring during winter. Rainfall during the 1991-2020 period is typically less than 100 mm (4 inches) annually, and some years might even experience much lower rainfall.
- **Variation across Regions:** Slight temperature variations can occur across different UAE regions. Coastal areas, like Dubai and Abu Dhabi, might experience slightly milder temperatures than the interior desert areas due to the moderating influence of the Arabian Gulf.
- **High Humidity:** Coastal areas might also experience higher humidity levels due to their proximity to the sea. Increasing humidity can lead to a more uncomfortable heat index, making the perceived temperature feel hotter than the actual air temperature.

- **Heat-waves:** The UAE occasionally experiences heat-waves, especially during the summer months. These periods of prolonged extreme heat can pose health risks to residents and visitors.
- It is important to note that these observations are general trends based on historical data until September 2020 (The World Bank Group 2023). Climate patterns can vary over time, and local factors like urbanization and land use changes might also influence temperature patterns in specific areas.

The observed annual minimum, mean, and maximum temperature and precipitation for the UAE from 1991 to 2020 are shown in figure 2.2 below and can vary based on different sources and datasets. Unfortunately, I cannot access real-time data or updates beyond September 2020. However, as of my last update, the annual mean temperature for the UAE during that period could be around 25-27°C (77-80.6°F).

Figure 2.4 Monthly climatology of minimum temperature, mean temperature, maximum temperature and precipitation-1991-2020 for the UAE.



Source: The World Bank Group (2023)

The climatic changes for the UAE shown above indicate that the compound heat risk is categorized on a scale of 0 to 4, likely based on a combination of factors such as temperature, humidity, and population density. This categorization helps identify areas and times where the heat-related risks are most significant. The analysis involves current

and potential future scenarios, considering different emission pathways and their impact on heat risk.

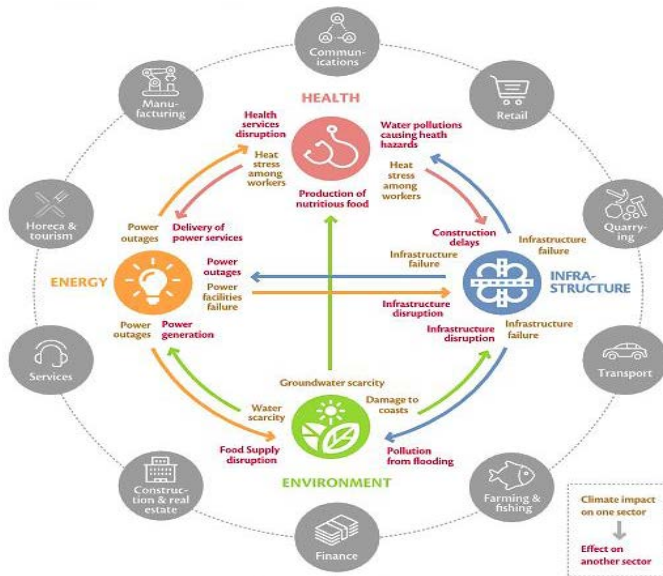
2.1.1.2. Climate change risks and challenges facing the UAE

The cited climate change priorities in the UAE revolve around moving to a green economy, sustaining the fragile environment and resource base, and climate change action across various sectors. To this effect, the joint report in 2017 by the Emirate Wildlife Society [EWS] in association with the World Wildlife Fund [WWF], co-authored with Acclimatise, highlighted climate change risks and challenges across the UAE sectors through the following themes; also see figure 2.3 below:

- Infrastructure and Utilities (Water & Energy - Transport & Logistics).
- Ecosystem and Biodiversity (Marine & Terrestrial).
- Health and Well-being.
- Economy and Business (Oil & Gas – Industry – Buildings, Construction & Real Estate – Financial Services – Cultural Heritage – Hospitality & Tourism).
- Food Security (Domestic Agriculture, Fisheries & Aquaculture – International Food Imports).

Mfarrej (2019) explained how demographic growth and climate change will affect the quality and access to water resources in the middle east and north Africa as an example of the complex impact of the interaction between climate change and the political, economic, and social variables.

Figure 2.5 Cross-sectoral Climate Change risks and challenges.



Source: UAE Ministry of Climate Change and Environment, (2019, p. 17)

Climate change is caused by the increase in GHG emissions, CO₂, and Methane; GHGs create a glass effect in the atmosphere due to their ability to absorb infrared radiation, which will trap heat in the atmosphere and disrupt heat exchange between the earth and outer space. The increase in atmospheric temperature is accelerated through two primary processes: first, through natural and human-caused vegetation cover loss, and second, the increase in GHG emissions from natural or man-made sources such as fossil fuel consumption, methane released from agricultural processes, and waste treatment through incineration (Mfarrej 2019). Climate change is the net product of the increased GHG emissions and the glass effect of disrupting atmospheric and carbon cycles (ibid).

The effects of climate change go beyond atmospheric disruption and changes and extend to complex primary and secondary effects. Mfarrej (2019, p. 262) cited the effects of climate on the UAE (Simon-Lewis 2017), such as ocean acidification, which will affect marine life, melting of snow leading to increasing temperature and sea level, extreme weather events causing loss of life and property, and desertification which will affect food

insecurity. Mfarrej (2019) cited that air pollution levels are the highest in the UAE's history, amounting to 80 tons per capita from transport and industries, stressing that emissions are occasionally toxic and aggravate medical conditions such as bronchitis, asthma, and heart disease for the young and old population.

2.1.1.2.1. Food security

The UAE depends on agricultural production imports to cover 87% of the food supply, which makes the UAE's food security vulnerable to the impacts of climate change as food prices are (Mfarrej 2019). Local food production is limited due to the UAE's arid nature and climate change's effects; while prices are increasing, population growth is another major challenge for the UAE's food security.

2.1.1.2.2. Rising sea level

Mfarrej (2019) cited the diverse effects of climate change on the UAE's natural and artificial systems; the UAE's coastline stretches for 1200km, where more than 85% of the population lives in areas borne to the rising sea levels (Alittihad 2017), meanwhile estimates suggest that the UAE will lose up to 6% of the developed coastline by 2100. The rising sea levels also threaten 90% of the country's infrastructure, escalating temperatures stimulate the rising sea level, changes in storm patterns, and detrimental effects on the aquatic and terrestrial ecosystems due to various activities (Hamza et al., (2011).

2.1.1.2.3. Energy

The broad commitment of the UAE upholds the Paris Agreement principle of reducing GHG emissions to adapt to climate change. According to the Ministry of Climate Change and Environment [MOCCA] release in 2019, under the Paris agreement, the UAE committed to increasing clean energy by 24% of the total energy mix and to 27% supported by its NDC score (UAE Ministry of Climate Change and Environment 2019) and to 50% clean energy by 2050 (Mfarrej 2019).

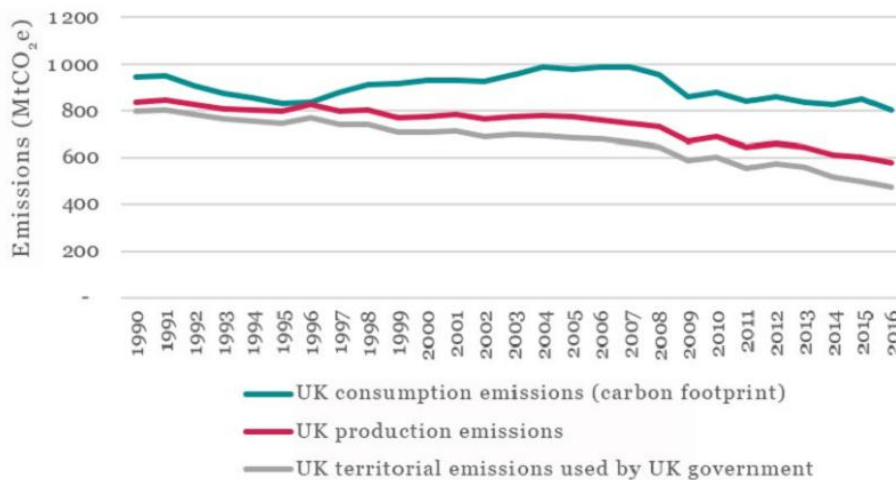
The UAE is an arid region with high temperatures and high demand for cooling energy; the International Energy Agency [IEA] estimates an increase of 7% by 2035 in Cooling Degree Days to 11% by 2050 (EWS-WWF and Acclimatise., 2017). In the UAE, most energy loads come from air conditioning in buildings, which is directly linked to an increase in the ambient air temperature, projected to increase energy demand to more

than 20% by mid-century (ibid). The increase in temperature and humidity will create a gap in energy supply, affecting energy security, higher costs for consumers, and increasing GHG emissions (Mfarrej 2019).

2.1.2. The UK

The UK falls into the temperate climatic zone located west of Europe with a varying geography and topography exposed to numerous climate change effects and challenges. Between 1990 and 2016, the UK reduced GHG emissions by 41%, and its carbon footprint decreased by 15% (World Wildlife Fund 2020), as shown in figure 2.4 below. By tracing the UK carbon footprint, 54% of the emissions are released domestically, and the remaining 56% comes from imported consumer goods (ibid).

Figure 2.6 The UK's GHG emissions from 1990 to 2016.



Source: World Wildlife Fund (2020, p. 4)

On a global scale, the UK's overseas carbon footprint comes from the EU at 19%, China at 7.3%, Africa at 5.3%, the Middle East at 5.3%, the United States of America at 3.6%, and Russia at 3.1% (ibid). IN the UK, 46% of GHG emissions come from heating homes 9.7%; automobile fuels, 8.6%, electricity 8%, construction 6.7%, agriculture 6.6%, and aviation 5.9% (ibid)

2.1.2.1. The UK's climate

The climate context of the UK for the period 1991-2020, derived from observed historical data, provides valuable insights into the current climate conditions and sets the stage for understanding future climate scenarios and projected changes. Analyzing annual and seasonal data across spatial variation, the seasonal cycle, and time series reveals vital patterns and trends.

2.1.2.1.1. The observed changes for the UK from 1991 to 2020

Between 1991 and 2020, climate change in the UK manifested in temperature variations across seasons and places, climate conditions, spatial variations, seasonal cycles, and trends in temperature and precipitation are explained in the following sub-sections.

Temperature

From 1991 to 2020, the UK experienced a range of temperature variations in its climate. The mean temperatures for different months and seasons showed specific trends. Winters tend to be relatively mild due to the warming influence of the North Atlantic Drift, a part of the Gulf Stream. However, cold snaps and occasional snowfall can still occur (The World Bank Group 2023).

Spring and autumn temperatures vary widely, with some years experiencing relatively mild conditions and others having cooler or warmer spells. Summers in the UK are typically characterized by moderate temperatures, rarely reaching extreme highs, especially in comparison to continental climates.

The UK's spatial temperature variation during 1991-2020, shown in figure 2.5 below, shows a smooth gradient from warmer temperatures in the south to cooler temperatures in the north. Urban areas are slightly warmer due to the urban heat island effect. The overall trend indicates a warming climate across the country (ibid).

The seasonal temperature cycle in the UK is characterized by relatively mild winters and cool summers. Winter temperatures increase in the south and southwest, while Scotland and the northern regions experience decreasing temperatures. Summers are cooler than in many continental areas due to the maritime influence of the surrounding oceans (ibid).

Over the period 1991-2020, the UK has experienced a noticeable warming trend. Average annual temperatures have increased, with some years exhibiting record-high

temperatures. This warming trend aligns with global climate change trends attributed to greenhouse gas emissions (ibid).

Precipitation

The UK is known for its relatively high and consistent levels of rainfall throughout the year. The distribution of precipitation can vary across the country. Western parts, such as Wales and the western coasts of Scotland and England, tend to receive more rainfall due to the prevailing westerly winds carrying moisture from the Atlantic Ocean. Eastern parts of the country are relatively drier (ibid).

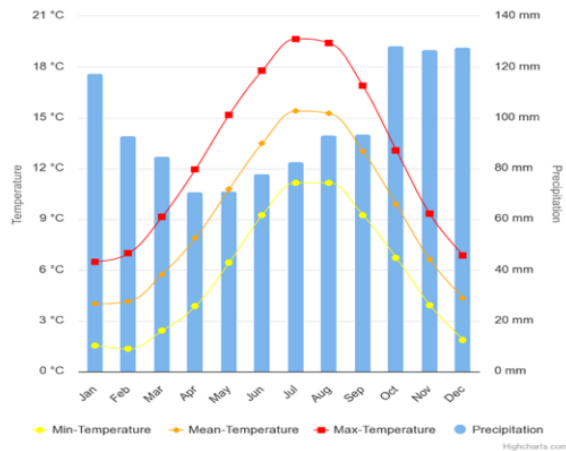
The period from 1991 to 2020 saw fluctuations in annual and seasonal rainfall patterns. Some years have experienced higher-than-average rainfall, leading to localized flooding and other water-related issues. Summers can sometimes be associated with rainfall, and prolonged wet spells can affect agriculture, transportation, and other sectors (ibid).

Precipitation patterns across the UK exhibit significant regional variation, as shown in figure 2.5 below. Western areas, particularly the mountainous regions of Wales and the northwest of England, receive higher annual precipitation than eastern regions. Higher precipitation is due to prevailing westerly winds bringing moist air from the Atlantic Ocean. Eastern areas, including parts of Scotland, tend to be drier. The distribution of precipitation has implications for agriculture, water resources, and flood risk (ibid).

The UK's precipitation cycle follows a typical maritime pattern with higher rainfall during the autumn and winter and relatively drier conditions in the spring and early summer. This is primarily influenced by the position of the jet stream and the passage of weather systems from the Atlantic (ibid).

Annual precipitation totals in the UK have shown some variability, but there is no clear trend across the entire period. However, extreme rainfall events have led to flooding, emphasizing the vulnerability of the UK to changing precipitation patterns.

Figure 2.7 Monthly climatology of minimum temperature, mean temperature, maximum temperature & precipitation-1991-2020 for the UK.



Source: The World Bank Group (2023)

In summary, the period from 1991 to 2020 saw the UK's climate maintaining its maritime, moist, and temperate nature. Its proximity to the Atlantic Ocean shaped its climatic features, the warming influence of the Gulf Stream/North Atlantic Drift, prevailing westerly winds, and its diverse topography. These factors combined to create a climate marked by variability, with regional differences in temperature, precipitation, and weather patterns.

2.1.2.2. Climate change risks and challenges facing the UK

Based on the second UK climate Change Risk Assessment, the UK's government adaptation communication to the UNFCCC highlighted six core priority risks:

- Flooding and coastal erosion
- Increasing temperature
- Water and Food security
- Natural resources and ecosystems, soil, and biodiversity
- Emerging pests and diseases and invasive non-native species.

2.1.3. Malaysia

Malaysia is a tropical Southeast Asian country comprising Peninsular Malaysia and East Malaysia. The geography of Malaysia comprises a diverse land cover, topography, a coastline over 4800km, a mountain range, and above 50% forest cover (Climate Risk Country Profile: Malaysia 2021); figure 2.6 below shows a map of Malaysia.

Figure 2.8 Context map for Malaysia.



Source: The World Bank Group (2023)

In tracking climatic changes in Malaysia, the primary data source for the World Bank's Climate Change Knowledge Portal [CCKP] is the Coupled Model Inter-comparison Project Phase 5 [CMIP5] models included in the IPCC Fifth Assessment Report. The climate risk profile of Malaysia Uses the CMIP5, the CCKP to develop four pathways for tracking GHG emissions from all sources defined by their total radiative forcing pathway and 2100 levels; the four pathways are referred to as:

- RCP2.6.
- RCP4.5.
- RCP6.
- RCP8.5

The model shows that Malaysia is constantly warming, and rainfall is projected to increase with the probability of extreme rainfall. Figure 2.7 below shows the CMIP5 pathway projections for daily minimum, average, and maximum temperature, followed by figure

2.8, showing temperature anomalies in different seasons (Climate Risk Country Profile: Malaysia 2021).

Figure 2.9 Daily minimum, average, and maximum temperature in Malaysia.

Scenario	Average Daily Maximum Temperature		Average Daily Temperature		Average Daily Minimum Temperature	
	2040-2059	2080-2099	2040-2059	2080-2099	2040-2059	2080-2099
RCP2.6	0.9 (0.1, 1.7)	0.8 (0.1, 1.9)	0.9 (0.3, 1.5)	0.9 (0.3, 1.6)	0.9 (0.4, 1.5)	0.9 (0.3, 1.6)
RCP4.5	1.2 (0.3, 2.1)	1.6 (0.7, 2.6)	1.2 (0.6, 1.8)	1.7 (1.0, 2.4)	1.2 (0.7, 1.8)	1.7 (1.0, 2.5)
RCP6.0	1.0 (0.2, 1.9)	2.0 (1.0, 3.1)	1.0 (0.5, 1.7)	2.1 (1.3, 3.0)	1.1 (0.6, 1.6)	2.1 (1.3, 3.0)
RCP8.5	1.6 (0.7, 2.6)	3.5 (2.3, 4.9)	1.6 (1.0, 2.3)	3.4 (2.6, 4.7)	1.7 (1.1, 2.3)	3.6 (2.6, 4.6)

Source: Climate Risk Country Profile: Malaysia (2021, p. 8)

Figure 2.10 Projections for average temperature anomaly in different seasons.

Scenario	2040-2059		2080-2099	
	Jun-Aug	Dec-Feb	Jun-Aug	Dec-Feb
RCP2.6	1.0 (0.5, 1.6)	0.9 (0.1, 1.4)	0.9 (0.5, 1.7)	0.9 (0.1, 1.5)
RCP4.5	1.2 (0.7, 1.8)	1.2 (0.1, 1.4)	1.7 (1.1, 2.4)	1.6 (0.8, 2.4)
RCP6.0	1.1 (0.6, 1.7)	1.0 (0.3, 1.6)	2.2 (1.5, 2.9)	2.0 (1.0, 2.8)
RCP8.5	1.7 (1.1, 2.3)	1.6 (1.0, 2.3)	3.6 (2.7, 4.6)	3.4 (2.3, 4.4)

Source: Climate Risk Country Profile: Malaysia (2021, p. 8)

2.1.3.1. Malaysia's climate

Malaysia has a tropical climate, with a mean annual temperature of 25.4°C. There is relatively little seasonal variability in average monthly temperature, ranging one degree Celsius between a minimum of 24.9°C in January and a maximum of 25.9°C in May. April, May and June are the hottest months of the year. Rainfall also remains high year-round, with mean annual precipitation of 3,085.5 millimetres [mm]. Average monthly precipitation

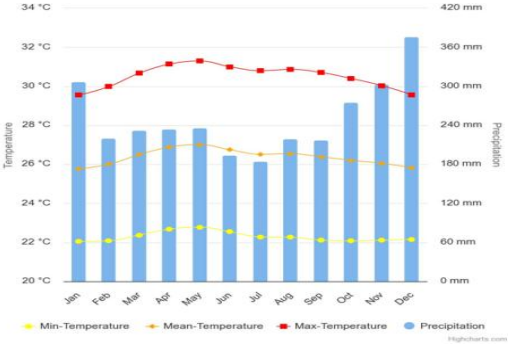
is also relatively constant throughout the year, ranging between approximately 200 mm during June and July and 350 mm in November and December. There are two monsoon seasons: The Southwest Monsoon (April-September) and the Northeast Monsoon (October-March). Malaysia receives about six hours of direct sunlight daily, with cloud cover most likely during the afternoon/evening.

2.1.3.1.1. The observed changes in Malaysia from 1991 to 2020

From 1991 to 2020, Malaysia's climate context has been shaped by various factors and trends based on observed historical data. Understanding these conditions can help appreciate potential future climate scenarios and projected changes.

- **Minimum Temperature:** The minimum temperature in Malaysia generally ranges between 22°C to 24°C (71.6°F to 75.2°F) in lowland areas. In the highlands, such as the Cameron Highlands, temperatures can drop to around 15°C (59°F) or even lower, see figure 2.10 below.
- **Mean Temperature:** The mean temperature in Malaysia typically hovers around 27°C to 28°C (80.6°F to 82.4°F) in lowland areas. Coastal regions and urban areas may experience slightly higher temperatures due to urban heat island effects; see Figure 2.10 below.
- **Maximum Temperature:** The maximum temperature in Malaysia usually ranges from 31°C to 33°C (87.8°F to 91.4°F) in lowland areas. Again, urban areas might experience higher temperatures, as shown in Figure 2.9 below.
- **Precipitation:** Malaysia receives significant rainfall due to its tropical climate. Precipitation can vary greatly depending on the region and time of year. The western coastal areas, including cities like Kuala Lumpur, experience the Southwest Monsoon, which brings heavy rainfall from May to September. The north-eastern parts, such as the states of Kelantan and Terengganu, experience the Northeast Monsoon, with heavy rainfall from November to March. The annual average precipitation in Malaysia is around 2,500mm to 3,000mm, as shown in figure 2.9 below.

Figure 2.11 Monthly climatology of minimum temperature, mean temperature, maximum temperature, and precipitation-1991-2020 for Malaysia.



Source: The World Bank Group, (2023)

2.1.3.2. Climate change risks and challenges facing Malaysia

According to (Climate Risk Country Profile: Malaysia 2021), Malaysia ranked 111 out of 191 by the INFORM Index for Risk Management developed by the European Commission. The index referenced direct climate hazards specific to Malaysia’s context but excluded hazards such as landslides; figure 2.10 below summarizes Malaysia’s rank regarding most countries at risk of climate hazards.

Figure 2.12 Malaysia's rank in the INFORM index for risk management.

Flood (0-10)	Tropical Cyclone (0-10)	Drought (0-10)	Vulnerability (0-10)	Lack of Coping Capacity (0-10)	Overall Inform Risk Level (0-10)	Rank (1-191)
6.6 [4.5]	2.9 [1.7]	3.3 [3.2]	3.0 [3.6]	3.2 [4.5]	3.2 [3.8]	111

Source: Climate Risk Country Profile: Malaysia (2021, p. 12)

Climate risk and challenges in Malaysia are dominated by floods due to its geographical setting and climatic zone, yet the following risk is drought, vulnerability, and tropical cyclones.

2.2. Theoretical construct

In the context of public administration, understanding the link between communities and governance is essential to conceptualizing governing realities and fostering effective policy development by governments and engaging communities. Skogstad (2005) used the term 'policy community' to describe how the public and private entities that share a common interest in an issue share a common interest in shaping its policy. The notion of policy community/policy network holds two distinct strands. The first argues that the community/ policy network is an interpersonal relationship, and the second dominates among policy analysts that the network is a structural linkage between the public and private sectors (Skogstad 2005). The community/policy network strands come with methodological pluralism with contesting quantitative and qualitative approaches; policy analysts within the human behavior field rely on institutionalist and constructivist approaches, while public policy scholars favor the structural approach (ibid). The structural approach in policy analysis embarks on the distinction between policy community and policy network, which provides an empirical description of the policymaking process (ibid). Rhodes (1997, p. 10) suggested that policy networks are about "Who rules?", "How do they rule?" and "In whose interest do they rule?". Daugbjerg and March (1998) emphasized the significance of understanding the ruling political structures, while Borzel (1998) argues that the policy network is the predominant mode of governance in modern societies. Policy networks and policy structure gained attention in the 1970s and 1980s as part of domestic politics, where policymaking had become increasingly complex, specialized, and fragmented with the state's involvement in society and the economy (Skogstad 2005). There are three distinct arguments in theorizing and empirically examining the role of community/network policy in globalization, multi-level governance, and the models of the new privatized forms of governance (ibid). First, transitional policy communities consist of experts, and civil society actors are likely to emerge to link actors in the national and worldwide arenas. Second, policy networks operate as a mechanism for governments to adjust their economic and public policies to the constraints and opportunities posed by globalization. Third, there is an emerging trend of governance arrangements similar to policy networks in horizontal governance structures but not necessarily mobilized or dissolved through the state actors. The

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literature on the Policy/community approach provided a sound construct for cross-sectoral and cross-country analysis of policy and decision-making processes and outcomes (Wright 1988; Rochefort, Rosenberg and White, 1998; Scott and Johnson, 1998; Storti, Henke and Macri, 2004).

2.3. Institutional structures and Climate change policy framework

This sub-section dissects the institutional structures, departments, legislations, and initiatives on climate action from national to local levels in the UAE, the UK, and Malaysia.

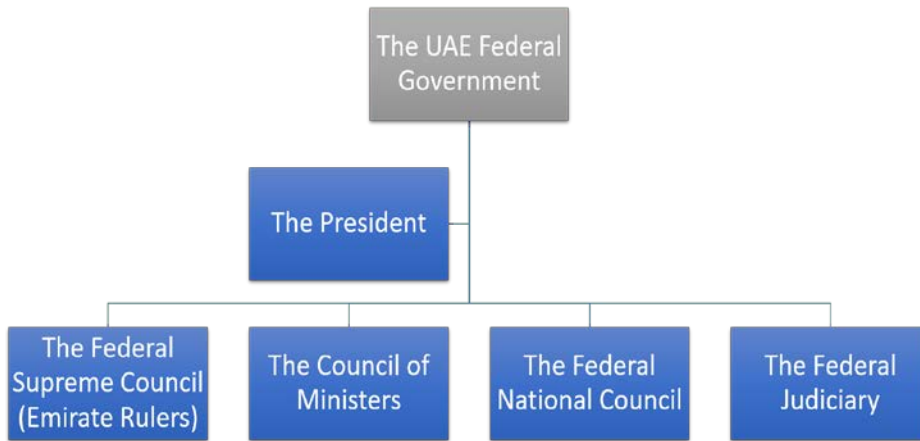
2.3.1. The UAE

The legislative procedure of the UAE, as shown in figure (2.1) below, reflects the federal constitution permanently enacted in 1996, whereby the federal structure consists of five bodies: The President, the Federal Supreme Council, the Council of Ministers, the Federal National Council, and the Federal Judiciary. The Council of Rulers is the supreme legislative, executive, and constitutional authority in the land, with the power to elect the President and the Vice-President, appoint the Prime Minister, and enact laws and legislations coupled with an advisory role.

2.3.1.1. The UAE's institutional structures on climate change

The UAE is a federal state; the UAE federal government has the highest government authority, as shown in Figure 2.11. AlRustamani (2014) draws the distribution of responsibility for responding to climate change as government-centric. On the one hand, the Ministry of Foreign Affairs is responsible for communicating with the UNFCCC. On the other hand, the MOCCA is concerned with handling intergovernmental communications with ministries involved in environmental, climate change, economic, social, and urban development agenda.

Figure 2.13 The UAE's federal structure.



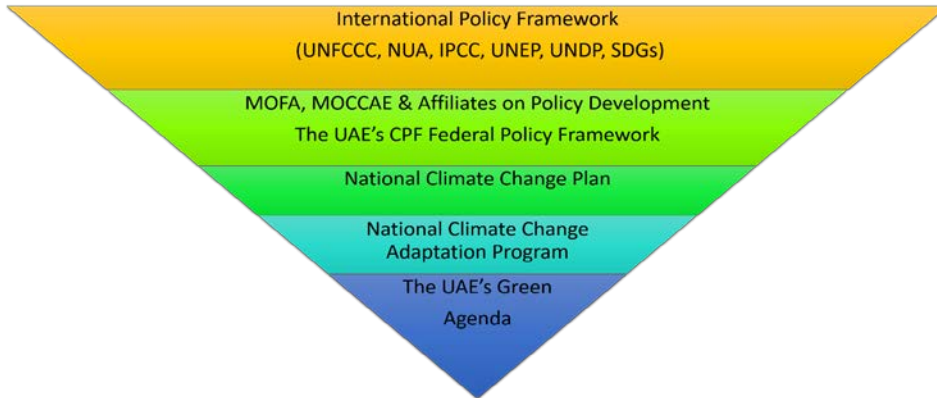
Source: Author's Own Work (2023)

In a partnership between the UAE government, the GGGI, and stakeholders, the Country Planning Framework [CPF] was established to guide the UAE's future (Global Green Growth Institute 2017). The GGGI developed the Theory of Change approach to guide the UAE's transformation through embedding a green growth agenda into CPF.

The center of the green growth plan is to promote low-carbon green growth in key sectors across the UAE, including energy, water, oil and gas industry, transport, and urban development on a federal level through policies and action plans (AlRustamani 2014). Figure 2.12 below illustrates the hierarchy of the UAE's policies that guide development planning and critical sectors, and figure 2.13 shows federal and emirate policy frameworks.

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Figure 2.14 UAE's climate change policy framework.



Source: Author's Own Work (2023)

Figure 2.15 Federal and Emirate level policy framework.

Current federal policy framework	Current emirate policy framework
<ul style="list-style-type: none"> UAE Vision 2021 specifies its objectives of creating a "Sustainable and Diversified Economy" as well as a "Knowledge-Based and Highly Productive Economy". Green Economy for Sustainable Development initiative highlights green investment and technology. Green Agenda covers diversification mainly through the Green Diversification Program and the Environmental Goods and Services Program. National Innovation Strategy calls for the necessity of technological innovation and value-added products and services in the green market economy. SDG 9 focuses on "Industry, Innovation and Infrastructure", and SDG 12 on "Responsible Consumption and Production". 	<ul style="list-style-type: none"> Dubai Industrial Strategy 2030 promotes environment-friendly and energy-efficient manufacturing by limiting energy consumption and manufacturing pollutants, and supporting green economy initiatives. Abu Dhabi Industrial Development Strategy 2011-2015 sets the emirate's target to raise the non-oil sector's gross domestic product (GDP) contribution from 41% in 2005 to 64% by 2030; nurturing the manufacturing industry is a key priority.

Source: UAE Ministry of Climate Change and Environment (2017, p. 42)

2.3.1.2. The UAE's climate change policy response

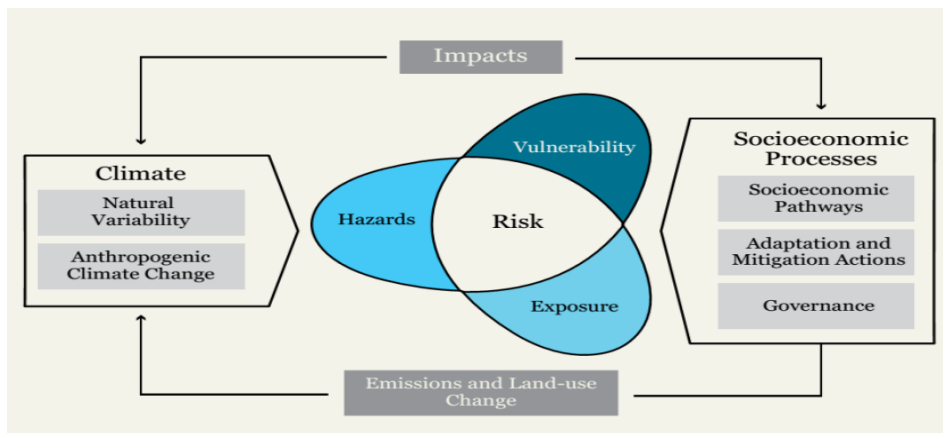
The UAE ratified the Kyoto Protocol in 2005, and as an emerging economy among other developed nations, is encouraged to limit GHG emissions consistently with sustainable development (UAE Ministry of Climate Change and Environment 2019). In 2011, the

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government of the UAE partnered with the Global Green Growth Institute [GGGI] to achieve the UAE's Green Agenda, 2015-2030, the National Climate Change Action Plan [NCCAP] 2050, and the UAE Energy Plan 2050.

In 2016, the UAE ratified the Paris agreement and the Kyoto Protocol to form the basis for the UAE's climate change policy and adopt the IPCC framework for approaching climate change risks and impacts; see Figure 2.14 below as a model for mobilizing mitigation and adaptation.

Figure 2.16 IPCC framework for defining climate change risks and impacts.



Source: EWS-WWF and Acclimatise., (2017, p. 42)

The UAE CPF included the climate change policy framework and the UAE's international commitment to climate change. The UAE launched the National Action Policy [NAP] to embed climate change and policy goals into economic, social, environmental, and urban development.

EWS-WWF and Acclimatise, (2017) highlighted the implications of the international climate change policy framework on the UAE's climate change policy objectives. The broad spectrum of the UAE's federal policy objectives reflects the interconnected nature of the economy, society, and the environment, emphasizing climate change and the economy. To this effect, the UAE's policy objectives consist of the following:

- Economic and societal development policies.

- Environmental policies and initiatives.
- Climate change policies.

Under climate change policies came the NCCAP, which anchors on three pillars:

- Key climate priorities.
- A foundation for green agenda.
- Enablers for implementation.

There are three distinct priorities to tackle the unique climate challenges of the UAE in response to the international policy framework goals, which include:

- National GHG emission management system.
- The national adaptation planning and implementation.
- Private sector-driven innovative diversification program.

The UAE's green agenda is an essential component staged between 2015 and 2030 and built on the 2021 vision, but collectively, it is part of the net-zero 2050 vision. The green agenda aims to achieve five strategic objectives of twelve programs and the 2050 vision. The green agenda deals with green energy, climate change, green investment, green cities, green life, and green technologies (UAE Ministry of Climate Change and Environment 2019). The strategic objectives of the UAE green agenda are:

- Competitive knowledge economy.
- Social development and quality of life.
- Sustainable environment and valued natural resources.
- Clean energy and climate action.
- Green life and sustainable use of resources.

To achieve the 2050 vision and uphold international commitment to reduce GHG emissions, the UAE anticipates the following five enablers of change:

- Innovative green finance.

- Capacity building.
- Governance, monitoring, and evaluation.
- Raising awareness and communication.
- International cooperation.

The UAE proved its commitment to climate change policies and action and ranked 2nd out of 14 projects with Clean Development Mechanisms [CDMs] under the Kyoto Protocol in the Middle East and North Africa. In February 2016, the Ministry of Environment and Water was renamed the Ministry of Climate Change and the Environment, reflecting a further commitment to climate change action, whereby the MOCCA spearheaded collaboration with UNFCCC (EWS-WWF and Acclimatise., 2017). The UAE is considered the most attractive and innovative country in the gulf region, hosting the International Renewable Energy Agency [IRENA]. Table 2.1 below summarizes the development of UAE's climate policy landscape since 1975.

Table 2.2 Climate Policy Development in UAE.

Year	Policy Development
1975	The UAE Supreme Committee of Environment (SCE) formed
1993	Federal Environmental Agency established to replace SCE
1995	Became an official party to the United Nations Framework Convention on Climate Change [UNFCCC]
1999	Federal Law for the Protection and Development of the Environment issued.
2005	Acceded to the Kyoto Protocol as a Non-Annex I Party
2006	Ministry of Environment and Water (MOEW) established
2007	Submitted the First National Communications to the UNFCCC
2009	Became a member and host of the International Renewable Energy Agency (IRENA)
2010	Submitted the Second National Communications to the UNFCCC The first Gulf region state is to be associated with the Copenhagen Accord.
2011	Launched the UAE Vision 2021, the national development planning blueprint Became host to the regional office of the Global Green Growth Institute
2012	Announced the UAE Green Growth Strategy– “Green Economy for Sustainable Development” Ratified the Doha Amendment under the Kyoto Protocol

2013	Submitted the Third National Communications to the UNFCCC
2015	Adopted the UAE Green Agenda 2015-2030 as the implementation framework of the UAE Green Growth Strategy
2016	Reorganized MOEW as the MOCCA Formed the UAE Council on Climate Change and Environment Ratified the Paris Climate Agreement Launched the Dubai Declaration on Sustainable Finance
2017	The National Committee on Sustainable Development Goals [NCSDGs]
2017	National Climate Change Plan 2017-2050

Source: Nachmany et al., (2015) and UAE Ministry of Climate Change and Environment (2017)

The UAE's government developed NCCP 2017-2050 as an umbrella policy framework for climate change action to identify strategic priorities that cover mitigation and adaptation (UAE Ministry of climate change and Environment 2019). The NCCP 2017-2050 structure reflects the UAE's commitment to the global climate change agenda, specifically to transforming the UAE towards a green economy and growth. The NCCP is composed of three phases and three objectives as follows:

A. Phases:

- By 2020, risk management measures will follow climate change risk assessment.
- By 2025, adaptation planning is to be imbedded into development policy.
- 2030 to 2050: continuous monitoring and evaluation to ensure evidence-based adaptation measures.

B. Objectives:

- Identify climate trends and assess their impacts.
- Identify high-risk climate impacts that require urgent response.
- Establish collective implementation from stakeholder groups.

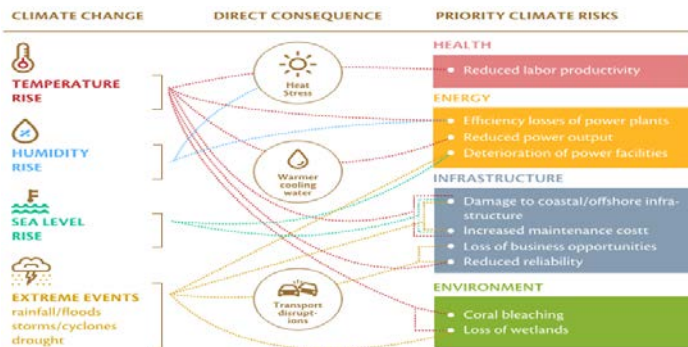
Gathered from the abovementioned policies, we highlight that the UAE's transformation to a green agenda is grounded in shifting the economy from the oil and gas industry towards a diverse economy. This is evident in two significant ways: The Emirates of Abu Dhabi and Dubai became international centers for trading, services, the tourism industry,

and world-class innovation hubs. Masdar, the world's most prominent zero-emission city, embodies the UAE's vision to become a comprehensive model of an economically vibrant, environmentally sustainable, socially cohesive, and effectively governed model for future urban development.

2.3.1.3. The UAE's climate change policy response to urban development

The UAE is among the most predominantly urban countries in the Middle East and Gulf region; 85.5% of the population lives in urban areas, which are the most exposed to the impacts of climate change. The UAE's urban areas face a wide range of climate change impacts, significantly increasing temperatures, energy supply and demand, and rising sea levels. UAE Ministry of Climate Change and Environment (2019) identified ten priority climate risks, as shown in figure 2.15 below; seven of the priority risks are linked to energy and infrastructure.

Figure 2.17 The UAE's Climate risk priorities.



Source: UAE Ministry of Climate Change and Environment (2019, p. 8)

The UAE is a federal state with a federal development planning system whereby each of the seven emirates is responsible for establishing its urban development planning framework under the national and international climate change action policy landscape (Nachmany et al., 2015). The UAE is facing a complex set of climate change-related impacts, risks, and vulnerabilities, forcing an autonomous response from each Emirate to climate-resilient and green urban development.

AlRustamani (2014) suggested that planning for climate change is an iterative process of cumulative knowledge on adapting to climate change over time. Although the MOCCA introduced the national policy for climate change, planning policy documents are unavailable at the local level. However, two problems arise: first, the literature and policy documents at the local level are scarce; second, there is a lack of communication between national and local governments in coordinating policy and action (ibid).

The National Climate Change Plan [NCCP] launched the National Climate Change Adaptation Program to transform the UAE into one of the most resilient countries to climate change. Under the NCCAP, the UAE conducted a risk assessment on the impacts of climate change on four key sectors: health, energy (electricity and heat), infrastructure, and the environment (UAE Ministry of climate change and Environment 2019). Mitigation and adaptation plans are constantly reviewed, assessed, and prioritized through the development cycle for climate change adaptation policy, illustrated in figure 2.16 below.

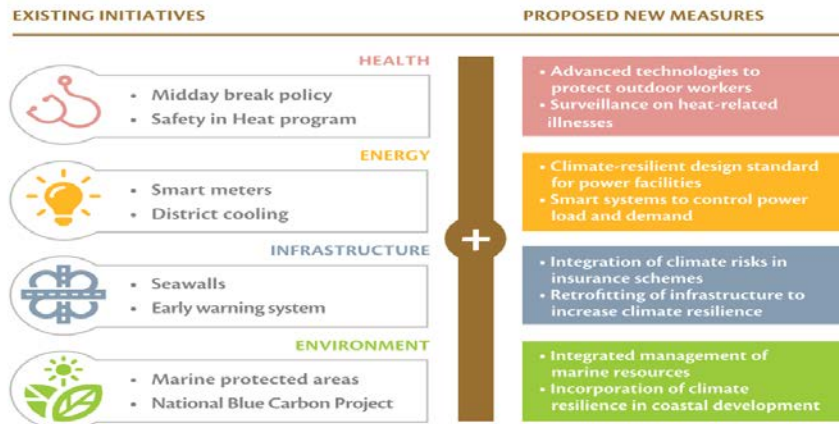
Figure 2.18 Climate change adaptation cycle.



Source: UAE Ministry of Climate Change and Environment (2019, p. 24)

The UAE launched several adaptation initiatives with measures for high-priority climate risks to increase resilience to the identified climate risks. Also, it introduced policies and action frameworks to compensate for insufficiencies in adaptation initiatives (UAE Ministry of climate change and Environment 2019). Figure 2.17 below illustrates high-priority initiatives and proposed measures for high-priority climate-induced risks.

Figure 2.19 Existing initiatives and proposed measures for climate risk adaptation.



Source: UAE Ministry of Climate Change and Environment (2019, p. 9)

2.3.2. The UK

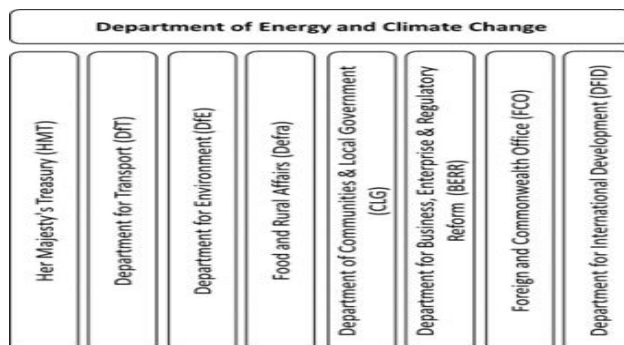
In the UK, long-term planning reduces GHG emissions from the built Environment. The UK has established the first legally enforceable carbon budget, intending to reduce GHG emissions by 80% by 2050 compared to 1990. The Climate Change Act 2008 also encourages a low-carbon economy to help the UK achieve a global climate change agreement (Legislation.gov.uk 2023). The UK government enacted the Climate Change Act 2008 to steer the efforts towards a low-carbon economy in commitment to global climate change. The UK's low-carbon economy concept initiated action in energy, transport, waste, land-use planning and buildings, and renewable energy (ibid).

The year 2006 was the warmest since the 1970s. Temperature increases rainfall predictability. Winters are wetter and have more precipitation. The Department of Energy and Climate Change [DECC] reported 2009 projected drier summers and wetted winters (Department of Energy and Climate Change 2009). AlRustamani (2014) cited that the 5th National Communication to the UNFCCC in 2009 and the UK climate change risk assessment in 2012 addressed climatic uncertainties through mitigation, adaptation, and R&D in three overlapping sections.

2.3.2.1. The UK's institutional structures on climate change

The UK adopted Kyoto and committed to accomplishing the target. Scotland, Wales, and Northern Ireland have supported the government's program. A carbon price, technological policy, and behavioral modification are all used to reduce emissions in the UK. The CCC, shown in figure 2.18 below, guides the UK government and devolved administrators on goals for emissions and communicates to parliament on advancements made to reduce GHG emissions and get ready for climate change adaptation, as well as the Audit Committee to regulate and regulate the implementation of policies related to climate change (Department of Energy and Climate Change 2009).

Figure 2.20 Institutional agreement on climate change in the UK.



Source: AlRustamani (2014, p. 67) from Department of Energy and Climate Change (2009)

2.3.2.2. The UK's climate change policy response

The European Climate Change Program [ECCP] demands that the UK implement climate change mitigation initiatives. Climate change response necessitated a reduction in emissions. Emission reduction is implemented through demand control and investments in renewable energy such as Emissions Trading System [ETS], CDM, Joint Implementation [JI], and energy efficiency supply and demand in transportation, agriculture, industry, waste, forest, and other sectors were studied nationwide. The UK has ratified the European Union [EU] Emissions Trading System, Renewable Energy, and Carbon Dioxide Storage Directives. The UK's Climate Change Act 2008 established the first legally mandated long-term objective of decreasing GHG emissions by 80% by 2050. GHG emissions from the Climate Change Levy [CCL], Carbon Reduction Commitment

[CRC], and European Union Emission Trading System [EUETS] were reduced due to increased energy efficiency.

Table 2.3 The UK's climate policy and initiatives.

Institutions	Instruments	Sectors	Policy Influence / Initiatives
Committee on Climate Change	The Climate Change Act of 2008	Power	<p>Early decarbonization of the power industry; substantial reform of the electrical market; long-term low-carbon transition generating contracts; 2030 carbon-intensity goal.</p> <p>CCS for new coal-fired power plants and gas generation for the experimental scheme, CCS.</p> <p>Prioritize biomass conversion over bioenergy enhancements to existing coal plants.</p>
		Residential / Construction	<p>In 2006, energy-efficient building requirements went into effect.</p> <p>Code for Sustainable Homes: voluntary criteria that go beyond construction codes.</p> <p>Building Energy Performance Directive (2006).</p> <p>Market Transformation Program [MTP].</p> <p>Energy-consuming product eco-design.</p>
		Transport	<p>Alternative Fuel Framework (2003) promotes long-term alternatives to fossil fuels.</p> <p>Increasing fuel economy.</p> <p>Future Transportation white paper.</p>
		Business	<p>Levy on Climate Change.</p> <p>The Carbon Trust, an independent organization, assists the UK in transitioning to a low-carbon economy.</p> <p>Building Regulations in the UK</p>
		Public sector	<p>Planning Policy Statement (PPS)</p>
		Forestry and agriculture	<p>There is no specific aim for lowering greenhouse gas (GHG) emissions or dealing with climate change.</p>

Source: AlRustamani (2014, p. 69)

The UK recognizes that GHG emissions influence climate and has established initiatives under the CCC and Climate Change Act 2008, shown in table 2.2 above, to combat GHG emissions. The Government's Adapting to Climate Change program [ACC] coordinates

and accelerates public sector adaptation initiatives. The ACC emphasized the November 2013 National Adaptation Program via 700 group sessions and two information consultations. NAP recommends climate-resilient government activities. The Climate Change Act 2008 requires a five-year risk assessment and National Adaptation Program review to aid the UK in adapting to climate change. The Government may compel agencies and statutory undertakings to provide climate risk evaluation and management information. Table 2.3 below shows the UK adaptation actions.

Table 2.4 Adaptation Programs in the UK.

Sector	Policies / Initiatives	Goals
Transport	Targets for the Department of Transport [DFT]	Ensure that efficient transportation networks continue functioning correctly and are constructed to resist future climate change.
Planning and Construction	Planning policy Statement	Raise stakeholder awareness of the CCA's UK statutory obligations.
	Proposals for Eco-cities	Identify synergies between the adaptation activities of transportation and other businesses.
	Construction guidelines	
	Regulations on energy efficiency	Adaptation to contemporary transportation planning based on risk. Encourage regional and local transportation authorities to do climate change analysis and mitigation.
Water	Future Water	Specifies how to include flexibility in planning.
	Water Tactical Policy Position Statement of the Welsh Assembly Government	Making urban areas more resistant to climate change's economic and social effects.
	Flood Control - Making Room for Water	Developing cities that are resilient to future climate-related economic and social concerns

Source: AlRustamani (2014, p. 71)

It has been observed that European regulations mandating responses to the effects of climate change are driving the reaction that the UK is making to climate change. In addition, at the national level, an integrated planning strategy for responding to the effects

of climate change is still being developed. At the regional level, the Scottish Government has made more headway in preparing the nation for the impacts of climate change.

2.3.2.3. The UK's climate change policy response to urban development

The urbanization and economic growth rate necessitates the UK to set a holistic and inclusive response to climate change that responds to the interests of stakeholders, groups affected by climate, economic growth, and the existing planning approach to reduce GHG emissions. According to (AlRustamani 2014), the UK's planning response has been framed (Davoudi 2009) into three interconnected aspects:

- Priority-based and context-specific proactive interventions.
- Autonomous pilot regulatory interventions.
- Strategic and participatory coordination and policy integration.

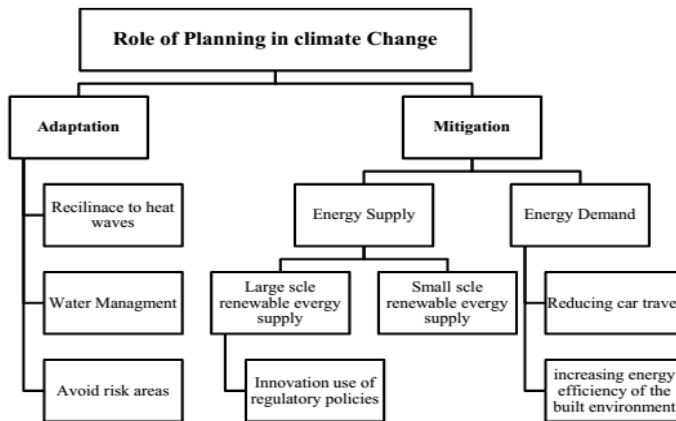
The UK's climate change policy response identified three key sectors: energy supply, demand, and adaptation. AlRustamani (2014, p. 73) cited that (Davoudi 2009) aligned climate policy targets with planning interventions to conceptualize the climate change policy and planning framework illustrated in figure 2.19 below and the role of planning in climate change policy in figure 2.20 below (Davoudi 2009; AlRustamani 2014, p. 73), while figure 2.21 highlights the UK's climate change policy development framework:

Figure 2.21 Spatial interventions and critical climate change policies in the UK.

			Types of planning interventions		
			Proactive Through plans, strategies, resource mobilization	Regulatory Through development control	Strategic coordination Through consultation/ collaboration
Key Climate Change Policies	Energy Supply (Mitigation)	Large Renewables	Site allocation / identification	Infrastructure Planning Commission	Renewable energy industry/ local communities etc
		Small Renewables	Specific requirements (e.g. Merton Rule)	Permitted development	
	Energy Demand (Mitigation)	Reducing Travel	Settlement size, density, mixed use location and accessibility, parking		Developers / transport authorities, etc
		Energy Efficiency		Planning conditions, Code for Sustainable Homes	
	Adaptation	Heat waves	Protecting & enhancing green infrastructure	Planning conditions, Design standards	Coordination with private sector
Drought		Water Management	Planning conditions, Design Standards	Coordination with private sector	

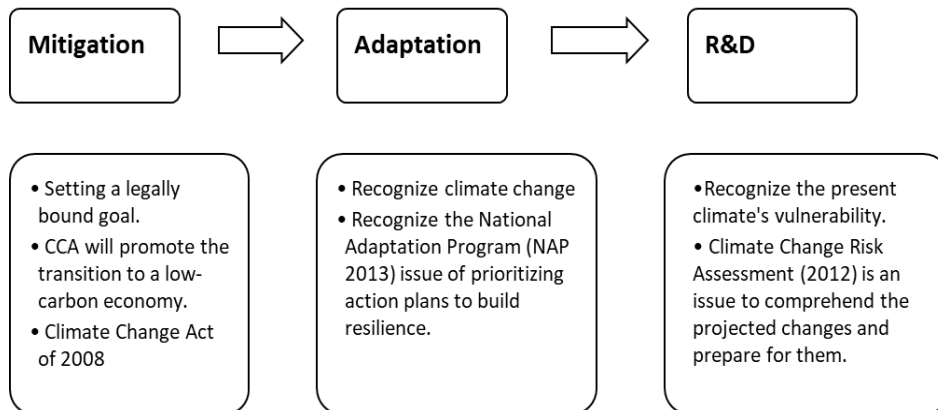
Source: AlRustamani (2014, p.73)

Figure 2.22 The role of planning in climate change.



Source: adopted from Davoudi (2009) and modified by AlRustamani (2014, p.73)

Figure 2.23 The UK Climate change policy development framework.



Source: AlRustamani (2014, p.66)

The CCC report on net-zero carbon stressed the importance of accommodating the impacts of climate change to inform the Climate Change Act 2008, which requires widening the perspective and expanding the ambition to achieve net-zero carbon (Committee on Climate Change 2019). The CCC acknowledges the role of strong leadership, robust planning, comprehensive policy efforts, and solid bases for the UK to achieve net-zero carbon and, therefore, set an example for developed nations as a global climate leader.

In conclusion, planning for climate change in the UAE is mainly fixated on adaptation through green energy supply and demand with efficient consumption, green growth, and a plan for a climate-resilient, carbon urban environment.

2.3.3. Malaysia

The federal Department of Environment leads national and international communications and efforts on climate change, along with state agencies in Malaysia, and implements UNFCCC action across sectors. Malaysia became a member of the UNFCCC in July 1994.

2.3.3.1. Malaysia’s institutional structures on climate change

A constitutional monarchy serves as the form of government in East Malaysia. There are 13 states and three federal territories included in this total. Federal, state, and local authorities are all responsible for contributing to the planning process of national development. The Minister of Environment and Natural Resources chaired a National Steering Committee on Climate Change [NSCCC], including climate change agency representatives. It develops and implements national climate change policy. The Coordinating Committee was renamed the Cabinet Committee on Climate Change and submitted the first National Communication to the UNFCCC. In 2008, the government of Malaysia officially established the Cabinet Committee on Climate Change [CCCC] to integrate the state's climate change agenda into the national development policy and framework shown in figure 2.22 below.

Figure 2.24 Malaysia's National Steering Committee on Climate Change.

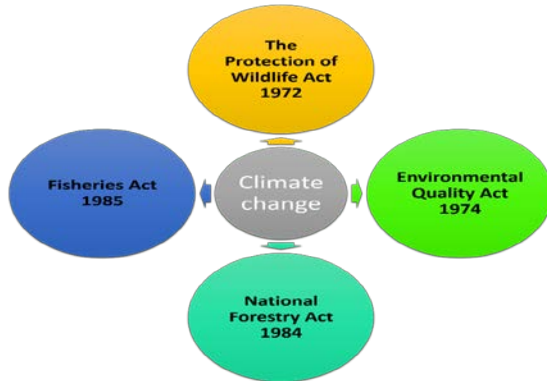
Ministry of Science, Technology and the Environment (Chair)	Malaysian National Steering Committee on Climate Change (NSCCC)
Ministry of Energy, Communications and Multimedia	
Ministry of Finance	
Ministry of International Trade and Industry	
Ministry of Foreign Affairs	
Ministry Primary Industries	
Ministry of Agriculture	
Ministry of Education	
Economic Planning Unit, Prime Minister’s Department	
Attorney General’s Office	
Malaysian Meteorological Service	
Others as and when required (eg. NGOs)	

Source: AlRustamani (2014, p.77)

The CCCC reports to the prime minister, develops mitigation and adaptation policies, decides on climate change measures, guides adaptation and mitigation, and receives feedback from corporations, NGOs, and academia. The department of Natural Resources and Environment spearheads policy development and implementation in Malaysia through climate change legislative integration shown in figure 2.23 and policy integration

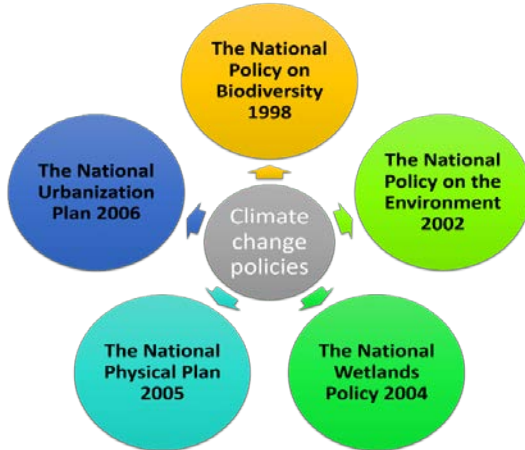
in figure 2.24 and the set of policies, laws, and regulations indirectly linked to Malaysia's climate change policy illustrated in figure 2.25 below.

Figure 2.25 Malaysia's climate change legislative integration.



Source: Author's Own Work (2023)

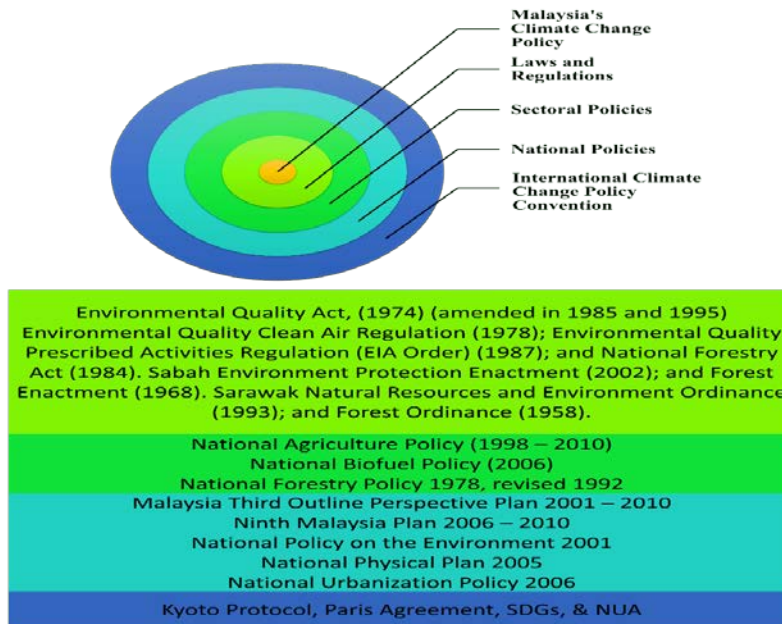
Figure 2.26 Malaysia's climate change policy integration.



Source: Author's Own Work (2023)

Commented [SF8]: Again - where did you source the information from to complete these two schematics?
If it is adapted from a website or paper that needs to be acknowledge

Figure 2.27 Laws, regulations, and policies indirectly linked to urban development in Malaysia.



Source: Adopted from Knowledge Adaptation Platform (2011) and modified by Author's Own Work (2023)

Commented [SF9]: This should be 'adapted'

2.3.3.2. Malaysia's climate change policy response

As a nation on the ascent, Malaysia recognizes the need to make ecologically responsible decisions about its economic expansion and reducing its output of GHGs. Representatives from energy, industrial processes, agriculture, land, and forestry are included in the Working Group for Mitigation, as stated in the Malaysian National Communication on Climate Change [MNCCC].

The results of the second national communication study on possible methods for mitigating the effects of climate change on critical industries are shown in figure (2.16) below. According to findings from studies on climate change, Malaysia's regulations on sustainability have the potential to assist in the reduction of greenhouse gas emissions caused by high-emission enterprises.

The National Physical Plan 2005 encompasses planning physical space and managing natural resources to guarantee sustainable growth and a high standard of living. This was done to ensure that the plan would be effective. The National Physical Plan emphasizes reducing GHG emissions through transit-oriented development, an integrated national transportation network, and public transportation in large metropolitan areas.

Climate change adaptation is embedded in a variety of environmental protection policies, such as integrating environmentally sensitive areas into land use and natural resource management, establishing the central forest spine to control development in highlands and protect humans and environmental quality, and preserving surface and groundwater as strategic resources (AIRustamani 2014). Figure 2.26 below highlights mitigation and adaptation initiatives established by the Malaysian government.

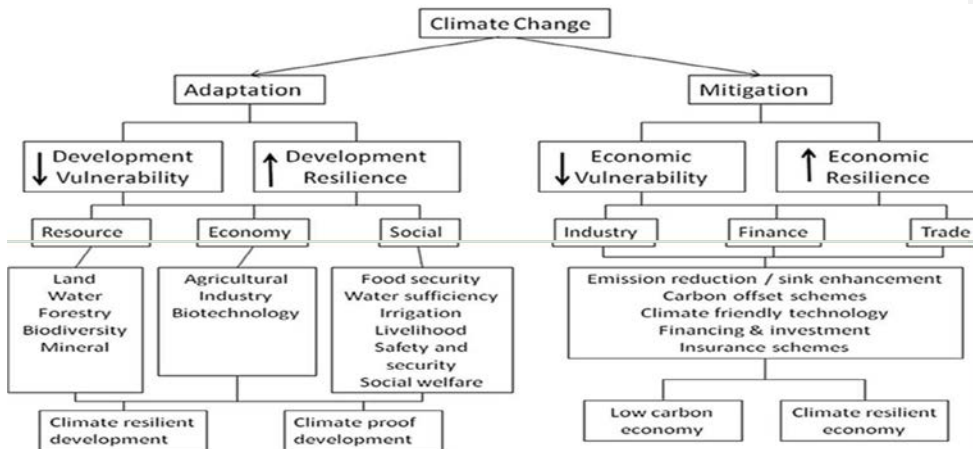
Figure 2.28 Summary of climate change mitigation and adaptation initiatives in Malaysia.

Initiative	Adaptation Policies / Initiatives	Mitigation Policies / Initiatives
<ul style="list-style-type: none"> • Environmental policy goals of the government 	<ul style="list-style-type: none"> • Integration of Planning and Resource Management Framework into spatial development polices 	
<ul style="list-style-type: none"> • National Physical Plan • Integrate physical planning and natural resource utilization within a management process aimed at achieving sustainable development goals 	<ul style="list-style-type: none"> • Promote compact urban development • Optimize the utilization of existing & future infrastructure & utilities 	<ul style="list-style-type: none"> • Integrated national transportation network • Promote Transit Oriented Development (TOD) concept
<ul style="list-style-type: none"> • National Urbanization Policy 	<ul style="list-style-type: none"> • Land Use Planning Appraisal for Risk Areas (LUPAr) 	<ul style="list-style-type: none"> • Integrated and efficient urban transport system • Creation of conducive living environment that promotes the green building concept
		<ul style="list-style-type: none"> • Green Building initiatives
		<ul style="list-style-type: none"> • Smart and cool homes technology

Source: AIRustamani (2014, p.82)

Figure 2.27 below shows that the Department of Environment determines the national climate change response, including adaptation and mitigation. Sector-specific researchers and developers provide R&D in the development and economic areas.

Figure 2.29 Malaysian Framework for Climate Planning.



Source: AlRustamani (2014, p.76) from Yusoff (2011)

2.3.3.3. Malaysia's climate change policy response to urban development

The Federal Department of Town and Country Planning's [FDTCP] national urbanization plan is to "Build a visionary city with a harmonious neighborhood and living environment through resilient urban development" (Federal Department of Town and Country Planning, 2006). The FDTCP drafted the National Physical Plan [NPP] to guide Malaysia's urban development and follow a concentrated decentralization model. In 2005, the cabinet approved the first NPP 2006-2020, highlighting Malaysia's broad development trend, land use, and physical development. The National Physical Planning Council reviews the NPP every five years under the National Five-Year Development Plans, where the federal and state governments oversee the development and implementation of policies and plans and utilize the state's structural plans. The revised NPP2 in 2010 included sustainability and equity to achieve a high-income state by 2020 and emphasized the need for action towards the pressing issues of climate change, sustainable urban structure, biodiversity, food security, and green technology.

The literature and policies on Malaysia's urban development offer a broad framework on the importance of climate change-conscious urban development practices and the future. However, empirical research and the literature emphasize flooding, rising sea levels,

energy, and urban heat island effects as climate change-related risks to the urban development of Malaysia. The National Urbanization Policy [NUP] encouraged development forms that reduce the effect of Urban Heat Islands [UHIs] (Federal Department of Town and Country Planning 2006) and UHI's effect on urban energy consumption (Climate Risk Country Profile: Malaysia 2021).

2.4. The literature on climate change policy analysis

Global climate change policy development came with the UNFCCC as climate change effects emerged. National governments are still developing policy and institutional structures to cope with the pace of climate change and mitigate and adapt to the economic, social, and environmental impacts of climate change. Scholarly contribution to climate change policy analysis remained context or subject-specific and limited evidence-based policy analysis.

Kamieniecki and Sanasarian (1990) stated that climate change policy research can benefit from theories in the field of comparative politics and cited the literature before 1990 that failed to apply theories and approaches of comparative politics to climate change policy analysis. Mehling (2015) argued that climate change defies traditional approaches to knowledge inquiry due to its scale and complexity, suggesting that climate change as an issue demands broader interdisciplinary research and that law and its rigid doctrines are unsuitable for the fluidity of climate change. Nevertheless, comparative law offers utility to bridge the gap between what (Mehling 2015) suggested as the facts and norms about climate change. Purdon (2015) deepens the discourse by illustrating the advancements in environmental politics literature and suggests that rigorous comparative policy analysis possesses three distinct features: institutions, interests, and ideas serving as the primes to domestic climate change politics.

The importance of integrated policies and frameworks lies at the heart of policy development and implementation and empowering sustainability transition (Bai et al., 2009). On the one hand, the literature suggests a discontinuity in policy development across scale, scope, locality, and implementation. On the other hand, decision-making processes are hindered by institutional mismatches operating across time, scale of governance, and implementation (ibid). This discontinuity manifests in operational terms

as decision-makers are constrained by the time scale in which they fulfill their duties, spatial scales in the form of jurisdictions, and institutional mismatch as decision-makers have to work within the hierarchy of governance structures. It is important to consider scale mismatches, but temporal mismatch affects long-term goals, as time-frames constrain decision makers, while goals such as GHG reduction and net-zero carbon are long-term goals.

Comparative analysis focused on specific aspects of climate change mitigation and adaptation, such as green finance policy outputs (Stadelmann-Steffen 2021), highlighting the knowledge gap in adaptation and mitigation in Latin American countries (Ryan and Bustos, 2019), comparative assessment of environmental policy instruments (Bailey and Rupp, 2005), energy and climate policy comparative analysis (Kaivo-oja et al., 2016), comparative evidence-based policy analysis of climate change adaptation in Australia and the UK (Tangney and Howes, 2016). (Malloy and Ashcraft, 2020) conceptualized a framework for promoting social justice in climate adaptation (Mi et al., 2019) focused on assessing city mitigation policies and GHG reduction across different sectors such as transport and energy. Romero-Lankao (2016) explored governing carbon emissions in cities through policy, planning, and the challenges encountered. McCright et al., (2016) explored how capitalism and ideology shaped the public and community views on climate change in the United States of America [USA].

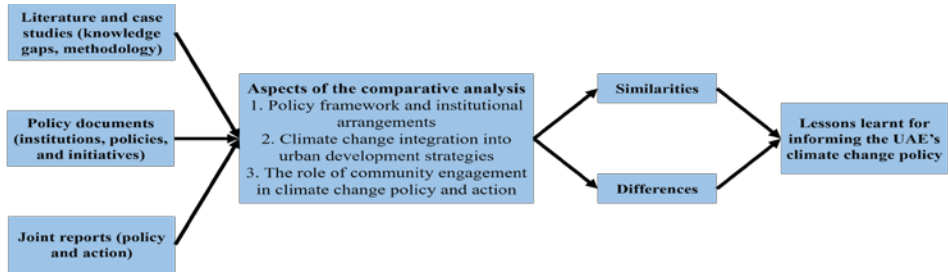
Vogel and Henstra, (2015) developed an empirical framework for comparative climate policy analysis. Schaffrin., et al., (2015) introduced the Index of Climate Policy Activities based on the taxonomy of policy provided by Howlett et al., (2009) to tackle theoretical and empirical challenges resulting from context-specific setting facing climate policy analysis by integrating a density-intensity approach (Knill., et al., 2012), categorization of policy instruments (Jordan., et al., 2005; Hood 2007; Steurer 2011). The intensity measure as a basis for analysis looks at the different types of policy types (International Energy Agency 2013), such as soft measures, market-based instruments, policy frameworks, public investment, and regulatory instruments as a basis for analysis, including comparative analysis, whereby the researcher uses the number of policy types for comparison.

The literature mentioned above on comparative analysis reflects (International Energy Agency 2013; Schaffrin, et al., 2015) approaches in categorizing policy types and empirical analysis. For instance, (Stadelmann-Steffen 2021) focuses on green finance as a regulatory instrument in OECD countries, and several case studies cited carbon pricing as a market-based policy measure. Ryan and Bustos, (2019) adopting the policy framework analysis highlighted in (International Energy Agency 2012), how climate change policy influenced the energy sector to move from oil-based and nuclear to renewables (Kaivo-oja et al., 2016), empirical analysis to policy instruments as (Tangney and Howes, 2016) highlighted. Lesnikowski et al. (2019) empirically compared climate change adaptation policies of 125 local governments in 25 of the largest cities in Canada, France, Germany, the Netherlands, and the UK, highlighting a sum of 3,328 adaptation policy devices aggregated at the local government.

2.5. Conceptual framework

Policy analysis is crucial for a deeper understanding of climate policy and action in light of the pressing imperative to address climate change. Under the theoretical framing highlighted in section 2.2, this study explores the prevailing global climate change trends to the collaborative institutional frameworks at the international level that have been established to guide collective action on national and local levels. Through a documentary comparative review of existing literature, policy documents, and reports, this research lays the groundwork for informing the UAE’s national climate change policy and institutional structures established in Figure 2.28 to spearhead and manage a coordinated climate response.

Figure 2.30 The conceptual framework.



Sources: Author's Own Work (2023)

2.6. Chapter Summary

In this chapter, the researcher analytically reviewed the relevant literature on climate change and climatic variations concerning climate risks and challenges, climate change policy across the UAE, the UK, and Malaysia, and how climate change's global impact inspired the global agenda and convention on climate change action—followed with literature review on climate policy analysis to highlight the differences, similarities, and gaps within the discourse on policy analysis, both theoretical and empirical approaches. Climate change policy on a global level is framed under the Kyoto Protocol and the Paris Agreement to mitigate GHG emissions and adapt to climate-related risks and hazards identified nationally. Meeting Kyoto Protocol and Paris Agreement thresholds requires integrating climate policy across sectors while fostering coordinated action vertically through the hierarchies of governance structures and horizontally across institutions.

As a regional leader in climate change, the UAE adopted the concept of green growth and the 2050 vision to transform and diversify its economy. The UK envisioned net-zero carbon to guide and innovate climate-resilient growth, while Malaysia is promoting climate-conscious and resilient communities.

In the light of reviewing climate change policy and institutional structure, the UAE centralized its policy and vision, whereby the MOFA and MOCCAIE operate and organize nationally. On an emirate level, institutions and organizations implement the UAE's policy and vision independently. This approach to policy may foster innovation for the green growth agenda but creates a discontinuity in policy integration from national to local levels and hinders monitoring and tracking progress. The UK's federal government leads climate change policy and action under the Climate Change Action 2008 and the CCC across the governance structure and institutions hierarchy, leading to integrated climate policy coordinated climate action. In Malaysia, climate change policy is centralized and operates vertically across institutions and federal states and horizontally across the levels of the federal system from national to local level.

Methodology .3

3.1. Comparative methodology

In this section, the researcher explains the comparative methodology applied throughout this research. This research stems from the concept of 'policy community' (Skogstad 2005) dissected in section 2.2 above. The methodology exhibits the notion of policy/community network to look at climate change policy and institutional structures of the UAE, the UK, and Malaysia. The comparative approach compares three significant aspects of climate change policy and action in the UAE, the UK, and Malaysia to form constructive feedback for the UAE's climate policy and action. The first aspect deals with the broad realm of climate action in terms of climate change policy framework and institutional structures. The second aspect deals with integrating climate change into urban development practice. The third aspect deals with the role of community engagement in fostering climate-responsive policy and action.

The research approach centers around using materials from the literature on climate change policy, policy documents, and country reports on climate change policy and action to understand how the UAE can benefit from the UK's and Malaysia's approaches to develop an integrated and comprehensive climate change policy and action. To this effect, the comparison features the following aspects: climate change laws, regulations, and initiatives, the institutional structures responsible for implementation, the integration of climate change policy into urban development practice, and the role of community engagement in fostering climate-responsive policy and action. Answers to the research questions will be gained by reviewing the similarities and differences between the UAE, the UK, and Malaysia to highlight the areas where the UAE's climate policy can be enhanced. The analysis is intended to provide a perspective for better cross-sectoral integration of climate change policy, urban development practice and community engagement in policy development in the UAE.

3.2. Research limitations

The effects of climate change in the United Arab Emirates have been a subject of increasing concern due to the region's vulnerability to its impacts. The UAE, characterized by its arid and desert climate, faces unique challenges from rising temperatures, changing

precipitation patterns, rising sea levels, and other climate-related phenomena. While research on this topic has shed light on many important aspects, it is essential to acknowledge some research limitations that can affect the comprehensiveness and accuracy of findings. Here are a few research limitations and the associated challenges of climate change in the UAE:

- **Limited Long-Term Data:** Long-term climate data is crucial for understanding trends and making accurate predictions. However, historical climate data in the UAE may be limited, affecting the ability to discern long-term patterns and identify precise climate change impacts.
- **Conceptualizing the object of comparison:** Schaffrin., et al., (2015) stressed conceptualizing the object of comparison in climate change comparative policy analysis. This applies in this research as we compare three different contexts with different political, governance, economic and social systems bounded by the natural settings that underline their climate change-related challenges.
- **Data Quality and Availability:** The availability and quality of climate data, including temperature and precipitation on a national level, can vary across different regions and overlooks sub-national variations.
- **Localized Effects:** Climate change impacts can vary widely even within a relatively small geographical area. Some research might not capture the localized effects of climate change in specific regions within the UAE, leading to a potential underestimation of specific impacts.
- **Complex Interactions:** Climate change effects often interact with other factors, such as urbanization, population growth, and economic development. Isolating the exact influence of climate change on specific challenges can be difficult due to these intertwined factors.
- **Projection Uncertainties:** Climate models are used to project future changes but come with uncertainties. Different models can yield different projections, and the accuracy of long-term predictions can be affected by factors like emissions scenarios and model assumptions.

- **Adaptation Strategies:** While research often focuses on the impacts of climate change, there might be a limited exploration of effective adaptation strategies that can help mitigate these impacts. Understanding how the UAE can adapt to changing conditions is crucial for informed decision-making.
- **Socioeconomic Factors:** Climate change impacts are not only environmental; they have significant socioeconomic implications. Research might not always fully capture the UAE's broader societal and economic consequences of climate change.
- **Limited Focus on Biodiversity:** The UAE's unique ecosystems and biodiversity are also at risk due to climate change, but research might not adequately cover the potential ecological consequences and the importance of preserving local biodiversity.
- **Policy and Governance:** The effectiveness of climate change mitigation and adaptation policies can significantly influence outcomes. Research might not fully address the crucial policy and governance aspects in addressing climate challenges.
- **Inclusive Representation:** Ensuring diverse representation in research can provide a more comprehensive understanding of climate change impacts, considering different perspectives, socioeconomic backgrounds, and vulnerable populations.

Commented [SF10]: Mona - you HAVE NOT addressed the limitations of the methods chapter.

This is totally inadequate - we have explained again and again what is required in the methods chapter - you do not provide any detail on how your chosen method will answer your RQs, virtually no information on your data sources or how you analyse them (apply the comparative analysis) - sadly, this section has gone backwards - it has to be addressed with urgency.

Analysis and findings .4

4.1. Contextual review

The contexts of the UAE, the UK, and Malaysia are distinct in climate conditions, climate change-related hazards, governance structure, climate change policy framework, initiatives, strategies and adaptation approach, and community engagement approach. Still, the UAE, the UK, and Malaysia converge at the international climate change conventions such as the Kyoto Protocol, the Paris Agreement, and the Sustainable Development Goals.

Climate change challenges are context-specific and depend on the climatic zone, natural and built environment and man-made systems. However, the contributions to GHG are global. In terms of the natural environment, climate change affects temperature, humidity, rainfall, floods, and proximity to seas and oceans, affecting the rise of sea levels, and topography and geographies affecting drought and floods. As for the built environment, climate change affects energy systems through increasing temperature and humidity, which affect both supply and demand for energy and infrastructure by extreme weather events, and indirectly affects the economy through adherence to GHG limits. Although climate change dates back more than five decades ago, when climate change was perceived as an environmental issue, only recently has climate change been acknowledged as a cross-sectoral issue (AlRustamani 2014).

The increase in global temperature, “*global warming*,” is the global benchmark for conceptualizing and tracking climate change, but the advent of analysis and modeling in climatology generated diverse and multi-factor indexes to track climate change.

As of my last knowledge update in September 2020, I can provide some general insights into how climate-induced challenges influence decision-making processes and policies related to sustainable urban development in the UAE, UK, and Malaysia. However, please note that specific developments or changes beyond September 2020 are not included in my response.

Commented [SF11]: This chapter should reflect the steps laid out in the methods chapter - ie. it should follow the steps of comparative analysis detailed in chapter 3, reflect the approach of Coleman and Skogstad, described in section 2.2 and further described in chapter 3. Chapter 3 needs to detail how the analysis is conducted - ie. how do you derive the results reported in chapter 4 ... etc.

4.1.1. The UAE

The UAE faces unique challenges due to its arid climate and dependence on fossil fuels. Climate-induced challenges like rising temperatures, water scarcity, and desertification have prompted the UAE to prioritize sustainable urban development. In recent years, the UAE has taken steps to integrate sustainability into its urban planning and policy frameworks, such as the UAE Vision 2021 and the UAE Green Agenda 2015-2030. These initiatives emphasize energy efficiency, renewable energy, and water conservation.

The UAE's rapid urbanization has led to concerns about ecological footprints and environmental degradation. While the UAE has invested in renewable energy projects and sustainable infrastructure, the dominance of the oil and gas sector in its economy creates a complex challenge in terms of transitioning to a more sustainable development path.

4.1.2. The UK

The UK has been actively addressing climate-induced challenges in its urban development policies. The Climate Change Act 2008 and subsequent commitments demonstrate the UK's commitment to reducing GHG emissions and promoting sustainable practices. This has led to policies encouraging energy-efficient buildings, public transportation, green spaces, and low-carbon technologies in urban areas.

Climate change impacts such as flooding and extreme weather events have influenced UK urban planning and infrastructure development decisions. The Thames Barrier, for example, was built as a response to the increased flood risk in London due to rising sea levels. The UK's robust regulatory framework and public awareness of climate issues contribute to its more integrated approach to sustainable urban development.

4.1.3. Malaysia

Malaysia faces climate-induced challenges, including tropical storms, flooding, and rising sea levels. Initiatives like the National Physical Plan and the Eleventh Malaysia Plan guide sustainable urban development in Malaysia. These plans emphasize sustainable land use, urban resilience, and green infrastructure. However, challenges arise from rapid urbanization and industrialization, particularly in cities like Kuala Lumpur. These pressures can sometimes lead to conflicts between economic development and

environmental conservation. Malaysia's approach to sustainable urban development is influenced by its status as a developing country with a growing economy, which can affect the prioritization of economic and environmental concerns.

4.2. Policy response to climate change and urban development

The flow of global ideas, challenges, and policies on climate change streamlined national and local policy development and implementation. However, policy development and implementation lack coordination and comprehensiveness in many aspects. The gap between goals and the status quo poses essential questions regarding the comprehensiveness, applicability, and efficiency of policies and transparency in reporting climate change policy implementation. On a state level, national legislation and policies form the basis to guide climate action on a sub-national level, while climate action takes the form of initiatives and action plans on the sub-national and local levels. By comparing the UAE, the UK, and Malaysia in terms of policy response to climate change, it is essential to emphasize the complexity and cross-sectoral nature of climate change issues globally, nationally, and locally. With cities and the built environment and all the associated economic, social, and environmental systems, the challenges seep not only into the built environment and urban issues but extend to the institutional structures we need or have in place and will operate within time if we are to realize the green agenda and resilient built-environment along with economic prosperity, and social cohesion.

Regarding urban development, the climate change global policy framework primarily focuses on mitigating the root causes of climate change and secondly deals with adapting the energy system, the economy, and the built environment to the diverse effects of climate change. Kyoto Protocol and the Paris Agreement form the basis for country-specific climate change action plans that respond to climate-related risks, mitigation, and adaptation capabilities to target the efforts toward sectors that highly contribute to GHG emissions and promote the transition to a green economy. The energy sector, industry, transportation, and buildings account for 79% of GHG emissions globally, while agriculture, forestry, and other land uses account for 22% (Intergovernmental Panel on Climate Change 2023).

In the UAE, the UK, and Malaysia, climate change policy regarding urban development focused on reducing GHG emissions using mitigation, adaptation, and initiatives based on context-specific risks, priorities, and institutional structures, and the following sub-sections will provide further details.

4.2.1. The UAE

Gathered from the available resources on climate change response in the UAE showed a lack of literature and policy documents dealing with directly embedding climate change into the urban development framework. The UAE has federal climate legislation and action plans. However, the UAE's institutional structures dealt with climate change challenges in specific sectors within the broader realm of urban issues. AlRustamani (2014, p.91) described the UAE's response to climate change as *an ad-hoc process* leveraging technological advances to respond and adapt to climate change. The global trend in climate response led the UAE to adopt *Green Growth* as a concept and create the institutional structures for a robust response to climate change.

The UAE has set three key climate policy priorities at the national level: first, the national GHG emission management system; second, national adaptation planning and implementation; third, the private sector-driven innovative diversification program. The first key priority is geared toward establishing a monitoring system for GHG emissions on a national scale, working on meeting the GHG emission target, and ensuring environmental sustainability. The second priority is tailored toward cross-sectoral resilience to climate change impacts, especially in development planning to manage contemporary and future climate risks. However, the priority and policy are in place, but implementation at the national level requires an evidence-based approach to adaptation planning. The third priority reflects the green growth agenda. It is geared to ensure eco-friendly economic growth and "*green growth*" through diversification by leveraging the nation's wealth, technology, and innovation to invest in environmental services by enabling the private sector to establish environmentally sustainable innovative businesses and services. Recently, the government began providing and developing the necessary institutional structures for the green growth agenda. The UAE prioritized leveraging co-benefits between adaptation and mitigation, whereby mitigation deals with climate change causes, and adaptation manages the impacts of climate change to deal

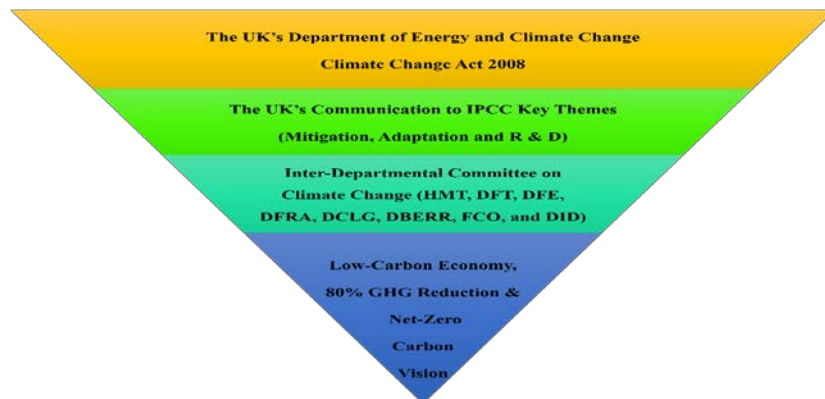
with behavioral issues, urban governance, water, green infrastructure, energy, waste, buildings, transportation, urban design and land-use planning (Sharifi 2021).

4.2.2. The UK

The UK's climate change policy is led by England's climate change policy framework and mainstreamed to Ireland and Wales. The Climate Change Act 2008 is the central climate change policy document intended to reduce the UK's GHG emissions by 80% by 2050. The rapidly changing climate patterns have expedited the UK's response to climate change since the 1970s. To cope with the rapid change, the UK prioritized three key areas: first mitigating causes, second adapting to the contemporary impacts, third leveraging R & D for better change projections to inform policy development, mitigation, and adaptation.

The overarching institution that guides and implements the Climate Change Act 2008 is the CCC, which coordinates the UK's response to climate change through inter-departmental committees to establish a low-carbon economy, GHG reduction, and Net-Zero carbon vision, see Figure 4.1 below.

Figure 4.31 The UK's Climate Change Policy and Goals.



Sources: Author's Own Work (2023)

The UK developed autonomous institutional structures for mitigation and adaptation with distinct goals and devices to ensure comprehensive implementation of the Climate Change Act 2008 across sectors, including urban development. For mitigation, the UK is

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committed to the European Climate Change Program and mitigating climate change through reducing GHG emissions, where the energy sector is leading the efforts. The UK established three distinct national-level mechanisms in line with the Kyoto Protocol: the ETS, CDM, and JI. Carbon emission pricing is another instrument for reducing GHG emissions, and this shows that the UK is pushing the effort to meet the net zero Carbon goal.

Mitigation initiatives are implemented with the supervision of the Climate Change Committee under the Climate Change Act 2008, and mitigation deals with power, buildings, transport, business, the public sector, and agriculture and forestry to mitigate GHG emissions and reduce carbon footprint across these sectors.

Adaptation initiatives, however, deal with building resilient water, planning, construction, and transport sectors, meeting policy objectives, achieving green growth, resource sufficiency, and quality, and promoting SDGs.

4.2.3. Malaysia

In Malaysia, climate change policy is directly linked to the National Physical Plan 2006 and the National Urbanization Plan 2006. The national physical plans incorporated climate change adaptation and mitigation into different issues in the following sectors, as indicated in Table 4.1 below.

Table 4.5 Malaysia's climate adaptation and mitigation initiatives and strategies.

Action	Programs and Initiatives for Adaptation	Strategies and Actions for Mitigation
The Government's ecological objectives	The Integration of a Planning and Resource Management Model into Spatial Development Strategies	
National Physical Strategy To achieve sustainable development objectives, integrate physical planning and natural resource exploitation into a management process.	Promote compact urban development by maximizing the utilization of existing and future Infrastructure and utilities.	Promote Transit-Oriented Development (TOD) via an integrated national transportation network.

National Urbanization Policy.	Risk Assessment for Land Use Planning [LUPAr]	Promoting green construction by integrating and improving urban mobility.
		Green construction projects
		Exciting and innovative technologies for homes

Source: AlRustamani (2014, p.81)

Both the National Physical Plan and the geographical framework of Agenda 21 aim to combat climate change, while the latter also works to advance sustainable development. Malaysia intends to keep its water resources, coastal ecosystems, mountains, and rainforests in their original conditions so that they can act as a source of carbon that has been stored. The national physical plan must contain ecologically sensitive land use and natural resource supervision areas—a Central Forest Spine, coastal environmental security, and groundwater and surface water protection. Additionally, the program needs to include a Central Forest Spine.

In Malaysia, there are four institutions directly urban development with climate change vulnerability and adaptation, focusing on urbanization and land use planning to adapt to climate change: The Ministry of Agriculture, Ministry of Housing and Local Government, Town and Country Planning Department, and the state government. There are 5 Principles [P] of Malaysia's national policy on climate change, referred to as P1 to P5, P1, and P3, which are indirectly linked to urban development and stress the need to embed climate change consideration into development planning and plans.

The NPCC 10 Strategic Thrusts [ST] are linked to the principles of NPCC on climate change action. As far as urban development and climate change entwine, all of the STs are directly influencing the significant aspects of urban development including energy supply and demand, clean, efficient energy consumption and GHG urban emissions (ST5-P2), urban governance (ST6-P3), resilient built-environment (ST3-P1), and community participation in urban policy development (ST8 and 9-P4), integration and implementation (ST1-P1), climate change mitigation and adaptation (ST4-P2).

It is valid to convey that Malaysia's integration of climate change policy objectives runs deep into urban development planning policy framework and initiatives, creating

resilience and an eco-friendly urban realm. In practicality, however, the climate risk assessment report suggests room for improvement and a need to accommodate.

4.3. The role of community engagement

Cultural and Social Context: Cultural norms and social structures influence how community engagement is approached. In the UAE, cultural norms may impact the depth and nature of engagement, whereas the UK's democratic traditions support robust engagement.

In all three countries, successful community engagement requires tailoring strategies to the local context, acknowledging cultural sensitivities, ensuring inclusivity, and providing platforms for meaningful participation. While the approaches may differ, the shared goal is to harness local knowledge and perspectives to create climate-responsive urban development strategies that are sustainable and effective.

As of my last knowledge update in September 2021, I can provide some general insights into how climate-induced challenges influence decision-making processes and policies related to sustainable urban development in the UAE, UK, and Malaysia. However, please note that specific developments or changes beyond September 2021 might not be included in my response.

Community engagement plays a crucial role in fostering the successful implementation of climate-responsive urban development strategies in the UAE, as well as in the UK and Malaysia. It facilitates collaboration, builds ownership, and ensures strategies are tailored to local needs and contexts. Here is how community engagement compares in these three countries:

4.3.1. The UAE

Community engagement is evolving in the UAE as sustainability becomes a higher priority. While community engagement is gaining traction, the traditional hierarchical decision-making structure can sometimes limit the depth of engagement. However, some initiatives aim to involve the public in sustainable urban development.

Cultural norms and their developmental context influence the UAE's approach to community engagement. In recent years, there has been an emphasis on raising

awareness about climate change and sustainability among the public. Public events, awareness campaigns, and educational programs engage communities in discussions about environmental issues.

4.3.2. The UK

Community engagement has significantly influenced the UK's climate-responsive urban development strategies. The UK has a history of active community involvement in urban planning and environmental decision-making. Active community engagement includes public consultations, participatory workshops, and community-led initiatives.

The UK's strong tradition of local governance and planning regulations requires developers to engage with local communities during the planning process. This approach fosters a sense of ownership among residents and ensures that climate-responsive strategies are aligned with local needs and preferences. Community engagement is often integrated into the Environmental Impact Assessment process, allowing communities to voice concerns and suggestions.

4.3.3. Malaysia

Community engagement in Malaysia varies depending on urbanization rates and local governance structures. Community engagement has been instrumental in promoting climate-responsive urban development in some areas. However, challenges can arise due to cultural diversity, differing levels of awareness, and socioeconomic disparities.

Efforts have been made to engage communities in sustainable urban development through public forums, consultations, and stakeholder engagement. In Malaysia, community engagement often focuses on issues like flood management and disaster preparedness, which are directly related to climate impacts.

4.4. Findings

In this section, the research discusses similarities and differences between the UAE, the UK, and Malaysia in three key aspects: climate change priorities and policy, climate change policy and urban development, and community engagement and climate change.

4.4.1. Similarities and differences in climate change priorities and policy

Climate change priorities are subject to the level of economic development and climate-induced challenges relevant to the geographical settings. However, the global policy agenda on climate change prioritized reducing GHG emissions that accelerate global warming, and national states are required to pledge to reduce GHG emissions across sectors by transforming to the concept of a green economy and developing climate action plans for mitigation and adaptation.

4.4.1.1. The UAE

The UAE has unique climate-induced challenges and policy frameworks. However, the government ratified the Kyoto Protocol and the Paris Agreement at the national level, climate change policy and planning are decentralized, whereby each of the seven Emirates is responsible for adherence to the national priorities on climate change without a reference point on the level reduction required from each state to achieve the national goal. On the one hand, the UAE leveraged its economic resources and technological advances to mitigate and adapt to climate change. On the other hand, the UAE simultaneously strives for sustainable economic growth under *Green Growth*. However, climate change policy in the UAE requires better integration from the federal to the Emirate level, at least in terms of laws and regulations, which can be leveraged in terms of in-country knowledge and experience exchange, coordinated action, and a comprehensive system for informing policy development through public engagement.

4.4.1.2. The UK

The UK's climate change policy centers around the global agenda and the nature of climate-induced challenges at the national level. The UK has an integrated policy framework that embeds climate change into the broader policy frameworks but is geared explicitly towards emissions reduction targets, mitigation and adaptation to river floods and coastal erosion, and climate finance.

On an institutional level, the CCC spearheads action on climate change under the Climate Change Act 2008, which primarily targets power, residential, transport, business, public sector, and agriculture and forestry sectors to reduce GHG emissions through legally binding carbon pricing. In terms of policies and initiatives, the government launched eight

policies and initiatives across transport, planning and construction, and water sectors to adapt to climate change. As for mitigation, the UK's initiatives focused on decarbonizing energy supply through renewables and clean energy and energy demand through an energy-efficient built environment.

As a global leader in climate change, the UK is constantly working and reworking on climate change policy integration and development. The CCC report to Parliament 2021 suggested there is room for improvement in expanding policy and delivering climate change action, progress must encapsulate the economy, and adaptation plans must be updated to cope with the pace of climate change. Further action is required to deliver a Net Zero strategy, envisioning adaptation for future climate risks, better policy integration, publicizing climate action, and expanding international aid for climate challenges.

4.4.1.3. Malaysia

In Malaysia, climate-related challenges stem from its geographical context as a tropical peninsula, diverse topography and land cover, a long coastline, and more than half of Malaysia is covered in forests. As a federal state, Malaysia ratified the Kyoto Protocol and the Paris Agreement with a commitment to develop a policy framework that reduces GHG emissions, allows economic growth, and adapts and mitigates climate change impacts. Climate change in Malaysia is central to legislative integration regarding the natural and the built environment. Climate action in Malaysia revolves around adaptation and mitigation to manage vulnerability and resilience simultaneously. Mitigation is tailored to industry, finance, and trade to reduce emissions and promote eco-friendly technologies, green finance, and investment. Adaptation is steered towards three aspects: resources, the economy, and society, to build climate resilience and resistant development.

Regarding urban development, climate change action in Malaysia is an integral part of the FDTCP policy framework. The NPP recognized the necessity of achieving economic growth in an eco-friendly, climate-conscious fashion. As a result, the NUP promoted a resilient built environment to floods, UHIs, rising sea levels, water, and energy efficiency. Through mitigation and adaptation, Malaysia embedded climate change national goals into urban development by promoting TOD, efficient transport system, green building initiatives, smart homes, and eco-friendly living environments to mitigate climate change.

For adaptation, Malaysia leveraged natural resources to enhance physical planning and development policies, promoted compact development, retrofitted and utilized existing infrastructure and utilities, and enacted land use planning appraisal for risk areas.

4.4.2. Similarities and differences in the role of community engagement in climate change policy and action

Community engagement has become essential to policy development and action, including climate change policy and action. The UAE, the UK, and Malaysia incorporate community engagement into urban development and the impact of climate change. However, similarities and differences are highlighted as follows:

- **Regulatory Framework:** The UK's legal requirements for public engagement in planning processes provide a strong foundation. While Malaysia and the UAE work to enhance community involvement, the UK's regulations provide a more established structure.
- **Awareness and Education:** The UAE prioritizes raising public awareness about climate issues due to its unique challenges. In the UK, community engagement benefits from higher levels of climate awareness, allowing for more informed discussions.
- **Local Governance:** The UK's devolved governance structure allows for decentralized decision-making, empowering local communities. Malaysia's engagement efforts may vary between regions due to differing levels of local authority capacity.
- **Participation Levels:** The extent of community participation can vary, with the UK having a more robust tradition of involving citizens in decision-making compared to the UAE and Malaysia.

4.5. Chapter Summary

The UAE's response to climate change involves balancing economic development and environmental preservation. While the country contributes rather modestly to global greenhouse gas emissions, it acknowledges its ethical responsibility to contribute to worldwide efforts in addressing climate change. This recognition stems from the

understanding that climate change is a shared global challenge requiring collaborative action from developed and developing nations.

At the heart of the UAE's ethical considerations lies the tension between pursuing rapid economic growth and ensuring the sustainability of its ecosystems. The country has experienced remarkable development, primarily driven by industries like oil, gas, and tourism. However, this growth has come with an ecological cost, as increased energy consumption and industrial activity contribute to carbon emissions and ecological degradation. Nordhaus (2019) suggested that climate change is the ultimate challenge to economic development, but balancing economic prosperity with environmental integrity becomes an ethical imperative, as failure to do so risks jeopardizing the well-being of current and future generations.

Although the UAE made remarkable commitments, efforts, initiatives, policy frameworks, and institutions, the analysis reveals gaps, mismatches, and discontinuity in climate change policy integration and implementation that require urgent intervention due to the accelerating pace of climate change. The integrated climate policy and actions of the UK and Malaysia's targeted climate policy and action emphasize the significance of integrating policy and institutional structures, exhibiting to the nation that policy is a network between the public and private sectors (Skogstad 2005). While the UAE's green growth strategy promotes innovation and diversification of economic activity and social cohesion, the climate change policy framework still lacks robust legislative integration on a national and local level. The lack of legislative and institutional integration, especially within the federal context of the UAE, will hinder climate action and lead to discontinuity across spatial and institutional scales (Bai et al., 2009). This discontinuity extends not only to policy development and implementation but to the monitoring and evaluation mechanisms Table 4.2 below provides a synthesis of the analysis and findings of the research.

Table 4.6 Analysis summary.

Country	The UAE	The UK	Malaysia
Climate change policy and governance	National legislations, vision and sub-national government are set to	National legislation that applies to sub-	National legislation that applies to sub-

	develop local initiatives and programs that adhere to t	national levels of governance	national levels of governance
Climate change policy and governance	Ratified the Kyoto Protocol, Paris Agreement– Centralized climate policy and vision on a national level – Autonomous climate action on an emirate and local level	Ratified the Kyoto Protocol and Paris Agreement– Centralized climate change policy and vision on national and local levels.	Ratified the Kyoto Protocol and Paris Agreement– Centralized climate change policy and vision on national and local levels.
Climate change and urban development practice	Prioritize mitigation and adaptation co-benefits. Adopting green growth as a lexicon for development	Proactive, regulatory and strategic coordination of mitigation (energy supply and demand) and adaptation (heat waves and drought) (Climate Change Act 2008)	Mitigation and adaptation to tropical climate-related hazards (NPP and NUP) (MNCCC)
The role of community engagement in climate change policy and action	Evolving but hindered by traditional decision-making hierarchy	Vibrant in climate-responsive urban development strategies	Localized effect varies with urbanization rates but is active in promoting climate-responsive urban development in some areas
Policy and institutional integration	Centralized, but lacks sectoral and spatial integration from federal to local levels	Centralised and highly integrated	Centralised and modestly integrated

Source: Author's Own Work (2024)

~~In the next chapter Five, Titled Conclusion and Recommendations, the researcher presents the lessons learned from comparing the UAE, the UK, and Malaysia's climate change policy responses, the institutional structures, climate change policy and urban development, and the role of engagement in climate policy and action.~~

Conclusion and Recommendations .5

5.1. Conclusions

In conclusion, the research has shed light on climate change policy's complex, interconnected and cross-sectoral nature in the UAE, UK, and Malaysia. The findings have highlighted differences and similarities in how these countries embedded climate change into their urban development strategies and the role of community engagement in policy development and action.

Given its unique climatic conditions and high emissions, the UAE's climate change policy and goals are linked to the Kyoto Protocol and Paris Agreement, but the country strives to achieve economic growth and environmental sustainability through *green growth*. Regarding policy framework integration and institutional structures, the MOCCA spearheads policy development and decision-making on a national level, while each of the seven emirates is responsible for adhering to the MOCCA roadmap. With the same token, concerning climate change and urban development, the UAE leverages the co-benefits of mitigation and adaptation to address climate-related challenges. In contrast, community engagement has become pivotal in achieving successful climate-responsive urban development strategies. The UAE and the UK are leading climate change action in their respective region. Both countries strive for long-term climate planning and vision, but the UAE could learn from the UK and enhance climate action through deeper cross-sectoral integration of climate change policy. The comparison of community engagement practices across the UAE, UK, and Malaysia has illuminated these countries' diverse dynamics of community engagement. The UK's decentralized governance structure and Malaysia's multi-ethnic diversity have influenced tailored approaches to community collaboration, reflecting the importance of context-specific engagement methods. The UAE tailored the role of community engagement to raising awareness about climate-induced risks.

This research has contributed to filling gaps in understanding the nuances of urban development strategies in the face of climate change challenges. By analyzing the distinct and interconnected approaches of the UAE, UK, and Malaysia, this study offers valuable insights for policymakers, urban planners, and stakeholders. The findings can guide the

refinement of existing strategies and the formulation of more practical measures that address the multifaceted impacts of climate change and foster community ownership and resilience.

Ultimately, the research underscores the need for continuous adaptation and innovation in urban development strategies as the impacts of climate change evolve. It emphasizes that community engagement remains a cornerstone for successful implementation as a bridge between policy intentions and tangible, meaningful actions on the ground. As these countries and others worldwide continue to navigate the challenges of climate change and urbanization, the lessons drawn from this study can serve as a blueprint for more sustainable, climate-responsive urban development.

5.2. Recommendation

The research outlined in this report offers a comprehensive and timely investigation into the similarities and differences in climate change policy, institutional framework, the integration of climate change into urban development strategies, and the role of community engagement in climate change policy and action across the UAE, UK, and Malaysia. The chosen research questions are highly relevant, addressing the critical need to understand how different nations with varying climate challenges approach climate-responsive policy and action. The emphasis on community engagement as a critical factor adds depth to the study, recognizing the importance of societal involvement in driving successful implementation and feedback venue for policy development.

Given the increasing urgency of climate change and its impact on urban environments, the proposed research has the potential to yield invaluable insights for policymakers, urban planners, and stakeholders, especially in the UAE. Although climate-induced challenges are context-specific, comparing and contrasting the approaches taken by the UK and Malaysia could identify best practices, lessons learned, and innovative strategies that can be adapted across different contexts and create space for knowledge, experience, and best practice exchange.

Furthermore, the proposed research aligns with the global push for sustainable development and climate action. The findings can contribute to international discourse

and enhance our understanding of how different regions respond to climate challenges, offering potential avenues for collaboration and knowledge sharing among nations.

In conclusion, this research has the potential to contribute to climate-responsive policy development, sustainable urban development practice, climate change mitigation and adaptation, and community engagement. The outcomes can guide policy formulation, urban planning strategies, and community-oriented initiatives, ultimately contributing to more resilient and sustainable urban futures in the UAE, UK, and Malaysia. Therefore, I wholeheartedly recommend the implementation of this research proposal. It is essential to consider the following key aspects in the UAE:

- The UAE government needs to expand and enrich its policy framework across the national, emirate and local levels.
- Systematize and institutionalize policy development and implementation through the NCCAP enablers of change.
- The UAE is on track to achieve the 2050 agenda and is currently in the third phase of NCCP 2017-2050, which is monitoring and evaluating adaptation measures through an evidence-based approach; this is critical for progress. However, a centralized monitoring framework can be optimized at national, emirate, and local scales.
- The UAE needs to develop confederated metrics for compliance with climate change commitments from the national to local levels.
- Enriching the NCCAP with federal and local rules and regulations on urban development to overcome the institutional, temporal, and spatial discontinuity in policy development and implementation.
- Embedding the NCCAP on the broader policy frameworks on social, economic, and governance systems.
- The state should leverage the advent of technologies and Available platforms into community engagement through public platforms.

- Strengthening the relationship between climate change action stakeholders, the state, the private sector, and the community.

5.3. Further research

The research highlighted the similarities and differences in climate change policy frameworks, institutional structures, the integration of climate change into urban development strategies, and the role of community engagement in policy development and action. It is critical to enrich the discourse in the following aspects:

- Further investigation into effective policy integration to overcome spatial, temporal, and institutional discontinuity in policy development and implementation.
- Developing metrics for monitoring progress and evaluating policy outcomes.
- Continuous climate trend analysis and risk assessment for robust and effective adaptation, mitigation, and policy development and implementation.
- Investigate the extent of stakeholder engagement in policy development, integration, and implementation.
- Evaluate decision-making inclusivity and effectiveness by looking into the decision-making process.

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